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FINAL PILOT STUDY TECHNICAL MEMORANDUM AT SITE 16 OPERABLE UNIT 7 (OU 7)

NAS CECIL FIELD FL

8/1/2011

TETRA TECH

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PITT-08-11-081

August 25, 2011

Project 112G00746

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

Reference: CLEAN Contract No. N62467-94-D-0555
Contract Task Order 0076

Subject: Final Pilot Study Technical Memorandum at Operable Unit 7, Site 16
Naval Air Station Cecil Field
Jacksonville, Florida

Dear Mr. Sanford:

Enclosed please find one copy of the subject deliverable. Copies have been provided to the members of the NAS Cecil Field Partnering Team as noted below. The draft version of this document was approved by U.S. EPA and FDEP as submitted, therefore only the cover pages were changed in this Final submission. Based on regulatory approval of the draft version without comment, this final version is assumed to be approved as submitted; however, regulatory letters providing approval of the subject final document are requested.

If you have any questions, please call me at 412-921-8163 or Mark Jonnet at 412-921-8622.

Sincerely,

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

RFS/alk

Enclosure

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Comprehensive **L**ong-term **E**nvironmental **A**ction **N**avy

CONTRACT NUMBER N62467-04-D-0055

Pilot Study Technical Memorandum
at
Operable Unit 7, Site 16

Naval Air Station Cecil Field
Jacksonville, Florida

Contract Task Order 0076

August 2011

BRAC Program Management Office Southeast
4130 Faber Place Drive, Suite 202
North Charleston, South Carolina 29405

TETRA TECH NUS, Inc.

011012/P

PILOT STUDY TECHNICAL MEMORANDUM
AT
OPERABLE UNIT 7, SITE 16

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY CONTRACT

Submitted to:
Naval Facilities Engineering Command
Southeast
Naval Air Station Jacksonville
Jacksonville, Florida 32212-0030

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AUGUST 2011

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TABLE OF CONTENTS

SECTION		PAGE NO.
ACRONYMS		**v**
1.0	**INTRODUCTION**	**1-1**
1.1	PURPOSE OF REPORT	1-1
1.2	IN-SITU BIOREMEDIATION PILOT STUDY SCOPE AND OBJECTIVE	1-1
1.3	IN-SITU CHEMICAL OXIDATION PILOT STUDY SCOPE AND OBJECTIVE	1-1
1.4	PILOT STUDIES RESULTS	1-1
1.5	DOCUMENT ORGANIZATION	1-2
2.0	**IN-SITU BIOREMEDIATION PILOT STUDY SYSTEM DESIGN AND OPERATION**	**2-1**
2.1	BIOREMEDIATION RATIONALE	2-1
2.2	BIOREMEDIATION PROCESS DECRIPTION	2-1
2.3	WELL INSTALLATION	2-2
2.4	STARTUP/OPERATION	2-2
2.5	CHEMICAL ADDITION	2-3
2.6	FIELD SAMPLING AND MONITORING	2-4
3.0	**BIOREMEDIATION PILOT STUDY RESULTS AND DISCUSSION**	**3-1**
3.1	OPERATION OF PILOT STUDY	3-1
3.2	FIELD MEASUREMENTS	3-1
3.3	LABORATORY RESULTS	3-2
3.4	WATER LEVELS	3-2
3.5	DISCUSSION	3-2
4.0	**ISCO PILOT STUDY SYSTEM DESIGN AND OPERATION**	**4-1**
4.1	ISCO RATIONALE	4-1
4.2	ISCO PROCESS DECRIPTION	4-1
4.3	WELL INSTALLATION	4-2
4.4	STARTUP/OPERATION	4-2
4.5	CHEMICAL ADDITION	4-3
4.6	FIELD SAMPLING AND MONITORING	4-4
4.7	SUMMARY OF SYSTEM OPERATION	4-4
5.0	**ISCO PILOT STUDY RESULTS AND DISCUSSION**	**5-1**
5.1	OPERATION OF PILOT STUDY	5-1
5.2	FIELD MEASUREMENTS	5-1
5.3	LABORATORY RESULTS	5-2
5.4	DISCUSSION	5-2
6.0	**DIRECT-PUSH TECHNOLOGY INVESTIGATION**	**6-1**
6.1	BACKGROUND	6-1
6.2	DPT SAMPLING	6-1
6.3	RESULTS	6-1
7.0	**CONCLUSIONS AND RECOMMENDATIONS**	**7-2**
7.1	CONCLUSIONS	7-2
7.2	RECOMMENDATIONS	7-2
REFERENCES		**R-1**

TABLE OF CONTENTS (Continued)

APPENDICES

A OPERATOR LOG SHEETS
B LABORATORY ANALYTICAL REPORTS
C ISCO PILOT STUDY PHOTOS

TABLES

NUMBER

1-1 Evaluation of Geochemical Conditions at Site 59 and Site 16
1-2 Comparison of Geochemical Conditions at Site 59 and Site 16
2-1 Groundwater Sampling and Analysis Summary, Bioremediation Pilot Study
3-1 Summary of Operator Log Data, Bioremediation Pilot Study
3-2 Summary of Analytical Results, Bioremediation Pilot Study
4-1 Groundwater Sampling and Analysis Summary, ISCO Pilot Study
5-1 Summary of Operator Log Data, ISCO Pilot Study
5-2 Summary of Analytical Results, ISCO Pilot Study

FIGURES

NUMBER

1-1 General Location Map
1-2 Site Layout and Pilot Study Location Map
2-1 Bioremediation Pilot Study Baseline Conditions
2-2 Bioremediation Pilot Study Site Plan
2-3 Piping and Instrumentation Diagram – Bioremediation Pilot Study
2-4 Extraction Well Detail
2-5 Injection Well Detail
3-1 Dissolved Oxygen Concentrations – Bioremediation Pilot Study
3-2 ORP Values – Bioremediation Pilot Study
3-3 pH Values – Bioremediation Pilot Study
3-4 Groundwater Levels – Bioremediation Pilot Study
4-1 ISCO Pilot Study Baseline Conditions
4-2 ISCO Pilot Study Site Plan
4-3 Piping and Instrumentation Diagram – ISCO Pilot Study
5-1 Dissolved Oxygen Concentrations – ISCO Pilot Study
5-2 ORP Values – ISCO Pilot Study
5-3 pH Values – ISCO Pilot Study
5-4 Groundwater Levels – ISCO Pilot Study
5-5 TCE Contaminant Trends – ISCO Pilot Study
6-1 DPT Location Map

ACRONYMS

AIMD	Aircraft Intermediate Maintenance Department
BCT	BRAC Cleanup Team
bgs	Below ground surface
BRAC	Base Realignment and Closure
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	Constituent of Concern
CTO	Contract Task Order
DCE	Dichloroethene
DHC	Dehalococcoides
DO	Dissolved oxygen
DPT	Direct-push technology
gph	Gallons per hour
gpm	Gallons per minute
HSA	Hollow stem auger
ISCO	In-situ chemical oxidation
lb	Pound
mg/L	Milligrams per liter
mV	Millivoltz
NAS	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command Southeast
ORP	Oxidation / reduction potential
OU	Operable Unit
P&ID	Piping and instrumentation diagram
PVC	Polyvinyl chloride
TCE	Trichloroethene
TOC	Total organic carbon
TtNUS	Tetra Tech NUS, Inc.
µg/L	Micrograms per liter
VOC	Volatile organic compound
VC	Vinyl chloride

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

This Pilot Study Technical Memorandum for Operable Unit (OU) 7, Site 16 at Naval Air Station (NAS) Cecil Field, Jacksonville, Florida, has been prepared by Tetra Tech NUS, Inc. (TtNUS) 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) 0076. This report describes the activities and results of the in-situ bioremediation and in-situ chemical oxidation (ISCO) pilot studies, which were conducted to determine the feasibility and effectiveness of the technologies in addressing contaminated groundwater present at Site 16. The bioremediation pilot study was conducted from July 16, 2007 through October 30, 2007 in accordance with the Pilot Study Work Plan for In-situ Bioremediation at OU 7, Site 16, (TtNUS, 2007a). The ISCO pilot study was conducted from April 23, 2008 through July 28, 2008 in accordance with the Pilot Study Work Plan for In-situ Chemical Oxidation at OU 7, Site 16, (TtNUS, 2008). A Direct-Push Technology (DPT) investigation was also conducted after the pilot studies were completed, in order to verify that the trichloroethene (TCE) plume at Site 16 was well-delineated. The DPT investigation was completed in March 2009 in accordance with the DPT Investigation Work Plan (TtNUS, 2009).

1.2 IN-SITU BIOREMEDIATION PILOT STUDY SCOPE AND OBJECTIVE

The purpose of this pilot study was to determine the effectiveness of an in-situ remediation technology at Site 16, specifically at monitoring well CEF-016-46I. Sodium lactate and sodium bicarbonate were injected into the subsurface of Site 16 via a groundwater recirculation application to promote anaerobic degradation of Trichloroethene (TCE) and its daughter products at Site 16.

1.3 IN-SITU CHEMICAL OXIDATION PILOT STUDY SCOPE AND OBJECTIVE

The purpose of this pilot study was to determine the effectiveness of ISCO technology in reducing the concentrations of TCE and its daughter products at Site 16. The pilot study was conducted approximately 10 feet southwest of the in-situ biological stimulation conducted in the area of monitoring well CEF-016-46I. During the ISCO pilot study, hydrogen peroxide was injected into the subsurface at Site 16 via groundwater recirculation to oxidize TCE and its daughter products.

1.4 PILOT STUDIES RESULTS

In both the in-situ bioremediation pilot study and the in-situ chemical oxidation pilot study, the remediation technologies were found to be inappropriate due to the formation of precipitates within the injection wells.

The likely cause of the precipitation is the high concentration of dissolved iron within the groundwater at Site 16. As shown on Tables 1-1 and 1-2, sampling at Site 16 has revealed concentrations of dissolved iron that are much greater than Site 59.

1.5 DOCUMENT ORGANIZATION

This report describes the activities, evaluation, and conclusions and recommendations for the Site 16 Pilot Study. Section 1.0 is the introduction, which summarizes the scope and objectives of the two pilot studies and describes the document organization. Section 2.0 provides a description of the design and operation of the bioremediation pilot study system. Section 3.0 provides a discussion of laboratory results and field observations from the bioremediation pilot study. Section 4.0 provides a description of the design and the operation of the ISCO pilot study system. Section 5.0 provides a discussion of laboratory results and field observations from the ISCO pilot study. Section 6.0 describes the purpose and results of the DPT investigation that followed the completion of the pilot studies. Conclusions and recommendations from the pilot studies are discussed in Section 7.0. The appendices include information from pilot studies including: operator log sheets, a summary of the data from the operator log sheets, field geochemical parameter forms, and analytical reports.

TABLE 1-1

EVALUATION OF GEOCHEMICAL CONDITIONS AT SITE 59 AND SITE 16
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Date		2/28/1999	4/28/1999	1/28/2006	7/28/2006	7/28/2006	1/23/2007	3/6/2007
Site / Well		**Site 16 CEF-016-45/46I**				**Site 59 CEF-059-NG-12D**		
Parameters		Before Air Sparging		After Air Sparging		Before Recirculation	After Recirculation	
Total Organic Carbon (TOC)	mg/L	23.4	16.1	NA	NA	1.1	41.6	30
Ethene	µg/L	6 U	10.2	0.22	6 U	0.067	84	53
Ethane	µg/L	5.4	0.21	ND	ND	0.027	0.11	0.034
Methane	µg/L	6 U	15.1	0.65	0.62	270	1200	1400
Field CO2	mg/L	105	101	400	600	105	300	290
Field DO	mg/L	0	0.1	0	0	1	0.6	1
Field Hydrogen Sulfide (H2S)	mg/L	0	ND	0	0	ND	2	2
Field Alkalinity	mg/L	NA	104	NA	2.5U	<10	120	140
Field Ferrous Iron (Fe^{2+})	mg/L	5.1	3.3	5	5.6	0.74	0.44	0.34
Dissolved Iron	µg/L	12,200	12,500	72,400	80,700	796	115	79.4
Dissolved Manganese	µg/L	88.4	83.7	543	480	3.8	1.7	1.7
Sulfate	mg/L	16.2	ND	823	757	21.4	9.1	8.2
Chloride	mg/L	79.5	63.5	10.4	24.2	9.9	14.8	10.5
Sodium	mg/L	NA	NA	NA	NA	4.2	208	166
pH	S.U.	4.18	4.31	3.73	3.67	4.62	6.73	6.51
ORP	mV	235	246.3	161.6	231.2	78	-272.3	-239.6
Spec. Cond.	mS/cm	0.265	0.217	0.898	0.799	0.045	1.295	0.874
TCE	µg/L	719,750	978,000	682	983	2,160	0.81	28.1
1,2-Cis-DCE	µg/L	0.5 U	1130	0.5 U	0.5 U	0.5 U	58	123
1,2-Trans-DCE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.4	1.3
VC	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	75	74.1

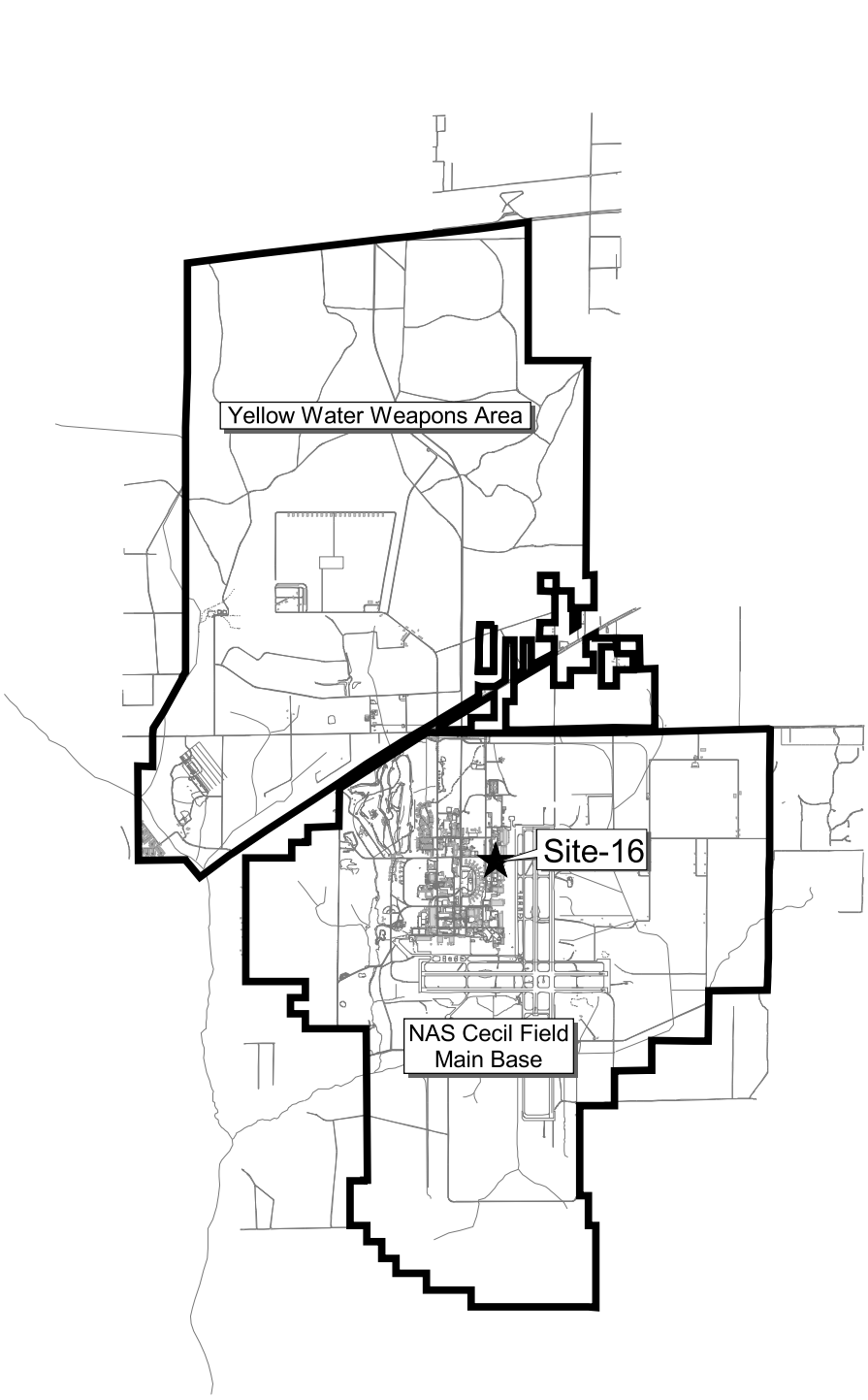
Notes:
NA - Not Analyzed
ND - Not Detected
mg/L - milligrams per liter
mS/cm - millisiemens per centimeter
mV - millivolts
µg/L - micrograms per liter
S.U. - standard units
TCE - Trichloroethane
DCE - dichloroethene
ORP - oxidation/reduction potential

TABLE 1-2

COMPARISON OF GEOCHEMICAL CONDITIONS AT SITE 16 TO SITE 59
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Parameters		Site 16 After Air Sparging	Site 59 Before Recirculation	Site 16 compared to Site 59	Comparison / Impact
Total Organic Carbon (TOC)	mg/L	NA	1.1	NA	NA
Ethene	µg/L	0.22	0.067	~ Same	Difference does not warrant any changes.
Ethane	µg/L	ND	0.027	Higher	Difference does not warrant any changes.
Methane	µg/L	0.635	270	Lower	Site 16 is more of an oxidizing environment. Site 59 was more of a reducing enviroment. Probably will need more fermentation to drive to anaerobic conditions
Field CO2	mg/L	500	105	Higher	Site 16 has a greater CO2 concentration. The greater CO2 concentration is most likely related to the low pH of the site. Site 16 will need more pH adjustment.
Field DO	mg/L	ND	1	NA	Difference does not warrant any changes.
Field Hydrogen Sulfide (H2S)	mg/L	ND	ND	NA	Difference does not warrant any changes.
Field Alkalinity	mg/L	ND	< 10	Lower	Site 16 has a lower alkalinity concentration. The lower alkalinity concentration is most likely related to the low pH of the site. Site 16 will need more pH adjustment.
Field Ferrous Iron (Fe^{2+})	mg/L	5.3	0.74	Higher	Site 16 has greater iron concentrations which may compete as an electron acceptor suggesting more lactate is required. However, The increased Iron concentration my also serve as a mineral source to support abiotic dechlorination.
Dissolved Iron	µg/L	76,550	796	Much Higher	Site 16 has greater iron concentrations which may compete as an electron acceptor suggesting more lactate is required. However, the increased Iron concentration my also serve as a mineral source to support abiotic dechlorination.
Dissolved Manganese	µg/L	511.5	3.8	Much Higher	Site 16 has greater Mn concentrations which may compete as an electron acceptor suggesting more lactate is required. However, the increased Mn concentration my also serve as a mineral source to support abiotic dechlorination.
Sulfate	mg/L	790	21.4	Much Higher	Site 16 has greater Sulfate concentrations which may compete as an electron acceptor suggesting more lactate is required. However, the increased sulfate concentration my also serve as a mineral source to support abiotic dechlorination.
Chloride	mg/L	17.3	9.9	Higher	Difference does not warrant any changes.
Sodium	mg/L	NA	4.2	Lower	NA
pH	S.U.	3.7	4.62	Lower	The lower pH at 16 will require much more pH adjustment (~ 10X).
ORP	mV	196.4	78	Higher	ORP is greater than at 59. Site 16 will need more lactate fermentation to bring ORP down.
Specific Conductivity	mS/cm	0.8485	0.045	Higher	Specific conductivity is most likely high because of the increased iron and sulfate desorption into the GW. The concentration is however still slighty less than the concectration at the end of the PS at 59.
TCE	µg/L	832.5	2,160	Lower	TCE concentration is less at 16 than at 59 which would indicate a slightly less of a demand for lactate.
1,2-Cis-DCE	µg/L	ND	ND	NA	No daugther products at either site.
1,2-Trans-DCE	µg/L	ND	ND	NA	No daugther products at either site.
VC	µg/L	ND	ND	NA	No daugther products at either site.

Notes:
NA - Not Analyzed
ND - Not Detected
mg/L - milligrams per liter
mS/cm - millisiemens per centimeter
mV - millivolts
µg/L - micrograms per liter
S.U. - standard units
TCE - Trichloroethane
DCE - dichloroethene
ORP - oxidation/reduction potential



DRAWN BY MJJ	DATE 03May07	GENERAL LOCATION MAP PILOT STUDY TECHNICAL MEMORANDUM OPERABLE UNIT 7, SITE 16 NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0076
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-1 / REV 0

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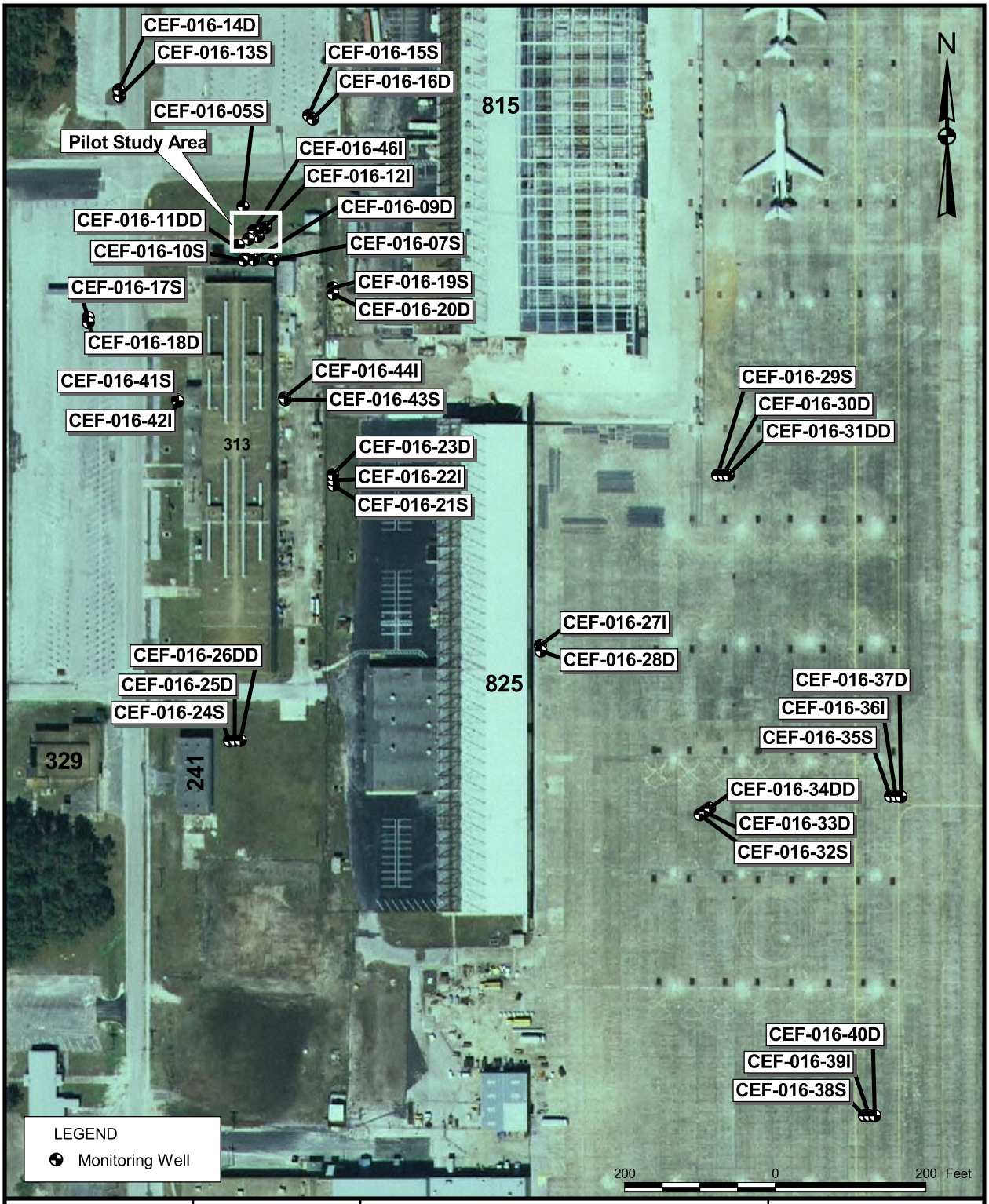

DRAWN BY MJJ	DATE 03May07	SITE LAYOUT AND PILOT STUDY LOCATION MAP PILOT STUDY TECHNICAL MEMORANDUM OPERABLE UNIT 7, SITE 16 NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0076
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-2 / REV 0

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2.0 IN-SITU BIOREMEDIATION PILOT STUDY SYSTEM DESIGN AND OPERATION

2.1 BIOREMEDIATION RATIONALE

The target mechanism of the bioremediation study was reductive dechlorination, which is one of several processes by which chlorinated volatile organic compounds (VOCs) are transformed to environmentally innocuous compounds. In the presence of the appropriate bacteria, a suitable electron donor, and favorable geochemical conditions, microbial reductive dechlorination can occur. This microbial process occurs under anaerobic (oxygen-deficient) conditions where organic carbon is fermented and produces hydrogen. In the presence of hydrogen, TCE can be reduced to dichloroethene (DCE). DCE can then be reduced to vinyl chloride (VC). Subsequently, VC can reduce to ethene or ethane and eventually to carbon dioxide, water, and chloride ions via mineralization.

The bioremediation baseline conditions for TCE, DCE, and VC at Site 16 describe the state of the contamination onsite before reductive dechlorination was initiated. These concentrations can be seen on Figure 2-1.

2.2 BIOREMEDIATION PROCESS DECRIPTION

The pilot study equipment and chemical feed systems were housed in a mobile trailer. The pilot study system consisted of the following components:

- Extraction well (EW-1).
- Extraction well pump (P-1).
- Sodium lactate feed pump (P-2) and chemical feed tank (T-1).
- Sodium carbonate feed pump (P-3) and chemical feed tank (T-2).
- Static mixer (SM-1).
- Injection well (IW-1).
- Recirculation flow meter (FQI-1 and FI-1).
- Flow control valves.
- Pressure gauges.

Groundwater was pumped from the extraction well via a submersible well pump, through a 5-micron filter, and then to the pilot study system for amendment dosing. Groundwater extraction flow rates were manually controlled by a flow control valve. Concentrated stock liquid sodium lactate was diluted with water in a chemical feed tank to a concentration of 200 grams per liter (g/L). Sodium carbonate was mixed into water in a chemical feed tank to achieve a concentration of 62.4 g/L. Sodium lactate and

sodium carbonate were injected via chemical feed pumps into the extracted groundwater and subsequently mixed through an in-line static mixer. The mixture was then conveyed to the injection well to be circulated through the system. Operation and maintenance of the system was scheduled to be conducted twice weekly and chemical solution tanks were to be refilled as needed. The target recirculation rate of the system was 3 gallons per minute (gpm). The system was constructed to treat contaminated groundwater identified at a nominal depth of 34 feet below ground surface (bgs).

Figure 2-2 shows the layout of the treatment system and the study wells. Figure 2-3 is a piping and instrumentation diagram (P&ID) of the bioremediation pilot study system.

2.3 WELL INSTALLATION

This section summarizes the well installations completed for the bioremediation pilot study. Injection well (IW-1), extraction well (EW-1), and monitoring wells (MW-1, MW-2, and MW-3) were installed for the pilot study during the week of June 11, 2007. Existing well CEF-016-46I (32 feet bgs) was also used as a monitoring well for the pilot study.

The five new wells were installed using hollow stem auger (HSA) methods. IW-1 and EW-1 were installed to a depth of 34 feet bgs with 10-foot-long 0.01-inch slotted screens. Screen and riser piping was 4-inch Schedule 40 threaded polyvinyl chloride (PVC). Monitoring wells MW-1, MW-2, and MW-3 were installed to a depth of 32 feet bgs with a 5-foot long 0.01-inch slotted screen. Screen and riser piping were 1-inch Schedule 40 threaded PVC. All wells were installed with flush-mounted casings. After installation, the wells were developed to remove fines. Details for the extraction and injection well are provided in Figures 2-4 and 2-5.

2.4 STARTUP/OPERATION

The study began with the startup of the groundwater recirculation phase on July 19, 2007. Chemical solutions were prepared and the injection wells were tested, but no chemicals were injected. After operation of the recirculation system for five days, the sodium carbonate feed pump was activated on July 24, 2007. After approximately one week of sodium carbonate addition, a precipitate formed, clogging the injection well and in-line screens. After the injection well and in-line screens were cleaned and groundwater recirculation resumed, additional situations occurred which extended the startup process for various reasons. They are noted as follows:

- August 1, 2007 to August 29, 2007 - A precipitate clogged the injection well, halting operation and the start of sodium lactate injection. The injection well was cleaned and precipitate was removed. The system was then operated in recirculation mode to clear the area around the injection well. In

addition, the flow path of the groundwater through the process equipment was reversed to attempt to clear precipitate from the subsurface surrounding the injection well.

- August 29, 2007 to September 4, 2007 – Forward recirculation flow resumed. A bleed valve was installed to reduce flow at the injection well. Sodium carbonate solution injection restarted.

- September 4, 2007 to October 8, 2007 – Sodium carbonate solution was injected at a reduced rate. Numerous system shutdowns occurred, limiting the quantity of sodium carbonate and sodium lactate solution injected and the duration of groundwater recirculation time. Precipitation at the injection well and in-line filter were the primary cause of system shutdown.

- October 8, 2007 to October 25, 2007 – The sodium lactate chemical addition was restarted. Numerous system shutdowns occurred, which limited the amount of sodium carbonate injected and the duration of groundwater recirculation time. The injection and extraction wells were washed and surged in an effort to improve flow rates. Precipitation at the injection well and in-line filter were the primary cause of system shutdowns. On October 25, 2007 the precipitated material seeped to the ground surface in the injection well area. At this time, the system was shut down indefinitely.

2.5 CHEMICAL ADDITION

The Pilot Study Work Plan for In-Situ Bioremediation (TtNUS, 2007a) described the addition of chemical amendments and the respective quantities that were to be injected to facilitate favorable conditions for reductive dechlorination; however, because the pilot study was unable to operate without forming a precipitant, these quantities were not met. The following describes the proposed and actual injection quantities of sodium lactate, sodium carbonate, and bacterial inoculum:

According to the work plan, injection of approximately 800 pounds (lbs) of sodium lactate into groundwater was initially planned during the pilot study. However, due to the many system shutdowns described in Section 2.4, approximately 145 lb of sodium lactate were injected throughout the duration of the pilot study.

According to the work plan, injection of approximately 4,000 lbs of sodium carbonate into groundwater was initially planned during the pilot study. However, due to the numerous system shutdowns described in Section 2.4, approximately 640 lbs of sodium carbonate were injected throughout the duration of the pilot study.

Dehalococcoides (DHC) bacterial inoculum was to be injected during the bioremediation pilot study, as described in the work plan. DHC injection was to occur once the following target conditions were met:

dissolved oxygen (DO) less than 0.2 milligrams per liter (mg/L), oxidation-reduction potential (ORP) less than -75 millivolts (mV), and pH between 6 and 8.5. Because the pilot study injection well clogged and numerous other system shutdowns occurred, DHC was not injected during the pilot study.

2.6 FIELD SAMPLING AND MONITORING

According to the work plan, the study wells were scheduled for a series of eight sampling events. However, because the pilot study did not progress to steady-state operation of the system, only baseline sampling was performed. Table 2-1 summarizes the samples that were collected during the baseline sampling event. Analyses of groundwater samples were performed by Accutest Laboratories. These analyses included tests for VOCs, iron, manganese, sodium, chloride, nitrate, nitrite, orthophosphate, sulfate, and total organic carbon (TOC). Since sampling events subsequent to the baseline sampling event were not performed, trends of contaminant data are not available.

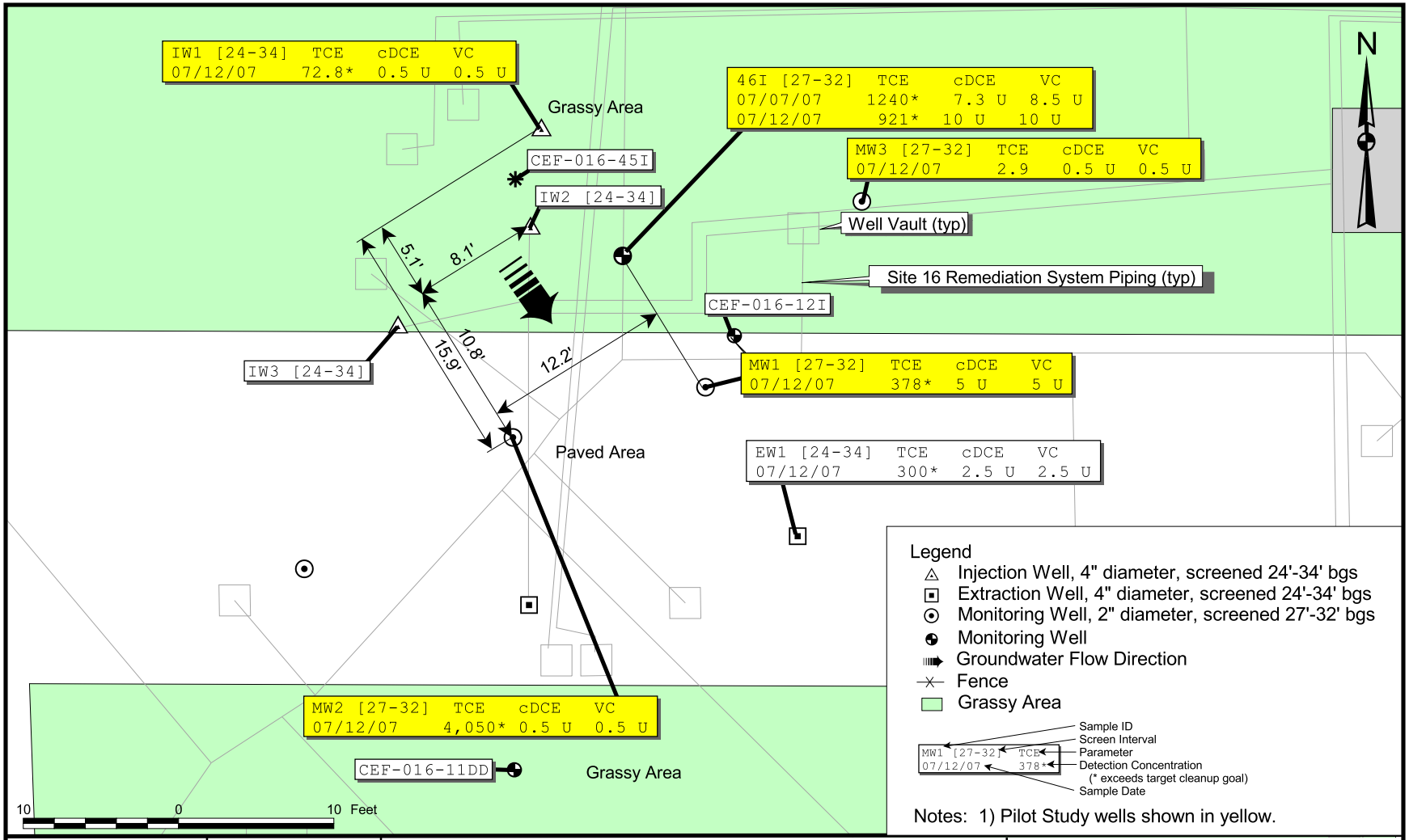
During the startup/operation effort, TtNUS personnel visited the system and a daily log sheet was filled out for each visit. The following operating information was recorded on the log sheets: groundwater elevation, pH, DO, ORP, chemical use, process pressures, and recirculation rate. Copies of the operator log sheets are included in Appendix A.

TABLE 2-1

GROUNDWATER SAMPLING AND ANALYSIS SUMMARY - BIOREMEDIATION PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	Sample Designation	LABORATORY ANALYSES								FIELD TESTS					
		Chlorinated VOCs	Dissolved Gases(1)	Iron and Manganese (Dissolved)	Sodium (Total)	Sulfide	Miscellaneous Anions(2)	Metabolic Acids(3)	TOC	Temperature	pH	Specific Conductivity	Oxidation / Reduction Potential	Dissolved Oxygen	Water Level
Event 1 - Baseline Samples - July 11 through 16, 2007															
CEF-16-EW-1	CEF-16-GW-EW-01	•	•		•					•	•	•	•	•	•
CEF-16-IW-1	CEF-GW-IW-01_20070713	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CEF-16-IW-1	CEF-16-IW-01-20070716		•							•	•	•	•	•	•
CEF-16-MW-1	CEF-16-GW-MW-1-01	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CEF-16-MW-2	CEF-16-GW-MW-2-01	•	•		•					•	•	•	•	•	•
CEF-16-MW-3	CEF-16-GW-MW-3-01	•	•		•					•	•	•	•	•	•

Notes:
1 Dissolved gases include ethane, ethene, methane, and acetylene.
2 Miscellaneous anions include chloride, fluoride, sulfide, sulfate, nitrate, nitrite, chloride, sulfate, orthophosphate.
3 Metabolic Acids include acetic, butanoic, hexanoic, i-hexanoic, i-pentanoic, lactic, pentanoic, propionic, and pyruvic acid.
TOC - total organic carbon
VOCs - volatile organic compounds.



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CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 2-1 / REV 0

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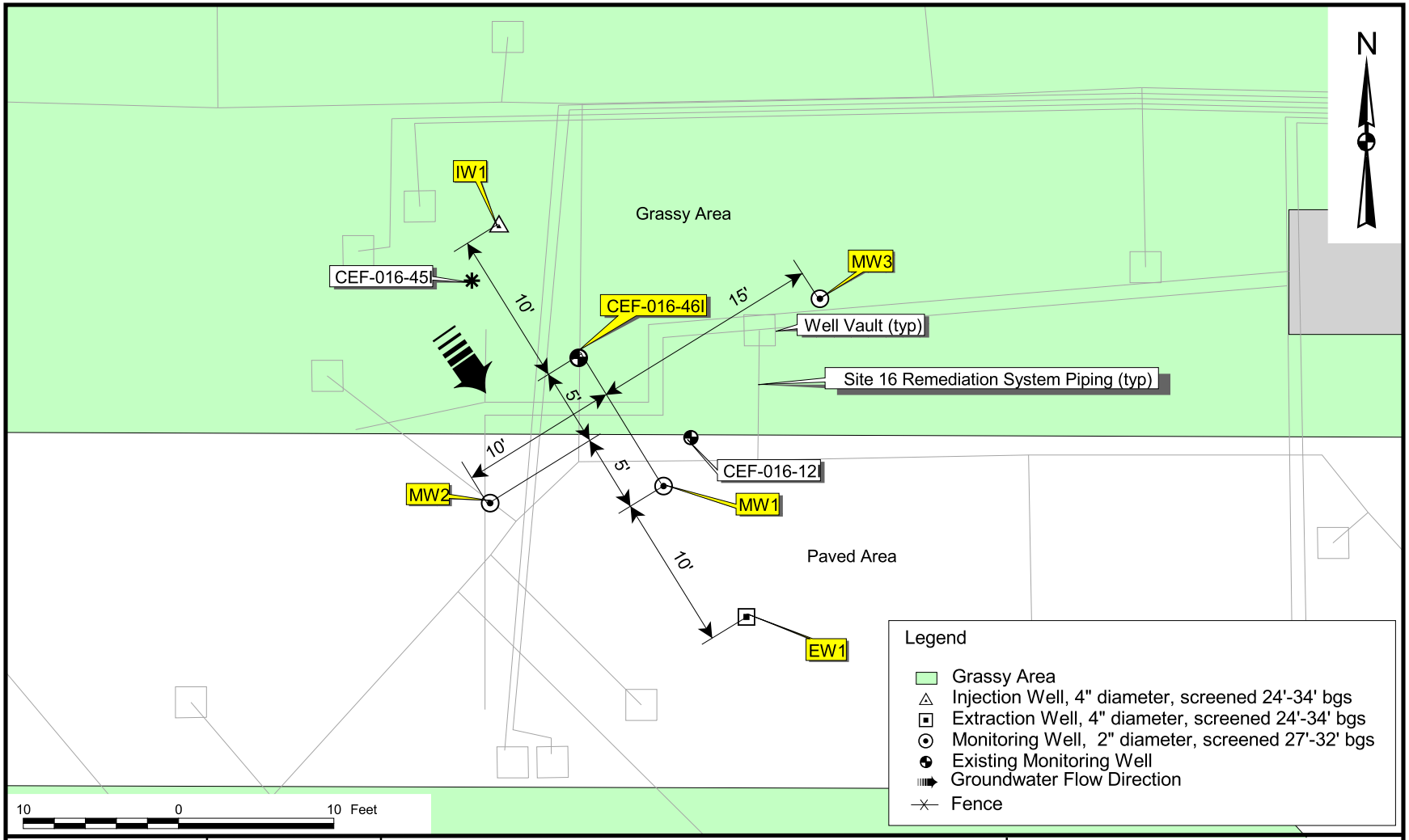

DRAWN BY MJJ	DATE 16Jun04	BIOREMEDIATION PILOT STUDY SITE PLAN PILOT STUDY TECHNICAL MEMORANDUM OPERABLE UNIT 7, SITE 16 NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0076
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-2 / REV 0

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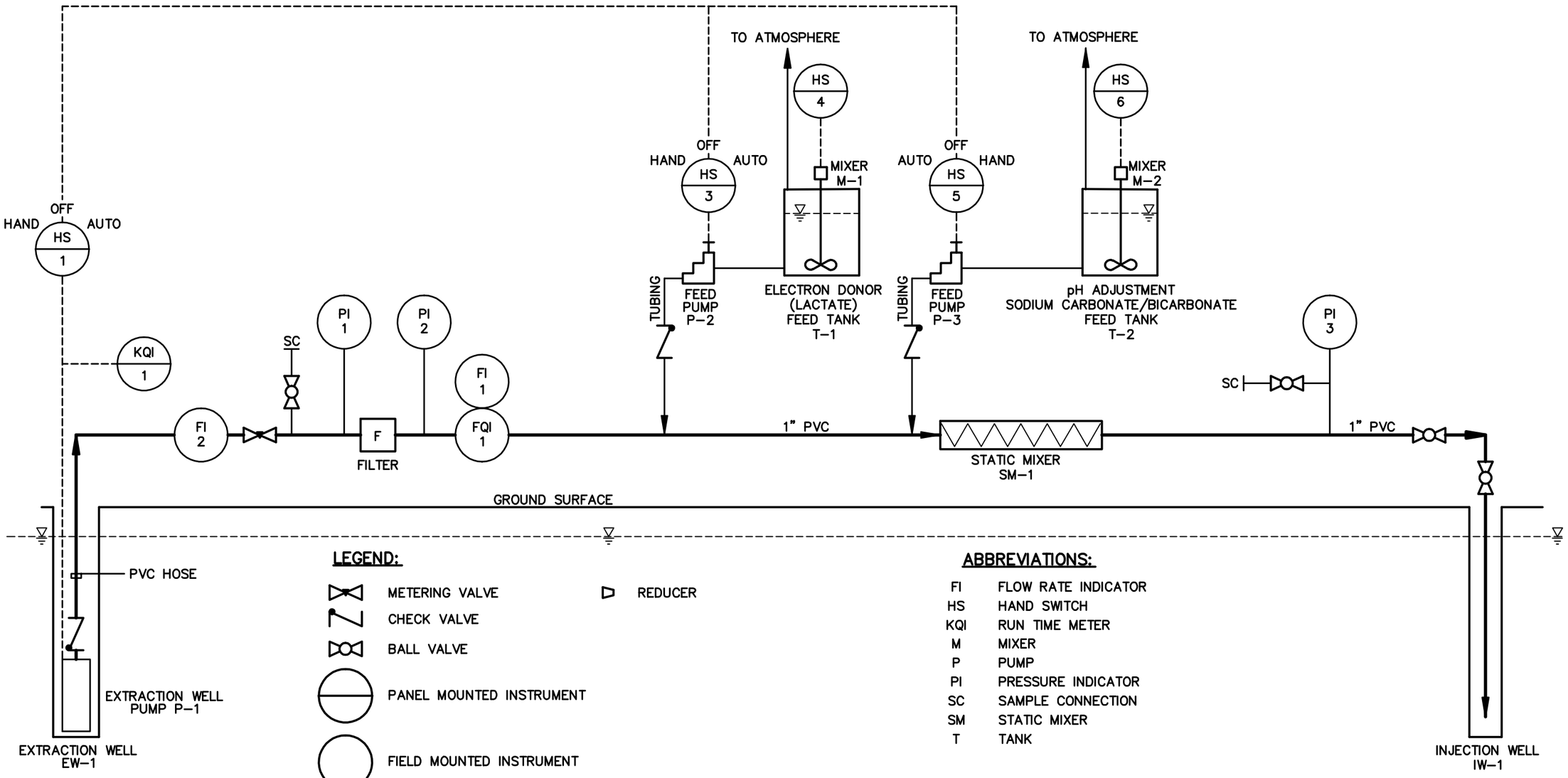

LEGEND:

- METERING VALVE
- CHECK VALVE
- BALL VALVE
- PANEL MOUNTED INSTRUMENT
- FIELD MOUNTED INSTRUMENT
- WATER LEVEL
- METERING PUMP
- ELECTRICAL CONNECTION
- REDUCER

ABBREVIATIONS:

FI	FLOW RATE INDICATOR
HS	HAND SWITCH
KQI	RUN TIME METER
M	MIXER
P	PUMP
PI	PRESSURE INDICATOR
SC	SAMPLE CONNECTION
SM	STATIC MIXER
T	TANK

DRAWN BY CK	DATE 7/13/09	BIOREMEDIATION PILOT STUDY PIPING AND INSTRUMENTATION DIAGRAM PILOT STUDY TECHNICAL MEMORANDUM OU 7, SITE 16 NAS CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0076
CHECKED BY	DATE		OWNER NO.
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-3 / REV. 0

NAVFAC

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

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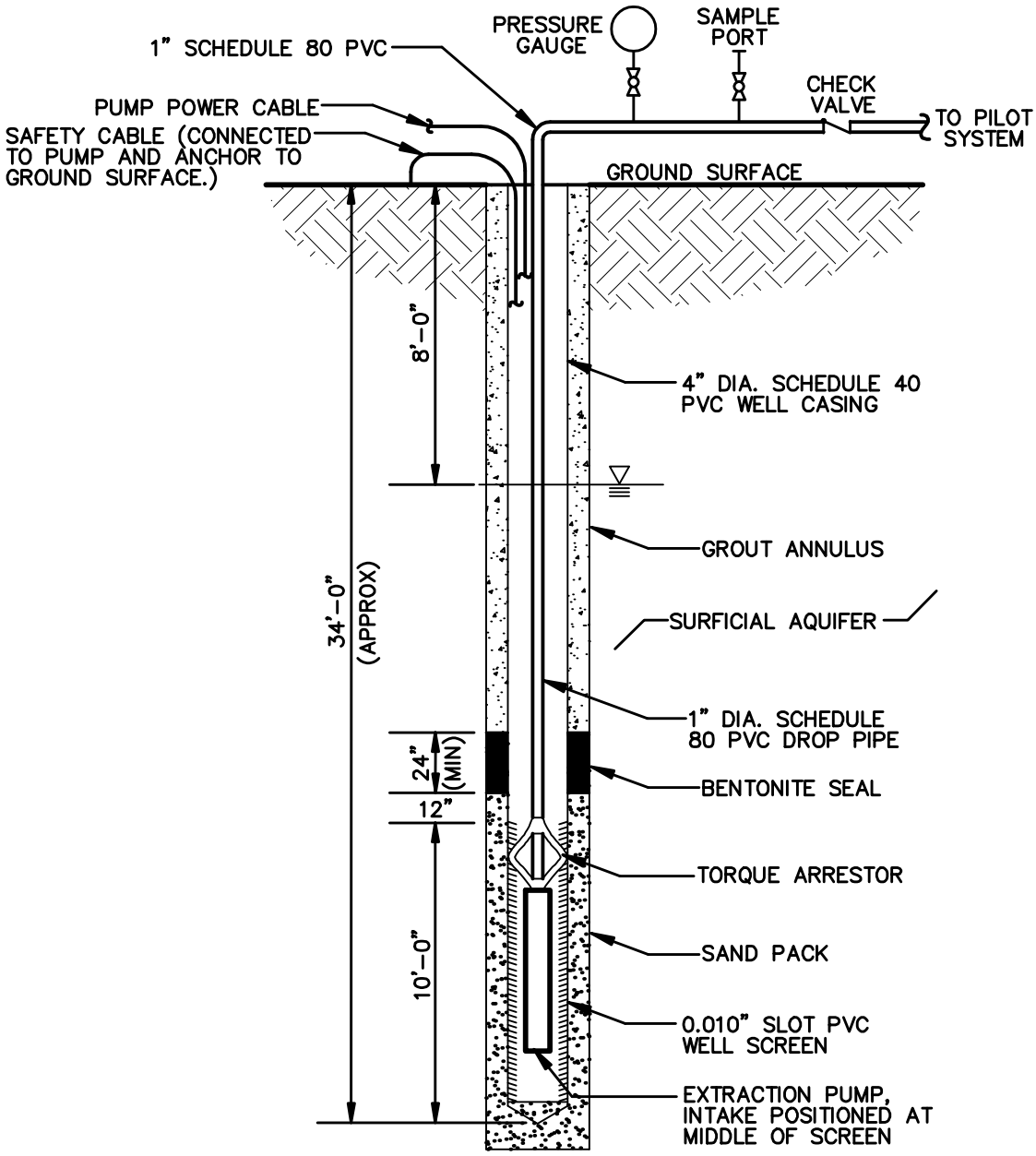
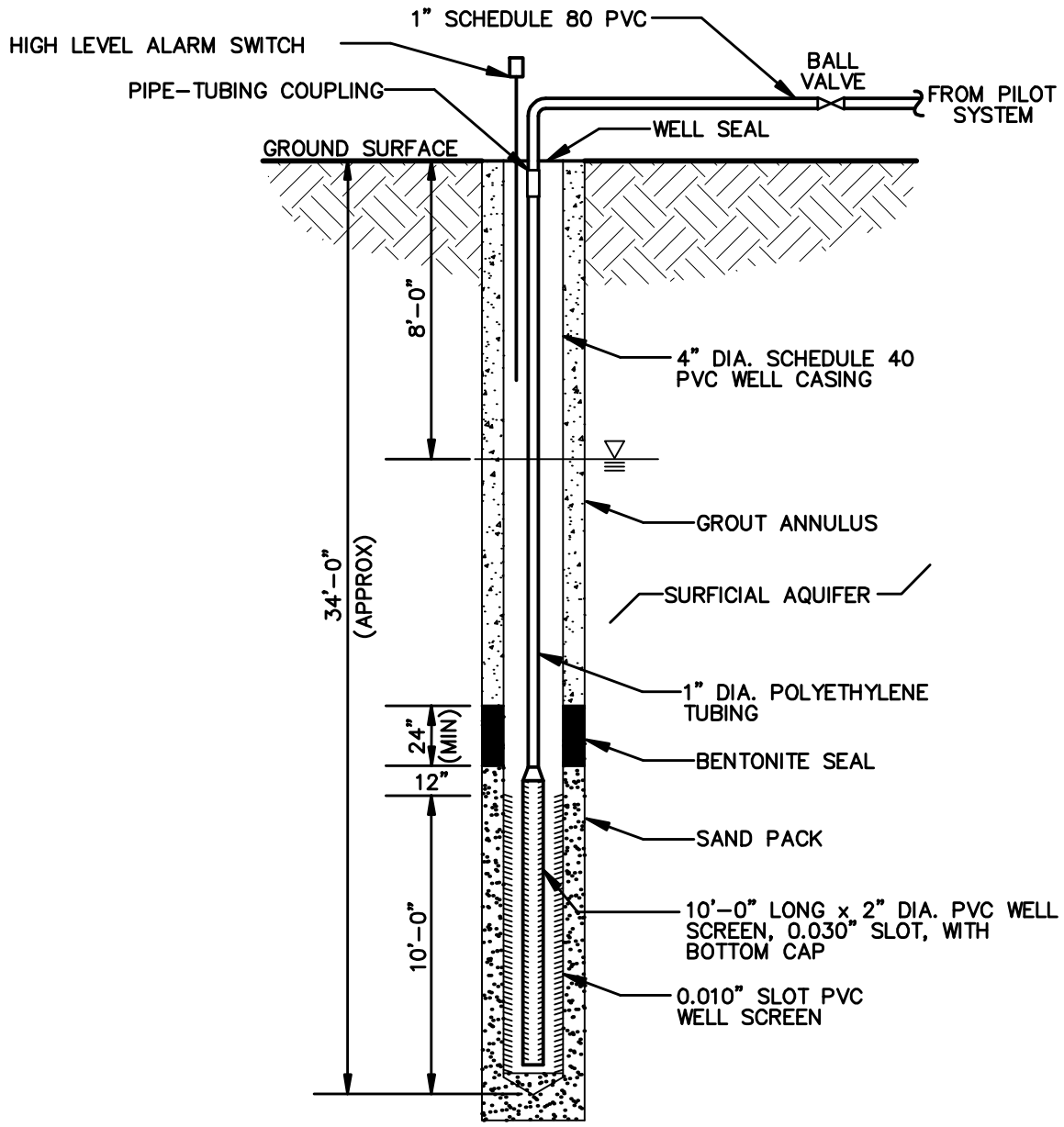


DRAWN BY CK DATE 7/13/09	NAVFAC	EXTRACTION WELL DETAIL PILOT STUDY TECHNICAL MEMORANDUM OU 7, SITE 16 NAS CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0076
CHECKED BY DATE			OWNER NO.
REVISED BY DATE			APPROVED BY DATE
SCALE NONE			DRAWING NO. FIGURE 2-4 / REV. 0

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

ACAD: 0746CD05.dwg 07/13/09 CK PIT



NOTE:
TYPICAL OF TWO.

DRAWN BY CK DATE 7/13/09	NAVFAC	INJECTION WELL DETAIL PILOT STUDY TECHNICAL MEMORANDUM OU 7, SITE 16 NAS CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0076
CHECKED BY DATE			OWNER NO.
REVISED BY DATE			APPROVED BY DATE
SCALE NONE			DRAWING NO. FIGURE 2-5 / REV. 0

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

3.0 BIOREMEDIATION PILOT STUDY RESULTS AND DISCUSSION

3.1 OPERATION OF PILOT STUDY

As mentioned in Section 2.0, the pilot study did not progress past the startup phase due to injection problems associated with fouling of the injection well and in-line filter. The groundwater recirculation system operated most effectively when no chemical amendments were added to the groundwater recirculation line. A precipitate formed after approximately one week of sodium carbonate addition, clogging the injection well and in-line screens. It is assumed that the dissolved metals present in groundwater formed insoluble precipitates after the sodium carbonate solution was added. This precipitate continued to form and foul the injection well until the pilot study operation ceased due to the difficulty in maintaining recirculation flow. Throughout the pilot study, maintenance of the in-line filters and injection well was performed to enable operation of the pilot study system.

3.2 FIELD MEASUREMENTS

Field measurements for system operation and groundwater geochemistry were recorded on the operator log sheets. Field parameters including DO, pH, and ORP were monitored to evaluate the geochemical influences of the bioremediation pilot study. These results are summarized on Table 3-1.

A plot of DO levels through the course of the study in the extraction well, injection well, and study monitoring wells is presented in Figure 3-1. Injected quantities of sodium carbonate and sodium lactate solutions were plotted on a second y-axis to compare the affects of amendment injection to DO values. DO concentrations in each well were influenced by the injection of sodium lactate solution and groundwater recirculation. DO in study wells decreased to less than 1 mg/L at the end of the study, compared to values ranging from 5.35 to 8.71 mg/L at the beginning of the study. The reduction in DO during the study indicates an anaerobic environment within the study area, which is essential for reductive dechlorination processes.

ORP observations are shown on Figure 3-2. ORP values from July 30, 2007 through August 3, 2007 decreased significantly following sodium lactate injection, indicating a reducing environment. Thereafter, ORP values fluctuated within study wells, and no trends or correlation with amendment injections were found.

Figure 3-3 shows the corresponding raise in study well pH values during the study. Study well pH values were most influenced from July 25, 2007 through July 30, 2007, when sodium carbonate injection raised

the pH in study wells. Following initial increases, pH values returned near the initial respective values once carbonate addition ceased.

3.3 LABORATORY RESULTS

Groundwater monitoring events were not performed subsequent to the July 13, 2007 baseline sampling event because of the difficulties in operating the system. Because of the limited analytical data available, a trend analysis of groundwater sampling results was not performed. The results from the baseline sampling event are summarized in Table 3-2. Laboratory analytical reports are provided in Appendix B.

3.4 WATER LEVELS

Depth to groundwater measurements were collected from extraction well EW-1, injection well IW-1, and study monitoring wells MW-1, MW-2, MW-3, and MW-46I. The data is included in Table 3-1 and plotted on Figure 3-4. The water level elevations were examined for the effects of draw-down and mounding as a result of the groundwater extraction and injection process.

3.5 DISCUSSION

The precipitate that formed during the pilot study did not allow for the intended operation of the pilot study system. The precipitate frequently fouled the area around the injection well and the in-line filters of the pilot study recirculation system. The high levels of dissolved iron in extracted groundwater and at the injection well were likely the primary contributors to the formation of precipitates. It is believed the addition of sodium carbonate solution temporarily raised the pH of groundwater enough to cause metals to precipitate. The metals precipitated to the point where the precipitate negatively impacted the performance of the pilot study and it was not feasible to continue operations.

TABLE 3-1

SUMMARY OF OPERATOR LOG DATA - BIOREMEDIATION PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Date		7/20/2007	7/23/2007	7/25/2007	7/27/2007	7/30/2007	8/1/2007	8/2/2007	8/3/2007	8/6/2007	8/8/2007	8/10/2007	8/13/2007	8/15/2007	8/17/2007	8/20/2007	8/22/2007	8/24/2007	8/27/2007	8/29/2007	9/7/2007
EW-1	**Units**																				
Depth to Water	feet	9.02	9.02	9.34	9.04	9.03	8.60	--	8.34	8.78	10.21	9.02	9.04	9.12	8.81	8.64	8.84	9.08	10.11	9.86	8.59
Dissolved Oxygen	mg/L	6.71	5.98	3.86	6.18	5.91	0.32	0.1	2.03	0.29	0.55	0.26	0.24	0.39	0.26	--	0.26	0.95	0.24	0.26	0.53
pH	S.U.	3.15	3.15	3.99	6.99	3.61	3.49	--	3.43	3.36	3.41	3.44	3.42	3.52	3.41	--	3.58	3.49	3.4	3.38	4.26
Oxidation/Reduction Potential	mV	316.5	320.1	320	320.3	349.1	278.2	--	-14.4	309.4	308.5	323.4	322.1	328	323.4	--	316.8	293.6	320.6	323.4	282.1
Specific Conductivity	uS/cm	1.109	1.111	1.899	1.111	1.109	0.754	--	1.177	0.858	1.017	1.211	1.224	0.851	1.222	--	1.028	1.07	1.219	1.224	1.538
IW-1	**Units**	--																			
Depth to Water	feet	9.60	9.59	8.99	9.62	9.59	8.10	8.99	8.69	8.67	8.13	9.10	9.11	8.95	8.74	9.38	9.80	10.04	9.99	9.84	8.40
Dissolved Oxygen	mg/L	5.35	6.01	4.88	4.1	5.54	0.48	0.4	1.49	0.3	1.81	1.86	1.6	0.89	1.31	--	0.27	1.18	1.19	0.94	1.19
pH	S.U.	3.23	3.25	5.99	5.96	6.99	3.84	--	3.61	3.64	3.18	3.39	3.36	3.86	3.39	--	3.82	3.73	3.43	3.39	3.48
Oxidation/Reduction Potential	mV	358.7	360.4	345.7	360.7	350.9	272	--	19.7	306.6	345.6	316.6	319.4	308.5	321.8	--	280.6	307.6	323.4	326.3	386.4
Specific Conductivity	uS/cm	1.433	1.501	1.410	1.429	1.421	1.035	--	1.245	0.987	1.910	1.141	1.139	1.120	1.136	--	1.203	1.148	1.143	1.146	1.228
MW-46I	**Units**	--																			
Depth to Water	feet	9.31	9.30	9.51	9.33	9.30	8.47	--	8.63	8.21	8.22	8.96	8.94	8.27	8.10	8.47	8.53	8.54	8.60	8.61	8.73
Dissolved Oxygen	mg/L	8.8	6.91	3.01	3.21	6.1	0.28	--	2.38	0.18	1.04	0.99	0.8	0.7	0.36	1.69	0.13	1.04	0.29	0.24	0.2
pH	S.U.	4.04	3.98	3.89	4.55	4	3.93	--	3.18	3.24	3.62	3.18	3.21	3.69	3.73	3.16	3.24	3.07	3.21	3.18	3.73
Oxidation/Reduction Potential	mV	317	350.6	320.8	320.2	321	153.9	--	144.7	391	336.3	323.1	326.2	288.9	325.5	368.3	453	426.2	316.1	321.2	323.5
Specific Conductivity	uS/cm	0.218	0.222	0.220	0.222	0.216	0.629	--	0.693	0.692	1.161	1.122	1.126	1.337	1.130	0.844	1.040	1.208	1.128	1.133	1.221
MW-1	**Units**	--																			
Depth to Water	feet	9.25	9.23	9.48	9.25	9.24	8.60	--	8.82	8.75	8.68	8.98	8.80	8.60	8.81	8.64	8.90	8.86	9.08	9.07	8.61
Dissolved Oxygen	mg/L	5.94	6.01	5.01	3.63	5.46	0.2	0.4	0.42	0.27	1.06	1.04	0.89	0.35	0.42	6.18	0.07	0.89	0.31	0.36	0.51
pH	S.U.	3.24	3.26	3.31	5.51	3.01	3.21	--	3.95	3.21	3.15	3.51	3.48	3.3	3.46	3.5	3.05	3.05	3.42	3.43	3.84
Oxidation/Reduction Potential	mV	402.8	361.6	386.6	333.1	366	272.1	--	25.9	326	409.8	399.5	404.3	364.7	399.8	367.6	459.8	414.8	369.6	366.4	353.5
Specific Conductivity	uS/cm	1.240	1.250	1.238	1.300	1.221	1.896	--	1.004	1.596	1.222	1.222	1.218	0.907	1.221	1.333	1.549	1.738	1.222	1.220	0.467
MW-2	**Units**	--																			
Depth to Water	feet	8.58	8.56	8.80	8.59	8.56	8.35	8.32	8.80	8.22	8.35	8.81	8.80	8.27	8.33	8.39	8.53	8.55	8.68	8.66	8.66
Dissolved Oxygen	mg/L	6.52	6.36	4.32	4.01	5.92	0.72	--	1.71	0.25	0.99	0.98	0.76	0.46	0.27	--	0.25	0.94	0.24	0.18	0.62
pH	S.U.	4.04	3.99	3.99	5.58	3.99	4.18	--	3.41	3.97	3.23	3.68	3.63	3.79	3.61	--	3.49	3.19	3.51	3.26	3.08
Oxidation/Reduction Potential	mV	324.4	343.3	314.2	340.4	343	221.2	--	124.6	389.2	355.6	354.1	368.3	288.9	371.6	--	426.8	421.9	363.2	365.4	421
Specific Conductivity	uS/cm	0.125	0.130	0.128	0.130	0.122	0.158	--	0.128	0.534	0.818	0.820	0.809	0.097	0.802	--	1.007	1.074	0.816	0.824	1.145
MW-3	**Units**	--																			
Depth to Water	feet	8.75	8.73	9.00	8.76	8.74	8.75	--	8.53	8.70	8.90	8.82	8.82	8.72	8.80	8.93	9.00	9.00	9.11	9.10	8.99
Dissolved Oxygen	mg/L	8.71	6.76	6.04	2.68	7.01	1.61	0.7	0.69	0.47	1.27	1.48	1.23	0.34	0.91	2.62	3.11	1.27	0.69	0.61	0.31
pH	S.U.	3.64	3.81	3.51	5.21	3.3	3.54	--	3.36	3.35	3.19	3.39	3.37	3.66	3.4	3.28	3.57	3.95	3.36	3.31	3.73
Oxidation/Reduction Potential	mV	321.3	351.3	330.3	318.6	331	166.4	--	111.9	394.4	386.4	379.4	371.4	300.5	373.3	404.2	389.4	290.3	370.4	373.3	370.5
Specific Conductivity	uS/cm	1.360	1.440	1.358	1.352	1.371	0.737	--	1.321	0.468	1.370	1.369	1.358	1.420	1.361	0.539	0.706	0.851	1.351	1.362	1.112
System Parameters																					
Groundwater temperature	ºC	25.67	25.76	27.69	27.87	24.78	24.81	--	24.68	25.4	25.19	25.18	25.23	26.3	25.21	--	24.58	24.73	25.3	25.23	28.26
Extraction Well Rate	gpm	3.5	3.0	3.0	3.0	3.0	3.0	0 / 3.0	3.1	3.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.2	3.0	3.0	1.3
Run meter (start of day)	hours	7468	7525.6	7574.2	7618	7691.6	7735.9	7756.5	7781	7847.2	7896.6	7940.8	7952.7	7984.7	8030.6	8100.4	8141.7	8187.2	8258.8	8259.9	8475.7
Totalizer	gal	1088900	1100000	1107100	1112800	1123100	1131200	1134700	1139100	1151400	1160800	1169300	1169800	1177800	1186700	1199612	1207190	1216049	1230200	1230200	1258600
Average Extraction Rate	gpm	--	3.21	2.43	2.17	2.33	3.05	2.83	2.99	3.10	3.17	3.21	0.70	4.17	3.23	3.08	3.06	3.25	3.29	0.00	2.19
Pressure 1 (filter influent)	psig	30+	30+	30+	30+	30+	30++	30++	30+	30+	30+	30+	30+	30+	30+	30+	30+	30+	30+	30+	12
Pressure 2 (post-filter)	psig	31	30	30	30+	30	27	30	26	28	27	27	25	27	25	27	28	32	25	40	0
Pressure 3 (effluent)	psig	30	30	27	30+	25	26	29	24	26	25	25	25	25	24	26	26.5	31	25	40	0
Chemical Tank Data																					
Tank Level, Lactate (start of day)	gal	46	40	40	40	40	46	46	46	--	--	--	--	40	40	40	45	45	40	40	--
Tank Level, Sodium Carbonate (start of day)	gal	150	20	20	70	10	150	128	128	--	--	--	--	128	128	125	125	125	130	130	100
Pump Rate, Lactate (start of day)	gph	0.4	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pump Rate, Sodium Carbonate (start of day)	gph	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0	0	0	0	0	0	0	0	0	0	0	0
Lactate Tank Refilling (solution)	gal	0	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lactate Tank Refilling (water)	gal	0	4.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sodium Carbonate Tank Refilling (solid)	lbs	0	65	62.4	41.6	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Soda Ash Tank Refilling (water)	gal	0	125	120	80	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 3-1

SUMMARY OF OPERATOR LOG DATA - BIOREMEDIATION PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Date		9/10/2007	9/12/2007	9/14/2007	9/19/2007	9/26/2007	9/28/2007	10/1/2007	10/4/2007	10/8/2007	10/12/2007	10/15/2007	10/18/2007	10/22/2007	10/25/2007	10/29/2007	10/30/2007
EW-1	**Units**																
Depth to Water	feet	8.56	8.82	8.95	--	--	8.21	8.22	7.30	6.79	5.64	6.45	5.54	7.35	6.89	--	--
Dissolved Oxygen	mg/L	0.57	2.17	2.13	0.5	--	0.71	1.57	0.78	0.45	0.38	0.87	0.32	0.31	0.34	--	--
pH	S.U.	3.56	3.53	3.47	3.52	--	3.91	3.83	3.72	3.63	3.8	3.92	3.44	3.44	3.43	--	--
Oxidation/Reduction Potential	mV	358.2	350.7	361.1	319	--	278.1	300.2	306	310.8	248.5	208	2.98	185	321	--	--
Specific Conductivity	uS/cm	1.574	1.373	0.999	0.94	--	1.217	1.131	1.086	1.007	1.276	1.284	1.028	0.917	1.161	--	--
IW-1	**Units**																
Depth to Water	feet	7.85	7.90	7.95	4.76	--	8.26	8.09	6.31	5.28	5.77	6.45	18.87	7.41	7.00	--	--
Dissolved Oxygen	mg/L	5.5	1.08	5.52	0.43	--	1.95	0.61	0.38	0.55	0.39	0.42	0.5	0.33	0.44	--	--
pH	S.U.	4.08	4.01	4	3.97	--	5.91	5.81	0.79	5.27	5.64	6.43	3.77	4.01	5.43	--	--
Oxidation/Reduction Potential	mV	373.5	291.3	298.7	295	--	8.6	-4.8	-123.5	89.9	6.8	-82	282	252	60.4	--	--
Specific Conductivity	uS/cm	1.202	1.545	1.184	1.005	--	1.697	1.648	2.138	1.393	1.693	2.341	1.045	0.959	2.035	--	--
MW-46I	**Units**																
Depth to Water	feet	8.88	8.90	8.95	9.12	--	8.53	8.53	7.62	6.35	6.48	6.70	7.76	6.97	7.07	--	--
Dissolved Oxygen	mg/L	0.9	0.71	0.58	0.41	--	0.57	0.6	0.57	0.38	0.39	0.54	0.32	0.28	0.32	--	--
pH	S.U.	3.43	2.94	2.79	2.64	--	2.81	2.84	2.65	3.56	3.62	3.69	2.64	3.54	2.64	--	--
Oxidation/Reduction Potential	mV	244.2	404.1	428.6	459	--	293.8	423.2	457.2	305.3	193.9	260	409	194	428	--	--
Specific Conductivity	uS/cm	1.289	1.663	1.207	1.253	--	1.112	1.032	1.054	1.060	1.408	1.072	1.150	1.119	1.376	--	--
MW-1	**Units**																
Depth to Water	feet	8.71	8.55	8.57	8.95	--	8.61	8.61	7.70	6.57	6.61	6.82	7.15	7.40	7.27	--	--
Dissolved Oxygen	mg/L	0.78	0.69	0.54	0.42	--	0.73	0.54	4.74	0.68	0.42	0.46	0.39	0.3	0.37	--	--
pH	S.U.	4.07	4	3.71	3.71	--	3.47	3.1	3.2	3.03	3.34	3.29	2.72	2.92	2.78	--	--
Oxidation/Reduction Potential	mV	264.2	279.9	338.8	275	--	276.6	367.3	370.1	394.2	303.3	293	366	349	384	--	--
Specific Conductivity	uS/cm	0.286	0.422	0.308	0.532	--	0.513	0.598	0.616	0.788	1.104	1.166	0.940	1.050	1.444	--	--
MW-2	**Units**																
Depth to Water	feet	8.66	8.70	8.74	9.00	--	8.43	8.45	7.49	6.30	6.43	6.61	6.79	7.02	6.97	--	--
Dissolved Oxygen	mg/L	0.67	0.69	0.7	0.38	--	0.81	0.55	0.63	0.41	0.48	0.41	0.34	0.31	0.37	--	--
pH	S.U.	3.79	3.17	3.29	3.32	--	3.15	2.89	2.85	3.73	3.73	3.68	2.69	2.74	3.74	--	--
Oxidation/Reduction Potential	mV	275.1	395	362	337	--	356.5	404.7	431.7	297.5	209.1	257	372	402	272	--	--
Specific Conductivity	uS/cm	0.805	1.206	0.794	0.711	--	0.860	0.904	0.852	0.825	1.035	1.058	1.084	1.055	1.707	--	--
MW-3	**Units**																
Depth to Water	feet	9.02	9.06	9.07	9.25	--	8.90	8.91	8.01	6.77	6.92	7.09	7.18	7.48	7.43	--	--
Dissolved Oxygen	mg/L	0.67	0.63	0.74	0.78	--	0.61	0.77	0.65	0.68	0.48	0.49	0.41	0.37	0.33	--	--
pH	S.U.	3.75	3.05	3.14	3.38	--	3.42	3.19	3.03	3.01	3.32	3.66	2.84	2.94	2.79	--	--
Oxidation/Reduction Potential	mV	287.6	387.8	398	293	--	272.3	349.4	330.9	366.7	333.1	247.3	290	331	328	--	--
Specific Conductivity	uS/cm	0.662	1.020	0.681	0.963	--	0.710	0.684	0.679	0.727	0.891	0.858	0.499	0.737	1.049	--	--
System Parameters																	
Groundwater temperature	ºC	27.06	25.91	26.63	26.68	--	27.65	26.09	27.62	27	27.43	26.87	26	25.18	25.36	--	--
Extraction Well Rate	gpm	1.2	2.7	2.3	4.3	1.2	1.2	1.1	0.3	1.5	0.9	1.2	3.0	2.3	2.2	1.2	1.2
Run meter (start of day)	hours	8543.5	8588.2	8633.7	8752.4	8783.40	8826.8	8898	8967.2	9061.1	9157.5	9226	9297.1	9388.4	9461.5	9462.3	9485.4
Totalizer	gal	1263969	1272119	1278694	1305000	1307800.00	1311079	1315449	1319915	1328837	1334150	1338800	1346600	1360000	1370400	1370500	1373200
Average Extraction Rate	gpm	1.32	3.04	2.41	3.69	1.51	1.26	1.02	1.08	1.58	0.92	1.13	1.83	2.45	2.37	2.08	1.95
Pressure 1 (filter influent)	psig	13	14	17	16	6.00	6	7	6	14	9	16	15	10	12	8	10
Pressure 2 (post-filter)	psig	4.5	14	17	12	6.00	7	7.5	6	14	9	12	14	8	10	7	6
Pressure 3 (effluent)	psig	3	12	14	0	4.00	4.5	6	4	12	7	9	11	6	5	4	5
Chemical Tank Data																	
Tank Level, Lactate (start of day)	gal	--	--	--	--	0	--	--	--	40	26	35	30	--	60	--	--
Tank Level, Sodium Carbonate (start of day)	gal	55	130	110	--	40	105	65	20	94	35	40	110	--	35	--	--
Pump Rate, Lactate (start of day)	gph	0	0	0	0	0	0	0	0	0	0.4	0.4	0.4	0.4	0.4	0.4	0
Pump Rate, Sodium Carbonate (start of day)	gph	1.6	0	0	0.8	0.8	0.8	0.3	0.6	0.6	0.6	1.6	1.6	1.6	1.6	1.6	0
Lactate Tank Refilling (solution)	gal	0	0	0	0	0	0	0	0	0	3	0	0	7.4	1.48	0	0
Lactate Tank Refilling (water)	gal	0	0	0	0	0	0	0	0	0	10	0	0	25	5	0	0
Sodium Carbonate Tank Refilling (solid)	lbs	47	0	0	0	46.8	0	0	67	0	60	57.2	20	57	46.8	0	0
Soda Ash Tank Refilling (water)	gal	90	0	0	0	110	0	0	130	0	115	110	40	110	90	0	

Notes:
mg/L - miligrams per liter
S.U. - standard units
mV - millivolts
µS/cm - microsiemens per centimeter
ºC - degree Celcius
DTW - depth to water
gph - gallons per hour
gpm - gallons per minute
psig - pounds per square inch, gauge
gal - gallons
lb - pound

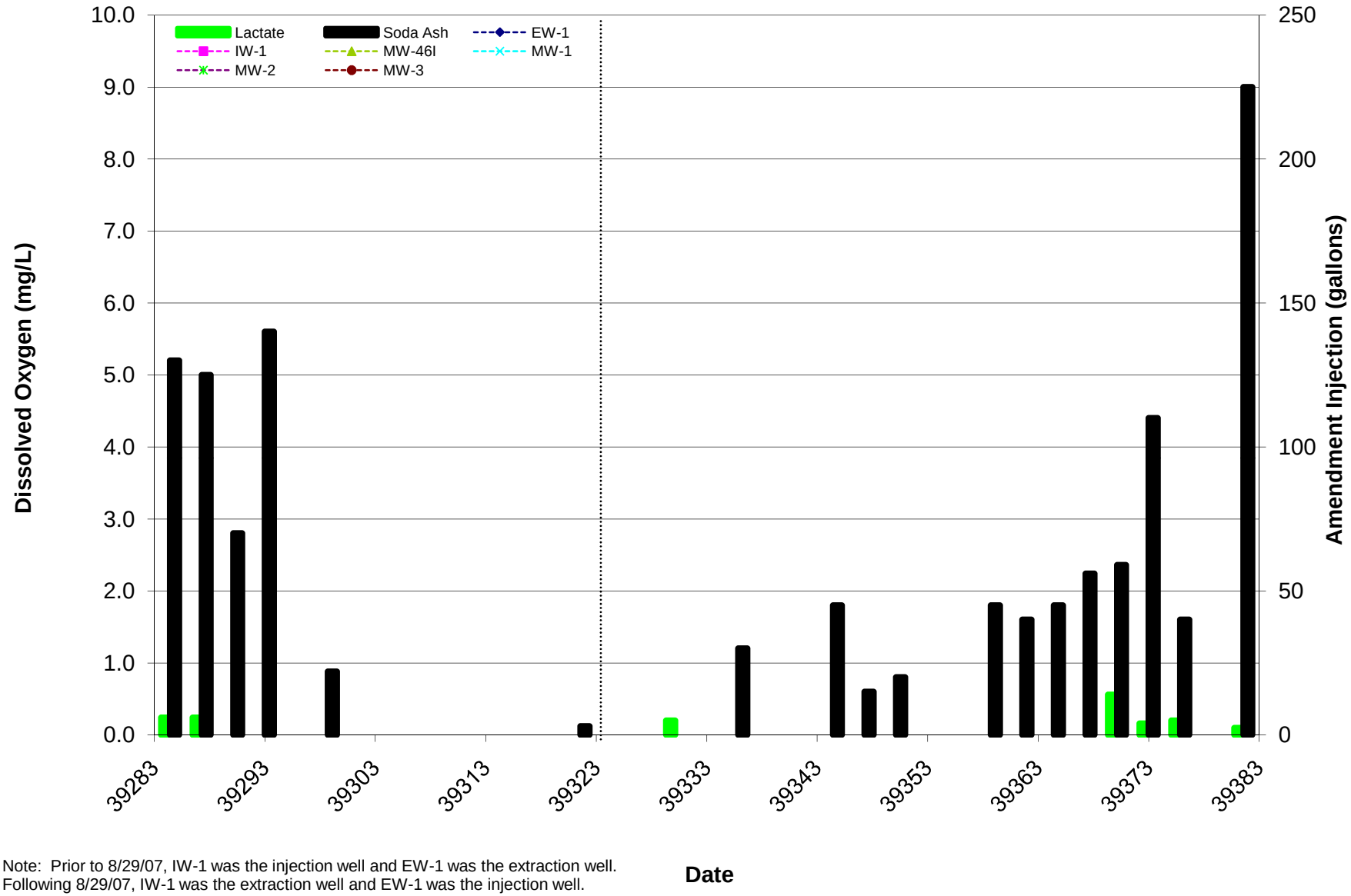
TABLE 3-2

SUMMARY OF ANALYTICAL RESULTS - BIOREMEDIATION PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

SAMPLE LOCATION SAMPLE DATE	CEF-016-EW-01 7/11/2007	CEF-016-IW-01 7/13/2007	CEF-016-IW-01 7/16/2007	CEF-016-MW-01 7/12/2007	CEF-016-MW-02 7/12/2007	CEF-016-MW-03 7/12/2007
Volatile Organics (ug/L)						
1,1,1-TRICHLOROETHANE	2.5 U	0.5 U	NA	5 U	54.7 J	0.5 U
1,1,2,2-TETRACHLOROETHANE	2 U	0.4 U	NA	4 U	40 U	0.4 U
1,1,2-TRICHLOROETHANE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
1,1-DICHLOROETHANE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
1,1-DICHLOROETHENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
1,2-DICHLOROETHANE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
1,2-DICHLOROPROPANE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
2-BUTANONE	13 U	2.5 U	NA	25 U	250 U	2.5 U
2-HEXANONE	13 U	2.5 U	NA	25 U	250 U	2.5 U
4-METHYL-2-PENTANONE	13 U	2.5 U	NA	25 U	250 U	2.5 U
ACETONE	25 U	9 J	NA	50 U	500 U	17.8 J
BENZENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
BROMODICHLOROMETHANE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
BROMOFORM	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
BROMOMETHANE	5 U	1 U	NA	10 U	100 U	1 U
CARBON DISULFIDE	5 U	1 U	NA	10 U	100 U	1.1 J
CARBON TETRACHLORIDE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
CHLOROBENZENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
CHLORODIBROMOMETHANE	2 U	0.4 U	NA	4 U	40 U	0.4 U
CHLOROETHANE	5 U	1 U	NA	10 U	100 U	1 U
CHLOROFORM	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
CHLOROMETHANE	5 U	1 U	NA	10 U	100 U	1 U
CIS-1,2-DICHLOROETHENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
CIS-1,3-DICHLOROPROPENE	1.5 U	0.3 U	NA	3 U	30 U	0.3 U
ETHYLBENZENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
METHYLENE CHLORIDE	5.9 J	1 U	NA	10 U	100 U	1 U
STYRENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
TETRACHLOROETHENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
TOLUENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
TOTAL XYLENES	5 U	1 U	NA	10 U	100 U	1 U
TRANS-1,2-DICHLOROETHENE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	1.5 U	0.3 U	NA	3 U	30 U	0.3 U
TRICHLOROETHENE	300	72.8	NA	378	4050	2.9
VINYL CHLORIDE	2.5 U	0.5 U	NA	5 U	50 U	0.5 U
Volatile Organic Gasses (ug/L)						
ETHANE	0.02 J	0.036	0.027	0.021 J	0.11	0.021 J
ETHENE	0.03	0.24	0.22	0.12	0.58	0.035
METHANE	1.3	15	14	4.1	1.4	2.1
Inorganics (ug/L)						
SODIUM	6470	4250	NA	7480	3030	15500
Filtered Inorganics (ug/L)						
IRON	NA	12200	NA	125000	NA	NA
MANGANESE	NA	37.3	NA	851	NA	NA
Miscellaneous Parameters (mg/L)						
ACETIC ACID	NA	0.07 U	NA	0.07 U	NA	NA
ACETYLENE	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
BUTANOIC ACID	NA	0.07 U	NA	0.07 U	NA	NA
CHLORIDE	NA	12.4	NA	29.1	NA	NA
FLUORIDE	NA	0.1 U	NA	10 U	NA	NA
HEXANOIC ACID	NA	0.1 U	NA	0.1 U	NA	NA
I-HEXANOIC ACID	NA	0.1 U	NA	0.1 U	NA	NA
I-PENTANOIC ACID	NA	0.07 U	NA	0.07 U	NA	NA
LACTIC ACID	NA	0.11	NA	0.1 J	NA	NA
NITRATE-N	NA	0.05 UJ	NA	0.05 UR	NA	NA
NITRITE-N	NA	0.05 UJ	NA	0.05 UR	NA	NA
ORTHOPHOSPHATE	NA	NA	NA	0.034 J	NA	NA
ORTHOPHOSPHATE-P	NA	0.046 J	NA		NA	NA
PENTANOIC ACID	NA	0.07 U	NA	0.07 U	NA	NA
PROPIONIC ACID	NA	0.07 U	NA	0.07 U	NA	NA
PYRUVIC ACID	NA	0.07 U	NA	0.07 U	NA	NA
SULFATE	NA	119	NA	2400	NA	NA
SULFIDE	NA	1.6	NA	3.1	NA	NA
TOTAL ORGANIC CARBON	NA	4	NA	12.1	NA	NA

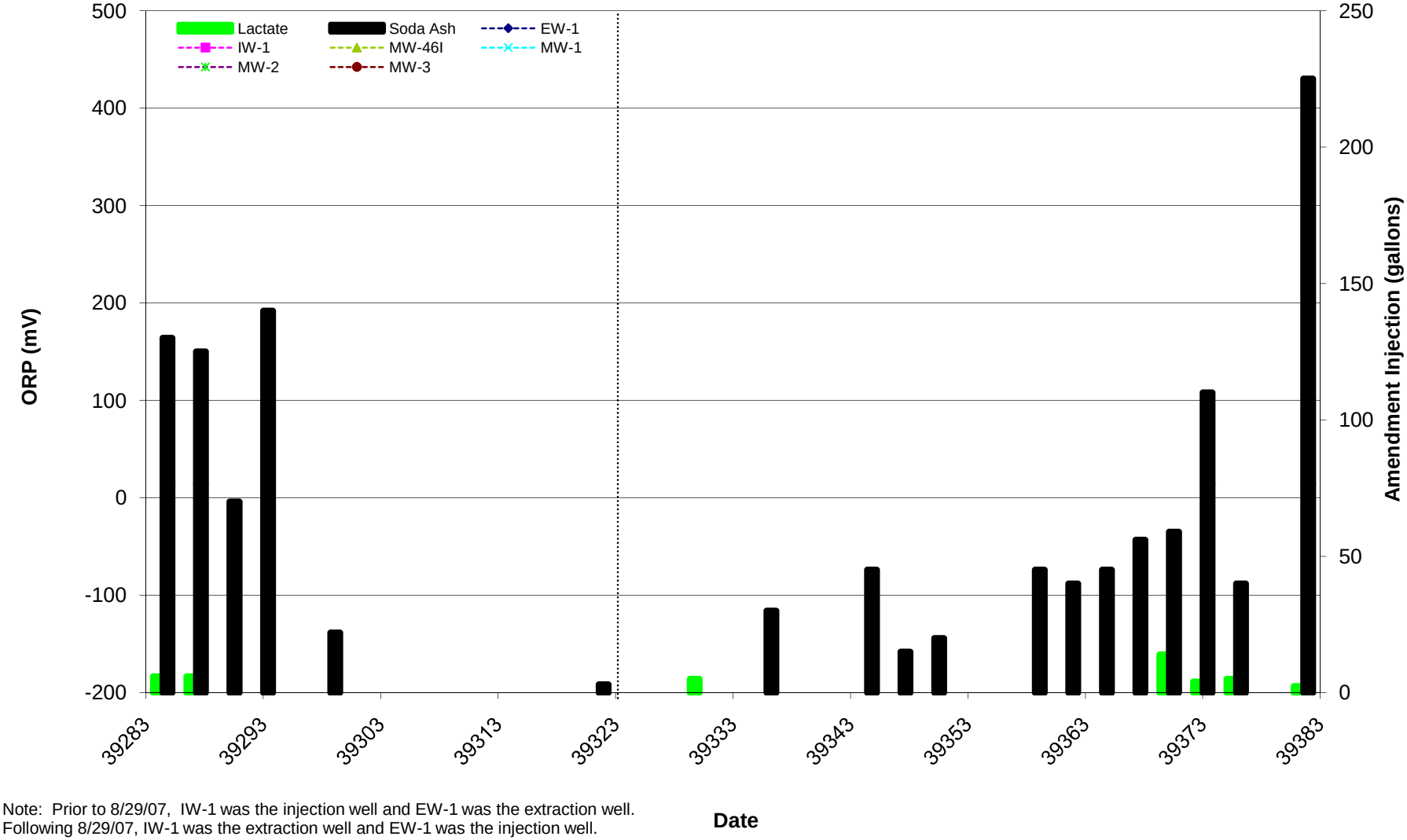
Notes:
J - estimated
U - not dected at detection limit shown
NA - not analyzed
µg/L - micrograms per liter
mg/L - milligrams per liter

FIGURE 3-1
DISSOLVED OXYGEN CONCENTRATIONS - BIOREMEDIATION PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA



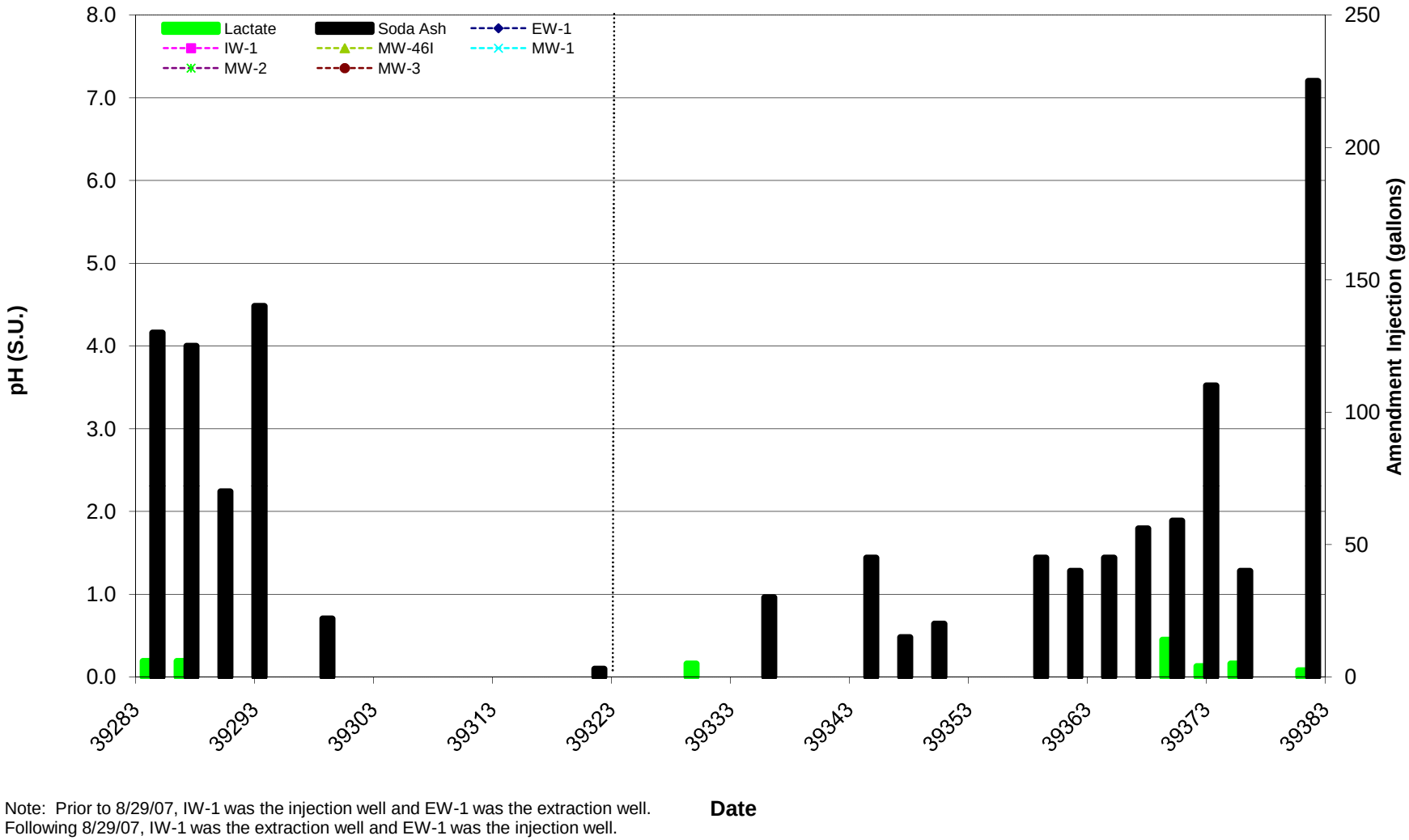
Note: Prior to 8/29/07, IW-1 was the injection well and EW-1 was the extraction well.
Following 8/29/07, IW-1 was the extraction well and EW-1 was the injection well.

FIGURE 3-2
ORP VALUES - BIOREMEDIATION PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA



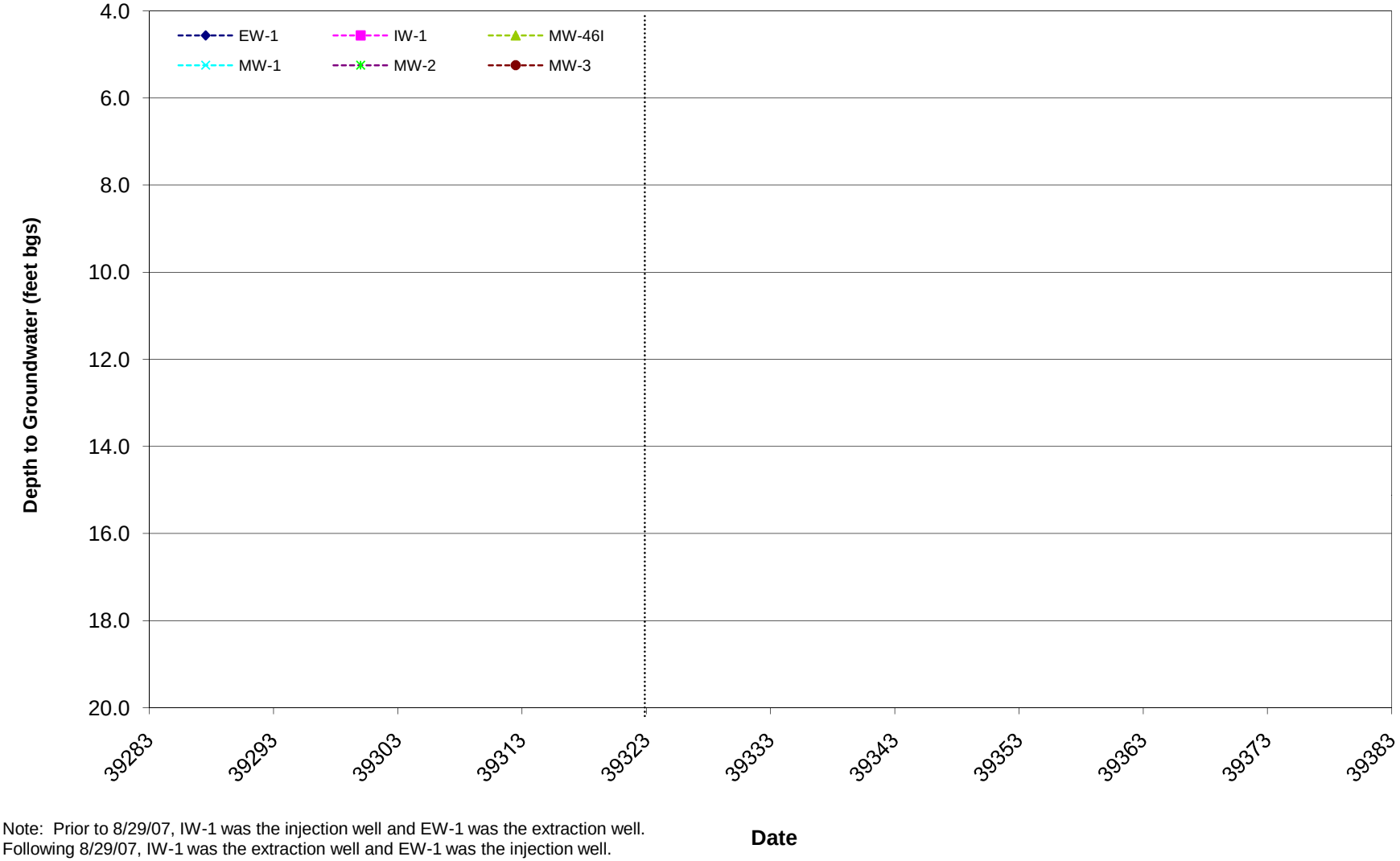
Note: Prior to 8/29/07, IW-1 was the injection well and EW-1 was the extraction well.
Following 8/29/07, IW-1 was the extraction well and EW-1 was the injection well.

FIGURE 3-3
pH VALUES - BIOREMEDIATION PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA



Note: Prior to 8/29/07, IW-1 was the injection well and EW-1 was the extraction well.
Following 8/29/07, IW-1 was the extraction well and EW-1 was the injection well.

FIGURE 3-4
GROUNDWATER LEVELS - BIOREMEDIATION PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA



Note: Prior to 8/29/07, IW-1 was the injection well and EW-1 was the extraction well.
Following 8/29/07, IW-1 was the extraction well and EW-1 was the injection well.

4.0 ISCO PILOT STUDY SYSTEM DESIGN AND OPERATION

4.1 ISCO RATIONALE

The general approach of the ISCO pilot study was to oxidize site constituents of concern (COCs) using hydrogen peroxide injection via a groundwater recirculation application. ISCO was to occur using the interaction of the injected hydrogen peroxide and the soluble iron within the site groundwater. The ISCO-baseline conditions for TCE, DCE, and VC at Site 16 describe the state of the contamination on-site after the bioremediation pilot study was abandoned, but before the startup of the ISCO pilot study system. These concentrations are shown on Figure 4-1.

4.2 ISCO PROCESS DECRIPTION

The pilot study equipment and chemical feed systems were housed in a mobile trailer. The pilot study system consisted of the following components:

- Extraction well (EW-2).
- Extraction well pump (P-1).
- Hydrogen peroxide feed pump (P-2) and chemical feed tank (T-1).
- Static mixer (SM-1).
- Injection wells (IW-2 and IW-3).
- Recirculation flow meter (FQI-1 and FI-1).
- Flow control valves.
- Pressure gauges.

Figure 4-2 shows the layout of the treatment system and the study wells. Figure 4-3 is a P&ID of the ISCO pilot study system.

Groundwater was pumped from extraction well EW-2 to the pilot study mobile trailer by an electric submersible pump. The groundwater extraction flow rate was manually controlled by a globe valve. A cartridge filter and sampling port were located after the globe valve. A 5-micron disposable filter element was used to capture particles from the extraction well to minimize plugging in the injection wells. The filter elements were replaced periodically when the pressure gauges located upstream and downstream of the filter indicated a large pressure drop because of particle buildup. A totalizer was used to measure the volume of groundwater extracted and was used as a basis for manual adjustments of the control valves based on flow rate. Flow rates were calculated by monitoring the volume of groundwater extracted during

a specific time period. The flow rate was adjusted according to observed flow rates. The target recirculation rate was approximately 3 gpm.

The target rate of hydrogen peroxide was 1.33 gallons per hour (gph) using an LMI C121 metering pump (maximum output of 4.0 gph). A chemical injection point introduced hydrogen peroxide solution into the extracted groundwater. The hydrogen peroxide and groundwater mixture was then delivered under pressure to injection wells IW-2 and IW-3. An in-line static mixer followed the injection point to mix the groundwater and hydrogen peroxide solution. The well heads at each injection well were sealed to enable well pressurization. The groundwater/hydrogen peroxide mixture was then injected into the injection well. Operation and maintenance of the system was conducted at least twice weekly and the hydrogen peroxide solution tank was refilled then, as needed. The system was constructed to use chemical oxidation as an in-situ treatment technology to address contaminated groundwater identified to a nominal depth of 34 feet bgs.

4.3 WELL INSTALLATION

This section summarizes the well installations completed for the ISCO pilot study. Two injection wells (IW-2 and IW-3), one extraction well (EW-2), and one monitoring well (MW-4) were installed for the pilot study. The four new wells were installed using HSA methods. IW-2, IW-3, and EW-2 were installed to a depth of 34.5 feet bgs with 10-foot-long 0.02-inch slotted screens. Screen and riser piping was 4-inch Schedule 40 threaded PVC. Monitoring well MW-4 was installed to a depth of 32.5 feet bgs with a 5-foot long 0.01-inch slotted screen. Screen and riser piping was 2-inch Schedule 40 threaded PVC. All wells were installed with flush-mounted well covers. After installation, the wells were developed to remove fines within the screened sand pack. Details for the extraction and injection well are provided in Figures 2-3 and 2-4.

4.4 STARTUP/OPERATION

The system initially operated in recirculation mode only from April 23, 2008 to April 28, 2008. During this period, a flow rate of approximately 3 gpm was successfully maintained. Following the recirculation phase, the chemical feed pump was activated on April 28, 2008. The chemical feed pump operated properly, and hydrogen peroxide at a concentration of 7-percent and 1.33 gph was injected in the recirculation line upstream of the static mixer.

Once the chemical feed pump was activated, the pilot study did not progress to the point where continuous recirculation of hydrogen peroxide-amended groundwater could occur. Similar to the bioremediation pilot study, fouling of the injection well screen and in-line filter resulted in poor conditions to inject the desired quantity of oxidizer. Precipitates continued to form and foul the injection well until the

pilot study operations had ceased. Throughout the pilot study, the in-line filter and injection well were routinely cleaned to enable operation of the pilot study system. Photos taken during the operation of the pilot study can be found in Appendix C.

Numerous system shutdowns and operational changes occurred for various reasons and are noted as follows:

- May 1, 2008 – A precipitate formed, clogging the injection well and in-line screens. After the injection well and in-line screens were cleaned, groundwater recirculation with hydrogen peroxide injection resumed.

- May 5, 2008 – Precipitate continued to form, clogging the injection well and in-line screens. Injection well and in-line screens were cleaned.

- May 5, 2008 to June 3, 2008 operation of the pilot study was reduced to only groundwater recirculation to attain pre-precipitant flow rates.

- June 3, 2008 to July 21 2008 – Resume hydrogen peroxide injection with a reduced concentration of 3-percent and reduced injection rate.

- June 10, 2008 to June 11, 2008 – Faulty wire in groundwater pump (subsequently rewired).

- June 10, 2008 to July 21, 2008 - Precipitant continuing to form, clogging the injection well and in-line screens. The injection well and in-line screens were cleaned on multiple occasions.

- July 21, 2008 to July 28, 2008 – Hydrogen peroxide injection was reduced to a concentration of 1.5-percent.

- July 28, 2008 – System shut down indefinitely.

4.5 CHEMICAL ADDITION

The Pilot Study Work Plan for In-situ Chemical Oxidation (TtNUS, 2008) recommended approximately 600 lbs or 187 gallons of 35-percent hydrogen peroxide stock solution. Approximately 47 gallons of 35-percent hydrogen peroxide stock solution were injected in varying concentrations during the study. The hydrogen peroxide concentrations were reduced incrementally via dilution to reduce precipitate formation. From April 28 to May 1, 2008, 115 gallons of 7-percent hydrogen peroxide solution was

injected. From June 3 to July 21, 2008, 171 gallons of 3-percent hydrogen peroxide solution was injected. From July 21 to July 28, 2008, 54 gallons of 1.5-percent hydrogen peroxide solution was injected.

4.6 FIELD SAMPLING AND MONITORING

TtNUS personnel visited the system at least twice per week to make routine measurements and to check and refill the chemical solutions. A daily log sheet was filled out for each visit. Operating information such as groundwater elevation, pH, DO, and ORP; chemical use, and recirculation rate were recorded on the log sheets. Copies of the log sheets are included in Appendix A.

Six sampling events were performed by TtNUS personnel during the pilot study. Table 4-1 summarizes the location and date at which samples were collected. Baseline-sampling events were conducted on December 11, 2007 and April 26, 2008, and pilot study performance sampling was conducted on May 5, May 27, June 3, and July 4, 2008. Field tests performed by TtNUS personnel using field instruments and field kits, included groundwater elevation, temperature, pH, specific conductivity, ORP, and DO. Samples were collected and sent to Accutest Laboratories for analysis for several parameters, including VOCs, iron, manganese, sodium, chloride, nitrate, nitrite, orthophosphate, sulfate, and TOC.

4.7 SUMMARY OF SYSTEM OPERATION

The operator log sheet entries were complied into a single spreadsheet. This table is provided in Table 5-1, and copies of the operator log sheets are included as Appendix A. The spreadsheet was used to generate graphs for tracking trends and comparing data. The following summarizes the overall operation of the pilot study system:

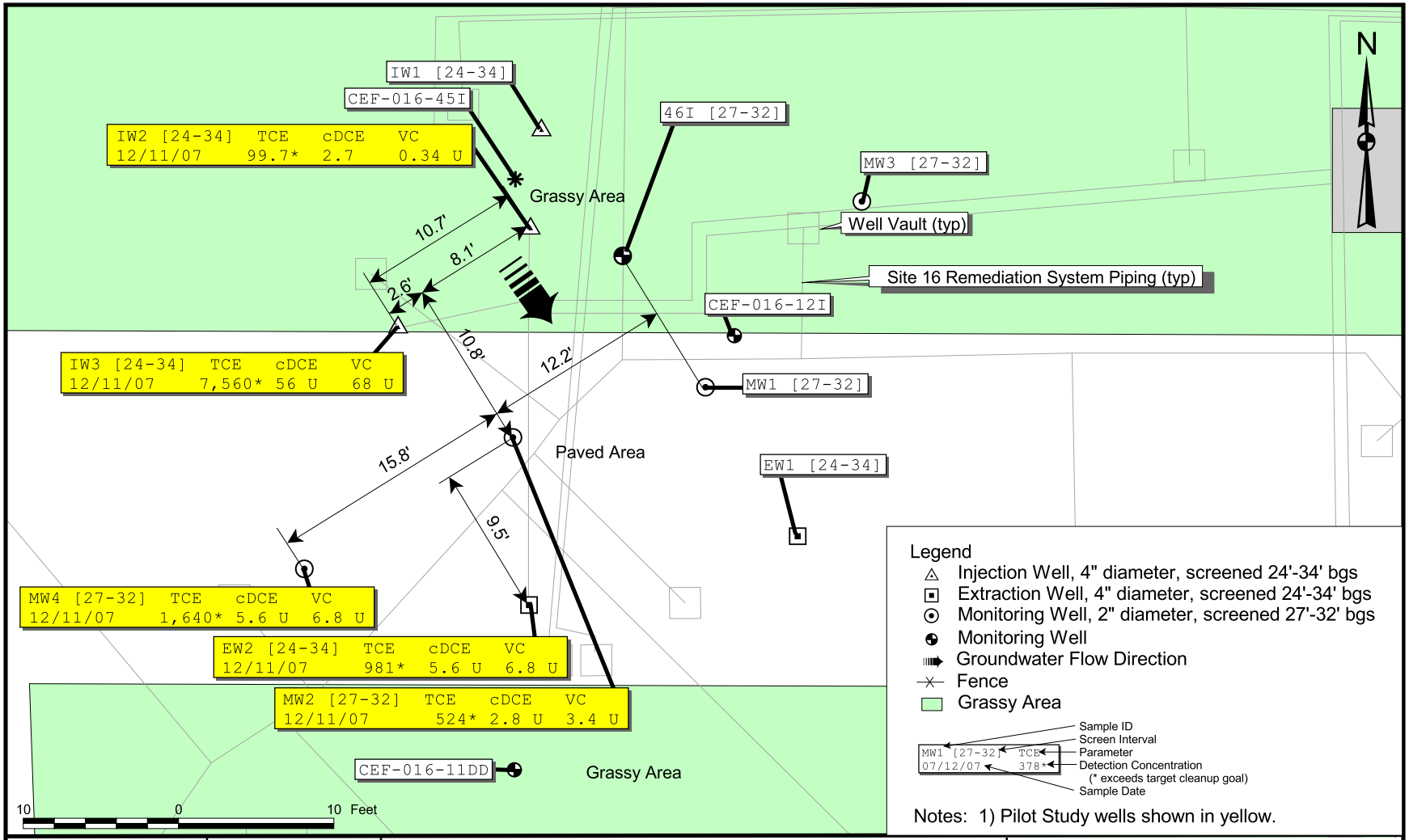
- System Operation: April 23, 2008 through July 28, 2008.
- Recirculation System Run-Time: 2,038 hours.
- Pilot Study Run-Time While Injecting Hydrogen Peroxide: 809 hours.
- Average Extraction Rate: 2.20 gpm.
- Hydrogen Peroxide Added (35-percent stock solution): 47 gallons.

TABLE 4-1

GROUNDWATER SAMPLING AND ANALYSIS SUMMARY
ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	Sample Designation	LABORATORY ANALYSES					FIELD TESTS				
		Chlorinated VOCs	Iron and Manganese (Dissolved)	Sodium (Total)	Miscellaneous Anions[2]	TOC	Temperature	pH	Oxidation / Reduction Potential	Dissolved Oxygen	Water Level
Event 1 - Baseline Samples - December 11, 2007											
CEF-06EW-02	CEF-016-EW2-01	▪		▪			▪	▪	▪	▪	▪
CEF-016-IW-03	CEF-016-IW2-01	▪					▪	▪	▪	▪	▪
CEF-016-IW-03	CEF-016-IW3-01	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪
CEF-016-MW-02	CEF-016-MW2-01	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪
CEF-016-MW-04	CEF-016-MW-4-01	▪		▪		▪	▪	▪	▪	▪	▪
Event 2 - Week 1 - April 26, 2008											
CEF-016-46I	CEF-016-MW46I-042608	▪	▪				▪	▪	▪	▪	▪
CEF-06EW2-02	CEF-016-EW2-042608	▪	▪				▪	▪	▪	▪	▪
CEF-016-IEW-03	CEF-016-IW3-042608	▪	▪				▪	▪	▪	▪	▪
CEF-016-MW-02	CEF-016-MW2-042608	▪	▪				▪	▪	▪	▪	▪
CEF-016-MW-04	CEF-016-MW-4-042608	▪	▪				▪	▪	▪	▪	▪
Event 3 - Week 2 Samples - May 5, 2008											
CEF-016-46I	CEF-016-MW46I-02	▪	▪				▪	▪	▪	▪	▪
CEF-06EW2-02	CEF-016-EW2-02	▪	▪				▪	▪	▪	▪	▪
CEF-016-IEW-03	CEF-016-IW3-02	▪	▪				▪	▪	▪	▪	▪
CEF-016-MW-02	CEF-016-MW2-02	▪	▪				▪	▪	▪	▪	▪
CEF-016-MW-04	CEF-016-MW-4-02-D	▪	▪				▪	▪	▪	▪	▪
Event 4 - Week 5 Samples - May 27, 2008											
CEF-016-IEW-03	CEF-016-IW3-03	▪	▪				▪	▪	▪	▪	▪
CEF-016-MW-02	CEF-016-MW2-03	▪	▪				▪	▪	▪	▪	▪
Event 5 - Week 6 Samples - June 3, 2008											
CEF-016-IEW-03	CEF-016-IW3-042608	▪	▪				▪	▪	▪	▪	▪
CEF-016-MW-02	CEF-016-MW2-02	▪	▪				▪	▪	▪	▪	▪
Event 6 - Week 11 Samples - June 17, 2008											
CEF-06EW2-02	CEF-016-EW2-06	▪	▪				▪	▪	▪	▪	▪
CEF-016-IEW-03	CEF-016-IW3-06	▪	▪				▪	▪	▪	▪	▪
CEF-016-MW-02	CEF-016-MW2-06	▪	▪				▪	▪	▪	▪	▪

Notes:
1 Dissolved gases include ethane, ethene, methane, and acetylene.
2 Miscellaneous anions include sulfate, sulfide, nitrate, nitrite, chloride, phosphate.
TOC - total organic carbon
VOC - volatile organic compounds.



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CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE	AS NOTED

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ISCO PILOT STUDY BASELINE CONDITIONS
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NUMBER	
0076	
APPROVED BY	DATE
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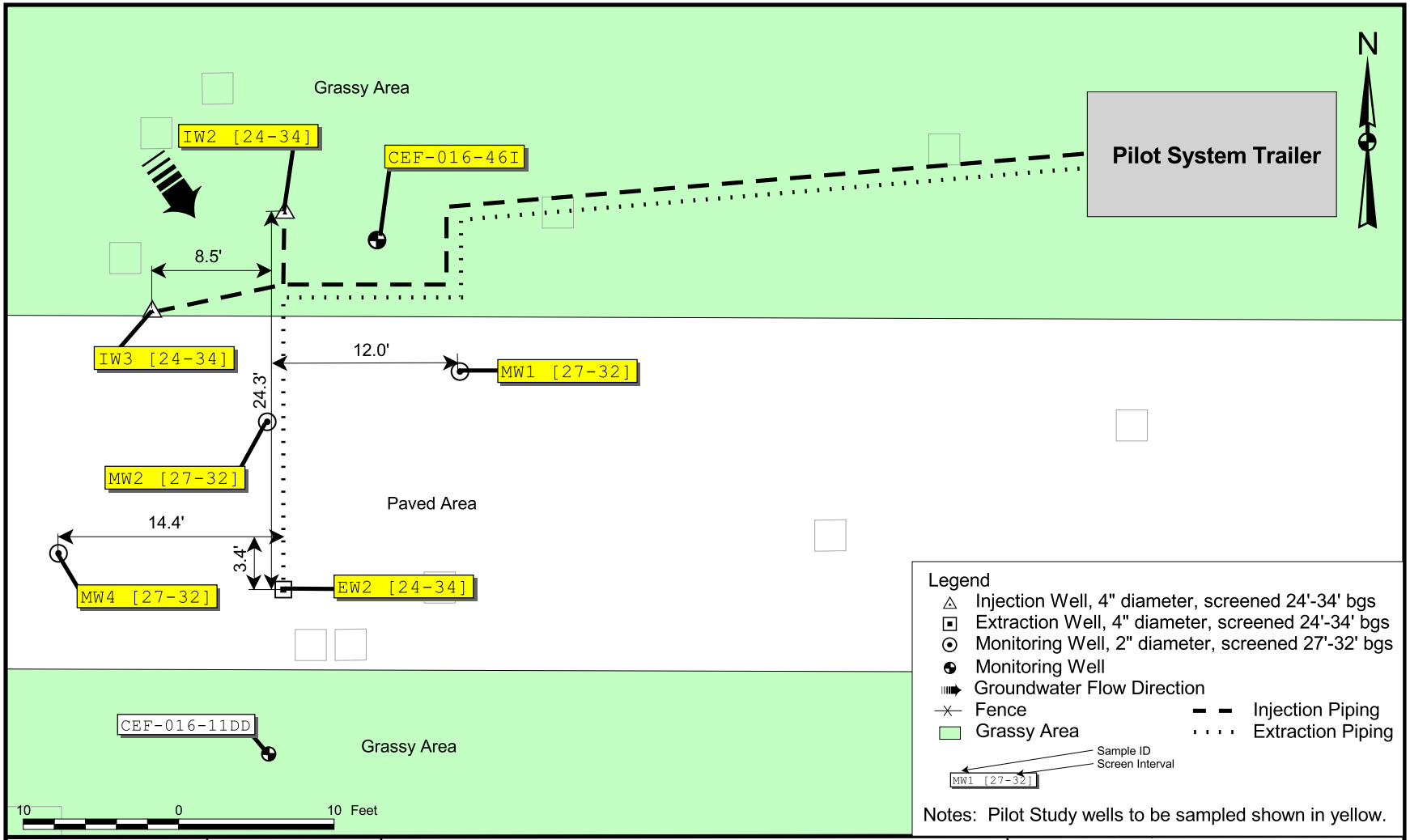

DRAWN BY	DATE
MJJ	22Feb08
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE	AS NOTED

NAVFAC

ISCO PILOT STUDY SITE PLAN
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NUMBER	
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APPROVED BY	DATE
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DRAWING NO. FIGURE 4-2	REV 0

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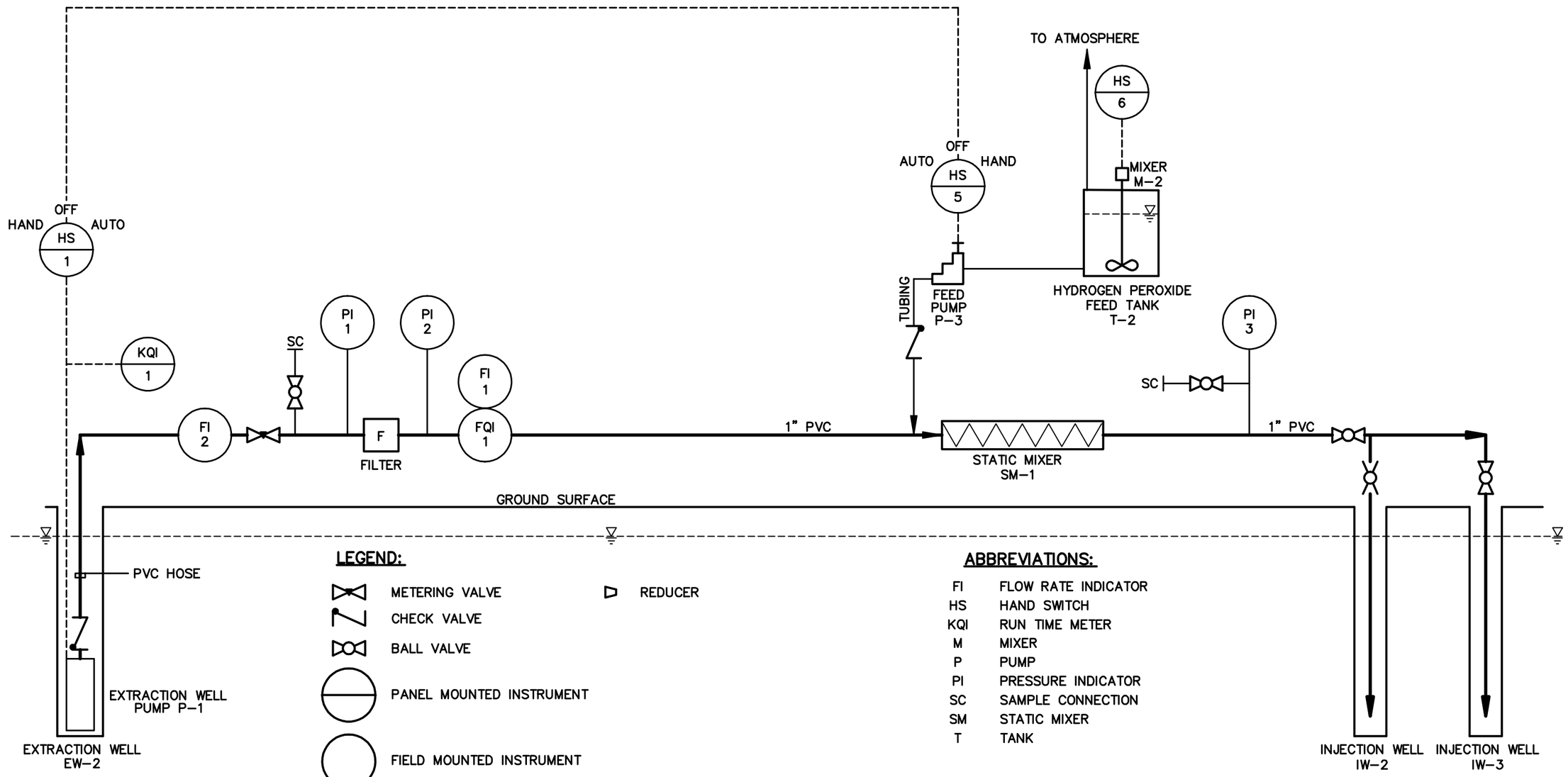


LEGEND:

- METERING VALVE
- CHECK VALVE
- BALL VALVE
- PANEL MOUNTED INSTRUMENT
- FIELD MOUNTED INSTRUMENT
- WATER LEVEL
- METERING PUMP
- ELECTRICAL CONNECTION
- REDUCER

ABBREVIATIONS:

FI	FLOW RATE INDICATOR
HS	HAND SWITCH
KQI	RUN TIME METER
M	MIXER
P	PUMP
PI	PRESSURE INDICATOR
SC	SAMPLE CONNECTION
SM	STATIC MIXER
T	TANK

DRAWN BY CK	DATE 7/13/09	ISCO PILOT STUDY PIPING AND INSTRUMENTATION DIAGRAM PILOT STUDY TECHNICAL MEMORANDUM OU 7, SITE 16 NAS CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0076
CHECKED BY	DATE		OWNER NO.
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-3 / REV. 0

NAVFAC

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

5.0 ISCO PILOT STUDY RESULTS AND DISCUSSION

5.1 OPERATION OF PILOT STUDY

The pilot study did not progress to the point where continuous recirculation of hydrogen peroxide-amended groundwater could occur. Similar to the bioremediation pilot study, fouling of the injection well screen and in-line filter resulted in poor conditions to inject the desired quantity of oxidizer. Precipitates continued to form and foul the injection well until the pilot study operations had ceased. Throughout the pilot study, the in-line filters and injection well were routinely cleaned to enable operation of the pilot study system.

5.2 FIELD MEASUREMENTS

Field measurements for system operation and groundwater geochemistry were recorded on operator log sheets. Field parameters including DO, pH, and ORP were monitored to evaluate the geochemical influences of the ISCO pilot study. However, because of the numerous shutdowns that occurred during operation of the pilot study, it was difficult to draw conclusions regarding the performance of the pilot study from evaluation of the field parameters. These results are summarized on Table 5-1.

A graphical depiction of DO levels during the study in the extraction well, injection well, and study monitoring wells is presented in Figure 5-1. No apparent trends in DO data associated with overall performance of the pilot study were observed.

ORP values varied over the course of the study, as summarized in Figure 5-2. ORP values in injection well IW-3 increased the most, as expected, due to the oxidizing conditions created from hydrogen peroxide injection within the well. The trends of ORP values at monitoring well MW-4 were similar to IW-3, suggesting the study monitoring well is influenced by injection at IW-3. During the 7.5-percent hydrogen peroxide injection, elevated ORP levels at monitoring well MW-2 were delayed by one week in comparison to the increase in MW-4 based on the study data. The delay may indicate either a preferential pathway between IW-3 and MW-4 or a higher oxidant demand in the location of MW-2.

During the study, pH values ranged from 2.5 to 4.1 as shown in Figure 5-3. Generally, trends in pH levels seemed to be inversely related to the observed trends of ORP. No other apparent trends in ORP data associated with overall performance of the pilot study were observed.

Depth to groundwater measurements were collected from extraction well EW-3, injection well IW-3, and monitoring wells MW-2, MW-4, and MW-46I. The data is included in Table 5-1 and shown on Figure 5-4.

The water level elevations were examined for the effects of draw-down at EW-3 and mounding at IW-3, MW-2, MW-4, and MW-46I.

5.3 LABORATORY RESULTS

The results of the laboratory analyses are summarized on Table 5-2. TCE was the target constituent at Site 16 and was to be used as the basis for pilot study evaluation. However, similar to the field data and because of the numerous shutdowns that occurred during operation of the pilot study, complete collection of samples described in the work plan was not possible. Because of this, only a limited evaluation of the performance of the pilot study from evaluation of TCE results was possible. Figure 5-5 depicts TCE concentrations in study wells during the ISCO pilot study.

As expected, IW-3 was most affected by hydrogen peroxide injection, resulting in a reduction from 325 micrograms per liter (µg/L) on April 26, 2008 to 4 µg/L on June 3, 2008. However, during the last sampling round on July 7, 2008, concentration did rebound to 160 µg/L. TCE concentrations at EW-2 steadily decreased during the course of the study from 409 µg/L during the baseline sampling date (April 26, 2008) to 157 µg/L on July 7, 2008. Other samples collected at CEF-016-46I and MW-4 during the pilot study were not collected systematically enough to draw conclusions regarding the performance of the pilot study. The laboratory analytical reports are included in Appendix B.

5.4 DISCUSSION

The effectiveness of ISCO through hydrogen peroxide injection at this site was difficult to determine because of the numerous system shutdowns and lack of systematic data; however TCE concentrations at the site did reduce generally at the injection and extraction wells. However, implementation of the tested ISCO approach is not recommended. The unusually high dissolved iron concentrations at the site are thought to have been the primary reason why numerous system shutdowns occurred and why precipitants formed which clogged the injection well and in-line mixer. It is believed the addition of the hydrogen peroxide solution oxidized the groundwater enough to cause metals to precipitate. After review of the performance of the pilot study it is believed that no other oxidant could be used as a replacement for hydrogen peroxide because the issues with precipitation would still occur.

TABLE 5-1

SUMMARY OF OPERATOR LOG DATA
ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Date		4/23/2008	4/26/2008	4/28/2008	5/1/2008	5/5/2008	5/7/2008	5/15/2008	5/20/2008	5/27/2008	6/3/2008	6/10/2008	6/11/2008	7/7/2008	7/14/2008	7/16/2008	7/17/2008	7/18/2008	7/21/2008	7/28/2008
Operating Phase		**Groundwater Recirculation**		**Groundwater Recirulcation and 7.5% H2O2 Addition**							**Groundwater Recirulcation and 3% H2O2 Addition**								**1.5% H2O2**	**Shutdown**
EW-2	**Units**																			
Depth to Water	feet	19.58	23.82	8.31	8.29	--	--	31.70	31.59	29.50	27.81	--	--	14.26	14.61	--	--	--	7.51	--
Dissolved Oxygen	mg/L	--	0.15	0.17	2.11	0.1	--	0.8	0.53	0.34	0.47	--	--	0.95	0.74	--	--	--	1.32	--
pH	S.U.	--	3.28	3.19	3.39	3.32	--	3.39	3.29	3.35	3.13	--	--	3.08	3.04	--	--	--	3.36	--
Oxidation/Reduction Potential	mV	--	334	293	309.4	306	--	304	320	316.9	330.3	--	--	262.6	309.5	--	--	--	336.2	--
Specific Conductivity	uS/cm	--	0.15	1.773	2.02	1.528	--	1.339	1.214	1.437	1.393	--	--	1.157	1.222	--	--	--	1.322	--
IW-3	**Units**																			
Depth to Water	feet	--	9.43	9.23	9.18	9.26	--	9.29	8.21	10.10	7.10	--	--	4.20	6.01	--	--	--	8.32	--
Dissolved Oxygen	mg/L	--	0.09	0.36	43.48	12.06	--	0.74	2.58	0.32	0.85	--	--	1.19	0.78	--	--	--	3.21	--
pH	S.U.	--	3.22	3.25	2.64	2.75	--	3.37	3.22	3.35	2.5	--	--	3.03	2.63	--	--	--	2.83	--
Oxidation/Reduction Potential	mV	--	436	306	573.3	434	--	301	381	305.6	516.8	--	--	306.5	415.8	--	--	--	613.3	--
Specific Conductivity	uS/cm	--	1.857	1.790	2.450	1.978	--	1.437	1.220	1.444	1.576	--	--	1.149	1.363	--	--	--	1.509	--
016-46I	**Units**																			
Depth to Water	feet	--	8.04	8.15	8.24	8.27	--	7.68	7.96	8.33	7.94	--	--	7.61	7.51	--	--	--	7.40	--
Dissolved Oxygen	mg/L	--	0.13	0.52	4.49	0.17	--	0.8	1.15	0.21	0.74	--	--	0.56	0.72	--	--	--	1.3	--
pH	S.U.	--	4.09	2.84	3.86	3.78	--	3.28	3.05	2.96	2.77	--	--	2.63	2.77	--	--	--	3.5	--
Oxidation/Reduction Potential	mV	--	197	346	265.6	248	--	302	358	389.5	408.6	--	--	396.5	323.9	--	--	--	314.2	--
Specific Conductivity	uS/cm	--	1.397	1.378	2.009	1.469	--	1.186	1.225	1.644	1.683	--	--	1.534	1.358	--	--	--	1.188	--
MW-2	**Units**																			
Depth to Water	feet	--	8.26	8.28	8.23	8.30	--	9.02	8.92	9.16	8.86	--	--	8.40	7.84	--	--	--	7.12	--
Dissolved Oxygen	mg/L	--	0.11	3.78	0.16	0.3	--	0.47	0.34	0.62	0.77	--	--	1.03	0.59	--	--	--	0.75	--
pH	S.U.	--	3.8	3.46	3.82	3.41	--	3.78	3.24	3.63	3.11	--	--	3.15	3.33	--	--	--	3.36	--
Oxidation/Reduction Potential	mV	--	188	214	152.4	354	--	247	340	--	224.4	--	--	240.7	245.8	--	--	--	302.3	--
Specific Conductivity	uS/cm	--	1.371	0.714	1.769	1.335	--	0.923	0.890	1.401	1.649	--	--	1.174	0.938	--	--	--	0.948	--
MW-4	**Units**																			
Depth to Water	feet	--	8.04	8.09	8.24	8.29	--	8.61	7.62	9.05	9.05	--	--	7.93	7.82	--	--	--	7.19	--
Dissolved Oxygen	mg/L	--	0.13	0.13	0.12	0.18	--	5.73	0.32	0.31	0.64	--	--	0.6	0.61	--	--	--	1.04	--
pH	S.U.	--	3.73	3.32	3.81	3.86	--	4.13	3.8	3.85	3.27	--	--	3.63	3.46	--	--	--	3.42	--
Oxidation/Reduction Potential	mV	--	345	377	395	231	--	244	318	278.6	355.1	--	--	287.6	263.6	--	--	--	308.7	--
Specific Conductivity	uS/cm	--	0.652	0.564	0.512	0.408	--	0.304	0.266	0.375	0.460	--	--	0.349	0.359	--	--	--	0.386	--
IW-1	**Units**																			
Depth to Water	feet	--	7.79	8.23	7.84	--	--	5.95	7.16	7.71	7.48	--	--	7.08	5.94	--	--	--	6.95	--
MW-1	**Units**																			
Depth to Water	feet	--	8.22	8.26	8.28	--	--	8.64	8.70	8.88	8.80	--	--	8.04	7.94	--	--	--	7.56	--
EW-1	**Units**																			
Depth to Water	feet	--	7.83	7.87	7.84	--	--	8.36	3.38	8.52	8.40	--	--	7.62	7.54	--	--	--	7.07	--
System Parameters																				
Groundwater Temperature	ºC		25.06	24.65	24.64	26.04	--	23.9	25.54	24.52	24.95	--	--	25.78	25.89	--	--	--	29.18	--
Run Meter (start of day)	hours	9488.7	9554.2	9598.4	9666.5	9760.6	9770.9	9953.9	10081.6	10243	10407.7	--	10576	11194.1	11360.8	--	--	--	11527	--
Totalizer	gal	100	12400	19500	28944	33300	33300	67600	85900	114300	140100	160000	160200	239800	256400	--	--	--	268600	--
Average Extraction Rate	gpm	--	3.13	2.68	2.31	0.77	0.00	3.12	2.39	2.93	2.61	--	1.99	2.15	1.66	--	--	--	1.22	--
Pressure 1 (filter influent)	psig	--	4	4	27	28	0	14	1	2	1.5	--	12	6	14	--	--	--	21	--
Pressure 2 (post-filter)	psig	--	5	4.5	26	28	0	7	1	2	0	--	13	6	13.5	--	--	--	21	--
Pressure 3 (effluent)	psig	--	0	0	24	26.5	0	2	0	0	0	--	10	2	11	--	--	--	15	--
Chemical Tank Data																				
Tank Level H2O2 (start of day)	gal	--	--	--	87	95	95	--	95	95	92	145	--	120	90	82	136	117	53	52
Pump Rate H2O2 (start of day)	gph	--	--	--	1.33	1.3	--	--	--	--	0.07	0	--	0.35	1	1.11	1.27	1.42	1.43	--
H2O2 Tank Refilling (35% solution)	gal	--	--	29	12	--	--	--	--	--	--	--	--	--	--	5.83	--	--	--	--
H2O2 Tank Refilling (water)	gal	--	--	121	48	--	--	--	--	--	58	--	--	--	--	68	--	--	53	--

Notes:
mg/L - miligrams per liter
S.U. - standard units
mV - millivolts
µS/cm - microsiemens per
ºC - degree Celcius
H2O2 - hydrogen peroxide
DTW - depth to water
gph - gallons per hour
gpm - gallons per minute
psig - pounds per square inch,
gal - gallons

TABLE 5-2

SUMMARY OF ANALYTICAL RESULTS
ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

SAMPLE LOCATION	CEF-016-46I	CEF-016-46I	CEF-016-EW-02	CEF-016-EW-02	CEF-016-EW-02	CEF-016-EW-02	CEF-016-IW-02	CEF-016-IW-03	CEF-016-IW-03	CEF-016-IW-03
SAMPLE DATE	4/26/2008	5/5/2008	12/11/2007	4/26/2008	5/5/2008	7/7/2008	12/11/2007	12/11/2007	4/26/2008	5/5/2008
Volatile Organics (ug/L)										
1,1,1-TRICHLOROETHANE	2.9 U	2.9 U	6.4 J	3 J	2.2 J	1.4	0.29 U	74.9 J	3 J	1.8 J
1,1,2,2-TETRACHLOROETHANE	3.7 U	3.7 U	7.4 U	1.9 U	1.9 U	0.21 U	0.37 U	74 U	1.9 U	0.74 U
1,1,2-TRICHLOROETHANE	3 U	3 U	6 U	1.5 U	1.5 U	0.26 U	0.3 U	60 U	1.5 U	0.6 U
1,1-DICHLOROETHANE	2.5 U	2.5 U	5 U	1.3 U	1.3 U	0.24 U	0.66 J	50 U	1.3 U	0.5 U
1,1-DICHLOROETHENE	2.3 U	2.3 U	4.6 U	1.4 J	1.2 U	0.93 J	0.23 U	46 U	1.2 U	0.67 J
1,2-DICHLOROBENZENE	2 U	2 U		1 U	1 U	0.2 U			1 U	0.4 U
1,2-DICHLOROETHANE	2 U	2 U	4 U	1 U	1 U	0.34 U	0.2 U	40 U	1 U	0.4 U
1,2-DICHLOROPROPANE	2.5 U	2.5 U	5 U	1.3 U	1.3 U	0.21 U	0.25 U	50 U	1.3 U	0.5 U
1,3-DICHLOROBENZENE	2.3 U	2.3 U		1.2 U	1.2 U	0.23 U			1.2 U	0.46 U
1,4-DICHLOROBENZENE	2.2 U	2.2 U		1.1 U	1.1 U	0.22 U			1.1 U	0.44 U
2-BUTANONE			1700				49.3	400 U		
2-CHLOROETHYL VINYL ETHER	12 U	12 U		6.1 U	6.1 U	1 U			6.1 U	2.4 U
2-HEXANONE			57 U				2.9 U	570 U		
4-METHYL-2-PENTANONE			44 U				2.2 U	440 U		
ACETONE			337 J				18.8 J	2000 U		
BENZENE			4 U				0.2 U	40 U		
BROMODICHLOROMETHANE	2.9 U	2.9 U	5.8 U	1.5 U	1.5 U	0.2 U	0.29 U	58 U	1.5 U	0.58 U
BROMOFORM	2.8 U	2.8 U	5.6 U	1.4 U	1.4 U	0.33 U	0.28 U	56 U	1.4 U	0.56 U
BROMOMETHANE	5.4 U	5.4 U	11 U	2.7 U	2.7 U	0.78 U	0.54 U	110 U	2.7 U	1.1 U
CARBON DISULFIDE			4 U				3	40 U		
CARBON TETRACHLORIDE	2.9 U	2.9 U	5.8 U	1.5 U	1.5 U	0.22 U	0.29 U	58 U	1.5 U	0.58 U
CHLOROBENZENE	2 U	2 U	4 U	1 U	1 U	0.22 U	0.2 U	40 U	1 U	0.4 U
CHLORODIBROMOMETHANE	2 U	2 U	4 U	1 U	1 U	0.2 U	0.2 U	40 U	1 U	0.4 U
CHLOROETHANE	4.6 U	4.6 U	9.2 U	2.3 U	2.3 U	0.48 U	0.46 U	92 U	2.3 U	0.92 U
CHLOROFORM	2.1 U	2.1 U	4.2 U	1.1 U	1.1 U	0.28 U	0.21 U	42 U	1.1 U	0.42 U
CHLOROMETHANE	3.8 U	3.8 U	7.6 U	1.9 U	1.9 U	0.61 U	0.38 U	76 U	1.9 U	0.76 U
CIS-1,2-DICHLOROETHENE	2.8 U	2.8 U	5.6 U	2.6 J	2.7 J	1.5	2.7	56 U	2.2 J	1.5 J
CIS-1,3-DICHLOROPROPENE	2.4 U	2.4 U	4.8 U	1.2 U	1.2 U	0.21 U	0.24 U	48 U	1.2 U	0.48 U
ETHYLBENZENE			4 U				0.2 U	40 U		
METHYLENE CHLORIDE	17.8 J	10 U	20 U	5 U	5 U	1 U	1 U	200 U	5 U	2 U
STYRENE			4 U				0.2 U	40 U		
TETRACHLOROETHENE	2.5 U	2.5 U	5 U	1.3 U	1.3 U	0.22 U	0.25 U	50 U	1.3 U	0.5 U
TOLUENE			5.4 U				0.27 U	54 U		
TOTAL XYLENES			11 U				0.56 U	110 U		
TRANS-1,2-DICHLOROETHENE	2 U	2 U	4 U	1 U	1 U	0.45 U	0.2 U	40 U	1 U	0.4 U
TRANS-1,3-DICHLOROPROPENE	2.1 U	2.1 U	4.2 U	1.1 U	1.1 U	0.21 U	0.21 U	42 U	1.1 U	0.42 U
TRICHLOROETHENE	448	549	981	409	290	157	100	7560	325	188
VINYL CHLORIDE	3.4 U	3.4 U	6.8 U	1.7 U	1.7 U	1	0.34 U	68 U	1.7 U	0.68 U
Inorganics (ug/L)										
IRON		205000			168000	132000				190000
MANGANESE		549			1210	924				1200
SODIUM			57500					155000		
Filtered Inorgaincs (ug/L)										
IRON	195000	202000		187000	171000	133000		77100	167000	137000
MANGANESE	862	529		1470	1220	917		534	1400	1180
Miscellaneous Parameters (mg/L)										
CHLORIDE								24.2		
NITRATE-N								0.05 U		
NITRITE-N								1.9		
ORTHOPHOSPHATE								0.05		
SULFATE								798		
TOTAL ORGANIC CARBON			10					8.3		

TABLE 5-2

SUMMARY OF ANALYTICAL RESULTS
ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

SAMPLE LOCATION	CEF-016-IW-03	CEF-016-IW-03	CEF-016-IW-03	CEF-016-MW-02	CEF-016-MW-02	CEF-016-MW-02	CEF-016-MW-02	CEF-016-MW-02	CEF-016-MW-02	CEF-016-MW-04
SAMPLE DATE	5/27/2008	6/3/2008	7/7/2008	12/11/2007	4/26/2008	5/5/2008	5/27/2008	6/3/2008	7/7/2008	12/11/2007
Volatile Organics (ug/L)										
1,1,1-TRICHLOROETHANE	1.3 J	1.5	1.6	3.9 J	15.8	50	18.7	5.3	6.6 U	27.4
1,1,2,2-TETRACHLOROETHANE	0.74 U	0.21 U	0.21 U	3.7 U	3.7 U	19 U	3.7 U	1.1 U	4.2 U	7.4 U
1,1,2-TRICHLOROETHANE	0.6 U	0.26 U	0.26 U	3 U	3 U	15 U	3 U	1.3 U	5.2 U	6 U
1,1-DICHLOROETHANE	0.5 U	0.24 U	0.27 J	2.5 U	2.5 U	13 U	2.5 U	1.2 U	4.8 U	5 U
1,1-DICHLOROETHENE	0.79 J	0.54 U	0.98 J	2.3 U	6 J	12 U	5.8 J	2.7 U	11 U	4.6 U
1,2-DICHLOROBENZENE	0.4 U	0.2 U	0.2 U		2 U	10 U	2 U	1 U	4 U	
1,2-DICHLOROETHANE	0.4 U	0.34 U	0.34 U	2 U	2 U	10 U	2 U	1.7 U	6.8 U	4 U
1,2-DICHLOROPROPANE	0.5 U	0.21 U	0.21 U	2.5 U	2.5 U	13 U	2.5 U	1.1 U	4.2 U	5 U
1,3-DICHLOROBENZENE	0.46 U	0.23 U	0.23 U		2.3 U	12 U	2.3 U	1.2 U	4.6 U	
1,4-DICHLOROBENZENE	0.44 U	0.22 U	0.22 U		2.2 U	11 U	2.2 U	1.1 U	4.4 U	
2-BUTANONE				20 U						40 U
2-CHLOROETHYL VINYL ETHER	2.4 U	1 U	1 U		12 U	61 U	12 U	5 U	20 U	
2-HEXANONE				29 U						57 U
4-METHYL-2-PENTANONE				22 U						44 U
ACETONE				100 U						200 U
BENZENE				2 U						4 U
BROMODICHLOROMETHANE	0.58 U	0.2 U	0.2 U	2.9 U	2.9 U	15 U	2.9 U	1 U	4 U	5.8 U
BROMOFORM	0.56 U	0.33 U	0.33 U	2.8 U	2.8 U	14 U	2.8 U	1.7 U	6.6 U	5.6 U
BROMOMETHANE	1.1 U	0.78 U	0.78 U	5.4 U	5.4 U	27 U	5.4 U	3.9 U	16 U	11 U
CARBON DISULFIDE				2 U						4 U
CARBON TETRACHLORIDE	0.58 U	0.22 U	0.22 U	2.9 U	2.9 U	15 U	2.9 U	1.1 U	4.4 U	5.8 U
CHLOROBENZENE	0.4 U	0.22 U	0.22 U	2 U	2 U	10 U	2 U	1.1 U	4.4 U	4 U
CHLORODIBROMOMETHANE	0.4 U	0.2 U	0.2 U	2 U	2 U	10 U	2 U	1 U	4 U	4 U
CHLOROETHANE	0.92 U	0.48 U	0.48 U	4.6 U	4.6 U	23 U	4.6 U	2.4 U	9.6 U	9.2 U
CHLOROFORM	0.42 U	0.28 U	0.28 U	2.1 U	2.1 U	11 U	2.1 U	1.4 U	5.6 U	4.2 U
CHLOROMETHANE	0.76 U	0.63 J	0.8 J	3.8 U	3.8 U	19 U	3.8 U	3.1 U	12 U	7.6 U
CIS-1,2-DICHLOROETHENE	1.4 J	0.2 U	1.7	2.8 U	2.8 U	14 U	3 J	1.6 J	4 U	5.6 U
CIS-1,3-DICHLOROPROPENE	0.48 U	0.21 U	0.21 U	2.4 U	2.4 U	12 U	2.4 U	1.1 U	4.2 U	4.8 U
ETHYLBENZENE				2 U						4 U
METHYLENE CHLORIDE	2.5 J	1 U	1 U	10 U	21.6 J	50 U	14.5 J	5 U	20 U	50 U
STYRENE				2 U						4 U
TETRACHLOROETHENE	0.5 U	0.22 U	0.22 U	2.5 U	2.5 U	13 U	2.5 U	1.1 U	4.4 U	5 U
TOLUENE				2.7 U						5.4 U
TOTAL XYLENES				5.6 U						11 U
TRANS-1,2-DICHLOROETHENE	0.4 U	0.45 U	0.45 U	2 U	2 U	10 U	2 U	2.3 U	9 U	4 U
TRANS-1,3-DICHLOROPROPENE	0.42 U	0.21 U	0.21 U	2.1 U	2.1 U	11 U	2.1 U	1.1 U	4.2 U	4.2 U
TRICHLOROETHENE	168	4	160	524	1880	3430	976	566	1200	1640
VINYL CHLORIDE	0.68 U	0.3 U	0.84 J	3.4 U	3.4 U	17 U	3.4 U	1.5 U	6 U	6.8 U
Inorganics (ug/L)										
IRON	155000	108000	168000			148000	131000	137000	126000	
MANGANESE	999	1010	905			1350	1390	1320	1160	
SODIUM				206000						28500
Filtered Inorgaincs (ug/L)										
IRON	138000	59200	129000	87000	234000	142000	131000	136000	125000	
MANGANESE	930	997	871	552	2080	1300	1360	1440	1150	
Miscellaneous Parameters (mg/L)										
CHLORIDE				20.8						
NITRATE-N				0.05 U						
NITRITE-N				2.4						
ORTHOPHOSPHATE				0.078						
SULFATE				867						
TOTAL ORGANIC CARBON				10						6.6

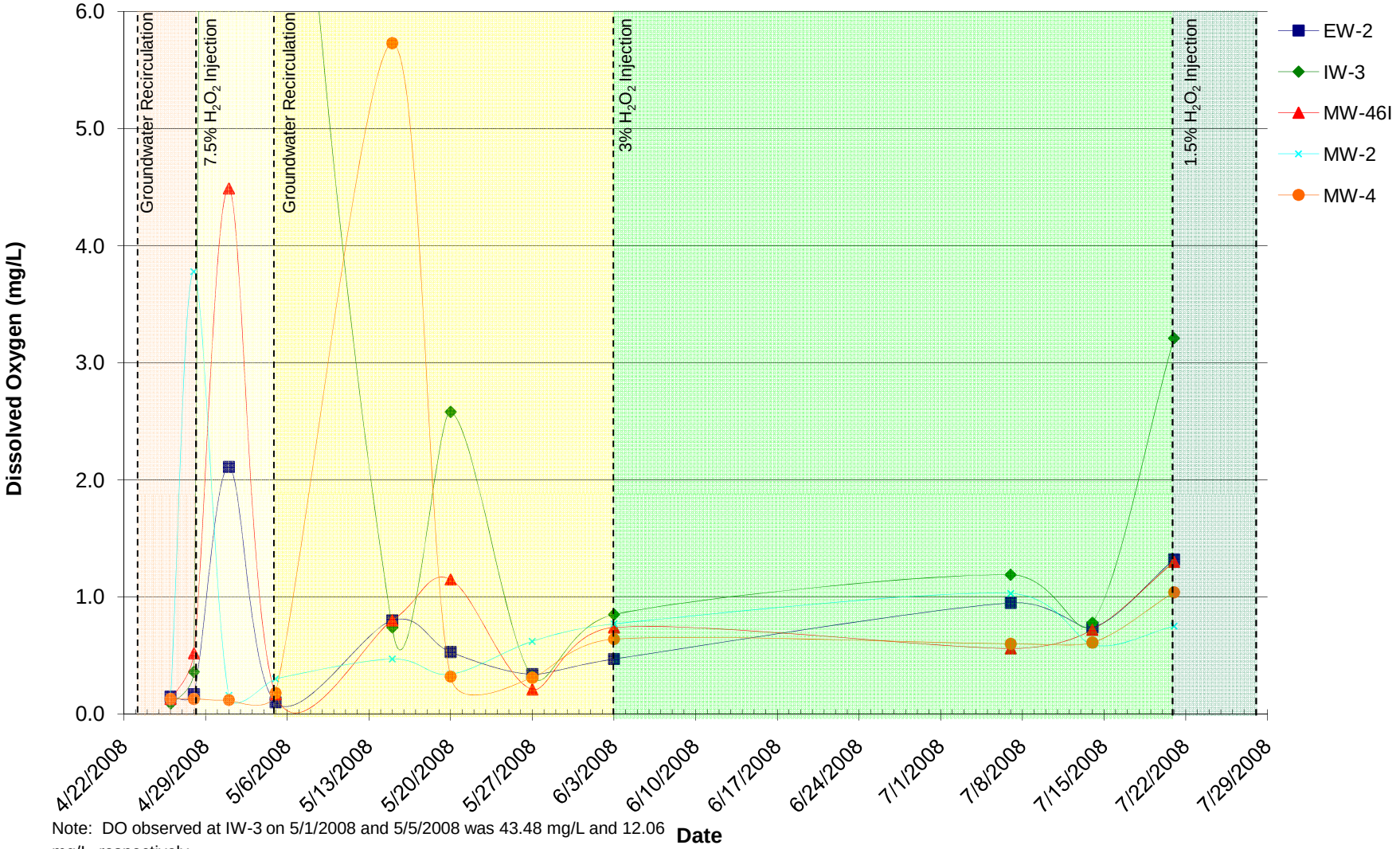
TABLE 5-2

SUMMARY OF ANALYTICAL RESULTS
ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

SAMPLE LOCATION **SAMPLE DATE**	CEF-016-MW-04 4/26/2008	CEF-016-MW-04 5/5/2008	CEF-016-MW-04 5/5/2008
Volatile Organics (ug/L)			
1,1,1-TRICHLOROETHANE	13.4		11.5
1,1,2,2-TETRACHLOROETHANE	3.7 U		3.7 U
1,1,2-TRICHLOROETHANE	3 U		3 U
1,1-DICHLOROETHANE	2.5 U		2.5 U
1,1-DICHLOROETHENE	2.3 U		3.1 J
1,2-DICHLOROBENZENE	2 U		2 U
1,2-DICHLOROETHANE	2 U		2 U
1,2-DICHLOROPROPANE	2.5 U		2.5 U
1,3-DICHLOROBENZENE	2.3 U		2.3 U
1,4-DICHLOROBENZENE	2.2 U		2.2 U
2-BUTANONE			
2-CHLOROETHYL VINYL ETHER	12 U		12 U
2-HEXANONE			
4-METHYL-2-PENTANONE			
ACETONE			
BENZENE			
BROMODICHLOROMETHANE	2.9 U		2.9 U
BROMOFORM	2.8 U		2.8 U
BROMOMETHANE	5.4 U		5.4 U
CARBON DISULFIDE			
CARBON TETRACHLORIDE	2.9 U		2.9 U
CHLOROBENZENE	2 U		2 U
CHLORODIBROMOMETHANE	2 U		2 U
CHLOROETHANE	4.6 U		4.6 U
CHLOROFORM	2.1 U		2.1 U
CHLOROMETHANE	3.8 U		3.8 U
CIS-1,2-DICHLOROETHENE	2.8 U		2.8 U
CIS-1,3-DICHLOROPROPENE	2.4 U		2.4 U
ETHYLBENZENE			
METHYLENE CHLORIDE	11.8 J		10 U
STYRENE			
TETRACHLOROETHENE	2.5 U		2.5 U
TOLUENE			
TOTAL XYLENES			
TRANS-1,2-DICHLOROETHENE	2 U		2 U
TRANS-1,3-DICHLOROPROPENE	2.1 U		2.1 U
TRICHLOROETHENE	837		823
VINYL CHLORIDE	3.4 U		3.4 U
Inorganics (ug/L)			
IRON		38200	39400
MANGANESE		186	190
SODIUM			
Filtered Inorgaincs (ug/L)			
IRON	50500	36200	36500
MANGANESE	291	178	180
Miscellaneous Parameters (mg/L)			
CHLORIDE			
NITRATE-N			
NITRITE-N			
ORTHOPHOSPHATE			
SULFATE			
TOTAL ORGANIC CARBON			

Notes:
J - estimated
U - not detected at detection limits shown
µg/L - micrograms per liter
mg/L - milligrams per liter

FIGURE 5-1
DISSOLVED OXYGEN CONCENTRATIONS - ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA



Note: DO observed at IW-3 on 5/1/2008 and 5/5/2008 was 43.48 mg/L and 12.06 mg/L, respectively.

FIGURE 5-2
ORP VALUES - ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

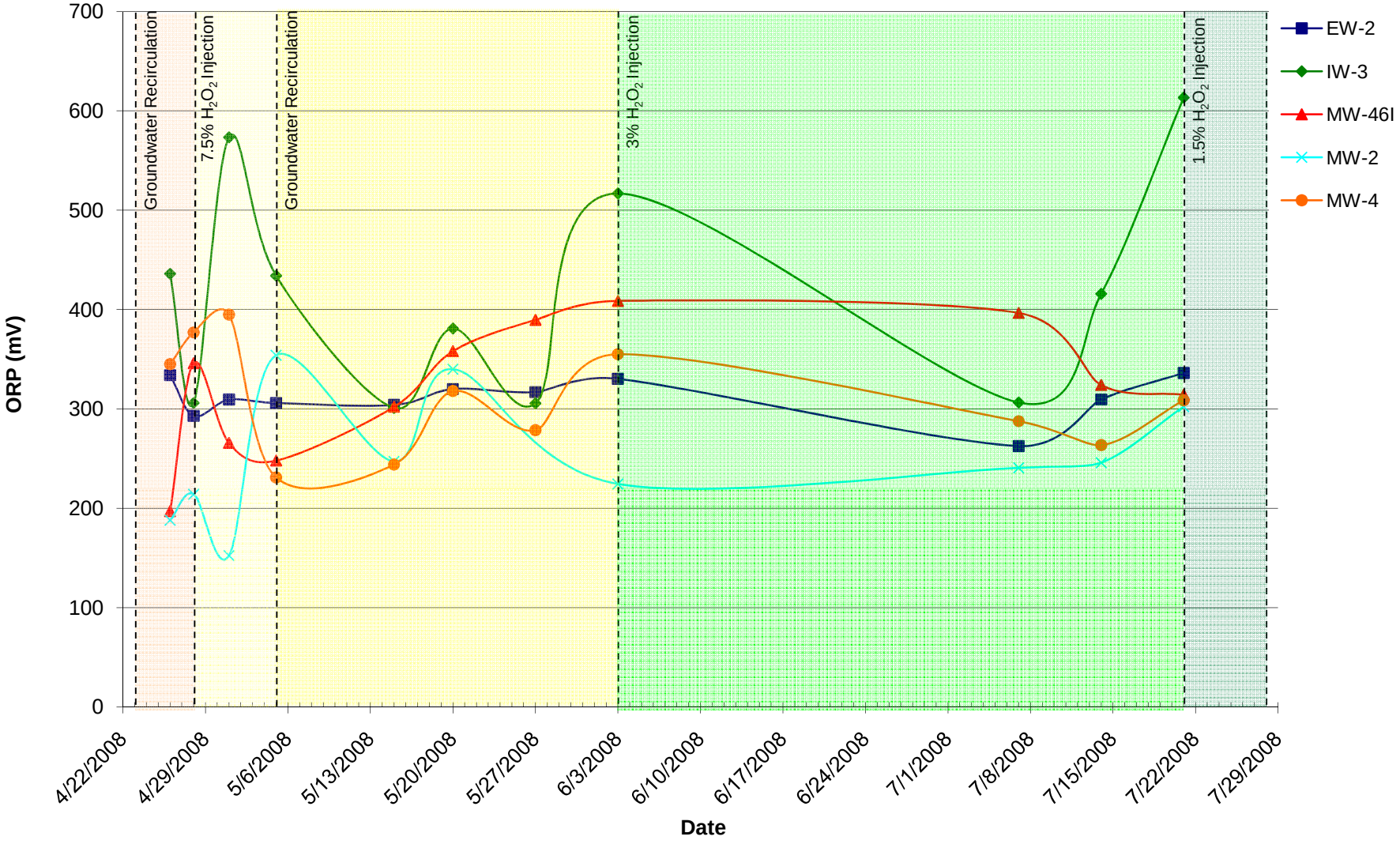


FIGURE 5-3
pH VALUES - ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

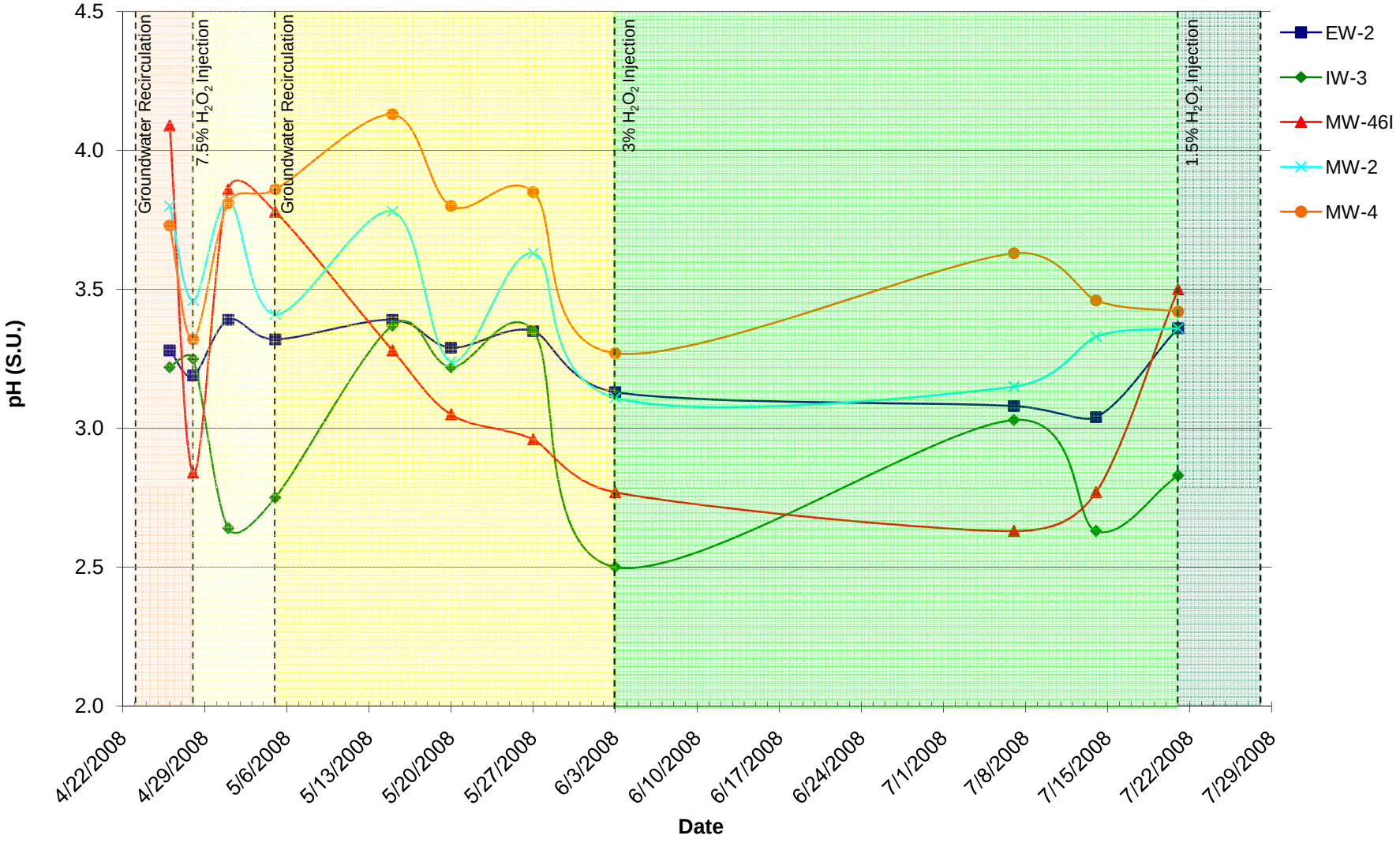


FIGURE 5-4
TCE CONCENTRATION - ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

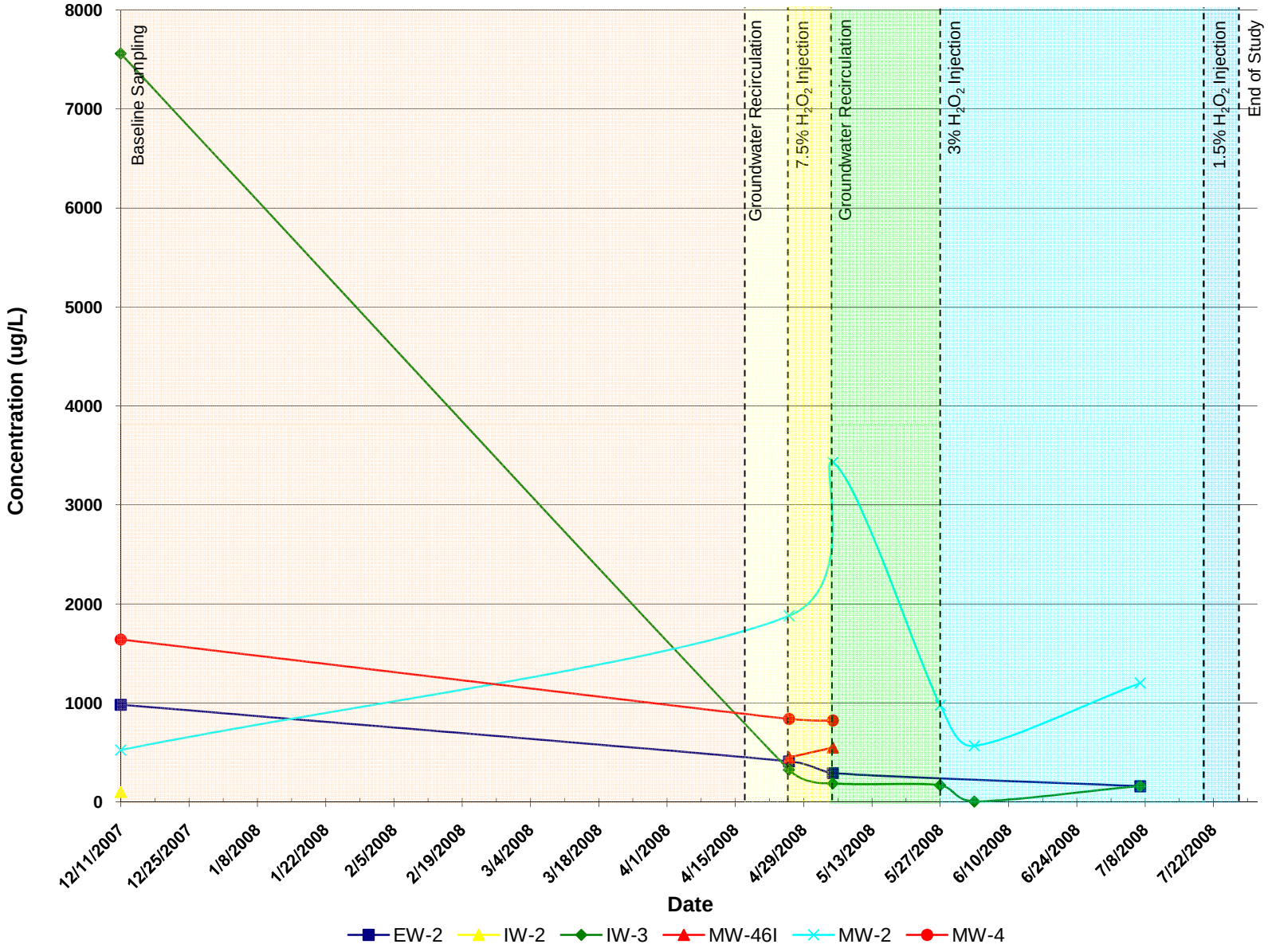
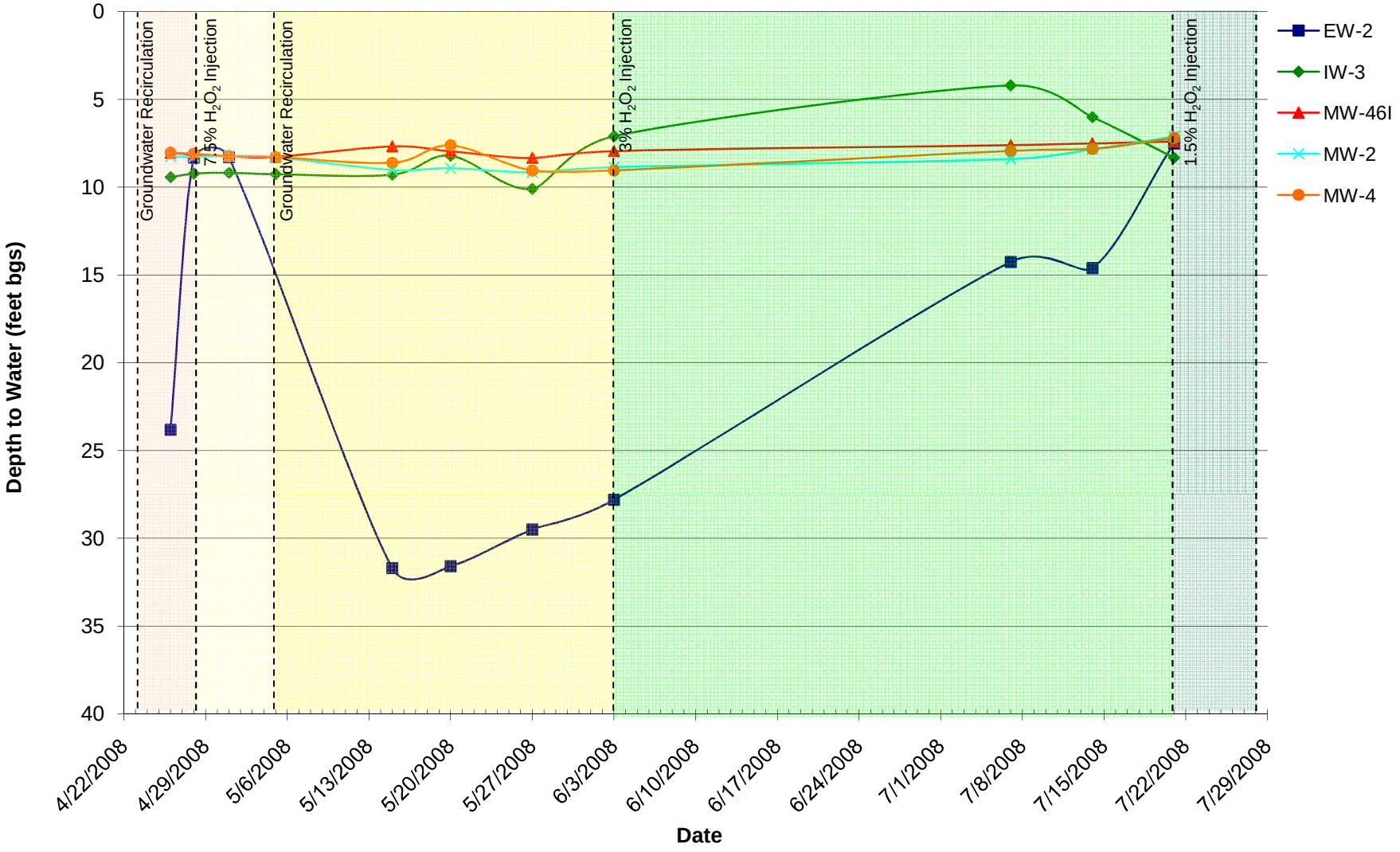


FIGURE 5-5
GROUNDWATER LEVELS - ISCO PILOT STUDY
PILOT STUDY TECHNICAL MEMORANDUM
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA



6.0 DIRECT-PUSH TECHNOLOGY INVESTIGATION

6.1 BACKGROUND

During the pilot studies, TCE was detected above the Site 16 remedial action level of 1,000 μg/L. It was decided at the November 2008 Base Realignment and Closure (BRAC) Cleanup Team (BCT) meeting that a DPT investigation would be conducted to delineate the hot spot area and to verify that a contaminated groundwater plume is not present outside of the limits of the existing air sparge system. A plan for the DPT investigation was proposed and agreed upon during the February 2009 BCT meeting. The plan estimated that 40 total samples would be collected over two days at Site 16, beginning with the location of pilot study monitoring well MW4, which had a TCE concentration of 6,600 μg/L during the pilot studies, and then moving outward at 25-foot interval offsets.

6.2 DPT SAMPLING

The DPT investigation initially included DPT groundwater sampling at two locations, one as close as practicable to MW4 (CEF-016-DPT1) and one approximately 25 feet northwest of MW4 (CEF-016-DPT5). Samples were collected at these locations from the following intervals:

- 19 to 23 feet bgs.
- 28 to 32 feet bgs.
- 36 to 40 feet bgs.

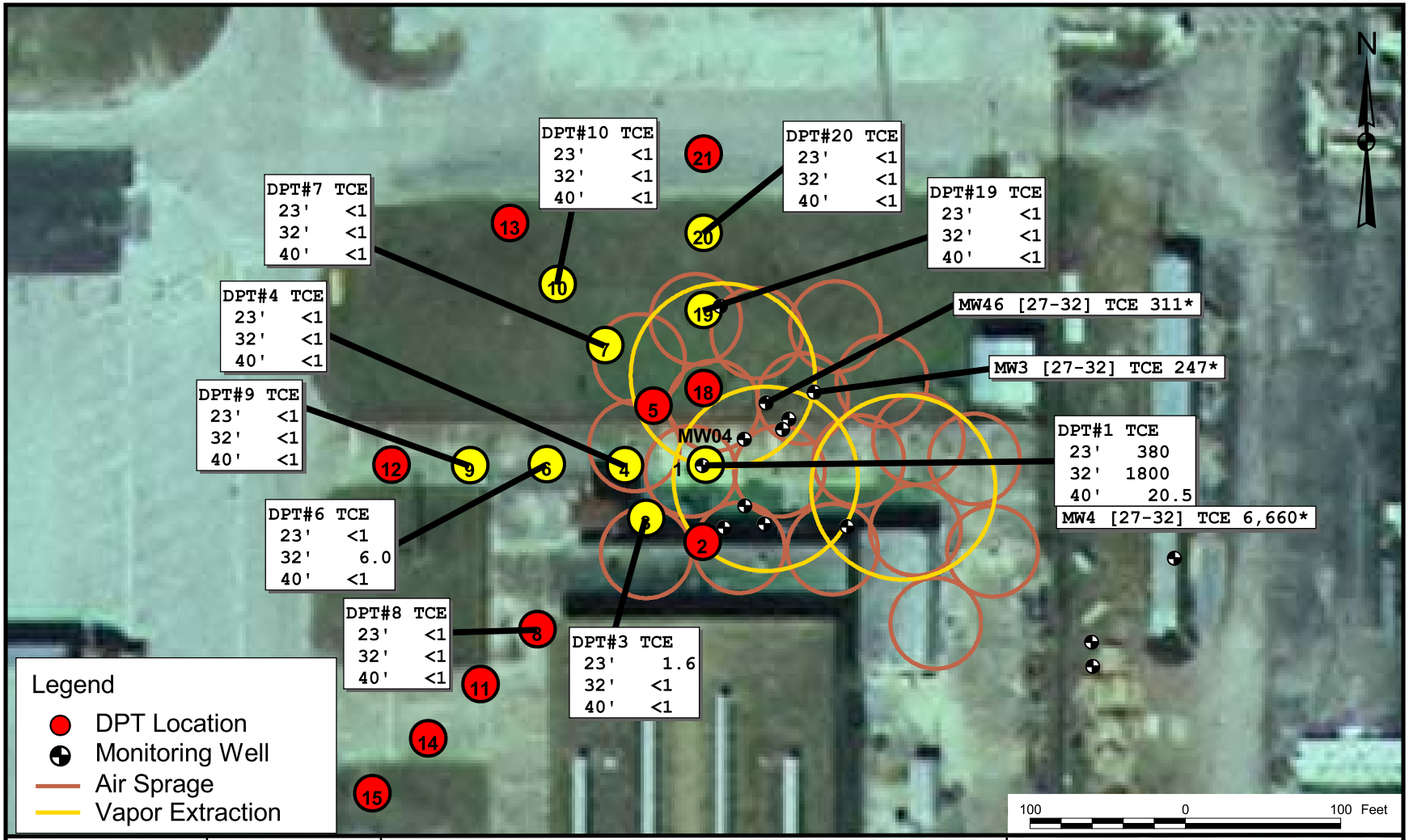
Based on the results from locations CEF-016-DPT1 and -DPT5, additional DPT samples were collected at the same depth intervals from step-out locations in a radial pattern from northwest to southwest from the MW4 area. Ten total DPT locations were sampled, as shown on Figure 6-1: locations 3 and 4 (25 feet from MW4 to the southwest and west), locations 6, 7, and 19 (50 feet west, northwest, and north), and locations 8, 9, 10, and 20 (75 feet from MW4 to the southwest, west, northwest, and north).

At Site 16, an on-site laboratory analyzed the samples collected for TCE via SW-846 Method 8260B and provided quick turn-around results to guide subsequent sampling. The existing monitoring wells MW3, MW4, and MW46 were sampled as well.

6.3 RESULTS

The DPT effort verified that the limits of the hot spot at Site 16 were within the radius of the air sparging system. TCE was not detected at concentrations greater than the detection limits in any of the DPT

samples other than DPT#1. Figure 6-1 shows the TCE concentrations detected at each DPT location and well that was sampled.



MJJ	DATE 07Feb08	DPT LOCATION MAP PILOT STUDY TECHNICAL MEMORANDUM OPERABLE UNIT 7, SITE 16 NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	DRAWN BY / CONTRACT NUMBER 0076
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 6-1 / REV 0

P:\GIS\NAS_CecilField\s16-dpt_investigation.apr 22Jan10 MJJ Layout15

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Overall, the results of the bioremediation pilot study at Site 16 indicated that this technology was not appropriate for this location, given the geochemical properties resulting from previous air sparging activities at the site. The formation of precipitates within the injection wells and piping did not allow for continuous operation of the pilot study system. The cause of the precipitation was the addition of sodium carbonate, which increased the pH of the groundwater to the point where the high dissolved iron and other metals within the groundwater precipitated out and caused multiple system shutdowns to occur. The significant precipitation that occurred during this pilot test makes this technology an unlikely candidate for this site.

Results from the ISCO pilot study suggest that chemical oxidation reduced TCE concentrations within the study area, but precipitation problems as mentioned in the bioremediation pilot study also plagued the ISCO pilot study. The unusually high dissolved iron concentrations at the site, as in the bioremediation pilot study, were thought to have been the primary reason why numerous system shutdowns occurred and why precipitants formed which clogged the injection well and pilot study piping. It is believed the addition of the hydrogen peroxide solution oxidized the groundwater enough to cause metals to precipitate. After review of the performance of the pilot study, it is believed that no other practical oxidant could be used as a replacement to hydrogen peroxide because the issues with precipitation would most likely still occur.

7.2 RECOMMENDATIONS

As demonstrated by the two pilot study results, the combination of the unusually high dissolved metals concentrations and the low pH at the site were the underlying factors which ultimately made both technologies unusable at the site. Consequently, the original remediation technology of air sparging is most likely the most appropriate remediation technology for use at Site 16.

REFERENCES

TtNUS, 2007a. Pilot Study Work Plan for In Situ Bioremediation at Operable Unit 7, Site 16 - Buildings 324/1845 Area, Naval Air Station Cecil Field, Jacksonville, Florida, July 2007.

TtNUS, 2007b. Technical Memorandum for the Southern Pilot Study, Operable Unit 9, Site 59 - Buildings 324/1845 Southern Area, Naval Air Station (NAS) Cecil Field, Jacksonville, Florida, December 2007.

TtNUS, 2008. Pilot Study Work Plan for In-Situ Chemical Oxidation at Operable Unit 7, Site 16. Naval Air Station Cecil Field, Jacksonville, Florida, April 2008.

TtNUS, 2009. DPT Investigation Work Plan for Operable Unit 7, Site 16 and Building 81, Tanks 81A/B/C. Naval Air Station Cecil Field, Jacksonville, Florida, March 2009.

APPENDIX A

OPERATOR LOG SHEETS

BIOREMEDIATION PILOT STUDY OPERATOR LOG SHEETS

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 7/28/07 Weather 94°F Partly Cloudy
Personnel MY . DS

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.02	9.60	9.31	9.25	8.58	8.75			
DO, mg/L	6.71	5.35	8.8	5.94	6.52	8.71			
pH	3.15	3.23	4.04	3.24	4.84	3.64	~~3.19~~		
ORP, mV	316.5	358.7	317.0	402.8	324.4	321.3			
Spec. Cond., mS/cm	1.109	1.433	.218	1.240	.125	1.360			
YSI stabilization time, minutes	10	11	13	11	10	12			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.67	1.404	90.9

of saturation

Extraction Well flow rate		
Rate, gpm	3.5	3.0
Totalizer	1088900	1088900
Time of day	0940	1215

Run meter	
Reading	[redacted]
Time of day	[redacted]

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+ / 30+	31 / 25	30 / 24

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	46	—	46	46			50	50	.4	.4
Bi/carbonate	150	—	150	150	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: NO Filled 7/19/07	Lactate	gal solution add:	gal water added:
	Bi/carbonate	lb added:	gal water added:

Chemical Feed Off:	Time Stopped:	Time Restarted:	1210
Filter check (Y/N):	0940		

Samples Collected: NO

Notes: Changed filter

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 7/23/07 Weather 84°F overcast
Personnel MY

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.02	9.59	9.30	9.23	8.56	8.73			
DO, mg/L	5.98	6.01	6.91	6.01	6.36	6.76			
pH	3.15	3.25	3.98	3.26	3.94	3.81			
ORP, mV	320.1	360.4	350.9	361.6	343.3	357.3			
Spec. Cond., mS/cm	1.111	1.501	.222	1.250	.130	1.440			
YSI stabilization time, minutes	12	13	10	12	10	12			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.76	1.406	90.8

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	11000 00	11000 00
Time of day	1200	1400

Run meter	
Reading	75256
Time of day	1200

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+ / 30+	30 / 25	30 / 24

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	40	46	40	46			50	50	.4	.4
Bi/carbonate	20	150	20	150	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate ✓	gal solution add: 1.5	gal water added: 4.5
	~~Bi/carbonate~~ Soda Ash ✓	lb added: 65 lb	gal water added: 125

Chemical Feed Off:	Time Stopped:	Time Restarted:	1400
Filter check (Y/N):	1200		

Samples Collected: N/A

Notes: Changed Filter

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 7/25/07 Weather 94°F
Personnel MY some clouds
22.8 Running

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.34	8.99	9.51	9.48	8.80	9.00			
DO, mg/L	3.86	4.88	3.01	5.01	4.32	6.04			
pH	3.99	5.99	3.89	3.31	3.99	3.51			
ORP, mV	320	345.7	320.8	386.6	314.2	330.3			
Spec. Cond., mS/cm	1.899	1.410	.220	1.238	.128	1.358			
YSI stabilization time, minutes	13	14	13	12	11	11			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	27.69	1.399	4.61

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1107100	1107100
Time of day	1230	1530

Run meter	
Reading	75742
Time of day	1230

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+ / 30+	30 / 25	27 / 25

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	40	40	40	40			50	50	.4	.4
Bi/carbonate	/	/	20	150	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate OFF/NO	gal solution add:	gal water added:
	Bi/carbonate 120 / 62.4	lb added: 62.4 lb	gal water added: 120 gl

Chemical Feed Off:	Time Stopped:	Time Restarted:	1530
Filter check (Y/N):	1230		

Samples Collected	NO

Notes: Changed filter / shut Down lactate

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 7-27-07 Weather 98°F overcast
Personnel MY

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.04	9.62	9.33	9.25	8.59	8.76			
DO, mg/L	6.18	4.10	3.21	3.63	4.01	2.68			
pH	6.99	5.94	4.55	5.51	5.58	5.21			
ORP, mV	320.3	360.7	320.2	333.1	340.4	318.6			
Spec. Cond., mS/cm	1.111	1.429	.222	1.300	.130	1.352			
YSI stabilization time, minutes	13	12	13	15	13	12			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	27.87	1.419	5.14

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1112800	1112800
Time of day	1000	1430

Run meter	
Reading	76180
Time of day	1000 / 1430

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+ / 30+	30+ / 25	30+ / 25

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate (off)	N/A	N/A	N/A	N/A	X	X	50	50	.4	.4
Bi/carbonate	70	150	70	150	60	60	60	60	1.6	1.6

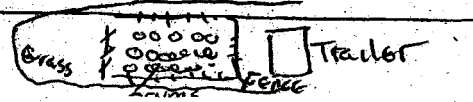
Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate N/A	gal solution add: N/A	gal water added: N/A
	Bi/carbonate Soda Ash	lb added: 41.6	gal water added: 80 gl

Chemical Feed Off:	Time Stopped:	Time Restarted:	1430
Filter check (Y/N):	1000		

Samples Collected	N/A

Notes: Repair injection well Bushing (was leaking)
Change filter
IDW Fence moved to surround Drums @ site 16 system



NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 7/30/07 Weather 95°F Sunny
Personnel MY

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.03	9.59	9.30	9.24	8.56	8.74			
DO, mg/L	5.91	5.54	6.1	5.46	5.92	7.01			
pH	3.61	6.99	4.0	3.01	3.99	3.30		6.99	
ORP, mV	349.1	356.9	321	366	343	331			
Spec. Cond., mS/cm	1.109	1.421	.216	1.221	.122	1.371			
YSI stabilization time, minutes	12	14	13	14	12	13			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	24.78	1.018	1.36

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1123100	1123100
Time of day	1200	1350

Run meter	
Reading	76916
Time of day	1200

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+ / 30+	30 / 27	25/25

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	N/A	N/A	N/A	N/A			50	50	.4	.4
Bi/carbonate	N/A	N/A	[illegible]	150	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate N/A	gal solution add: N/A	gal water added: N/A
	Bi/carbonate Soda Ash	lb added: 73	gal water added: 140

Chemical Feed Off:	Time Stopped: 1200	Time Restarted: 1350
Filter check (Y/N):	1200 - Changed	

Samples Collected	N/A

Notes: Changed filter

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date: Aug 1, 2007 Weather: Pt Clear 88°F
Personnel: Dave Siefken

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3		MW1	
DTW, feet	8.60	8.10	8.47	8.60	8.35	8.75		8.60	
DO, mg/L	0.32	0.48	0.28	0.28	0.72	1.61		0.20	
pH	3.49	3.84	3.93	3.93	4.18	3.54		3.21	
ORP, mV	(+) 278.2	(+) 272	(+) 153.9	(+) 153.9	(+) 221.2	(+) 166.4		(+) 272.1	
Spec. Cond., mS/cm	0.754	1.035	0.629	0.629	0.158	0.737		1.896	
YSI stabilization time, minutes	15	25	15	15	15	15		15	

* Recorded from in-line YSI meter.

Fe Color
MW 3
MW 1
MW 2

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	24.81	0.990	4.3

Extraction Well flow rate		
Rate, gpm		3.0
Totalizer		11312
Time of day		1501

Run meter	
Reading	77359
Time of day	1501

[redacted]	[redacted]	[redacted]

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	46	46	46	46	X	X	50	50	.4	.4
Bi/carbonate	150	150	150	150	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add:	gal water added: 0
	~~Bi/carbonate~~ Na Ash	lb added: 0 Tank full when I arrived	gal water added: 0

Chemical Feed Off:	Time Stopped: 1100	Time Restarted: 1140
Filter check (Y/N):	No change	

Samples Collected	None

Notes: Lots of iron in wells & in pipes
Lots of chalk like substance in IW - purged out.
Ash feed pump NOT pumping when I arrived - Fixed

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date: Aug 2, 2007 Weather: Pt Sunny 89°F
Personnel: Dave Siefken

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet		8.99			8.32				
DO, mg/L	0.1	0.4-0.8		0.4		0.7			
pH									
ORP, mV									
Spec. Cond., mS/cm									
YSI ~~stabilization~~ time, minutes	15	5		5		5			

* Recorded from in-line YSI meter.

← Chemetric Analysis
R-7501
R-7502

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %

Extraction Well flow rate		
Rate, gpm		3.0
Totalizer		11347
Time of day		1350

Run meter	
Reading	77565
Time of day	1350

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	max / "p" psi	30 / 26	29 / 25

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			—	—			50	50	.4	.4
Bi/carbonate			128	128	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: —	gal water added: —
	Bi/carbonate	lb added: —	gal water added: —

Chemical Feed Off:	Time Stopped:	1135	Time Restarted:	1350
Filter check (Y/N):	Ok			

Samples Collected	pH of Soda Ash tank = 11.0 pH
	(*) pH of IW difficult to estimate due to white material in water

Notes: - No Soda Ash being injected
- Removed white material from IW & injection point more material in injection point than well.

(Direct pumped H_2O into 16-85)

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8-3-07 Weather Rain 93°f
Personnel MY

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.34	8.69	8.63	8.82	8.80	8.53			
DO, mg/L	2.03	1.49	8.38 ~~2.38~~	.42	1.71	.69			
pH	3.43	3.61	3.18	3.95	3.41	3.36			
ORP, mV	-14.4	19.7	144.7	25.9	124.6	111.9			
Spec. Cond., mS/cm	1.177	1.245	.693	1.004	.128	1.321			
YSI stabilization time, minutes	12	14	13	13	12	12			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	24.68	.946	.89

3.27 pH

Extraction Well flow rate		
Rate, gpm	3.1	3.1
Totalizer	1139100	1139100
Time of day	1230	1700

Run meter	
Reading	77810
Time of day	[redacted] 1230

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+	26	24

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	46	46	46	46	X	X				
Soda Ash → Bi/carbonate	130	130	130	130	60	60	50 / 60	50 / 60	.4 / 1.6	.4 / 1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: No	Lactate —	gal solution add: —	gal water added:
	Bi/carbonate —	lb added: —	gal water added:

Chemical Feed Off:	Time Stopped:	Time Restarted:	1700
Filter check (Y/N):	1230		

Samples Collected	No

Notes: Test EW water with water from Bi/carb, injection Tank ph and view for any changes

Ph Drum 16.85 3.89

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date: Aug 6, 2007 Weather: Clear 94°F
Personnel: DS

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.78	8.67	8.21	8.75	8.22	8.70			
DO, mg/L	0.29	0.30	0.18	0.27	0.25	0.47			
pH	3.36	3.64	3.24	3.21	3.97	3.35			
ORP, mV	(+) 309.4	(+) 306.6	(+) 391.0	(+) 326.0	(+) 389.2	(+) 394.4			
Spec. Cond., mS/cm	0.858	0.957	0.692	1.596	0.534	0.468			
YSI stabilization time, minutes	10	15	15	11	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.40	0.854	6.6

Extraction Well flow rate		
Rate, gpm	3.2	3.15
Totalizer	11514 00	11516 00
Time of day	1058	1312

Run meter		
Reading	07847.2	07848.2
Time of day	1058	1312

[redacted]	[redacted]	[redacted]
[redacted]	[redacted] 28	[redacted] 26

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	—	—	—	—			50	50	.4	.4
Bi/carbonate	—	—	—	—	*60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: None	gal water added: None

Chemical Feed Off:	Time Stopped:	Time Restarted:
Filter check (Y/N): ok	1153	

Samples Collected: None

Notes: System running fine when I arrived. Not injecting any chemical

100° Humidity

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8/8/07 Weather 100°F Hot / Heat index 115°F TO 120°F

Personnel Mark Yarbrough

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	10.21	8.13	8.22	8.68	8.35	8.90			
DO, mg/L	.55	1.81	1.04	1.06	.99	1.27			
pH	3.41	3.48	3.62	3.15	3.23	3.19			
ORP, mV	308.5	345.6	336.3	409.8	355.6	386.4			
Spec. Cond., mS/cm	1.017	1.091	1.161	1.222	.818	1.370			
YSI stabilization time, minutes	12	13	11	10	11	10			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, ~~%~~ mg/L
	25.19	1.033	.81

3.13 Ph

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1160800	1160800
Time of day	1405	1700

Run meter	
Reading	78966
Time of day	1400 / 1700

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+ / 30+	27 / 25	25 / 25

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	N/A	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	50	50	.4	.4
Bi/carbonate	N/A	[redacted]	[redacted]	[redacted]	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH

Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Tanks for injection pumps of

Chemical tanks refilled?: NON	Lactate N/A	gal solution add: N/A	gal water added: N/A
	Bi/carbonate N/A	lb added: N/A	gal water added: N/A

Chemical Feed Off:	Time Stopped:	Time Restarted:	1700
Filter check (Y/N):	1410		

Samples Collected	No

Notes: Cleaned Filter Transfer contents of 5 Drums (steel) containing H_2O to Poly Drums check Ph This information is in Site 16 log Ph sin The 6.5 to 7.5 Ranges after Transfer will check again on 8/10/07 after Liquid and Solids separate Hung signs on IDW fence (compound) Haz waste/No smoking/authorized Rare forced by intense Heat To Take frequent Breaks away from site (No shade) [illegible]

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

99°f

Date 8-10-07 Weather 120 °f Heat index
Personnel MY

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.02	9.10	8.96	8.98	8.81	8.82			
DO, mg/L	.26	1.86	.99	1.04	.98	1.48			
pH	3.44	3.39	3.18	3.51	3.68	3.39			
ORP, mV	323.4	316.6	323.1	399.5	354.1	379.4			
Spec. Cond., mS/cm	1.211	1.141	1.122	1.222	.820	1.369			
YSI stabilization time, minutes	15	15	15'	15'	15'	15'			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.18	1.030	.84

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1169300	1169300
Time of day	1030	1600

Run meter	
Reading	79408
Time of day	1030

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+ / 30+	27 / 25	25/25

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate							50	50	.4	.4
Bi/carbonate					60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: NO	Lactate	gal solution add:	gal water added:
	Bi/carbonate	lb added:	gal water added:

Chemical Feed Off:	Time Stopped:	Time Restarted:	1600
Filter check (Y/N):	1030		

Samples Collected: NO

Notes: Clean filter

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8-13-07 Weather 100°f Cloudy 100% Humidity
Personnel MY

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.04	9.11	8.94	8.80	8.80	8.82			
DO, mg/L	.24	1.60	.80	.89	.76	1.23			
pH	3.42	3.36	3.21	3.48	3.63	3.37			
ORP, mV	322.1	319.4	326.2	404.3	368.3	371.4			
Spec. Cond., mS/cm	1.227	1.139	1.126	1.218	.809	1.358			
YSI stabilization time, minutes	15	15	15	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.23	1.033	.78

Extraction Well flow rate		
Rate, gpm	Down/3.0	3.0
Totalizer	[redacted]	1169800
Time of day		

Run meter	
Reading	79527
Time of day	

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+	25	25

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate							~~50~~ 30	~~50~~ 30	.4	.4
Full → Bi/carbonate	N/A	N/A	N/A	N/A	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate NONE	gal solution add: NONE	gal water added: NONE
	Bi/carbonate NONE	lb added: NONE	gal water added: NONE

Chemical Feed Off:	Time Stopped:	Time Restarted:	1800
Filter check (Y/N):			

Samples Collected	

Notes: System Down on arrival. Breaker Thrown
Restart [redacted] / OK [redacted]
[redacted] ssible lightning or power fluctuation
Restarted lactate at lowest settings 30

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8-15-07 Weather 100%
Personnel MY
1020-1102

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.12	8.95	8.27	8.00	8.27	8.72			
DO, mg/L	.39	.89	.70	.35	.46	.34			
pH	3.52	3.86	3.69	3.30	3.79	3.66			
ORP, mV	328.0	308.5	288.9	364.7	288.9	300.5			
Spec. Cond., mS/cm	.851	1.120	1.337	.907	1.097	1.420			
YSI stabilization time, minutes	42	25 ~~1105-1130~~	30	25 1105 1130	1130 1200 30	25			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	26.30	.847	.98

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1177800	1177800
Time of day	1000	1000

Run meter	
Reading	79.3947
Time of day	1000

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+ / 30+	27 / 25	

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	—	—	40	40			30	30	.4	.4
Bi/carbonate	—	—	150	150	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate None	gal solution add:	gal water added:
	Bi/carbonate NONE	lb added:	gal water added:

Chemical Feed Off:	Time Stopped:	Time Restarted: 1400
Filter check (Y/N):	1000	

Samples Collected	No

Notes: System Running Fine Lactate injection @ 30 settings

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8/17/07 Weather Hot 96°F
Personnel MY

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.81	8.74	8.10	8.81	8.33	8.80			
DO, mg/L	.26	1.31	.36	.42	.27	.91			
pH	3.41	3.39	3.23	3.46	3.61	3.40			
ORP, mV	323.4	321.8	325.5	399.8	371.6	373.3			
Spec. Cond., mS/cm	1.222	1.136	1.130	1.221	.802	1.361			
YSI stabilization time, minutes	25	25	25	25	25	25			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, ~~%~~ mg/L
	25.21	1.038	.76

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1186700	1186700
Time of day	1150	1500

Run meter	
Reading	80306
Time of day	1150

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+/30+	25/25	24/24

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	140	140	40	40	X	X	~~50~~ 30	~~50~~ 30	.4	.4
Bi/carbonate	130	130	130	130	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add:	gal water added:
NO		None	None
	Bi/carbonate	lb added:	gal water added:
	None	None	None

Chemical Feed Off:	Time Stopped:	Time Restarted:	1500
Filter check (Y/N):	1150		

Samples Collected	
	NO

Notes: check site 59 EW
1 Lt EW with 10mL Sodium bicarb (Same result as before ON EW for site 16
1 Lt EW with 10mL Soda ash on both Tests

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8/20/07 Weather Partly Cloudy ~95°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.64	9.38	8.47	8.64	8.39	8.93			
DO, mg/L			1.69	6.18		2.62			
pH			3.16	3.50		3.28			
ORP, mV			368.3	367.6		404.2			
Spec. Cond., mS/cm			0.844	1.333		0.539			
YSI stabilization time, minutes			15	15		15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1199612	1199632
Time of day	0945	1642

Run meter	
Reading	08100.4
Time of day	0947

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	> 30	27	26

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			~40	40	X	X	50	50	.4	.4
Bi/carbonate			125	125	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: No	Lactate	gal solution add: 0	gal water added: 0
	Bi/carbonate	lb added: 0	gal water added: 0

Chemical Feed Off:	Time Stopped:	0948	Time Restarted:	1642
Filter check (Y/N):	Y			

Samples Collected	
	NONE

Notes: Leak observed in influent line before entering trailer. YSI malfunctioned and remaining wells could not be evaluated today

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8/22/07 Weather partly cloudy ~95°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.84	9.80	8.53	8.90	8.53	9.00			
DO, mg/L	0.26	0.27	0.13	0.07	0.25	3.11			
pH	3.58	3.82	3.24	3.05	3.49	3.57			
ORP, mV	316.8	280.6	453.0	459.8	426.8	389.4			
Spec. Cond., mS/cm	1.028	1.203	1.040	1.549	1.007	0.706			
YSI stabilization time, minutes	5	25	15	15	20	20			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	24.58	1.028	3.3%

Extraction Well flow rate		
Rate, gpm	3.0	3.0
Totalizer	1207190	1207225
Time of day	0952	1232

Run meter	
Reading	08141.7
Time of day	0954

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	> 30	28	26.5

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			45	45			50	50	.4	.4
Bi/carbonate			125	125	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: No	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: None	gal water added: None

Chemical Feed Off:	Time Stopped:	0955	Time Restarted:	1230
Filter check (Y/N):	Y			

Samples Collected	NONE

Notes: Leak fixed in influent hose.

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8/24/07 Weather Partly cloudy ~95°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.08	10.04	8.54	8.86	8.55	9.00			
DO, mg/L	0.95	1.18	1.04	0.89	0.94	1.27			
pH	3.49	3.73	3.07	3.05	3.19	3.95			
ORP, mV	293.6	307.6	426.2	414.8	421.9	290.3			
Spec. Cond., mS/cm	1.070	1.148	1.208	1.738	1.074	0.851			
YSI stabilization time, minutes	5	20	15	20	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	24.73	1.070	11.2

Extraction Well flow rate		
Rate, gpm	3.2	3.0
Totalizer	1216049	1216113
Time of day	0957	1158

Run meter	
Reading	08187.2
Time of day	0955

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	> 30	32	31

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			45	45			50	50	.4	.4
Bi/carbonate			125	125	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: No	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: None	gal water added: None

Chemical Feed Off:	Time Stopped:	0958	Time Restarted:	1140
Filter check (Y/N):	Y			

Samples Collected	None

Notes:

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8/27/07 Weather 100°F clear 100% Humidity
Personnel MY Mark Yadavosky Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	10.11	9.99	8.69	9.08	8.68	9.11			
DO, mg/L	.24	1.19	.29	.31	.24	.69			
pH	3.40	3.43	3.21	3.42	3.51	3.36			
ORP, mV	320.6	328	316	369.6	363.2	370.4			
Spec. Cond., mS/cm	1.219	1.143	1.128	1.222	.816	1.351			
YSI stabilization time, minutes	20	20	20	20	20	20			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.30	1.036	.68

Extraction Well flow rate		
Rate, gpm	3.0	Not Restarted
Totalizer	1230200	
Time of day	1010	

Run meter	
Reading	82588
Time of day	1010

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+	25	25

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			40	40			50	50	.4	.4
Bi/carbonate			130	130	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate NO	gal solution add: NONE	gal water added: NONE
	Bi/carbonate NO	lb added: NONE	gal water added: NONE

Chemical Feed Off:	Time Stopped:		Time Restarted:
Filter check (Y/N):	1010		8/29/07 1300

Samples Collected	NO

Notes: System Changed around Not Restarted Due to Modification

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 8/29/07 Weather 100°F
Personnel Mark Yarbrough

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	9.86	9.84	8.61	9.07	8.66	9.10			
DO; mg/L	.26	.94	.24	.36	.18	.61			
pH	3.38	3.39	3.18	3.43	3.26	3.31			
ORP, mV	323.4	3.26	33.21	23.66	43.63	5.733			
Spec. Cond., mS/cm	1.224	1.146	1.133	1.220	.824	1.362			
YSI stabilization time, minutes	23	21	24	25	23	2			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.23	1.226	.38

Extraction Well flow rate		
Rate, gpm	3.0	2.5
Totalizer	1230200	1230200
Time of day	1230	1600

Run meter	
Reading	82599
Time of day	1230

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	30+	4[illegible]	40

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			40	40			50	50	.4	.4
Bi/carbonate			130	130	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: NO	Lactate 40	gal solution add: NONE	gal water added: NONE
	Bi/carbonate 130	lb added: NONE	gal water added: NONE

→ OFF

Chemical Feed Off:	Time Stopped:	Time Restarted:	1300
Filter check (Y/N):	8/27/07 1010 AM	8/29/07	

Samples Collected	NO

Notes: IW now Recovery Well EW is injection well
Change filter

Logan, Joe

From: Siefken, David
Sent: Tuesday, October 16, 2007 8:33 AM
To: Logan, Joe
Subject: RE: Cecil - Site 16 - missing operator logs?

II'll have to check the log book from the trailer for Sept 17.

8/24/2007	Y	
8/27/2007	Y	
8/29/2007	Y	
8/31/07?	I believe Rob told us to let the system run	
9/3/07?	We had just switched the wells	
9/5/07?	EW to IW and IW to EW on the 29th	
9/7/2007	Y	
9/10/2007	Y	
9/12/2007	Y	
9/14/2007	Y	
9/17/2007 ?	don't know – Kearney Jim	
9/19/2007	Y	
9/21/07 ?	System down	
9/24/07 ?	System down	
9/26/2007	Y	
9/28/2007	Y	
9/1/2007	Y	
10/4/07 ?		Just sent
10/8/07 ?		Just sent
10/12/07 ?		Just sent
10/15/2007	Y	

From: Logan, Joe
Sent: Tuesday, October 16, 2007 7:37 AM
To: Siefken, David
Subject: Cecil - Site 16 - missing operator logs?

Dave

I don't think I have a complete set of operator log for the Site 16 pilot study. Please see the attached list. The dates marked with a Y means that I have a copy of a log for that date. The dates in red indicate that I don't have a log for that date (or close to it.) Further, I'm not sure if there should be a log for the dates in red.

Please supply any copies of missing logs. (If you sent anything Friday, it may not be here yet.

Thanks

Joe

File: op log list.xls >>

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NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 9/7/07 Weather 95°F 10°±015° NE wind overcast
Personnel MY

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.59	8.40	8.73	8.61	8.66	8.99			
DO, mg/L	.53	1.19	.20	.51	.62	.31			
pH	4.26	3.48	3.73	3.84	3.08	3.73			
ORP, mV	282.1	380.4	323.5	335	421.0	320.5			
Spec. Cond., mS/cm	1.538	1.223	1.221	.467	1.145	1.112			
YSI stabilization time, minutes	20	20	15	20	20	20			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, ~~%~~ mg/L
	28.26	1.520	.81

Extraction Well flow rate		
Rate, gpm	1.3	3.0
Totalizer	125 8600	125 8600
Time of day	1330	1600

Run meter	
Reading	084757
Time of day	1330

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	12	0	0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	OFF						50	50	.4	.4
Bi/carbonate			100	100	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add:	gal water added:
NO	NO	NO	NO
	Bi/carbonate	lb added:	gal water added:
	NO	NO	NO

Chemical Feed Off:	Time Stopped:	Time Restarted:	1600
Filter check (Y/N):	1330		

Samples Collected	No

Notes: filter clogged with Iron / changed

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 9/10/07 Weather clear ~95°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.56	7.85	8.88	8.71	8.66	9.02			
DO, mg/L	0.57	0.50	0.90	0.78	0.67	0.67			
pH	3.56	4.08	3.43	4.07	3.79	3.75			
ORP, mV	358.2	373.5	244.2	264.2	275.1	287.6			
Spec. Cond., mS/cm	1.574	1.202	1.289	0.286	0.805	0.622			
YSI stabilization time, minutes	5	15	15	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	27.06	0.952	0.57

Extraction Well flow rate		
Rate, gpm	1.2	3.0
Totalizer	1263969	1263985
Time of day	1103	1343

Run meter	
Reading	8543.5
Time of day	1103

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	13.0	4.5	3.0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	NA	NA	NA	NA	X	X	50	50	.4	.4
Bi/carbonate			55	145	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: Yes	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: 47	gal water added: 90

Chemical Feed Off:	Time Stopped:	1105	Time Restarted:	1340
Filter check (Y/N):	Y			

Samples Collected	None

Notes: Changed filter. Added solution to Soda Ash tank. System running at 1.2 GPM upon arrival; changed to 3.0 GPM

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 9-12-07 Weather cloudy ~95°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.83	7.90	8.90	8.55	8.70	9.06			
DO, mg/L	2.17	1.08	0.71	0.69	0.69	0.63			
pH	3.53	4.01	2.94	4.00	3.17	3.05			
ORP, mV	350.7	291.3	404.1	279.9	395.0	387.8			
Spec. Cond., mS/cm	1.373	1.545	1.663	0.422	1.206	1.020			
YSI stabilization time, minutes	10	20	20	20	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.91	1.373	26.6

Extraction Well flow rate		
Rate, gpm	2.7	3.0
Totalizer	1272119	1272177
Time of day	1014	1228

Run meter	
Reading	8588.2
Time of day	1014

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	14.0	14.0	12.0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate							50	50	.4	.4
Bi/carbonate			130	132	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: No	Lactate None	gal solution add: None	gal water added: None
	Bi/carbonate None	lb added: None	gal water added: None

Chemical Feed Off:	Time Stopped:	1015	Time Restarted:	1228
Filter check (Y/N):	Y			

Samples Collected	None

Notes: Changed filter.

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 9/14/07 Weather Partly cloudy ~90°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.95	7.95	8.95	8.57	8.74	9.07			
DO, mg/L	2.13	5.52	0.58	0.54	0.70	0.74			
pH	3.47	4.00	2.79	3.71	3.29	3.14			
ORP, mV	361.1	298.7	428.6	338.8	362.0	398.0			
Spec. Cond., mS/cm	0.999	1.184	1.207	0.308	0.794	0.681			
YSI stabilization time, minutes	5	15	15	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	26.63	0.999	26.6

Extraction Well flow rate		
Rate, gpm	2.25	3.0
Totalizer	1278694	1278761
Time of day	0937	1148

Run meter	
Reading	8633.7
Time of day	0937

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	17.0	17.0	14.0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate							50	50	.4	.4
Bi/carbonate			110	110	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: None	gal water added: None

Chemical Feed Off:	Time Stopped:	0938	Time Restarted:	1148
Filter check (Y/N):	Y			

Samples Collected	None

Notes: No soda ash added to tank today.

Logan, Joe

From: Siefken, David
Sent: Tuesday, October 16, 2007 8:33 AM
To: Logan, Joe
Subject: RE: Cecil - Site 16 - missing operator logs?

II'll have to check the log book from the trailer for Sept 17.

8/24/2007	Y
8/27/2007	Y
8/29/2007	Y
8/31/07?	I believe Rob told us to let the system run
9/3/07?	We had just switched the wells
9/5/07?	EW to IW, and IW to EW on the 29th
9/7/2007	Y
9/10/2007	Y
9/12/2007	Y
9/14/2007	Y
9/17/2007 ?	~~Don't know~~ ← HEAVY RAIN - FLOODING - SYSTEM DOWN
9/19/2007	Y
9/21/07 ?	System down
9/24/07 ?	System down
9/26/2007	Y
9/28/2007	Y
10/1/2007	Y
10/4/07 ?	Just sent
10/8/07 ?	Just sent
10/12/07 ?	Just sent
10/15/2007	Y

From: Logan, Joe
Sent: Tuesday, October 16, 2007 7:37 AM
To: Siefken, David
Subject: Cecil - Site 16 - missing operator logs?

Dave

I don't think I have a complete set of operator log for the Site 16 pilot study. Please see the attached list. The dates marked with a Y means that I have a copy of a log for that date. The dates in red indicate that I don't have a log for that date (or close to it.) Further, I'm not sure if there should be a log for the dates in red.

Please supply any copies of missing logs. (If you sent anything Friday, it may not be here yet.

Thanks

Joe

File: op log list.xls >>

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NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date Sept 19, 2007 Weather RAIN 80°F
Personnel Dave Siefken

Well	EW* New	IW New	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet		4.76	9.12	8.95	9.00	9.25			
DO, mg/L	0.50	0.43	0.41	0.42	0.38	0.78			
pH	3.52	3.97	2.64	3.71	3.32	3.38			
ORP, mV	+ 319	+ 295	+ 459	+ 275	+ 337	+ 293			
Spec. Cond., mS/cm	0.940	1.005	1.253	0.532	0.711	0.963			
YSI stabilization time, minutes	8	15	15	10	20	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	26.68	0.941	5.9

Extraction Well flow rate		
Rate, gpm	4.25	
Totalizer	13050	
Time of day	0937	

Run meter	
Reading	87524
Time of day	0937

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	16	12	0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate										
Bi/carbonate					.5		.3		.8	

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:			
NO	Lactate	gal solution add:	gal water added: —
	Bi/carbonate	lb added: 0	gal water added: 0

Chemical Feed Off:	Time Stopped:	Time Restarted:
Filter check (Y/N): ok	0937	

Samples Collected	None

Notes: Lots of iron in MW1

DID NOT restart system - Blue well seal leaking need to get new part.

Logan, Joe

From: Siefken, David
Sent: Tuesday, October 16, 2007 8:33 AM
To: Logan, Joe
Subject: RE: Cecil - Site 16 - missing operator logs?

Il'll have to check the log book from the trailer for Sept 17.

8/24/2007	Y	
8/27/2007	Y	
8/29/2007	Y	
8/31/07?	I believe Rob told us to let the system run	
9/3/07?	We had just switched the wells	
9/5/07?	EW to IW and IW to EW on the 29th	
9/7/2007	Y	
9/10/2007	Y	
9/12/2007	Y	
9/14/2007	Y	
9/17/2007 ?	don't know	
9/19/2007	Y	
9/21/07 ?	System down	
9/24/07 ?	System down	→ EW & IW restored to normal flow direction on 9/25.
9/26/2007	Y	
9/28/2007	Y	
10/1/2007	Y	
10/4/07 ?		Just sent
10/8/07 ?		Just sent
10/12/07 ?		Just sent
10/15/2007	Y	

From: Logan, Joe
Sent: Tuesday, October 16, 2007 7:37 AM
To: Siefken, David
Subject: Cecil - Site 16 - missing operator logs?

Dave

I don't think I have a complete set of operator log for the Site 16 pilot study. Please see the attached list. The dates marked with a Y means that I have a copy of a log for that date. The dates in red indicate that I don't have a log for that date (or close to it.) Further, I'm not sure if there should be a log for the dates in red.

Please supply any copies of missing logs. (If you sent anything Friday, it may not be here yet.

Thanks

Joe

<< File: op log list.xls >>

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NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date: Sept 26, 2007 Weather: Clear 87°F
Personnel: DS

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet									
DO, mg/L									
pH									
ORP, mV									
Spec. Cond., mS/cm									
YSI stabilization time, minutes									

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %

Extraction Well flow rate		
Rate, gpm	1.2	1.2
Totalizer	13078	"
Time of day	1338	1528

Run meter	
Reading	87834
Time of day	1338

[redacted]

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	0	0					50	50	~~.3~~	~~.3~~
Bi/carbonate	40	150			~~80~~ .3	~~80~~ .3	~~60~~	~~60~~	~~.8~~	~~.8~~
							.3	.3	.8	.8

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add:	gal water added:
	Bi/carbonate	lb added: 46.8	gal water added: 170

Chemical Feed Off:	Time Stopped: 1340	Time Restarted: 1528
Filter check (Y/N):	ok	

Samples Collected	None

Notes: Let System Run

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 9-28-07 Weather clear ~80°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.21	8.26	8.53	8.61	8.43	8.89			
DO, mg/L	0.71	1.95	0.57	0.73	0.81	0.61			
pH	3.91	5.91	2.81	3.47	3.15	3.42			
ORP, mV	278.1	8.6	293.8	276.6	356.5	272.3			
Spec. Cond., mS/cm	1.217	1.697	1.112	0.513	0.860	0.710			
YSI stabilization time, minutes	10	20	20	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	27.65	1.217	9.4

Extraction Well flow rate		
Rate, gpm	1.2	1.2
Totalizer	1311079	1311198
Time of day	0900	1122

Run meter	
Reading	08826.8
Time of day	0902

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	6.0	7.0	4.5

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate							50	50	.4	.4
Bi/carbonate			105	105	~~80~~ .30	~~80~~ .30	~~30~~ 50	~~30~~ 50	~~1.0~~ .8	~~1.0~~ .8

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: No	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: None	gal water added: None

Chemical Feed Off:	Time Stopped:	0902	Time Restarted:	1122
Filter check (Y/N):	Y			

Samples Collected: No samples collected.

Notes: Leave flow rate at original rate of 1.2 GPM.

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 10/1/07 Weather Rainy ~75°F
Personnel Jon Foster Wind Advisory

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	8.22	8.09	8.53	8.61	8.45	8.91			
DO, mg/L	1.57	0.61	0.60	0.54	0.55	0.77			
pH	3.83	5.81	2.84	3.10	2.89	3.19			
ORP, mV	300.2	-4.8	423.2	367.3	404.7	349.4			
Spec. Cond., mS/cm	1.131	1.648	1.032	0.598	0.904	0.684			
YSI stabilization time, minutes	10	15	15	15	20	20			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	26.09	1.131	19.7

Extraction Well flow rate		
Rate, gpm	1.05	1.2
Totalizer	1315449	1315470
Time of day	1019	1239

Run meter	
Reading	08898.0
Time of day	1019

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	7.0	7.5	6.0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			~~65~~ 35							
Bi/carbonate			65		0.50	0.50	0.30	0.30		

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: No	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: None	gal water added: None

Chemical Feed Off:	Time Stopped:	1021	Time Restarted:	1239
Filter check (Y/N):	Y			

Samples Collected	None

Notes: Filter changed out.

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 10/4/07 Weather cloudy ~85°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	7.30	6.31	7.62	7.70	7.49	8.01			
DO, mg/L	0.78	0.38	0.57	4.74	0.63	0.65			
pH	3.72	6.79	2.65	3.20	2.85	3.03			
ORP, mV	306.0	-123.5	457.2	370.1	431.7	330.9			
Spec. Cond., mS/cm	1.086	2.138	1.054	0.616	0.852	0.679			
YSI stabilization time, minutes	10	15	20	25	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	27.62	1.086	10.0

Extraction Well flow rate		
Rate, gpm	0.3	1.2
Totalizer	1319915	1319933
Time of day	0931	1200

Run meter	
Reading	08967.2
Time of day	0931

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	6.0	6.0	4.0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate										
Bi/carbonate			20	150	~~80~~ 50	~~80~~ 50	~~80~~ 30	~~80~~ 30	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: 67	gal water added: 130

Chemical Feed Off:	Time Stopped:	0932	Time Restarted:	1200
Filter check (Y/N):	Y			

Samples Collected	None

Notes: Flow rate for Soda Ash injection = 35 ml/min
Inventory
Soda Ash: 185 lb.
Bicarbonate: 550 lb.
Let DO sit for 25 minutes at MW1. Not sure of reading.

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 10/8/07 Weather Clear day ~ 75°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	6.79	5.28	6.35	6.57	6.30	6.77			
DO, mg/L	0.45	0.55	0.38	0.68	0.41	0.68			
pH	3.63	5.27	3.56	3.03	3.73	3.01			
ORP, mV	310.8	89.9	305.3	394.2	297.5	366.7			
Spec. Cond., mS/cm	1.007	1.393	1.060	0.788	0.825	0.727			
YSI stabilization time, minutes	10	15	10	15	10	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	27.00	1.007	0.45 mg/L

Extraction Well flow rate		
Rate, gpm	1.5	1.2
Totalizer	1328837	1328882
Time of day	0936	1140

Run meter	
Reading	09061.1
Time of day	0936

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	14.0	14.0	12.0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			40	40			50	50	.4	.4
Bi/carbonate			94	94	~~80~~ 50	~~80~~ 50	~~80~~ 30	~~80~~ 30	~~1.6~~ 0.6	~~1.6~~ 0.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: No	Lactate	gal solution add: None	gal water added: None
	Bi/carbonate	lb added: None	gal water added: None

Chemical Feed Off:	Time Stopped:	0939	Time Restarted:	1140
Filter check (Y/N):	Y			

Samples Collected	No samples collected.

Notes: Lactate injection started today

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 10/12/07 Weather clear ~75°F
Personnel Jon Foster

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	5.64	5.77	6.48	6.61	6.43	6.92			
DO, mg/L	0.38	0.39	0.39	0.42	0.48	0.48			
pH	3.80	5.64	3.62	3.34	3.73	3.32			
ORP, mV	248.5	6.8	193.9	303.3	209.1	333.1			
Spec. Cond., mS/cm	1.276	1.693	1.408	1.104	1.035	0.891			
YSI stabilization time, minutes	10	20	15	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, ~~%~~ mg/L
	27.43	1.276	0.38

Extraction Well flow rate		
Rate, gpm	0.9	1.2
Totalizer	1334150	1334148
Time of day	1128	1353

Run meter	
Reading	09157.5
Time of day	1128

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	9.0	9.0	7.0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			26	40			50	50	.4	.4
Bi/carbonate			35	150	~~80~~ 50	60	~~80~~ 30	60	~~1.6~~ 0.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?: Yes	Lactate	gal solution add: 3	gal water added: 10
	Bi/carbonate	lb added: 60	gal water added: 115

Chemical Feed Off:	Time Stopped: 1131	Time Restarted: 1354
Filter check (Y/N):	Y	

Samples Collected: No samples collected.

Notes: Filter changed.

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date Oct 15, 2007 Weather Pt Sunny 82°F
Personnel Dave

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	6.45	6.45	6.70	6.82	6.61	7.09			
DO, mg/L	.87	0.42	0.54	0.46	0.41	0.49			
pH	3.92	6.43	3.69	3.29	3.68	3.66			
ORP, mV	+208	-82	+260	+293	+257	+247.3			
Spec. Cond., mS/cm	1.284	2.341	1.072	1.166	1.058	0.858			
YSI stabilization time, minutes	15	15	15	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	26.87	1.335	10.9

Extraction Well flow rate		
Rate, gpm	1.2	1.6
Totalizer	13388	13388
Time of day	1007	1213

Run meter	
Reading	09 2260
Time of day	1007

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	16	12	9

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	~~35~~	~~35~~	35	35			50	50	.4	.4
Bi/carbonate			40	150	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: 0	gal water added: ~~110~~ 0
	Bi/carbonate	lb added: 57.2	gal water added: 110

Chemical Feed Off:	Time Stopped:	Time Restarted:	1158
Filter check (Y/N):	1007		

Samples Collected	No samples collected, Filter ok, No Iron problem

Notes: (EW reading taken from sample ports at trailer.)
Cleaned injection filter for soda Ash

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 10-18-07 Weather Clear 87 °F
Personnel

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	5.54	18.87	7.76	7.15	6.79	7.18			
DO, mg/L	0.32	0.50	0.32	0.39	0.34	0.41			
pH	3.44	3.77	2.64	2.72	2.69	2.84			
ORP, mV	2.98	+282	+409	+364	+372	+290			
Spec. Cond., mS/cm	1.028	1.045	1.115	0.940	1.084	0.999			
YSI stabilization time, minutes	15	15	15	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	26.00	1.028	4

Extraction Well flow rate		
Rate, gpm	3.0	
Totalizer	13466	
Time of day	1433	

Run meter	
Reading	92571
Time of day	1432

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	18	14	11

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate			30	30	X	X	50	50	.4	.4
Bi/carbonate			110	150	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: 40	gal water added: 0
	Bi/carbonate	lb added: 20	gal water added: 40

Chemical Feed Off:	Time Stopped:	Time Restarted:	1405
Filter check (Y/N):	0900		

Samples Collected: None - Skip cleaned injection screen 4 wells

Notes: System running well

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date Oct 22, 2007 Weather Rain 81°F
Personnel D.S

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	7.35	7.41	6.97	7.40	7.02	7.48			
DO, mg/L	0.31	0.33	0.28	0.30	0.31	0.37			
pH	3.44	4.01	3.54	2.92	2.74	2.94			
ORP, mV	+185	+252	+194	+349	+402	+331			
Spec. Cond., mS/cm	0.917	0.959	1.119	1.059	1.055	0.737			
YSI stabilization time, minutes	15	15	15	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.18	0.918	3.7

Extraction Well flow rate		
Rate, gpm		13600
Totalizer		2.3
Time of day		1105

Run meter	
Reading	93884
Time of day	1105

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	10	8	6

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate							50	50	.4	.4
Bi/carbonate					60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: 110 7.4	gal water added: 25
	Bi/carbonate	lb added: 57 110	gal water added: 110

Chemical Feed Off:	Time Stopped: 0915	Time Restarted: 1200
Filter check (Y/N): OK	0915	

Samples Collected: None collected

Notes: Let system run at 24 with ↑ speed
Clean & check H2O level on EW next time

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date: Oct 25, 2007 Weather: Pt Sunny 75 °F
Personnel: D. Siefken

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet	6.89	7.	7.07	7.27	6.97	7.48			
DO, mg/L	0.34	0.44	0.32	0.37	0.37	0.33			
pH	3.43	5.43	2.64	2.78	3.74	2.79			
ORP, mV	+321	60.4	+428	+384	+272	+328			
Spec. Cond., mS/cm	1.161	2.035	1.376	1.444	1.707	1.049			
YSI stabilization time, minutes	15	15	15	15	15	15			

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.36	1.160	4.0

Extraction Well flow rate		
Rate, gpm	2.2	1.1
Totalizer	13704	13705
Time of day	1205	1522

Run meter	
Reading	94615
Time of day	94620

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	10 [redacted]

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate	—	—	60	150			50	50	.4	.4
Bi/carbonate	—	—	35	40	60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: 1.48	gal water added: 5
	Bi/carbonate	lb added: 46.8	gal water added: 90

Chemical Feed Off:	Time Stopped: 1205	Time Restarted: ~~1522~~
Filter check (Y/N):	1206	

Samples Collected	Charcoal filter, No samples

Notes: Talked w/ Rob, IW short circuiting slow to ~1 gpm
Did Not Restart - @ 1 gpm H2O overflowed from IW
will stop to see if this corrects the short circuit problem

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date Oct 29, 2007 Weather Rain 71°F
Personnel DS

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet									
DO, mg/L									
pH									
ORP, mV									
Spec. Cond., mS/cm									
YSI stabilization time, minutes									

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %

Extraction Well flow rate		
Rate, gpm		1.2
Totalizer		13705
Time of day		1020

Run meter	
Reading	094623
Time of day	1020

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	7	[redacted]

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate		[redacted]				X	50	50	.4	.4
Bi/carbonate					60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: —	gal water added: —
	Bi/carbonate	lb added: —	gal water added: —

Chemical Feed Off:	Time Stopped:		Time Restarted:	
Filter check (Y/N):				

Samples Collected	

Notes: Turn system on will take readings tomorrow

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date Oct 30, 2007 Weather pt Sunny 71°F
Personnel DS

Well	EW*	IW	016-46I	016-MW1	016-MW2	016-MW3			
DTW, feet									
DO, mg/L				X					
pH				X					
ORP, mV				X					
Spec. Cond., mS/cm									
YSI stabilization time, minutes									

* Recorded from in-line YSI meter.

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %

Extraction Well flow rate		
Rate, gpm		1.2
Totalizer		13732
Time of day		0937

Run meter	
Reading	94854
Time of day	0937

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	10	6	5

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
Lactate					X	X	50	50	.4	.4
Bi/carbonate					60	60	60	60	1.6	1.6

Normal settings: Lactate pump = 0.2 GPH; Bi/carbonate pump = 1.46 GPH
Maximum pumps output capacities: Lactate pump = 0.4 GPH; Bicarbonate pump = 4.0 GPH

Chemical tanks refilled?:	Lactate	gal solution add: —	gal water added: —
	Bi/carbonate	lb added: —	gal water added: —

Chemical Feed Off:	Time Stopped:	Time Restarted:
Filter check (Y/N):	0937	

Samples Collected	

Notes: System Stopped because of Short Circuit at IW - Cleaned up Area - Site Secure

Did Not take GW readings.

ISCO PILOT STUDY OPERATOR LOG SHEETS

Well INST. US NAVY Site 16 Nov 19, 2007

Personel : Dave Siefken
PPE : level "D"
Weather : Cloudy 70°F
Obj : Install : IW 2 & 3, MW 4, & EW 2
Injection well & Extraction wells
10 ft .01 slot - TD = 34
MW = 5 ft .01 slot TD = 32
Pantex Well. Richard, Kevin, & Jeff

0815 At JAA to get permit for digging
0840 Meet chris at site Have signed permit from JAA
Drillers arrive ~ 0830
0900 Do H&S.
0940 Done H&S sign-in forms, talked about contaminants, emergency information. Handed each person drilling a truck a map & the contact phone #s. Fire extinguisher in all trucks on-site. - Talked about work to be done

1000 Established decon pad on concrete new building looks good. Begin to post hole IW3
1028 Ready to begin to drill, hole clear to 4'
All persons wearing proper PPE

PID Calibrated To 100 ppm Isobutylene
75 changed to 100 ppm - good calibration
Drillers will tape rods & change rods w/ H2O to keep silts out. use 9.5" bit to cut hole
Will use Standard Sand & Silica for filter pack
(20/30 & 30/65)
Lehigh Heidelberd Cement Group
portland cement

Have set up cones forming exclusion area
5 ft greater than mast height
1119 Begin to turn augers

RC

Site 16 Well Inst. Cecil US NAVY Nov 19 2007

Soil Drums
16-90 - 4-10' IW3
16-91 - 11-27'
16-92 - 27-34'
16-93 - All depths

gravel 7-12' at 15 ft. now
Silty sands to 34'
H&S Screening Bore hole between rods & mud
from hole at ~ 20 ft All "0" or Bkgd.

1154 Well in HSA begin to set well
1157 Charge augers w/ H2O
1200 Begin to pump sand through tremmie
Bags of Sand 20/30
HH LHH =19

1217 H/S Screen breath zone, drum, HSA, All = 0 BKGD
All persons wearing proper PPE
1224 Bag 30/65 fine sand - 1
Begin adding @ 22 ft - 20 ft -
grout 20 - 0 ~ land surface
Bags of Grout
HHHHH = 9

1305 Well set All augers out looks good
1310 Done with IW3 still need to top off grout portland
but all else done.

Site 16 Well Inst. US NAVY Cecil Nov 19, 2007

1325 Done IW3 - begin to reset on IW2
1350 Post hole down to 4'
1406 Clear to 4' setting rig on IW2
1426 Begin to push to 34' - All persons wearing proper PPE
Rods down w/ pressure wash + ~~[illegible]~~ + Rinse DT
1434 HS Check breath zone of drum of cuttings

Soil Drums	ID	Depth	Well
	16-94	4'-15'	IW2
	16-95	15-25	
	16-96	25-34	
	16-97	20-34	
1445	HS - Breathzone of Drum = 0 Bkgd.		
	16-98	20-34	

1500 Well in augers, Changed augers w/ H_2O
Did PID reading in auger each when pumping
H_2O = 0

1503 Begin to put Sand 20/30 into filter pack
20/30 HH II (34'-22')
30/65 I (22-24')
Portland
Fine to Very fine Sand in filter pack area

1521 Filter pack in looks good

1540 Begin Decon of augers - H_2O collected for Drum 16-99

Decon Drum H_2O
16-99 · Decon H_2O

1645 All through - picked up Site
Work Completed today
- IW2 + IW3
- Need to do pads for these wells

1705 All leaveside - END of DAY

Site 16 Well Inst. US NAVY Cecil 11-20-07

Personnel : D. Siefker
PPE : Level D
Truck POU
Obj : Ins EW 2 (24'-34') & MW 4 (-27'-32')
Weather : Clear 75°F
Driller : Jeff, Richard, Kevin

0820 Drillers & Tt on site do H&S. - Core concrete went over safety of concrete core & PPE.

0903 Begin to core EW-2 - All persons wearing proper ppe.

0915 Stop core process we were in line with system pipes relocate.

0920 Begin to core again EW2 - Kevin wearing safety glasses + ear plugs + S. Toe boots.

0949 Post hole down located Schedule 80 pvc must move again for EW-2

MW-4 concrete core cut post hole down. to clear

1017 EW-2 Clear to 4' post hole down. Setting up to do drilling.

1020 Calibrate PID ID ED EF 203
PE Photovac 10.6 lamp.
97 ppm to 100 ppm
Augers cleaned from yesterday look good.

1034 Begin to spin 1st Auger - All persons wearing proper PPE.

1043 H2S PID = Bkgd at breath zone. 0

RCL

Site 16 US NAVY Cecil Well INST. 11-20-07

Soil Drums For EW 2		
16-100	4'-25'	EW2
16-101	15'-30'	
16-102	30'-34'	
16-103	mix All depths	
16-104	"	

1058 AT - Augers charged target depth of 34' ft bls - lowering well into augers 10 ft Screen .01 Slot
TD = 34 - 20/30 filter pack & 30/65 Seal
Sand 20/30 Bags - 1 1/4 1 1/8
30/65 Bags 1
Portland

1128 Well filter pack & seal set begin mixing Portland

1146 Still pumping portland.

1200 Well set moving to MW 4

Soils for EW 2 are same as IW 219
fine sand, some silts but Not to bad.

1215 Decon of rods

1300 Setting up for MW 4 - (27'-32') 2"
Augers will cut a ~9" hole, inspect augers look clean Richard sprayed them off during decon
All decon H_2O collected in plastic berm for disposal in drum 16-399

1319 Begin to spin augers - All persons wearing proper ppe

1132 H&S PID Screen 0 Ambient 0 Breath zone 0 - Auger Hole

[redacted]

52

Site 16, Well Inst. US NAVY, Cecil Nov 20, 2007

Soil Drums of MW4	
- 16-105	0-25'
- 16-106	25'-32' + Mix Soil Depth
- 16-107	Mix of all Depth

1338 H2S PID 0 = Bkgd, 0 = Breathing zone 0 = Auger hole
All persons wearing proper PPE

1345 Setting well out 32'. Have all covered in plastic until ready for installation. Wear latex gloves when handling screen. Have done this for other wells

1352 Pour filter pack 20/30 - Bags NH
30/65 1
Portland III
Portland Cement added, & topped off to ~2 ft bls

1530 All wells grouted. Cleaned up site
Decon H2O piped into Drum 16-99

1603 Leave Site. Site Secure - Put up Survey tape to keep people out. Cones on wells.

Site Ke , Well Inst US Navy Cecil 11-21-07

Personel: Dave Stiffler
Drillers : Jeffery & Kevin
PPE : Level "D"
Obj : Build pads & clean up site, move drums

0800 Drillers on site H&S lifting & PPE for cleanup

0818 Kevin & Jeffery on site today. Begin sweeping & cleaning of drums

0920 Put Devon pad into steel drum

16-108 - Devon Pad Plastic

0945 Begin to mix concrete for pads - cutting concrete out for wells in driveway wearing earplugs & safety glasses & ST shoes

1207 Pads done look ok - have plugged concrete core holes we did not use, Begin to move drums onto wood in fenced area

1315 Done moving drums look good pressure washed concrete & raked soil around pads looks good

1340 Drillers off site

1345 Begin To Rinse EW-2
Calibrate YSI
6.91 → pH 7.0 Lot # 2611631 exp 11/08
4.05 pH 4.0 Lot # 2604143 exp 03/08
1465 Cond 1.409 —

1426 Surging well with sump U. Fine ppt seals in bottom of well. Not many silts - Surging a lot to clean out well

Site 16 Well Inst. USNAUT Cecil 11-21-07

Well Development Drums

EW 2	16-109	50 gal
	16-110	
	16-111	
	16-112	
	16-113	
EW 2	16-114	50 gal
	16-115	
	16-116	
	16-117	
	16-118	

1745 Almost Done for day will Stop with this Drum
Site picked up drums secure

1807 Leave site - Done

IW 2
EW 2 } Developed

55

US NAVY ; Cecil Site 16 Well Dev. 11-23-07

Personnel: Dave Siefken
PPE : level "D"
Weather : Clear Cool 65°F
Develop IW3 & MW4

0803 On site Calibrate YSI
0810 Begin to develop IW3
pH 3.96 → 4.0
pH 7.02 - 7.0
Cond 1.462 1.409
Turb. 998 1000
Turb 13 10
Turb .03 .02
~~Rec 3 H2O Drums~~

0826 Sand almost all gone looks good
0920 Dave only took out 2 drums well looks good.
begin on MW 4
1025 Yellowish silt no solids hard to remove yellow color
1058 Removed 2 drums to get clear, did not produce much H2O purged below top of well screen
(*) All Drums stored in secured area at Site 16

1120 Packed up & leave site.

Dev. H2O Drums (11-23-07)

IW3	MW 4
16-119	16-121
16-120	16-122

DRUM
11-27 16-123 - Total H2O
50 gal
MW 2

56

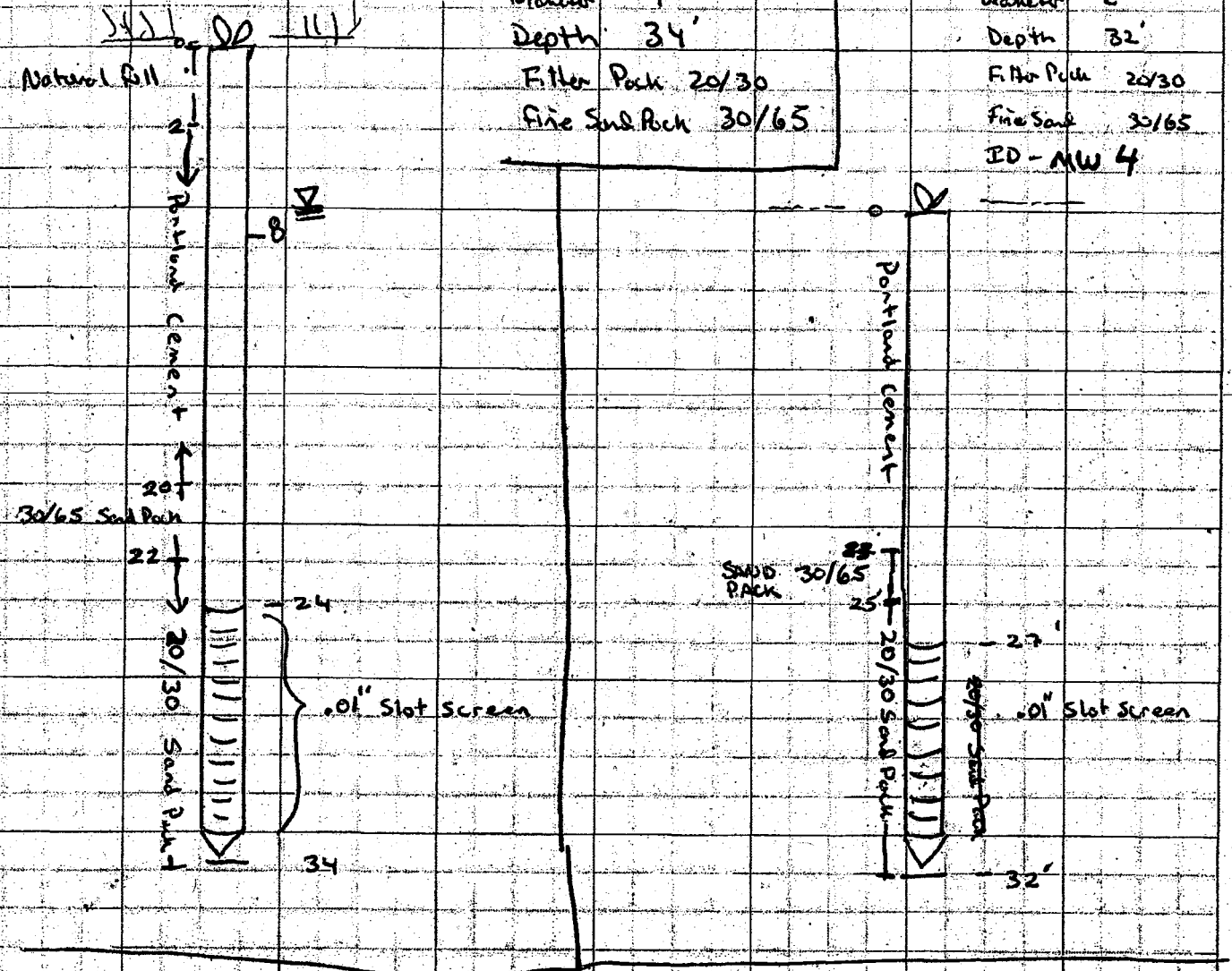
10

Wells Installed @ site the US NAVY 11-23-07

(IW2, IW3 & EW2)

Rig - HSA
Diameter 4"
Depth 34'
Filter Pack 20/30
Fine Sand Pack 30/65

Rig - HSA
Diameter 2"
Depth 32'
Filter Pack 20/30
Fine Sand 30/65
ID - MW 4



Well Installation Summary Table

Well installed on:

Nov 19, 2007 = IW2 & IW3

Nov 20, 2007 = EW2 & MW4

Developed on

Nov 21, 2007 = EW2 & IW2

Nov 23, 2007 = IW3 & MW4

Site 16 Baseline II GW Sampling 12-11-07

Personnel : Dave Siefker
PPE : Level "D"
LAB : ACCUTEST
Weather : Clear 80°F
Obj : Collect GW from IW2, IW3, EW2, MW2, MW4

0700 AT OFFICE BEGIN TO LOAD EQUIPMENT FOR SAMPLING
0738 LEAVE FOR CECIL
0810 AT CECIL - SITE LOOKS OK, SECURE SIGNS ON FENCE
CALIBRATE YSI ID 07010094I
pH 7.08 → 7.0
4.10 → 4.0
DO 101.3 → 100
ORP 234 → 240
Cond 1462 → 1409
HF SCIENTIFIC - TURBIDITY METER #2000
ID 200704133
995 → 1000 NTUs
10.4 → 10
.3 → .2
INSTRUMENTS CALIBRATED GOOD - PID READINGS DURING WELL INSTALLATION WERE = 0 - BASED ON HISTORICAL INFO. NO PID IS NEEDED
* USE OLD SOPs of FDEP FOR SAMPLES TODAY
ALL PURGE H_2O CONTAINERIZED IN DRUM
DRUM → 16-124 - PURGE H_2O

SAMPLE ID CEF-016-GW-XXX-01 (well ID)

TIME		VOC	Filter FE MN	Total NA	Anions	TOC
0930	IW2	3				
1010	IW3	3	1	1	1	2
1150	EW2	3		1		2
1245	MW4	3		1		2
1345	MW2	3	1	1	1	2

⊗ All SAMPLES ON ICE ONCE COLLECTED
* WEARING PROPER PPE DURING SAMPLING

D

Site 16 Baseline II Cecil US NAVY 12/11/07

(*) USE 1 um FILTER FOR Fe & Mn SAMPLES

1140 HAD TROUBLE GETTING H_2O PROBE TO H_2O IN EW2 PUMP & WIRES ARE BLOCKING ACCESS GOT PROBE STUCK 4 TIMES DECIDED TO NO CHANCE GETTING PROBE STUCK ~~for~~ PERMENANTLY THIS IS WHY NO H_2O LEVELS ON GW SAMPLE SHEET

1315 LOTS OF ORANGE PERCIPITATE IN MW2 BOTTOM OF WELL, HAD TO PUMP OUT CAUSED TURBIDITY PROBLEM.

1506 HAVE COMPLETED NA FIELD PARAMETERS ON EACH WELL

DO
ALK
CO_2
Fe^{2+}
H_2S

I ALSO DID SULFIDE even though IT WAS NOT REQUESTED - THERE WERE SEVERAL HIGH S READINGS.

1510 LEAVE SITE → RUSH TO FED-EX # 847-1834-4338

1555 AT OFFICE

Site 16

Turn Pump On The System for Pump test 12-13-07

1221 Turn submersible pump on located in EW2.
133733 GAL

1406 Flow set at 3.0 gpm. H_2O level ~~21.2~~ 19.99 in EW2
Almost holding.
P1 4 psi
P2 5 psi
P3 0 psi

EW2 Well looking good, only injecting into 1 well right now need to get 2 coupler forgot to pick up 4 am running out of time today. Have to leave site for meeting will try again tomorrow. Little to no sand in filter. Very good well.

1415 Turn pump off Successful pumptest - EW2 will produce 3 gpm. GW appears to be holding at 20.0 ft bls Top of Screen is ~ 24 ft bls

1418 Site Secure leave for office.

RCL

Site 16 Cecil - U.S. NAVY 3-14-08

Personnel: Jon Foster (JF) T+NUS
Josh Welch (JW) ARC Surveying
John Maffett (JM) ARC Surveying
PPE : Level D
Weather : Cloudy ~60°F
Objective : Survey well locations at Site 16. Will then proceed to 815 and Site 59 areas.

0830 JF at Site 16. Meet JW and JM at site. Point out locations of wells to be surveyed.

0840 JF begins uncapping Site 16 wells. JW and JM set up their equipment.

Wells Surveyed:
CEF-016-PT-IW1
CEF-016-PT-IW2
CEF-016-PT-IW3
CEF-016-PT-EW1
CEF-016-PT-EW2
CEF-016-PT-MW1
CEF-016-PT-MW2
CEF-016-PT-MW3
CEF-016-PT-MW4
CEF-016-12I
CEF-016-46I

1215 JF departs site.

JCF

61

START Recirculation ONLY

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 4.23.08 Weather Clear 75°F
Personnel

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	19.58							
DO, mg/L								
pH								
ORP, mV								
Spec. Cond., mS/cm								
YSI stabilization time, minutes								

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %

Extraction Well flow rate		
Rate, gpm		3.1
Totalizer		00001
Time of day		1630

Run meter	
Reading	094887
Time of day	1630

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig			

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2										

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ Peroxide	gal solution add:	gal water added:
		—	—

Chemical Feed Off:	Time Stopped:		Time Restarted:	
Filter check (Y/N):				

Samples Collected	None

Notes: Start Recirculation only

Site 16 Recirculation Start 4-23-08

Personel : D. Siefken

0800 on site

	DTW (Ft)
EW-2	8.10
IW-3	8.03 top of blue seal
IW-2	8.31
46i	8.11
MW-2	7.94
MW-1	8.11
MW-4	7.83
MW-3	8.46

Hour meter = 094872
Gal meter = 13735

Turn EW-2 on 1004

1006 Stop H_2O coming out of ground.

1028 Fixed second cracked pipe 1st was in road between wood & underground near MW 1
150 gal tank cleaned & filled, used Hose from Bldg 313. Placed splash face shield & goggles in peroxide drum storage container, used cat fenced area, pick up trash & organized trailer
Cleaned out injection line, reset attachments to injection pump.

1045 off to hardware store

1127 On site

1139 New leak in hose under trailer Stop
Also Gallon meter does not work

1204 Need New hose & meter off to Store

1436 Back on site Have new hose & meter

1510 New Flow meter installed

DK

Site 16 Recirculation Start 4-23-08

1311 Purchased Flowmeter from Grainger part 3HU71 - in line flowmeter 3/4"

1700 To mitigate broken lines & other
- put cones along buried line
- put cones at IW wells. ~3.5 ft apart
- added wood near well IW2 where line was broke
- Replaced elbow stress point on flex hose.
- Straighten hose making turn gradual to reduce stress at elbow.
- Added clear hose to view H_2O at elbow

1754 Site Secure - IW-3 no longer leaking, tightened well plug. System running at 100%.
Leave Site

Site 16 - Recirculation Only 4.24.08

1348 Onsite to Check System
1352 H_2O level at EW-2 23.7
this well is screened 35-25.

System running good

3.3 gpm
00044 gal
095102 Hrs

P-1 6 psi
P-2 6 psi
P-3 3 psi

No leaks in IW well system tight.

- Cones in place along H_2O line.
- Signs up for Haz storage
- Signs up at peroxide container storage.

1403 Leave site. Site secure

H_2O levels

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 4.26.08 Weather Clear 80°
Personnel D. Siefman

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	23.82	~~23.82~~ 9.43	8.04	8.26	8.04	7.79	8.22	7.83
DO, mg/L	0.15	0.09	0.13	0.11	0.13			
pH	3.28	~~24.80~~ 3.22	4.09	3.80	3.73			
ORP, mV	(+) 334	(+) 436	(+) 197	(+) 188	(+) 345			
Spec. Cond., mS/cm	0.15	1.857	1.397	1.371	0.652			
YSI stabilization time, minutes	30	30	45	40	40			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	~~DO, %~~ DO mg/L
	25.06	25.06	0.15

Extraction Well flow rate		
Rate, gpm	3.0	3.1
Totalizer	00124	00127
Time of day	1011	1557

Run meter	
Reading	09.5542/09.5561
Time of day	1011 / 1557

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	4 / 4	6 / 5	0 / 0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2										

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
	—	—	—

Chemical Feed Off:	Time Stopped:	1012	Time Restarted:	1430
Filter check (Y/N):	1012	– New filter		

Samples Collected	Yes

Notes: H_2O levels taken when system running

Site 16 Recirculation Only 4.26.08

Personel : D. Siefken
PPE level "D"
Equipment : YSI 556, Grab pos pump, turb meter
Rental Co. Field Env
Weather Clear 80°F
Obj : Collect GW Samples - TOC (halogenated) + Fe & Mn (Total)

0830 On site System running well, pressure is down from where I left it Thursday. This is to be expected. Wells performance should improve.

0845 Calibrate equip & set up to sample. Follow table G-1 in Work Plan. Wells to be sampled. IW3, EW2, MW2, MW4
1 2 3 4

These are the wells to be sampled through out this evaluation event. Same parameters also

In-line Pressure P1 = 5 P2 = 5 P3 0 psi

0911 23.81 H2O depth of EW-2

Wells Sampled

ID	Time
CEF-016-GW-EW2	1535
IW3	1400
MW2	1325
MW4	1240
MW-46i	1045

(X) Dup + MS/MSD

Samples placed on ICE once collected & in my position. Use New FDEP SOP for Sampling

D. Siefken

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 4.28.08 Weather Overcast 75°
Personnel DS

Well	EW-2*	IW-3	016-46I	MW2 ⊗	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	8.31	~~7.87~~ 9.23	8.15	8.28	8.09	8.23	8.26	7.87
DO, mg/L	0.17	0.36	0.52 (⊗)	3.78	0.13			
pH	3.19	3.25	2.84	3.46	3.32			
ORP, mV	(+) 293	(+) 306	(+) 346	(+) 214	(+) 377			
Spec. Cond., mS/cm	1.773	1.790	1.378	0.714	0.564			
YSI stabilization time, minutes	15	15	15	15	15			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	24.65	1.808	1.6

Extraction Well flow rate		
Rate, gpm	2.8	
Totalizer	00195	00197
Time of day	1020	1233

Run meter	
Reading	095984
Time of day	1020

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	4 /	4.5 /	0 /

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2	150	NA	150	NA	X		.58	.58	.58	.58

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
		121	29

Chemical Feed Off:	Time Stopped:	1021	Time Restarted:	1217
Filter check (Y/N):	~~1024~~			

Samples Collected	No

Notes: System running fine
⊗ Lots of small bubbles in H_2O, ↑ DO.

Site 16 - Begin Injection 4.28.08

Personnel : Dave Siefken
PPE : Level "D"
Weather Overcast 75°F
Obj : Take Evaluation readings & then start H_2O_2 inj.

1018 Onsite Cal. YSI - Rental Field Eqn 07K100291
& begin readings once calibrated
1020 Shut off system
1102 Let each well run 15 min through YSI then take reading

1246 System pressure is 0 at P1, P2 & P3. I opened valve to get more ↑ flow.
Depth to H_2O at EW-2 = 23.54 System started ~ 1215.
ADDed 29 gal H_2O_2
121 gal H_2O

Site 16 - System O&M

Personnel: Jon Foster
PPE: Level D
Weather: Clear day ~75° F
Obj: Perform system evaluation

0800 JF on site. Take initial system readings and begin calibrating YSI.

0817 Shut off system. Begin uncapping wells.

0830 Add the following quantities to chemical tank. Fill to 150 gallons.

H_2O_2 : 12 Gallons
H_2O : 48 Gallons

0832 Begin purging each well ~15 minutes followed by parameter readings. See Daily Log Sheet for details of today's system evaluation.

1115 Leave Site 16. System running fine.

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 5-1-2008 Weather Clear day ~75°F
Personnel Jon Foster

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	8.29	9.18	8.24	8.23	8.24	7.64	8.29	7.84
DO, mg/L	2.11	43.48	4.49	0.16	0.12			
pH	3.39	2.64	3.86	3.82	3.81			
ORP, mV	309.4	573.3	265.6	152.4	295.0			
Spec. Cond., mS/cm	2.020	2.450	2.009	1.769	0.512			
YSI stabilization time, minutes	5	20	15	15	20			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	24.24	2.020	25.2

Extraction Well flow rate		
Rate, gpm	1.0 GPM	3.0 GPM
Totalizer	28944	29081
Time of day	0816	1103

Run meter	
Reading	09666.5
Time of day	0813

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	27	26	24

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2	~87	150	~87	150			60	~~60~~ 60 (5A)		

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
Yes	12	60 total	48

Chemical Feed Off:	Time Stopped:	0817	Time Restarted:	1102
Filter check (Y/N):	N			

Samples Collected	None

Notes: well IW-3 producing orange color. D.O. at 43.48 mg/L.

Upon arrival at site, system flow rate was 1.0 GPM.

Tetra Tech NUS, Inc.

YSI EQUIPMENT CALIBRATION SHEET

PROJECT NAME : Site 16 Pilot Study

INSTRUMENT NAME/MODEL: YSI 556 MPS

SITE NAME: Site 16

MANUFACTURER: YSI

PROJECT No.: 112G00746

SERIAL NUMBER: 07K100291

		Date of Calibration (mm/dd/yy)	Person Performing Calibration (Name)	Machine Serial No.	Machine Settings	Instrument Readings Pre-cal	Instrument Readings Post-cal	Calibration Standard (Lot#/Expiration Date)	Comments
pH (4)	(S.U.)	05/01/08	J. Foster	07K100291	4.00	3.93	4.00	Lot# NA Exp.Date: NA	
pH (10)	(S.U.)	↓	↓	↓	10.00	9.90	10.00	Lot# NA Exp.Date: NA	
D.O.	%	↓	↓	↓	100.0	100.7	100.0	Lot# NA Exp.Date: NA	
Cond.	(mS/cm)	↓	↓	↓	1.409	1.345	1.409	Lot# NA Exp.Date: NA	
Temp.	°C	↓	↓	↓				Lot# Exp.Date:	
ORP	(mV)	↓	↓	↓	240	254.8	240.0	Lot# G1748 Exp.Date: 01-2012	
pH(7)	(S.U.)	↓	↓	↓	7.00	6.96	7.00	Lot# NA Exp.Date: NA	
pH (4)	(S.U.)							Lot# Exp.Date:	
pH (10)	(S.U.)							Lot# Exp.Date:	
D.O.	%							Lot# Exp.Date:	
Cond.	(mS/cm)							Lot# Exp.Date:	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)							Lot# Exp.Date:	

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 5-5-08 Weather Clear 85°F
Personnel D.S

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	—	9.26	8.27	8.30	8.29	—	—	—
DO, mg/L	0.10	12.06	0.17	0.30	0.18			
pH	3.32	2.75	3.78	3.41	3.86			
ORP, mV	(+) 306	(+) 434	(+) 248	(+) 354	(+) 231			
~~Spec.~~ Cond., ~~µ~~S/cm	1.528	1.978	1.469	1.335	.408			
YSI stabilization time, minutes	20	80	30	35	20			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	~~Spec.~~ Cond., ~~µ~~S/cm	~~DO, %~~ mg/l
	26.04	1.528	0.10

Extraction Well flow rate		
Rate, gpm	0.02	
Totalizer	00333	
Time of day	0856	

Run meter	
Reading 097606	
Time of day 0856	

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	28	28	26.5

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2	95	95		95	~~.58~~	~~.58~~	.58	.58	1.3	1.3

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
		—	—

Chemical Feed Off:	Time Stopped: 0857	Time Restarted:	
Filter check (Y/N):	0857		

Samples Collected	

Notes: Did not restart system lots of Fe in well worked to remove material

Tetra Tech NUS, Inc.

YSI EQUIPMENT CALIBRATION SHEET

PROJECT NAME : Site 16 Pilot Study

INSTRUMENT NAME/MODEL: YSI 556 MPS

SITE NAME: Site 16

MANUFACTURER: YSI

PROJECT No.: 112G0~~0746~~ 1264

SERIAL NUMBER:

		Date of Calibration (mm/dd/yy)	Person Performing Calibration (Name)	Machine Serial No.	Machine Settings	Instrument Readings Pre-cal	Instrument Readings Post-cal	Calibration Standard (Lot#/Expiration Date)	Comments
pH (4)	(S.U.)	5/5/08	DS	07K00291		4.10	4.	Lot# Exp.Date: —	
pH (~~10~~ 7)	(S.U.)					7.02	7	Lot# Exp.Date:	
D.O.	%					.94	100	Lot# Exp.Date:	
Cond.	(mS/cm)					1.844	1.409	Lot# Exp.Date:	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)							Lot# Exp.Date:	
Turbidity meter				—		10.5	10.	Lot# Exp.Date: —	
pH (4)	(S.U.)							Lot# Exp.Date:	
pH (10)	(S.U.)							Lot# Exp.Date:	
D.O.	%							Lot# Exp.Date:	
Cond.	(mS/cm)							Lot# Exp.Date:	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)							Lot# Exp.Date:	

Site 16 Sample Event 02 US Navy Cecil 5-5-08

Personel : Dave Sikfken
PPE : Level "D"
Weather : Clear 85°F
LAB : Accutest
Analysis - 8260, 6010 Fe + Mn (Total & Diss)
Equipment - YSI + HACH Turb.

0900 Turn system off, Just finisied picking/loading 2 more drums of 35% H_2O_2. Drums in container (yellow) & secure.
System very high in pressure ~27 psi @ P1 & P2. Little to No flow. H_2O entering system clear - leaving orange. Lots of iron.
Talked w/ Rob S. will collect Total + Diss Fe & Mn must leave for 40 hr OSHA class will return & Sample.

1538 On site begin calibration.

Wells SAMPLED TODAY

ID	Time	Analysis
MW461-02	1610	8260, 6010 (Total & Diss) Fe & Mn
MW4-02	1715	[redacted]
IW3-02	1805	⊗ DUP 02
MW2-02	1905	⊗ MS MSD
EW2-02	2005	

1708 - H_2O from IW3 very orange on Hand Fe Scale estimated to be greater than 6, Lots of Fe. So much solids have formed on bottom of well IW3. Have tried to remove solids & color is getting lighter but still orange. Will not be able to make clear. Took pictures of well & contents.

2025 All Samples collected
2035 leave site secure - System is NOT on Will turn on tomorrow.

Site 16 US NAVY Cecil 5-6-08

Recirculation

DAVE SIEFKEN - 85°F Sunny

1230 ON-Site System off. from last night

1245 Check pump gpm. Turn valve off at IW 2 & open IW 3. Purgel air from line & Check gpm of pump. Pumped in Calibrated (graduated) 5 gl container.
1 min = 3.80 gpm.

IW3

1743 Cleaned out injection tube screen in IW 3 Several feet estimated 2.5 ft to 3 ft full of Fe. Cleaned screen into Drum. Also purgel well till no Fe color.

IW2 IW 2 has ~6" of Fe in bottom of Well IW 2 - Injection screen tubing has 4+ ft of Fe packed into screen. Burned up injection submersible pump Stop purging well IW 2.

1822 Cleaned up site. H_2O containerized in Drums. Did not put injection screen & tubes back into IW2 & IW3. Will wait for tomorrow to purge wells again & then insert injection screen & tubes - packing first things & then leave for office.

Still need to pull pump - do jar tests & purge wells one more time - Will have to wait for cooler from Rob to come out here.

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 5-7-08 Weather Clear 87 °F
Personnel DS

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet								
DO, mg/L								
pH								
ORP, mV								
Spec. Cond., mS/cm								
YSI stabilization time, minutes								

START SYSTEM AGAIN

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %

Extraction Well flow rate		
Rate, gpm	3	
Totalizer	333	
Time of day	1430	

Run meter	
Reading	097709
Time of day	1706

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	0	0	0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2		95	95	95						

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
	—	—	—

Chemical Feed Off:	Time Stopped:		Time Restarted:	1430
Filter check (Y/N):				

Samples Collected	

Notes: No injection of Hydrogen Peroxide

Site 16 Cecil, US NAVY 5-7-08

Personnel : Dave Stephen
PPE : Level "D"
Weather : Clear 86°F
Obj : 1) Clean wells IW 2 & IW 3
2) Do Jar test on H_2O from EW2
3) Clean screen of pump

0815 off to get supplies for the day
1006 on site system off from yesterdays work
1015 Set up on IW 2 orange Fe precipitate in bottom + some (not much scale). Purge with peristaltic sub.
1108 IW 2 clear of all solids looks good - Checked
IW 3 not bad but will clean
1123 Cleaned IW 3 no solids in well. H_2O mostly clear. IW 2 H_2O at top of screen clear but depletes ~ 2 ft from bottom
Apex Env (Low) on site) help with drums
off to bldg 536
1310 Back from Lunch - Pull submersible pump in EW 2
1336 Screen did not look bad some Fe buildup cleaned & placed back into well
1349 Begin to replace & add clear hose on IW 3 & EW 2
1417 Done adding hose turn system on to test
1425 H_2O fills IW 3 first no H_2O going to IW 2 valve is open to IW-2.
Pumping ~ 3.1 gpm all valves are open 100% No flow restriction.
1440 Begin JAR Tests: Will use DI 2.5 l amber to store 1 l of EW 2 H_2O & will use to mix H_2O_2. To mix I swirl H_2O + H_2O_2 trying not to add O_2 air bubbles pour contents into new mason jar. I will triple rinse 2.5 l amber jar between mixing & do a control blank. Dedicated graduated cylinder are use to measure H_2O_2 & H_2O from EW2. DI control - No orange color

Site 16. JAR TEST Cecil US NAVY 5-7-08

Orange color change is very fast (seconds)
At first the jar is clear (Beer color) then
turns milk orange. See photos.
The 7.4 & 8.8 mL test have similar color
limited precipitate has occured.
Did 3.2 ml H_2O_2 test slight color change
Also did 2nd 7.4 ml test to make sure I
got similar results as 1st test which I DID

1636 Done Jar tests System recirculating only
No chemical injection. Wells accepting
H_2O very good. 0 pressure on P1, P2, or P3
2.9 gpm.

Solids have formed in all tests except
last 7.4 ml H_2O_2 test it is to recent
All jars similar in color & similar in
amount of solids produced.
No solids in 3.2 ml H_2O_2 test

1644 H_2O still only pumping into IW 3, IW 2
No H_2O being pumped (injected into)
No leaks. IW 3 accepting H_2O very
easily.

1645 Begin / pick up of site. All liquids have
been containerized into poly drums because
of low pH.

JAR Test II Cecil 5-8-08

Dave Siefker
PPG Level "D"
Obj Jar Test II

0920 On site have stopped at publix & gotte 1 L bottle (plastic) Soda jar to mix H_2O + H_2O_2.

1037 Set up 1, 3, 5 & 7 mL bottles into 1L RW-2 H_2O they all look the same color - Will have to wait for percipitate.

1050 Site secure leaves

JAR Test II 3-9-08

1025 At Ceil Check Jar test #2
All ~~tot~~ Samples have the same percipitate
pumping at ~3.2 gpm

Letting system run (recirculate)

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 5-15-08 Weather Clear 82°F
Personnel DS

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
					8.61	5.95		
DTW, feet	31.7	9.29	7.68	9.02	8.61	~~8.64~~ 8.36	8.64	8.36
DO, mg/L	0.80	0.74	0.80	0.47	5.73			
pH	3.39	3.37	3.28	3.78	4.13			
ORP, mV	(+) 304	(+) 301	(+) 302	(+) 247	(+) 244			
Spec. Cond., mS/cm	1.339	1.437	~~1.786~~ 1.786	0.923	0.304			
YSI stabilization time, minutes	5	15	15	15	12			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	23.90	1.340	9.0

Extraction Well flow rate		
Rate, gpm	3.0	2.6
Totalizer	676.00	676
Time of day	0732	0804

Run meter	
Reading	99539
Time of day	0804

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	0 / 14	0 / 7	0 / 2

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2	—	—	—	—	X	X				

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
	—	—	—

Chemical Feed Off:	Time Stopped:		Time Restarted:	
Filter check (Y/N): on	—			

Samples Collected	None

Notes: Closed valve at trailer to slow H_2O injection to 2.5 gpm
H_2 level in RW2 low.

Not injecting H_2O_2 only GW Recirculation.

Well System Evol 5-15-08

0630 Onsite to do System Evaluation
Drillers are to arrive at 0930. ~~So~~
Begin at MW46i & will go from there. Will not
stop system for evaluation.

0812 Done checking system. H_2O level ~ 32 ft bls
at EW2 will slow pump to ~2.5 gpm
to allow more H_2O to fill well.

1838 Check EW 2 ~ 29 ft bls, better will leave at ~2.5 gpm

System Evaluation Jar test III 5.19.08

Personnel : M. Jonet + D. Siefken
PPE level : "D"
Obj : Determine where or what concentration of peroxide does not make a lot of percipitate.

0840 At Site 16
0953 Off to get supplies
1024 Back on site begin Jar test III
1200 Conducted jar test - USE 2 L soda bottles to hold & mix in to. Mixed 0.1 mL, 0.2 mL, 0.4 mL, 0.6 mL, 0.8 mL & 1.0 mL peroxide with 1 L of EW 2 H_2O.
Prepared new peroxide 7% solution from drum of peroxide & used H_2O from nearby building to dilute just as we would do for the system.
Results - All tests turned H_2O orange although the least percipitate appears to be the 0.1 mL H_2O_2
Pictures will be taken tomorrow.

1605 Measured volume of H_2O_2 coming from yellow injector pump 2.9 mL/min we were shooting for 1 mL/min.

76

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 5.20.08 Weather Clear 92°F
Personnel DS

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	31.59	~~11.62~~ 8.21	7.96	8.92	7.62	7.16	8.70	8.38
DO, mg/L	0.53	2.58	1.15	0.34	0.32			
pH	3.29	3.22	3.05	3.24	3.80			
ORP, mV	(+) 320	(+) 381	(+) 358	(+) 340	(+) 318			
~~Spec~~. Cond., mS/cm	1.214	1.220	1.225	0.890	0.266			
YSI stabilization time, minutes	15	15	30	15	15			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	~~Spec~~ Cond., mS/cm	DO, %
	25.54	1.212	6.4

Extraction Well flow rate		
Rate, gpm	2.5	
Totalizer	85900	
Time of day	1605	

Run meter	
Reading	100816
Time of day	1605

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	0 / 1	0 / 1	0 / 0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2	—	—	95	95	X	X	15	15		

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?: NO	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
	—	—	—

Chemical Feed Off:	Time Stopped:		Time Restarted:	
Filter check (Y/N): ok	NO			

Samples Collected	None only H_2O chemistry

Notes:
- H_2O yellowish orange injecting into wells
- Not much percipitate in IW 2 & IW3 – Cleaned.

Tetra Tech NUS, Inc.

YSI EQUIPMENT CALIBRATION SHEET

PROJECT NAME : Site 16 Pilot Study

INSTRUMENT NAME/MODEL: YSI 556 MPS

SITE NAME: Site 16

MANUFACTURER: YSI

PROJECT No.: 112G~~00746~~ 01264

SERIAL NUMBER:

		Date of Calibration	Person Performing Calibration	Machine Serial No.	Machine Settings	Instrument Readings		Calibration Standard (Lot#/Expiration Date)	Comments
		(mm/dd/yy)	(Name)			Pre-cal	Post-cal		
pH (4)	(S.U.)	5-20-08	DS			4	4	Lot# Exp.Date: None	
pH (10)	(S.U.)	↓	↓			6.95	7.0	Lot# Exp.Date:	
D.O.	%	↓	↓			121	100	Lot# Exp.Date:	
Cond.	(mS/cm)	↓	↓			1.721	1.409	Lot# Exp.Date:	
Temp.	°C	↓	↓			—	—	Lot# Exp.Date:	
ORP	(mV)	↓	↓			229	240	Lot# Exp.Date:	
								Lot# Exp.Date:	
pH (4)	(S.U.)							Lot# Exp.Date:	
pH (10)	(S.U.)							Lot# Exp.Date:	
D.O.	%							Lot# Exp.Date:	
Cond.	(mS/cm)							Lot# Exp.Date:	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)							Lot# Exp.Date:	

System Eval 5-2008

1330 At Site Cal YSI
1345 Begin to pump 46; for 1st well of evaluation
Will purge for 15 min per well.

- Not much Fe in IW 2 & 3 pumped Fe into drum.

1600 Complete

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 5-27-08 Weather 80° Sunny
Personnel KEVIN WEICHERT

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	29.5	10.1	8.33	9.16	9.05	7.71	8.88	8.52
DO, mg/L	.34	.32	.21	.62	.31			
pH	3.35	3.35	2.96	3.63	3.85			
ORP, mV	316.9	305.6	389.5	Clear	278.6			
Spec. Cond., mS/cm	1.437	1.444	1.644	1.401	.375			
YSI stabilization time, minutes	15	25	18	20	16			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	24.52	1.437	4.0%

Extraction Well flow rate		
Rate, gpm	2.8	
Totalizer	1143	
Time of day	0829	

Run meter	
Reading	10243.0
Time of day	0924

Pressure Gauges	PI-1 (filter influent)		P1-2 (post-filter)		P1-3 (effluent)	
Reading, psig	2	2	2	2	0	0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2			95	95			1	1		
Normal settings: H202 pump = 1.33 GPH					15%	15%				
Maximum pumps output capacities: H202 pump = 4.0 GPH										

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add: NONE	gal water added: NONE

Chemical Feed Off:	Time Stopped:	Time Restarted:
Filter check (Y/N): OK	—	

Samples Collected	CEF-016-GW-IW3-03 and CEF-016-GW-MW2-03 collected Analyses: VOCs - HALOGENS, Total Fe + Mn, Dissolved Fe + Mn

Notes: 95 water into system is clear, water out appears slightly orange

Tetra Tech NUS, Inc.

YSI EQUIPMENT CALIBRATION SHEET

PROJECT NAME : Site 16 Pilot Study

INSTRUMENT NAME/MODEL: YSI 556 MPS

SITE NAME: Site 16

MANUFACTURER: YSI

PROJECT No.: 112G00746

SERIAL NUMBER: 07K100291

		Date of Calibration	Person Performing Calibration	Machine Serial No.	Machine Settings	Instrument Readings		Calibration Standard (Lot#/Expiration Date)	Comments
		(mm/dd/yy)	(Name)			Pre-cal	Post-cal		
pH (4)	(S.U.)	05/27/08	KW			3.93	4.00	Lot# Exp.Date:	
pH (10)	(S.U.)					9.99	10.00	Lot# Exp.Date:	
D.O.	%					131.7	100.0	Lot# Exp.Date:	
Cond.	(mS/cm)					1.116	1.409	Lot# Exp.Date:	
Temp.	°C					~~256.3~~	~~240.1~~	Lot# Exp.Date:	
ORP	(mV)					256.3	240.1	Lot# Exp.Date:	
								Lot# Exp.Date:	
pH (4)	(S.U.)							Lot# Exp.Date:	
pH (10)	(S.U.)							Lot# Exp.Date:	
D.O.	%							Lot# Exp.Date:	
Cond.	(mS/cm)							Lot# Exp.Date:	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)							Lot# Exp.Date:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : Site 16 Pilot Study

INSTRUMENT NAME/MODEL: Turbidimeter

SITE NAME: Site 16

MANUFACTURER: HF Scientific, Inc.

PROJECT No.: 112G00746

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		
5/27/08	200704133	KW	1.0NTU 10.0NTUs	1.0NTU 10.0NTUs		10.0	70514	exp. Nov 09
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				

System Eval + GW Sample - Site 16 5-27-08

Personal : Dave Siefken & Kevin Weighart
PPE level "D"
Weather 83°F pt. Sunny
Equip YSI 556, Geo Pump, HF Scientific Turb. - See cal sheet for ID's
Truck POV
LAB : Accutest - VOC + Fe + Mn total + Diss

0800 ON site begin calibration
0820 Ready to begin GW sampling - Rob Simcik says to sample MW-2 + IW3, Also will sample total Fe + Mn + Diss Fe + Mn
0830 BEGIN SETUP AND SAMPLING WELLS (SEE TABLE BELOW FOR DETAILS)

WELL ID	SAMPLE ID	START	STOP	SAMPLE TIME	ANALYSES
MW2	CEF-016-GW-MW2-03	0821	0841	0845	VOCs (Halogen) Total Fe+Mn,
IW3	CEF-016-GW-IW3-03	0922	0947	0950	Dissolved Fe+Mn (All for both)

*SEE GW SAMPLE LOG SHEETS FOR DETAILS
*GW HAS SLIGHT ORANGE COLOR

1000 BEGIN TAKING READINGS ON NON SAMPLED WELLS AND SYSTEM - READINGS FOR EW-2, 016-46I, MW4, IW-1, MW-1, AND IW-1 FOUND ON DAILY LOG SHEET

1115 WORK AT SYSTEM COMPLETE, KW LEAVES SITE FOR OFFICE

KPW

JL Wilt

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 6-3-2008 Weather 85° Sunny
Personnel Kevin Weichert

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	27.81	7.10	7.94	8.86	9.05	7.48	8.80	8.40
DO, mg/L	.47	.85	.74	.77	.64			
pH	3.13	2.50	2.77	3.11	3.27			
ORP, mV	330.3	516.8	408.6	224.4	355.1			
Spec. Cond., mS/cm	1.393	1.576	1.683	1.649	.460			
YSI stabilization time, minutes	17	20	21	20	15			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	[redacted]	1.393	5.6

Extraction Well flow rate		
Rate, gpm	3.2	2.7
Totalizer	1401	1401
Time of day	1054	1112

Run meter	
Reading	10407.7
Time of day	0747

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	1.5	0	0

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2			92	150	X	X	2.0 mL/min	4.5 mL/min		

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?: yes	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
			58 gallons

Chemical Feed Off:	Time Stopped:	11:00	Time Restarted:	11:40
Filter check (Y/N):	Changed filter			

Samples Collected	CEF-016-GW-IW3-04
	CEF-016-GW-MW2-04

Notes: GW is very orange
adjusted pump to 4.5 mL/min.

System Evaluation and GW Sampling - Site 16 6-3-08

Personnel: KEVIN WEICHERT (KW)
TRUCK: POV
Phone: 4722
PPE: LEVEL D
WEATHER: 85° Sunny
Equip: YSI 556, Geo Pump, Micro TPW
Lab: Accutest - VOCs, Fe + Mn (Total & Dissolved)

0700 KW ARRIVES AT SITE 16, BEGINS CALIBRATING EQUIPMENT - SEE FIELD CALIBRATION SHEETS FOR DETAILS.

0745 KW BEGINS TO SAMPLE WELLS - SEE TABLE BELOW.

WELL I.D.	SAMPLE I.D.	START	STOP	SAMPLE TIME	ANALYSES
MW2	CEF-016-GW-MW2-04	0807	0827	0832	VOCs (Halogens),
IW3	CEF-016-GW-IW3-04	0900	0920	0925	Total Fe + Mn, Dissolved Fe + Mn (All for both wells)

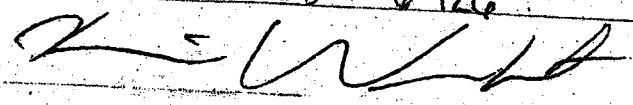
* SEE GW SAMPLE LOG SHEETS FOR DETAILS
* ALL SAMPLES PUT ON ICE AND COOLED TO 4°C
* GW HAS SLIGHT ORANGE COLOR

0935 KW BEGINS TAKING READINGS ON NON-SAMPLED WELLS AND SYSTEM, AND BEGINS FILLING TANK
- READINGS TAKEN ON EW-2, 016-46I, MW4, IW-1, MW-1, AND EW-1 - READINGS FOUND ON DAILY LOG SHEET.
- ADDED 58 gallons H_2O to MIX TANK.

0945 FILTER REPLACED ON SYSTEM - RETURNS SYSTEM TO GOOD RUNNING PRESSURE

1030 KW TAKES DRUM INVENTORY - SEE TABLE BELOW OF DRUMS PRESENT - ALSO PH TAKEN OF 2 NEWEST DRUMS

DRUMS		
	16-108	16-103
	16-96	16-102
	16-125	16-97
	16-126	16-93
	16-106	16-94
	16-105	16-98
	16-100	16-104
	16-125	16-126



SYSTEM EVALUATION AND GW SAMPLING - SITE 16 6-3-08

2 NEWEST DRUMS

DRUM I.D	pH	CONTENTS	GALLONS	JOB#
16-126	2.18	DEVELOPMENT + PURGE H_2O	50	0746
16-125	2.36	DEVELOPMENT H_2O	50	0746

1130 KW ADJUSTS FLOW ON INJECTION PUMP TO AN OUTPUT OF 4.5 mL/minute.

1200 SITE ASSESSMENT AND SAMPLING COMPLETE, KW LEAVES SITE 16 FOR TTNUS OFFICE

KW

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 6/10/2008 Weather Sunny . 80°
Personnel Kevin Weichert

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet								
DO, mg/L								
pH								
ORP, mV								
Spec. Cond., mS/cm								
YSI stabilization time, minutes								

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %

Extraction Well flow rate		
Rate, gpm	0	
Totalizer	1600	
Time of day	0720	

Run meter	
Reading	
Time of day	

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	—	—	—

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2	—	—	145	145	X	X		OFF		OFF

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ H_2O_2 gal solution add:	gal water added:
NO		

Chemical Feed Off:	Time Stopped:	Time Restarted:	N/A
Filter check (Y/N):	0930		

Samples Collected	NONE

Notes: SYSTEM IS NOT PUMPING - POSSIBLE PROBLEM WITH EXTRACTION WELL -

System Evaluation - Site 16 6-10-2008

PERSONNEL: KEVIN WEICHERT (KW)
TRUCK: POV
PHONE: 5431
PPE: LEVEL D
WEATHER: SUNNY 80°

0700 KW ARRIVES AT SITE 16.
0700 KW BEGINS CHECKING SYSTEM AND DISCOVERS IT IS NOT REGISTERING ANY FLOW THROUGH THE EXTRACTION WELL FLOW RATE METER.
0730 KW SHUTS DOWN SYSTEM AND REPLACES FILTER.
0735 KW RESTARTS SYSTEM, BUT STILL NO FLOW FROM THE EXTRACTION WELL.
0737 KW TALKS TO DAVE SIEFKEN, AND DAVE WILL COME FURTHER ASSESS THE PROBLEM LATER THIS WEEK.
0740 KW LEAVES SITE - SYSTEM IS LEFT OFF SO PUMP ISN'T PUMPING DRY.
0830 KW ARRIVES AT TTNUS OFFICE

KW

K. Weichert

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 6-11-08 Weather Rain
Personnel DS

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet								
DO, mg/L								
pH								
ORP, mV								
Spec. Cond., mS/cm								
YSI stabilization time, minutes								

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	NM	NM	NM

Extraction Well flow rate		
Rate, gpm	2.6	
Totalizer	01602	
Time of day	1506	

Run meter	
Reading	105760
Time of day	1507

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	12	13	10

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2										

Normal settings: H202 pump = 1.33 GPH

Maximum pumps output capacities: H202 pump = 4.0 GPH

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
	—	—	—

Chemical Feed Off:	Time Stopped:		Time Restarted:	1430
Filter check (Y/N): Y	No			

Samples Collected	

Notes: Bad wire on pump fixed running again.

Location Site 16 - System Date 6-17-08

Project / Client US NAVY Cecil

Sample + Evaluation

0732 On site calibrate ysi + turb. meter
See Cal Sheet.
Wear proper level "D" ppe
0740 Open wells & take H_2O levels
ON 8 wells - See Evaluation sheet
0800 Set up on well MW-46i
0820 Some red/orange solids in bottom of well pumped out.
0840 Sample MW 46i
0900 Begin purge IW 3 - lots of solids in bottom purge & surge out solids
0930 Sample IW 3
0945 Set up on MW 2
1025 Sample MW 2
1030 Set up on MW 4
1100 Sample MW 4
Collect EW 2 from sample port befor P-1. allow to stabilize in YSI
EW 2 - P-3 was collected at the P-3 sample port after the injection

Location Site 16 - System Date 6-17-08

Project / Client US NAVY Cecil

Sample + Evaluation

Sample Time	ID
0840	CEF-016-GW-MW46i-05
0930	" " IW3
1025	MW2
1100	MW4
1125	EW2
1140	EW2-P3

Injectors both Set on 20

% Stroke = 20
Pump Speed = 20

H_2O_2 injecting - H_2O is light orange turbidity Reading of 86 after injection 1 before. - Have had trouble keeping H_2O_2 injecting air pockets get into line so I have been slowly turning ↑ injection pump.

1240 Leave site samples on ice - Accutest to pick up tomorrow

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 7-7-08 Weather Sunny 90°
Personnel KEVIN WEICHERT

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	14.26	4.20	7.61	8.40	7.93	7.08	8.041	7.62
DO, mg/L	.95	1.19	.56	1.03	.60	—	—	—
pH	3.08	3.03	2.63	3.15	3.63	—	—	—
ORP, mV	262.6	306.5	396.5	240.7	287.6	—	—	—
Spec. Cond., mS/cm	1.157	1.149	1.534	1.174	.349	—	—	—
YSI stabilization time, minutes	14	20	15	20	15	—	—	—

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.78	1.157	15%

Extraction Well flow rate		EW-2
Rate, gpm	1.2	1.2
Totalizer	2398	~~1024~~ 2399
Time of day	1024	1126

Run meter	
Reading	11194.1
Time of day	1025

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	6	6	2

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2			120	120	X	X			.35	.57
Normal settings: H202 pump = 1.33 GPH					~~14%~~ 15%	15%	~~15%~~ 44%	52%		
Maximum pumps output capacities: H202 pump = 4.0 GPH										

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:
	NO		

Chemical Feed Off:	Time Stopped:	1105	Time Restarted:	1125
Filter check (Y/N):	Still Clean			

Samples Collected	CEF-016-GW-EW2-06, CEF-016-GW-IW3-06
	CEF-016-GW-MW2-06

Notes: ground water has slight orange color
* totalizer count off due to system being shut off during that time period
- SPED UP PUMP SPEED TO 52%

Tetra Tech NUS, Inc.

YSI EQUIPMENT CALIBRATION SHEET

PROJECT NAME : Site 16 Pilot Study

INSTRUMENT NAME/MODEL: YSI 556 MPS

SITE NAME: Site 16

MANUFACTURER: YSI

PROJECT No.: 112G00746

SERIAL NUMBER: 07D100941

		Date of Calibration	Person Performing Calibration	Machine Serial No.	Machine Settings	Instrument Readings		Calibration Standard (Lot#/Expiration Date)	Comments
		(mm/dd/yy)	(Name)			Pre-cal	Post-cal		
pH (4)	(S.U.)	07/07/08	KW	07D100941		4.05	4.00	Lot# 6201 Exp.Date: 3-11-09	
pH (7)	(S.U.)	7/7/08	KW			6.87	7.00	Lot# 4803516 Exp.Date: March 2010	
D.O.	%	7/7/08	KW			97.3%	100.1%	Lot# — Exp.Date: —	
Cond.	(mS/cm)	7/7/08	KW			1.602	1.413	Lot# 6126 Exp.Date: 2-1-2009	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)	7/7/08	KW			251.2	240.0	Lot# 62563 Exp.Date: 12-2012	
								Lot# Exp.Date:	
pH (4)	(S.U.)							Lot# Exp.Date:	
pH (7)	(S.U.)							Lot# Exp.Date:	
D.O.	%							Lot# Exp.Date:	
Cond.	(mS/cm)							Lot# Exp.Date:	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)							Lot# Exp.Date:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : Site 16 Pilot Study

INSTRUMENT NAME/MODEL: Turbidimeter

SITE NAME: Site 16

MANUFACTURER: HF Scientific, Inc.

PROJECT No.: 112G00746

SERIAL NUMBER: 200704133

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		
7/7/08	200704133	KWS	.02 ~~1.0~~NTU 10.0NTUs	.02 ~~1.0~~NTU 10.0NTUs		.02 10.0	70511 70514	Exp. Nov 2008 Exp Nov 2008
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				
			1.0NTU 10.0NTUs	1.0NTU 10.0NTUs				

Location SITE 16 - SYSTEM Date 7-7-08

Project / Client U.S. NAVY - CECIL

SAMPLE AND EVALUATE

PERSONNEL: KEVIN WEICHERT	PPE: LEVEL D
TRUCK: 2001 F-250	WEATHER: SUNNY 90°
PHONE: 5431	

OBJECTIVE: SAMPLE, 3 WELLS, TEST WELL PARAMETERS, AND CHECK SYSTEM

0730 KW ON SITE, BEGINS CALIBRATING EQUIPMENT - SEE FIELD CALIBRATION SHEETS FOR DETAILS.

0810 KW BEGINS SETTING UP AND SAMPLING WELLS - SEE TABLE BELOW FOR DETAILS

SAMPLE I.D.	START	STOP	SAMPLE TIME
CEF-016-GW-MW2-06	0839	0859	0900
CEF-016-GW-IW3-06	0917	0937	0940
CEF-016-GW-EW2-06	0956	1007	1010

* ALL SAMPLES ON ICE,
* ALL SAMPLES TO BE ANALYZED FOR VOCs (HALOGENATE), TOTAL FE + MN, + DISSOLVED FE + MN

Location SITE 16 - SYSTEM Date 7-7-08

Project / Client U.S. NAVY - CECIL FIELD

SAMPLE + EVALUATE (CONT'D)

1020 KW BEGINS TARING READINGS ON REMAINING WELLS - 016-46I, MW-4, IW-1, MW-1, AND EW-1, - AS WELL AS TAKING READINGS ON THE SYSTEM - SEE DAILY LOG SHEET FOR DETAILS.

1105 KW SHUTS OF SYSTEM, AND INCREASES PUMP SPEED TO 52%, OR .57 gal/hour, DUE TO MINISCULE AMOUNT OF FLUID BEING INJECTED

1125 KW RESTARTS SYSTEM, AND LEAVES FOR OFFICE.

1400 KW SHIPS SAMPLES TO ACCUTEST

KPW

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 7-14-08 Weather Sunny 85°
Personnel KEVIN WEICHERT

1.85 gal/hr

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	4.61	6.01	7.51	7.84	7.82	5.94	7.94	7.54
DO, mg/L	.74	.78	.72	.59	.61			
pH	3.04	2.63	2.77	3.33	3.46			
ORP, mV	309.5	415.8	323.9	245.8	263.6			
Spec. Cond., mS/cm	1.222	1.363	1.358	.938	.359			
YSI stabilization time, minutes	15	15	15	15	15			

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	25.89	1.222	8.57%

Extraction Well flow rate		
Rate, gpm	1.6	
Totalizer	2564	
Time of day	0930	

Run meter	
Reading	11360.8
Time of day	0932

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	14	13.5	11

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, GPH	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2			90	88			60		3.7L	
Normal settings: H202 pump = 1.33 GPH					30				≈1gal	
Maximum pumps output capacities: H202 pump = 4.0 GPH										

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added:

Chemical Feed Off:	Time Stopped:	1018	Time Restarted:	1035
Filter check (Y/N):	OK			

Samples Collected	

Notes:

01 + H2O2 + 1

Tetra Tech NUS, Inc.

YSI EQUIPMENT CALIBRATION SHEET

PROJECT NAME : Site 16 Pilot Study

INSTRUMENT NAME/MODEL: YSI 556 MPS

SITE NAME: Site 16

MANUFACTURER: YSI

PROJECT No.: 112G00746

SERIAL NUMBER: 07D100941

		Date of Calibration	Person Performing Calibration	Machine Serial No.	Machine Settings	Instrument Readings		Calibration Standard (Lot#/Expiration Date)	Comments
		(mm/dd/yy)	(Name)			Pre-cal	Post-cal		
pH (4)	(S.U.)	07/14/08	KW	07D100941		4.05	4.00	Lot# 6201 Exp.Date: 3-11-09	
pH ~~(10)~~ 7	(S.U.)					6.98	7.00	Lot# 4803516 Exp.Date: 3-2010	
D.O.	%					98.9	100.0	Lot# — Exp.Date: —	
Cond.	(mS/cm)					1.344	1.413	Lot# 6126 Exp.Date: 2-1-09	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)					237.6	240.0	Lot# G2563 Exp.Date: 12-2012	
								Lot# Exp.Date:	
pH (4)	(S.U.)							Lot# Exp.Date:	
pH (10)	(S.U.)							Lot# Exp.Date:	
D.O.	%							Lot# Exp.Date:	
Cond.	(mS/cm)							Lot# Exp.Date:	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)							Lot# Exp.Date:	

Location SITE 16- SYSTEM Date 7-11-08

Project / Client U.S. NAVY - CECIL FIELD

SYSTEM CHECK

1230 KEVIN WEICHERT AT SITE 16
1235 KW SHUTS DOWN SYSTEM, AND REPLACES FILTER
1245 KW BEGINS ADJUSTING INJECTION PUMP RATE SINCE SOLUTION IN TANK REMAINS AT 120 GALLONS
1300 FINAL INJECTION PUMP RATE IS 3.7 L/HOUR (JUST UNDER 1 GAL/HOUR) SPEED = 62% STROKE = 30%
1330 KW LEAVES SITE.

KPW

Location SITE 16- SYSTEM Date 7-14-08

Project / Client U.S NAVY - CECIL FIELD

SYSTEM CHECK, WELL READINGS

PERSONNEL: KEVIN WEICHERT
TRUCK: 2001 F-250
PHONE: 5431
PPE: LEVEL D
WEATHER: SUNNY 90°

0900 KW ON SITE, BEGINS CALIBRATING EQUIPMENT - SEE FIELD CALIBRATION SHEETS FOR DETAILS
0915 KW BEGINS TAKING WELL PARAMETERS AND SYSTEM INFORMATION. SEE DAILY LOG SHEET FOR DETAILS
- DURING YSI STABILIZATION TIMES - KW SCRUBS IW-2 and IW3 WELL SCREENS.
1000 KW CALCULATES THAT INJECTION MATERIAL HAS BEEN INJECTED AT .45 G/H BASED ON CHANGE IN TANK LEVEL

Location SITE 16-SYSTEM Date 7-14-08

Project / Client U.S. NAVY - CECIL FIELD.
SYSTEM CHECK, WELL READINGS

1100 KW LEAVES SITE 16 FOR BUILDING 536 FOR WEEKLY DRUM INSPECTION.

1130 KW RETURNS TRUCK TO TENUS OFFICE

~~1245~~ KW

1305 KW BACK AT 16 TO TAKE FINAL READINGS. AND MEET ROBSIMCIK AND MATT JONNET FOR SYSTEM REVIEW.

KPW

KPW

Location _____ Date _____

Project / Client _____

Draw Down Test #1 H202 pump
100 ml
Inject: Extract
Line in Beaker.

Time 58 sec.

50 ml ÷ 26.4 = 53 ml/min

Pump Speed Rate:
Speed: 50%
Stroke: 31%
for 30 gal/day

Pump Rate before system inlet
rate: 2.8 gal/min

Pump rate out of outlet
rate: 2.8 gal/min.

Observed (meter) flow rate: 1.85 gal/min.

Drum
#16127 placed purge water in drum

Location SITE 16- SYSTEM Date 7-15-08

Project / Client US NAVY- CECILFIELD

SYSTEM CHECK

1720 KW OBSERVES THAT ONLY 4 GALLONS HAVE BEEN INJECTED IN A 24 HOUR SESSION - MOST LIKELY DUE TO AIR BUBBLES IN THE INJECTION LINE

1740 KW MEASURES TANK WITHDRAWL, AND REALIZES RETURN LINE IS ALLOWING TOO MUCH TO RETURN

1745 KW CRANKS UP PUMP TO BLAST OUT AIR, AND THEN RETURNS IT TO ORIGINAL SETTINGS- WILL CHECK AGAIN TOMORROW TO SEE IF IT HAS REMAINED PUMPING PROPERLY

TANK LEVEL = 85 gal

KPW

Location SITE 16- SYSTEM Date 7-16-08

Project / Client U.S. NAVY- CECIL FIELD

SYSTEM CHECK

0720 KW ON SITE, OBSERVES THAT ONLY 2 GALLONS HAVE BEEN INJECTED SINCE YESTERDAY

0730 KW BLEEDS AIR OUT, AND BEGINS ADJUSTING RATE

0745 INJECTION RATE INCREASED TO 70 mL/min

pump speed = 60%

pump stroke = 40%

-this is equivilant to

70mL/min × 60min/hr × 24hr/day =

100800mL/Day ÷ 1000 mL/L = 100.8 L

100.8 L = 26.6 gal/day

0800 KW BEGINS MEASURING 35% H_2O_2 for refilling tank with 3% H_2O_2 →

Location SITE 16-SYSTEM Date 7-16-08

Project / Client U.S. NAVY CECIL FIELD

SYSTEM CHECK

- Current tank level = 82 gallons
- will fill to 150 gallons
- 68 gallons to be added

$(x)(.35) = (68)(.03)$

$x = 5.83$ gallons of .35% to be added

$5.83g = 22.07 L$

- 5.8 g 35% peroxide added. - tank filled to 150 g. - mixture is stirred with paddle.

0845 system flow rate observed at 2.0 g/minute

0900 KW LEAVES SITE

KPW

Location Date

Project / Client

16-SYSTEM Date 7-17-08
S NAVY CECIL FIELD
m CHECK

KEVIN WEICHERT ARRIVES ON SITE, AND OBSERVES THAT TANK LEVEL IS AT 136 gallons
- 14 gallons have been injected since yesterday.
- Again THERE IS AIR IN THE INJECTION LINE, AND SOLUTION IS RUNNG BACK INTO THE TANK.

745 KW UPS TANK OUT PUT TO 80 mL/minute = 30.4 g/day
Speed = 70%
Stroke = 40%

0800 - System FLOW RATE = 1.9 gal/min.

0830 - KW LEAVES SITE FOR OFFICE.

KW

Location SITE 16- SYSTEM Date 7-18-08

Project / Client U.S NAVY- CECIL FIELD

SYSTEM CHECK

0730 KW ARRIVES ON SITE AND OBSERVES TANK LEVEL AT 117 gallons

- 19 Gallons have been injected in a 24 hour period.
- Some air bubbles have built up in the injection line, but not as bad as before

0750 KW BLEEDS AIR OUT OF LINE, AND BEGINS ADJUSTING INJECTION RATE

0800 FINAL INJECTION RATE IS 90 mL/minute = 34 gal/DAY

SPEED = 75%, STROKE = 50%

- Value is SLIGHTLY HIGHER THAN DESIRED, BUT WILL HOPEFULLY KEEP AIR BUBBLES FROM BUILDING UP.

Location SITE 16 SYSTEM Date 7-18-08

Project / Client U.S. NAVY - CECIL FIELD

SYSTEM CHECK

0810 - SYSTEM FLOW RATE = 1.3 gal/min

- Slight decrease, probably due to well screens clogging up - Screens will be cleaned Monday.
- TOTALIZER = 266200

0820 - KW CLEARS MIXING TUBE BY OPENING LARGE SYSTEM INJECTION HOSE TO REMOVE BUILDUP - PUT WASTE IN DRUM # 16-127

0830 - EVEN AFTER CLEARING MIXING CHAMBER, SYSTEM FLOW RATE REMAINS AT 1.3 gal/min

- MORE CERTAIN THAT WELL SCREENS ARE TO BE BLAMED
- WILL SCRUB MONDAY

0855 - KW LEAVES SITE

KPW

NAS CECIL FIELD
SITE 16 PILOT STUDY
DAILY LOG SHEET

Date 7-21-08 Weather 90° SUNNY
Personnel KEVIN WEICHERT

Well	EW-2*	IW-3	016-46I	MW2	MW4	IW-1**	MW-1**	EW-1**
DTW, feet	7.51	8.32	7.40	7.12	7.19	6.95	7.56	7.07
DO, mg/L	1.32	32.10	1.30	.75	1.04	—	—	—
pH	3.36	2.83	3.50	3.36	3.42	—	—	—
ORP, mV	336.2	613.3	314.2	302.3	308.7	—	—	—
Spec. Cond., mS/cm	1.322	1.509	1.188	.948	.386	—	—	—
YSI stabilization time, minutes	15	30	15	15	15	—	—	—

* Recorded from in-line YSI meter.
** Test only DTW

In-Line YSI Meter (from extraction well)	Temp., °C	Spec. Cond., mS/cm	DO, %
	29.18	1.322	16.7

Extraction Well flow rate		
Rate, gpm	0.5	
Totalizer	268600	~~0850~~
Time of day	0850	

Run meter	
Reading	11527.0
Time of day	0850

Pressure Gauges	PI-1 (filter influent)	P1-2 (post-filter)	P1-3 (effluent)
Reading, psig	21	21	15

Chemical Feed	Tank level, feet		Tank level, gallons		Pump stroke setting, %		Pump Speed, %		Pump rate, ~~GPH~~ mL/min	
	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day	start of day	end of day
H2O2			53	106					90mL/min	90mL/min
Normal settings: H202 pump = 1.33 GPH					50%	50%	75%	75%		
Maximum pumps output capacities: H202 pump = 4.0 GPH										

Chemical tank refilled?:	~~Lactate~~ H_2O_2	gal solution add:	gal water added: 53 gal
YES			
Chemical Feed Off:	Time Stopped:	0800	Time Restarted:
Filter check (Y/N):	REPLACED		

Samples Collected	

Notes: EXTRACTION LINE SPRUNG A LEAK OVER THE WEEKEND
IW-3 DO. WOULDN'T GO DOWN
- DILUTED 53 gal 3% to 106 gal of 1.5% H_2O_2
- REPLACED FILTER

412-972

321-388-2538

561-445-1999
~~455~~

Tetra Tech NUS, Inc.

YSI EQUIPMENT CALIBRATION SHEET

PROJECT NAME : Site 16 Cecil Field

INSTRUMENT NAME/MODEL: YSI 556 MPS

SITE NAME: Site 16

MANUFACTURER: YSI

PROJECT No.: 112G00746

SERIAL NUMBER: 07D100941

		Date of Calibration	Person Performing Calibration	Machine Serial No.	Machine Settings	Instrument Readings		Calibration Standard (Lot#/Expiration Date)	Comments
		(mm/dd/yy)	(Name)			Pre-cal	Post-cal		
pH (4)	(S.U.)	07/21/08	KW	07D100941		3.73	4.00	Lot# - Exp.Date: -	
pH (10)	(S.U.)					10.06	10.00	Lot# - Exp.Date: -	
D.O.	%					101.2%	100.1%	Lot# - Exp.Date: -	
Cond.	(mS/cm)					1.076	1.000	Lot# - Exp.Date: -	
Temp.	°C							Lot# - Exp.Date: -	
ORP	(mV)					220.8	240.0	Lot# - Exp.Date: -	
								Lot# Exp.Date:	
pH (4)	(S.U.)							Lot# Exp.Date:	
pH (10)	(S.U.)							Lot# Exp.Date:	
D.O.	%							Lot# Exp.Date:	
Cond.	(mS/cm)							Lot# Exp.Date:	
Temp.	°C							Lot# Exp.Date:	
ORP	(mV)							Lot# Exp.Date:	

Location SITE 16- SYSTEM Date 7-21-08

Project / Client U.S. NAVY - CECIL FIELD

SYSTEM CHECK / READINGS

0800 KW ON SITE, SEES THAT INJECTION HOSE - FROM TRAILER TO THE GROUND - HAS SPRUNG A LEAK - KW SHUTS SYSTEM DOWN.

0815 KW BEGINS CALIBRATING EQUIPMENT - SEE FIELD CALIBRATION SHEET FOR DETAILS

0820 - CORRECTION - IT IS THE EXTRACTION LINE THAT IS LEAKING.

0835 - KW BEGINS TAKING YSI READINGS, AND SOME SYSTEM READINGS

0910 - KW MOVES DRUMS THAT WERE DELIVERED INTO FENCED IN AREA.

0945 KW BEGINS CLEANING OUT SYSTEM WHICH IS PLUGGED UP.

1300 KW BEGINS DILUTING TANK SOLUTION FROM 3% to 1.5%

Location SITE 16-SYSTEM Date 7-21-08

Project / Client U.S. NAVY- CECIL FIELD

SYSTEM CHECK / READINGS

53 gal of 3% in tank
+
53 gal H_2O = 106 gal
1.5%

tank level now at 106 gal

1330 KW LEAVES SITE TO GET REPLACEMENT HOSE.

1420 KW BACK AT CECIL - AIDS JEFF KROWE AT SI ABC

1500 KW BEGINS REPAIRING EXTRACTION HOSE

1530 HOSE REPAIRED - SYSTEM BACK ON. - TAKE FINAL READINGS

1600 KW LEAVES CECIL FOR OFFICE

KPW

Location SITE 16- SYSTEM Date 7-25-08

Project / Client U.S. NAVY - CECIL FIELD

SYSTEM CHECK

1800 KW ON SITE -
SYSTEM STILL RUNNING,
TANK LEVEL AT 52 gallons

-SYSTEM FLOW RATE
AT .4 gal/min.

-WILL CHECK / FILL MONDAY.

KPW

Location SITE 16- SYSTEM Date 7-28-08

Project / Client U.S. NAVY - CECIL FIELD

SYSTEM CHECK.

1000 KEVIN WEICHERT ON
SITE.
-SYSTEM EXTRACTION
LINE - OTHER
HALF OF THE ONE
THAT WAS JUST
REPLACED - IS LEAKING.
1030 - KW GETS THE OK FROM
MARK JONNET TO
CLEAN SYSTEM AND
SHUT IT DOWN.

-OVER THE WEEKEND, THE
INJECTION PUMP
SHUT OFF, AND
GW. RAN INTO
CHEMICAL TANK,
TURNING IT BROWN.
1050 KW CLEANS WELL SCREENS
ON THE TWO INJECTION
WELLS.
1150 KW BREAKS FOR LUNCH

Location SITE 16 - SYSTEM Date 7-28-08

Project / Client U.S. NAVY - CECIL FIELD

SYSTEM CHECK.

1245 KW + JEFF KROWE ON SITE
- BEGIN PUMPING
CONTENTS OF INJECTION
TANK INTO DRUMS.
DRUM # 16-128
16-129

- 82 gallons removed
from tank

1400 KW + JK LEAVE SITE -
SYSTEM OFF UNTIL
ROB SIMAIK SAYS TURN IT
ON.

Location Date

Project / Client

APPENDIX B

ANALYTICAL DATA REPORTS

BIOREMEDIATION PILOT STUDY BASELINE SAMPLING – JULY 11, 2007

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 26010 | PAGE ___ OF ___

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112600746	Site 16 Cecil Field	Rob Smock		Accutest
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: Mark Yanek	PHONE NUMBER: 904 303 3133	ADDRESS: 4405 Vineland Rd
		CARRIER/WAYBILL NUMBER		CITY, STATE: Orlando

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

DATE YEAR 2007	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	Select VOC's	Dis Fe/Mn	Sulfide	Anions	TOC's	Sodium	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	P	P	P	G	P	
PRESERVATIVE USED									HCL	HNO3	NaOH	NA	HCL	N/A	
7/12	0853	CEF-16-GW-MW-1-01-032-20070712				GW	G	10	✓	✓	✓		✓	✓	Cool @ Lass than 4°C
7/13	0800	CEF-16-GW-M1-01-032-20070713				GW	G	1				✓			
7/13	0933	CEF-16-GW-IW-01-034-20070713				GW	G	11	✓	✓	✓	✓	✓	✓	
7/11	0923	CEF-16-GW-EW-01-034-20070711				GW	G	4	✓					✓	
7/12	1233	CEF-16-GW-MW-2-01-032-20070711				GW	G	4	✓					✓	
7/12	1453	CEF-16-GW-MW3-01-032-20070712				GW	G	4	✓					✓	
7/13	1200	CEF-16-GW-4~~5~~6I-01-20070713						11	✓	✓	✓	✓	✓	✓	

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
[signature]	7/13/07	1630			
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)

FORM NO. TINUS-0 4/01

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.3

Client Sample ID:	CEF-16-GW-1W-01-034-20070713		
Lab Sample ID:	F51037-2	Date Sampled:	07/13/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031429.D	1	07/25/07	JG	n/a	n/a	VJ2186
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	25	5.0	ug/l	I
71-43-2	Benzene	[redacted]	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	[redacted]	1.0	0.50	ug/l	
75-25-2	Bromoform	[redacted]	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	[redacted]	1.0	0.50	ug/l	
75-00-3	Chloroethane	[redacted]	2.0	1.0	ug/l	
67-66-3	Chloroform	[redacted]	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	[redacted]	2.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	[redacted]	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	[redacted]	1.0	0.50	ug/l	
591-78-6	2-Hexanone	[redacted]	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	5.0	2.5	ug/l	
74-83-9	Methyl bromide	[redacted]	2.0	1.0	ug/l	
74-87-3	Methyl chloride	[redacted]	2.0	1.0	ug/l	
75-09-2	Methylene chloride	[redacted]	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	5.0	2.5	ug/l	
100-42-5	Styrene	[redacted]	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	1.0	0.50	ug/l	
108-88-3	Toluene	[redacted]	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	[redacted]	1.0	0.50	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST Laboratories F51037

Accutest Laboratories

Report of Analysis

3.3

3

Client Sample ID:	CEF-16-GW-1W-01-034-20070713		
Lab Sample ID:	F51037-2	Date Sampled:	07/13/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	[redacted]	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%
17060-07-0	1,2-Dichloroethane-D4			76-127%
2037-26-5	Toluene-D8			86-112%
460-00-4	4-Bromofluorobenzene			84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.8 3

Client Sample ID:	CEF-16-GW-451-01-032-20070713		
Lab Sample ID:	F51037-6	Date Sampled:	07/13/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031430.D	20	07/25/07	JG	n/a	n/a	VJ2186
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	500	100	ug/l	
71-43-2	Benzene	[redacted]	20	10	ug/l	
75-27-4	Bromodichloromethane	[redacted]	20	10	ug/l	
75-25-2	Bromoform	[redacted]	20	10	ug/l	
108-90-7	Chlorobenzene	[redacted]	20	10	ug/l	
75-00-3	Chloroethane	[redacted]	40	20	ug/l	
67-66-3	Chloroform	[redacted]	20	10	ug/l	
75-15-0	Carbon disulfide	[redacted]	40	20	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	20	10	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	20	10	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	20	10	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	20	10	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	20	10	ug/l	
124-48-1	Dibromochloromethane	[redacted]	20	8.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	20	10	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	20	6.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	20	10	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	20	6.0	ug/l	
100-41-4	Ethylbenzene	[redacted]	20	10	ug/l	
591-78-6	2-Hexanone	[redacted]	100	50	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	100	50	ug/l	
74-83-9	Methyl bromide	[redacted]	40	20	ug/l	
74-87-3	Methyl chloride	[redacted]	40	20	ug/l	
75-09-2	Methylene chloride	[redacted]	100	20	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	100	50	ug/l	
100-42-5	Styrene	[redacted]	20	10	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	20	10	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	20	8.0	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	20	10	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	20	10	ug/l	
108-88-3	Toluene	[redacted]	20	10	ug/l	
79-01-6	Trichloroethylene	[redacted]	20	10	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.8 3

Client Sample ID:	CEF-16-GW-45I-01-032-20070713		
Lab Sample ID:	F51037-6	Date Sampled:	07/13/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	20	10	ug/l	
1330-20-7	Xylene (total)	[redacted]	60	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.5 3

Client Sample ID:	CEF-16-GW-EW-01-034-20070711		
Lab Sample ID:	F51037-3	Date Sampled:	07/11/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0049955.D	5	07/24/07	KW	n/a	n/a	VC2018
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	130	25	ug/l	
71-43-2	Benzene	[redacted]	5.0	2.5	ug/l	
75-27-4	Bromodichloromethane	[redacted]	5.0	2.5	ug/l	
75-25-2	Bromoform	[redacted]	5.0	2.5	ug/l	
108-90-7	Chlorobenzene	[redacted]	5.0	2.5	ug/l	
75-00-3	Chloroethane	[redacted]	10	5.0	ug/l	
67-66-3	Chloroform	[redacted]	5.0	2.5	ug/l	
75-15-0	Carbon disulfide	[redacted]	10	5.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	5.0	2.5	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	5.0	2.5	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	5.0	2.5	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	5.0	2.5	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	5.0	2.5	ug/l	
124-48-1	Dibromochloromethane	[redacted]	5.0	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	5.0	2.5	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	5.0	1.5	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	5.0	2.5	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	5.0	1.5	ug/l	
100-41-4	Ethylbenzene	[redacted]	5.0	2.5	ug/l	
591-78-6	2-Hexanone	[redacted]	25	13	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	25	13	ug/l	
74-83-9	Methyl bromide	[redacted]	10	5.0	ug/l	
74-87-3	Methyl chloride	[redacted]	10	5.0	ug/l	
75-09-2	Methylene chloride	[redacted]	25	5.0	ug/l	I
78-93-3	Methyl ethyl ketone	[redacted]	25	13	ug/l	
100-42-5	Styrene	[redacted]	5.0	2.5	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	5.0	2.5	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	5.0	2.0	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	5.0	2.5	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	5.0	2.5	ug/l	
108-88-3	Toluene	[redacted]	5.0	2.5	ug/l	
79-01-6	Trichloroethylene	[redacted]	5.0	2.5	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

F51037

Accutest Laboratories

Report of Analysis

3.5

3

Client Sample ID:	CEF-16-GW-EW-01-034-20070711		
Lab Sample ID:	F51037-3	Date Sampled:	07/11/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	5.0	2.5	ug/l	
1330-20-7	Xylene (total)	[redacted]	15	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	CEF-16-GW-MW-1-01-032-20070712		
Lab Sample ID:	F51037-1	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J031428.D	10	07/25/07	JG	n/a	n/a	VJ2186
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	250	50	ug/l	
71-43-2	Benzene	[redacted]	10	5.0	ug/l	
75-27-4	Bromodichloromethane	[redacted]	10	5.0	ug/l	
75-25-2	Bromoform	[redacted]	10	5.0	ug/l	
108-90-7	Chlorobenzene	[redacted]	10	5.0	ug/l	
75-00-3	Chloroethane	[redacted]	20	10	ug/l	
67-66-3	Chloroform	[redacted]	10	5.0	ug/l	
75-15-0	Carbon disulfide	[redacted]	20	10	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	10	5.0	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	10	5.0	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	10	5.0	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	10	5.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	10	5.0	ug/l	
124-48-1	Dibromochloromethane	[redacted]	10	4.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	10	5.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	10	3.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	10	5.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	10	3.0	ug/l	
100-41-4	Ethylbenzene	[redacted]	10	5.0	ug/l	
591-78-6	2-Hexanone	[redacted]	50	25	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	50	25	ug/l	
74-83-9	Methyl bromide	[redacted]	20	10	ug/l	
74-87-3	Methyl chloride	[redacted]	20	10	ug/l	
75-09-2	Methylene chloride	[redacted]	50	10	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	50	25	ug/l	
100-42-5	Styrene	[redacted]	10	5.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	10	5.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	10	4.0	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	10	5.0	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	10	5.0	ug/l	
108-88-3	Toluene	[redacted]	10	5.0	ug/l	
79-01-6	Trichloroethylene	[redacted]	10	5.0	ug/l	

U = Not detected MDL - Method Detection Limit I = Result > = MDL but < RL J = Estimated value
RL = Reporting Limit = PQL V = Indicates analyte found in associated method blank
L = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

F51037

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	CEF-16-GW-MW-1-01-032-20070712		
Lab Sample ID:	F51037-1	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	10	5.0	ug/l	
1330-20-7	Xylene (total)	[redacted]	30	10	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.6

3

Client Sample ID:	CEF-16-GW-MW-2-01-032-20070712		
Lab Sample ID:	F51037-4	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0049956.D	100	07/24/07	KW	n/a	n/a	VC2018
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	2500	500	ug/l	
71-43-2	Benzene	[redacted]	100	50	ug/l	
75-27-4	Bromodichloromethane	[redacted]	100	50	ug/l	
75-25-2	Bromoform	[redacted]	100	50	ug/l	
108-90-7	Chlorobenzene	[redacted]	100	50	ug/l	
75-00-3	Chloroethane	[redacted]	200	100	ug/l	
67-66-3	Chloroform	[redacted]	100	50	ug/l	
75-15-0	Carbon disulfide	[redacted]	200	100	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	100	50	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	100	50	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	100	50	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	100	50	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	100	50	ug/l	
124-48-1	Dibromochloromethane	[redacted]	100	40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	100	50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	100	30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	100	50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	100	30	ug/l	
100-41-4	Ethylbenzene	[redacted]	100	50	ug/l	
591-78-6	2-Hexanone	[redacted]	500	250	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	500	250	ug/l	
74-83-9	Methyl bromide	[redacted]	200	100	ug/l	
74-87-3	Methyl chloride	[redacted]	200	100	ug/l	
75-09-2	Methylene chloride	[redacted]	500	100	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	500	250	ug/l	
100-42-5	Styrene	[redacted]	100	50	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	100	50	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	100	40	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	100	50	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	100	50	ug/l	
108-88-3	Toluene	[redacted]	100	50	ug/l	
79-01-6	Trichloroethylene	[redacted]	100	50	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST F51037 LABORATORIES

Accutest Laboratories

Report of Analysis

3.6

3

Client Sample ID:	CEF-16-GW-MW-2-01-032-20070712		
Lab Sample ID:	F51037-4	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	100	50	ug/l	
1330-20-7	Xylene (total)	[redacted]	300	100	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%
17060-07-0	1,2-Dichloroethane-D4			76-127%
2037-26-5	Toluene-D8			86-112%
460-00-4	4-Bromofluorobenzene			84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-16-GW-MW3-01-032-20070712		
Lab Sample ID:	F51037-5	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C0049957.D	1	07/24/07	KW	n/a	n/a	VC2018
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	25	5.0	ug/l	I
71-43-2	Benzene	[redacted]	1.0	0.50	ug/l	
75-27-4	Bromodichloromethane	[redacted]	1.0	0.50	ug/l	
75-25-2	Bromoform	[redacted]	1.0	0.50	ug/l	
108-90-7	Chlorobenzene	[redacted]	1.0	0.50	ug/l	
75-00-3	Chloroethane	[redacted]	2.0	1.0	ug/l	
67-66-3	Chloroform	[redacted]	1.0	0.50	ug/l	
75-15-0	Carbon disulfide	[redacted]	2.0	1.0	ug/l	I
56-23-5	Carbon tetrachloride	[redacted]	1.0	0.50	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	1.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	1.0	0.50	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	1.0	0.50	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	1.0	0.50	ug/l	
124-48-1	Dibromochloromethane	[redacted]	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	1.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	1.0	0.30	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	1.0	0.50	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	[redacted]	1.0	0.50	ug/l	
591-78-6	2-Hexanone	[redacted]	5.0	2.5	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	5.0	2.5	ug/l	
74-83-9	Methyl bromide	[redacted]	2.0	1.0	ug/l	
74-87-3	Methyl chloride	[redacted]	2.0	1.0	ug/l	
75-09-2	Methylene chloride	[redacted]	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	5.0	2.5	ug/l	
100-42-5	Styrene	[redacted]	1.0	0.50	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	1.0	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	1.0	0.50	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	1.0	0.50	ug/l	
108-88-3	Toluene	[redacted]	1.0	0.50	ug/l	
79-01-6	Trichloroethylene	[redacted]	1.0	0.50	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-16-GW-MW3-01-032-20070712		
Lab Sample ID:	F51037-5	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	[redacted]	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	CEF-16-GW-MW-1-01-032-20070712		
Lab Sample ID:	F51037-1	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Sodium	[redacted]	10000	500	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-16-GW-1W-01-034-20070713		
Lab Sample ID:	F51037-2	Date Sampled:	07/13/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Sodium	[redacted]	10000	500	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.5

3

Client Sample ID:	CEF-16-GW-EW-01-034-20070711		
Lab Sample ID:	F51037-3	Date Sampled:	07/11/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Sodium	[redacted]	10000	500	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

F51037

Accutest Laboratories

Report of Analysis

3.6

3

Client Sample ID:	CEF-16-GW-MW-2-01-032-20070712		
Lab Sample ID:	F51037-4	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Sodium	[redacted]	10000	500	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

3.7

3

Client Sample ID:	CEF-16-GW-MW3-01-032-20070712		
Lab Sample ID:	F51037-5	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Sodium	[redacted]	10000	500	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
1 = Indicates a result > = MDL but < RL

F51037

Accutest Laboratories

Report of Analysis

3.8

3

Client Sample ID:	CEF-16-GW-45I-01-032-20070713		
Lab Sample ID:	F51037-6	Date Sampled:	07/13/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Sodium	[redacted]	10000	500	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

F51037

Accutest Laboratories

Report of Analysis

3.2

3

Client Sample ID:	CEF-16-GW-MW-1-01-032-20070712		
Lab Sample ID:	F51037-1A	Date Sampled:	07/12/07
Matrix:	AQ - Groundwater Filtered	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	~~15~~ 12	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	~~1.50~~ 0.C	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

SWS
8/15/07

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

3.4

3

Client Sample ID:	CEF-16-GW-1W-01-034-20070713		
Lab Sample ID:	F51037-2A	Date Sampled:	07/13/07
Matrix:	AQ - Groundwater Filtered	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	~~15~~ 12	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	~~1.5~~ 0.6	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

EWS
8/15/07

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

3.9

3

Client Sample ID:	CEF-16-GW-45I-01-032-20070712		
Lab Sample ID:	F51037-6A	Date Sampled:	07/13/07
Matrix:	AQ - Groundwater Filtered	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By		Method	Prep Method
Iron	69900	300	~~18~~ 12	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	24	15	~~1.5~~ 0.6	ug/l	1	07/18/07	07/18/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5861
(2) Prep QC Batch: MP12516

EWS
8/15/07

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

ACCUTEST Laboratories
F51037

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	CEF-16-GW-MW-1-01-032-20070712		
Lab Sample ID:	F51037-1	Date Sampled:	07/12/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chloride	[redacted]	2.0	1.0	mg/l	1	07/17/07 00:46	MP	EPA 300/SW846 9056
Fluoride [a]	[redacted]	20	10	mg/l	100	07/24/07 15:09	MP	EPA 300/SW846 9056
Nitrogen, Nitrate [b]	[redacted]	0.10	0.050	mg/l	1	07/17/07 00:46	MP	EPA 300/SW846 9056
Nitrogen, Nitrite [b]	[redacted]	0.10	0.050	mg/l	1	07/17/07 00:46	MP	EPA 300/SW846 9056
Phosphate, Ortho [c]	[redacted]	0.10	0.020	mg/l	1	07/25/07	KG	EPA 365.3
Sulfate	[redacted]	200	100	mg/l	100	07/24/07 15:09	MP	EPA 300/SW846 9056
Sulfide	[redacted]	1.0	1.0	mg/l	1	07/18/07	LE	EPA 376.1
Total Organic Carbon	[redacted]	1.0	0.50	mg/l	1	07/19/07 11:57	LE	EPA 415.1

(a) Dilution required due to matrix interference.
(b) Originally ran on 07-14-2007. Re-run due to autosampler failure.
(c) Exceeded holding time.

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.3

3

Client Sample ID:	CEF-16-GW-1W-01-034-20070713		
Lab Sample ID:	F51037-2	Date Sampled:	07/13/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chloride	[redacted]	2.0	1.0	mg/l	1	07/17/07 01:02	MP	EPA 300/SW846 9056
Fluoride	[redacted]	0.20	0.10	mg/l	1	07/24/07 15:24	MP	EPA 300/SW846 9056
Nitrogen, Nitrate [a]	[redacted]	0.10	0.050	mg/l	1	07/17/07 01:02	MP	EPA 300/SW846 9056
Nitrogen, Nitrite [b]	[redacted]	0.10	0.050	mg/l	1	07/17/07 01:02	MP	EPA 300/SW846 9056
Phosphate, Ortho [c]	[redacted]	0.10	0.020	mg/l	1	07/25/07	KG	EPA 365.3
Sulfate	[redacted]	2.0	1.0	mg/l	1	07/24/07 15:24	MP	EPA 300/SW846 9056
Sulfide	[redacted]	1.0	1.0	mg/l	1	07/18/07	LE	EPA 376.1
Total Organic Carbon	[redacted]	1.0	0.50	mg/l	1	07/19/07 12:12	LE	EPA 415.1

(a) Originally ran on 07-14 -2007. Re-run due to autosampler failure.
(b) Originally ran on 07-14-2007. Re-run due to autosampler failure.
(c) Exceeded holding time.

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

F51037

Accutest Laboratories

Report of Analysis

3.8

3

Client Sample ID:	CEF-16-GW-45I-01-032-20070713		
Lab Sample ID:	F51037-6	Date Sampled:	07/13/07
Matrix:	AQ - Ground Water	Date Received:	07/14/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chloride	[redacted]	2.0	1.0	mg/l	1	07/17/07 01:17	MP	EPA 300/SW846 9056
Fluoride [a]	[redacted]	1.0	0.50	mg/l	5	07/24/07 15:40	MP	EPA 300/SW846 9056
Nitrogen, Nitrate [b]	[redacted]	0.10	0.050	mg/l	1	07/17/07 01:17	MP	EPA 300/SW846 9056
Nitrogen, Nitrite [b]	[redacted]	0.10	0.050	mg/l	1	07/17/07 01:17	MP	EPA 300/SW846 9056
Phosphate, Ortho [c]	[redacted]	0.10	0.020	mg/l	1	07/25/07	KG	EPA 365.3
Sulfate	[redacted]	10	5.0	mg/l	5	07/24/07 15:40	MP	EPA 300/SW846 9056
Sulfide	[redacted]	1.0	1.0	mg/l	1	07/18/07	LE	EPA 376.1
Total Organic Carbon	[redacted]	1.0	0.50	mg/l	1	07/19/07 12:27	LE	EPA 415.1

(a) Dilution required due to matrix interference.
(b) Originally ran on 07-14-2007. Re-run due to autosampler failure.
(c) Exceeded holding time.

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

ISCO PILOT STUDY BASELINE SAMPLING EVENT 1 – DECEMBER 11, 2007

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 26178 F54485

PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112600746	Cecil / Site 16	R. Simcik		Accutest / Heather
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
RL LC		D. Siefken	904.334.7260	4405 Vineland Rd C-15
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed-Ex 8427 1834-4338		Orlando, FL

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

DATE YEAR 2007	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, OC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOC 8260B	Dissolved Fe+Mn - 6010	Total Mn - 6010	Anions	TOC				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	P	P	P	G				
PRESERVATIVE USED									HCL	HNO3	HNO3	-	HCL				
12/11	0930	CEF-016-GW-IW2-01	IW2			GW		3	3								Cool to 4°C
	1010	CEF-016-GW-IW3-01	IW3					8	3	1	1	1	2				
	1150	CEF-016-GW-EW2-01	EW2					6	3		1		2				
	1245	CEF-016-GW-MW4-01	MW4					6	3		1		2				
	1345	CEF-016-GW-MW2-01	MW2					8	3	1	1	1	2				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY RL	12/11/07		1. RECEIVED BY FX		
2. RELINQUISHED BY FX			2. RECEIVED BY FM	12-12-07	0900
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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

1.8

4/02R
FORM NO. TINUS-001

4.1 4

F54485: Chain of Custody
Page 1 of 5

TERRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER F54485 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112600746	Cecil / Site 16	R. Smith		Accutest / Heather
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
RL LC		D. Stephen	904-334-7260	4405 Vineland Rd C-15
F54485.		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed-Ex 18427 1834-4338		Orlando, FL

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

DATE YEAR 2007	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	VOC SOLVS	Dissolved Fe/Mn - 6010	Total Mn - 6010	Anions	TOC				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	P	P	P	G				
PRESERVATIVE USED									HCL	HNO_3	HNO_3	-	HCL				
12/11	0930	CEF-016-GW-IW2-01	IW2			GW		3	3								Cool to 4°C
	1010	CEF-016-GW-IW3-01	IW3					8	3	1	1	1	2				
	[illegible]	CEF-016-GW-IW2-01	IW2					6	3		1						
5 12/11	1245	CEF-016-GW-MW4-01	MW4					6	3		1		2				
	[illegible]	[illegible]						[illegible]	3	1	1	1	2				

Forgot to ship these with the other
Make sure the MW 4 samples are on
the same print out as the other wells

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
RL	12/11/07		Luis Garcia Alse	12/13/7	3pm
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
Luis Garcia Alse	12/13/7	3pm	J. Cowan 12-14-07		08:0
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 2.0 4/02R FORM NO. TNRIS 004

4.1 4

Raw Data: J034773.D

Accutest Laboratories

Report of Analysis

3.4 3

Client Sample ID:	CEF-016-GW-EW2-01		
Lab Sample ID:	F54485-3	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J034773.D	20	12/15/07	KW	n/a	n/a	VJ2316
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	500	200	ug/l	I
71-43-2	Benzene	[redacted]	20	4.0	ug/l	
75-27-4	Bromodichloromethane	[redacted]	20	5.8	ug/l	
75-25-2	Bromoform	[redacted]	20	5.6	ug/l	
108-90-7	Chlorobenzene	[redacted]	20	4.0	ug/l	
75-00-3	Chloroethane	[redacted]	40	9.2	ug/l	
67-66-3	Chloroform	[redacted]	20	4.2	ug/l	
75-15-0	Carbon disulfide	[redacted]	40	4.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	20	5.8	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	20	5.0	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	20	4.6	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	20	4.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	20	5.0	ug/l	
124-48-1	Dibromochloromethane	[redacted]	20	4.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	20	5.6	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	20	4.8	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	20	4.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	20	4.2	ug/l	
100-41-4	Ethylbenzene	[redacted]	20	4.0	ug/l	
591-78-6	2-Hexanone	[redacted]	200	57	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	100	44	ug/l	
74-83-9	Methyl bromide	[redacted]	40	11	ug/l	
74-87-3	Methyl chloride	[redacted]	40	7.6	ug/l	
75-09-2	Methylene chloride	[redacted]	100	20	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	100	40	ug/l	
100-42-5	Styrene	[redacted]	20	4.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	20	5.8	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	20	7.4	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	20	6.0	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	20	5.0	ug/l	
108-88-3	Toluene	[redacted]	20	5.4	ug/l	
79-01-6	Trichloroethylene	[redacted]	20	7.6	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.4

3

Client Sample ID:	CEF-016-GW-EW2-01		
Lab Sample ID:	F54485-3	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	20	6.8	ug/l	
1330-20-7	Xylene (total)	[redacted]	60	11	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-IW2-01		
Lab Sample ID:	F54485-1	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J034805.D	1	12/17/07	KW	n/a	n/a	VJ2318
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	25	10	ug/l	I
71-43-2	Benzene	[redacted]	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	[redacted]	1.0	0.29	ug/l	
75-25-2	Bromoform	[redacted]	1.0	0.28	ug/l	
108-90-7	Chlorobenzene	[redacted]	1.0	0.20	ug/l	
75-00-3	Chloroethane	[redacted]	2.0	0.46	ug/l	
67-66-3	Chloroform	[redacted]	1.0	0.21	ug/l	
75-15-0	Carbon disulfide	[redacted]	2.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	1.0	0.29	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	1.0	0.25	ug/l	I
75-35-4	1,1-Dichloroethylene	[redacted]	1.0	0.23	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	1.0	0.25	ug/l	
124-48-1	Dibromochloromethane	[redacted]	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	1.0	0.28	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	1.0	0.24	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	1.0	0.21	ug/l	
100-41-4	Ethylbenzene	[redacted]	1.0	0.20	ug/l	
591-78-6	2-Hexanone	[redacted]	10	2.9	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	5.0	2.2	ug/l	
74-83-9	Methyl bromide	[redacted]	2.0	0.54	ug/l	
74-87-3	Methyl chloride	[redacted]	2.0	0.38	ug/l	
75-09-2	Methylene chloride	[redacted]	5.0	1.0	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	5.0	2.0	ug/l	
100-42-5	Styrene	[redacted]	1.0	0.20	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	1.0	0.29	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	1.0	0.37	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	1.0	0.30	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	1.0	0.25	ug/l	
108-88-3	Toluene	[redacted]	1.0	0.27	ug/l	
79-01-6	Trichloroethylene	[redacted]	1.0	0.38	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-016-GW-IW2-01		
Lab Sample ID:	F54485-1	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	0.34 J	1.0	0.34	ug/l	
1330-20-7	Xylene (total)	0.56 J	3.0	0.56	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		87-116%
17060-07-0	1,2-Dichloroethane-D4	105%		76-127%
2037-26-5	Toluene-D8	101%		86-112%
460-00-4	4-Bromofluorobenzene	114%		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.2

3

Client Sample ID:	CEF-016-GW-IW3-01		
Lab Sample ID:	F54485-2	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J034761.D	200	12/14/07	KW	n/a	n/a	VJ2315
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	5000	2000	ug/l	
71-43-2	Benzene	[redacted]	200	40	ug/l	
75-27-4	Bromodichloromethane	[redacted]	200	58	ug/l	
75-25-2	Bromoform	[redacted]	200	56	ug/l	
108-90-7	Chlorobenzene	[redacted]	200	40	ug/l	
75-00-3	Chloroethane	[redacted]	400	92	ug/l	
67-66-3	Chloroform	[redacted]	200	42	ug/l	
75-15-0	Carbon disulfide	[redacted]	400	40	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	200	58	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	200	50	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	200	46	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	200	40	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	200	50	ug/l	
124-48-1	Dibromochloromethane	[redacted]	200	40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	200	56	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	200	48	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	200	40	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	200	42	ug/l	
100-41-4	Ethylbenzene	[redacted]	200	40	ug/l	
591-78-6	2-Hexanone	[redacted]	2000	570	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	1000	440	ug/l	
74-83-9	Methyl bromide	[redacted]	400	110	ug/l	
74-87-3	Methyl chloride	[redacted]	400	76	ug/l	
75-09-2	Methylene chloride	[redacted]	1000	200	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	1000	400	ug/l	
100-42-5	Styrene	[redacted]	200	40	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	200	58	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	200	74	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	200	60	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	200	50	ug/l	
108-88-3	Toluene	[redacted]	200	54	ug/l	
79-01-6	Trichloroethylene	[redacted]	200	76	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST Laboratories

Accutest Laboratories

Report of Analysis

3.2

3

Client Sample ID:	CEF-016-GW-IW3-01		
Lab Sample ID:	F54485-2	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	200	68	ug/l	
1330-20-7	Xylene (total)	[redacted]	600	110	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

F54485

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.5

3

Client Sample ID:	CEF-016-GW-MW2-01		
Lab Sample ID:	F54485-4	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J034774.D	10	12/15/07	KW	n/a	n/a	VJ2316
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	250	100	ug/l	
71-43-2	Benzene	[redacted]	10	2.0	ug/l	
75-27-4	Bromodichloromethane	[redacted]	10	2.9	ug/l	
75-25-2	Bromoform	[redacted]	10	2.8	ug/l	
108-90-7	Chlorobenzene	[redacted]	10	2.0	ug/l	
75-00-3	Chloroethane	[redacted]	20	4.6	ug/l	
67-66-3	Chloroform	[redacted]	10	2.1	ug/l	
75-15-0	Carbon disulfide	[redacted]	20	2.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	10	2.9	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	10	2.5	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	10	2.3	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	10	2.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	10	2.5	ug/l	
124-48-1	Dibromochloromethane	[redacted]	10	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	10	2.8	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	10	2.4	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	10	2.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	10	2.1	ug/l	
100-41-4	Ethylbenzene	[redacted]	10	2.0	ug/l	
591-78-6	2-Hexanone	[redacted]	100	29	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	50	22	ug/l	
74-83-9	Methyl bromide	[redacted]	20	5.4	ug/l	
74-87-3	Methyl chloride	[redacted]	20	3.8	ug/l	
75-09-2	Methylene chloride	[redacted]	50	10	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	50	20	ug/l	
100-42-5	Styrene	[redacted]	10	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	10	2.9	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	10	3.7	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	10	3.0	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	10	2.5	ug/l	
108-88-3	Toluene	[redacted]	10	2.7	ug/l	
79-01-6	Trichloroethylene	[redacted]	10	3.8	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL, J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.5

3

Client Sample ID:	CEF-016-GW-MW2-01		
Lab Sample ID:	F54485-4	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	3.4 U	10	3.4	ug/l	
1330-20-7	Xylene (total)	5.6 U	30	5.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		87-116%
17060-07-0	1,2-Dichloroethane-D4	98%		76-127%
2037-26-5	Toluene-D8	98%		86-112%
460-00-4	4-Bromofluorobenzene	101%		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST Laboratories
F54485

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.7

3

Client Sample ID:	CEF-016-GW-MW4-01		
Lab Sample ID:	F54485-5	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/13/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J034851.D	20	12/18/07	KW	n/a	n/a	VJ2319
Run #2	J034867.D	50	12/19/07	KW	n/a	n/a	VJ2321

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	[redacted]	500	200	ug/l	
71-43-2	Benzene	[redacted]	20	4.0	ug/l	
75-27-4	Bromodichloromethane	[redacted]	20	5.8	ug/l	
75-25-2	Bromoform	[redacted]	20	5.6	ug/l	
108-90-7	Chlorobenzene	[redacted]	20	4.0	ug/l	
75-00-3	Chloroethane	[redacted]	40	9.2	ug/l	
67-66-3	Chloroform	[redacted]	20	4.2	ug/l	
75-15-0	Carbon disulfide	[redacted]	40	4.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	20	5.8	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	20	5.0	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	20	4.6	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	20	4.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	20	5.0	ug/l	
124-48-1	Dibromochloromethane	[redacted]	20	4.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	20	5.6	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	20	4.8	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	20	4.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	20	4.2	ug/l	
100-41-4	Ethylbenzene	[redacted]	20	4.0	ug/l	
591-78-6	2-Hexanone	[redacted]	200	57	ug/l	
108-10-1	4-Methyl-2-pentanone	[redacted]	100	44	ug/l	
74-83-9	Methyl bromide	[redacted]	40	11	ug/l	
74-87-3	Methyl chloride	[redacted]	40	7.6	ug/l	
75-09-2	Methylene chloride	[redacted]	250	50	ug/l	
78-93-3	Methyl ethyl ketone	[redacted]	100	40	ug/l	
100-42-5	Styrene	[redacted]	20	4.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	20	5.8	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	20	7.4	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	20	6.0	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	20	5.0	ug/l	
108-88-3	Toluene	[redacted]	20	5.4	ug/l	
79-01-6	Trichloroethylene	[redacted]	50	19	ug/l	

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-016-GW-MW4-01		
Lab Sample ID:	F54485-5	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/13/07
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA TCL List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-01-4	Vinyl chloride	[redacted]	20	6.8	ug/l	
1330-20-7	Xylene (total)	[redacted]	60	11	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]	[redacted]	87-116%
17060-07-0	1,2-Dichloroethane-D4	[redacted]	[redacted]	76-127%
2037-26-5	Toluene-D8	[redacted]	[redacted]	86-112%
460-00-4	4-Bromofluorobenzene	[redacted]	[redacted]	84-120%

(a) Result is from Run# 2

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.4

3

Client Sample ID:	CEF-016-GW-EW2-01		
Lab Sample ID:	F54485-3	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Sodium	[redacted]	10000	500	ug/l	1	12/14/07	12/14/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6169
(2) Prep QC Batch: MP13616

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

ACCUTEST F54485

Accutest Laboratories

Report of Analysis

3.2

3

Client Sample ID:	CEF-016-GW-IW3-01		
Lab Sample ID:	F54485-2	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By		Method	Prep Method
Sodium	[redacted]	40000	2000	ug/l	4	12/14/07	12/17/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6171
(2) Prep QC Batch: MP13616

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

ACCUTEST Laboratories
F54485

Accutest Laboratories

Report of Analysis

3.5

3

Client Sample ID:	CEF-016-GW-MW2-01		
Lab Sample ID:	F54485-4	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Sodium	[redacted]	50000	2500	ug/l	5	12/14/07	12/17/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6171
(2) Prep QC Batch: MP13616

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.7

3

Client Sample ID:	CEF-016-GW-MW4-01		
Lab Sample ID:	F54485-5	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/13/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By		Method	Prep Method
Sodium	[redacted]	10000	500	ug/l	1	12/17/07	12/17/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6171
(2) Prep QC Batch: MP13625

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

F54485

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-IW3-01		
Lab Sample ID:	F54485-2A	Date Sampled:	12/11/07
Matrix:	AQ - Groundwater Filtered	Date Received:	12/12/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	15	ug/l	1	12/14/07	12/14/07	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	12/14/07	12/14/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6169
(2) Prep QC Batch: MP13616

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-MW2-01		
Lab Sample ID:	F54485-4A	Date Sampled:	12/11/07
Matrix:	AQ - Groundwater Filtered	Date Received:	12/12/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	15	ug/l	1	12/14/07	12/14/07	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	12/14/07	12/14/07	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6169
(2) Prep QC Batch: MP13616

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.4

3

Client Sample ID:	CEF-016-GW-EW2-01		
Lab Sample ID:	F54485-3	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Total Organic Carbon	[redacted]	1.0	0.50	mg/l	1	12/13/07 14:58	LE	SM19 5310B/SW 9060A

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

ACCUTEST LABORATORIES
F54485

Accutest Laboratories

Report of Analysis

3.2 3

Client Sample ID:	CEF-016-GW-IW3-01		
Lab Sample ID:	F54485-2	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chloride	[redacted]	2.0	1.0	mg/l	1	12/12/07 16:36	LT	EPA 300/SW846 9056
Nitrogen, Nitrate	[redacted]	0.10	0.050	mg/l	1	12/12/07 16:36	LT	EPA 300/SW846 9056
Nitrogen, Nitrite	[redacted]	0.10	0.050	mg/l	1	12/12/07 16:36	LT	EPA 300/SW846 9056
Phosphate, Ortho	[redacted]	0.10	0.020	mg/l	1	12/12/07 15:30	LE	EPA 365.3
Sulfate	[redacted]	4.0	2.0	mg/l	2	12/14/07 01:26	LT	EPA 300/SW846 9056
Total Organic Carbon	[redacted]	1.0	0.50	mg/l	1	12/13/07 14:40	LE	SM19 5310B/SW 9060A

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

ACCUTEST Laboratories
F54485

Accutest Laboratories

Report of Analysis

3.5 3

Client Sample ID:	CEF-016-GW-MW2-01		
Lab Sample ID:	F54485-4	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/12/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Chloride	[redacted]	2.0	1.0	mg/l	1	12/12/07 16:52	LT	EPA 300/SW846 9056
Nitrogen, Nitrate	[redacted]	0.10	0.050	mg/l	1	12/12/07 16:52	LT	EPA 300/SW846 9056
Nitrogen, Nitrite	[redacted]	0.10	0.050	mg/l	1	12/12/07 16:52	LT	EPA 300/SW846 9056
Phosphate, Ortho	[redacted]	0.10	0.020	mg/l	1	12/12/07 15:30	LE	EPA 365.3
Sulfate	[redacted]	10	5.0	mg/l	5	12/19/07 01:29	LT	EPA 300/SW846 9056
Total Organic Carbon	[redacted]	1.0	0.50	mg/l	1	12/13/07 15:13	LE	SM19 5310B/SW 9060A

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

ACCUTEST F54485 Laboratories

Accutest Laboratories

Report of Analysis

3.7 3

Client Sample ID:	CEF-016-GW-MW4-01		
Lab Sample ID:	F54485-5	Date Sampled:	12/11/07
Matrix:	AQ - Ground Water	Date Received:	12/13/07
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

General Chemistry

Analyte	Result	RL	MDL	Units	DF	Analyzed	By	Method
Total Organic Carbon	[redacted]	1.0	0.50	mg/l	1	12/19/07 09:18	LE	SM19 5310B/SW 9060A

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

ACCUTEST Laboratories F54485

ISCO PILOT STUDY SAMPLING EVENT 2 – APRIL 26, 2008

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 26130 F57197 PAGE 1 OF 1

PROJECT NO: 112G00378 CTO 25
FACILITY: Cecil / Site 16
SAMPLERS (SIGNATURE): [signature]

PROJECT MANAGER: Rob Simon
PHONE NUMBER: 407 921 8163
FIELD OPERATIONS LEADER: Dave Steffen
PHONE NUMBER: 904 334-7260
CARRIER/WAYBILL NUMBER: Fed Ex 8427 1834 4349

LABORATORY NAME AND CONTACT: Heather Worley / Accutest
ADDRESS: 4405 Vineland Rd - C-15
CITY, STATE: ORLANDO, FL 32811

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

	DATE YEAR 2008	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SO, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: 8260 (HALOGEN)	6010 (Filtered) Fe+Mn							COMMENTS
			CONTAINER TYPE PLASTIC (P) or GLASS (G)							G	P							
			PRESERVATIVE USED							HCL	HNO3							
1	4/16	1045	CEF-016-GW-MW461-042608				GW		4	3	1							Cool to 4°C
2		1240	CEF-016-GW-MW4-042608						4	3	1							
3		1325	CEF-016-GW-MW2-042608						12	9	3							
4		1400	CEF-016-GW-MW3-042608						4	3	1							
5		1515	CEF-016-GW-MW2-042608						4	3	1							
6		0000	CEF-016-GW-DUP01-042608						4	3	1							

1. RELINQUISHED BY [signature]	DATE 4-28-08	TIME 1525	1. RECEIVED BY FEDEX	DATE	TIME
2. RELINQUISHED BY FEDEX	DATE	TIME	2. RECEIVED BY Felix Montenegro (AISC)	DATE 4-29-08	TIME 0900
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: MW2=MS/MSD

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

4/02R
FORM NO. TINUS-001

4.1 4

F57197: Chain of Custody
Page 1 of 2

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: F57197 CLIENT: TETRA TECH PROJECT: 112G00378\CT 025

DATE/TIME RECEIVED: 04.29.08 0900 # OF COOLERS RECEIVED: 1 COOLER TEMPS: 1.6

METHOD OF DELIVERY: (FEDEX) UPS ACCUTEST COURIER GREYHOUND DELIVERY OTHER

AIRBILL NUMBERS: 8427 1834 4349

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [ ] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET
- [x] WET ICE RECEIVED IN COOLER

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [x] TRIP BLANK NOT PROVIDED
- [x] TRIP BLANK NOT ON COC
- [ ] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [ ] SAMPLE LABELS NOT PRESENT ON ALL BOTTLES
- [ ] CORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] TIMES ON COC DOES NOT MATCH LABEL(S)
- [ ] ID'S ON COC DOES NOT MATCH LABEL(S)
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING INSTRUCTIONS
- [ ] UNCLEAR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] 5035 FIELD KIT NOT FROZEN WITHIN 48 HOUR'S
- [ ] RESIDUAL CHLORINE PRESENT

(APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS)

MISC. INFORMATION

NUMBER OF ENCORES ? Ø

NUMBER OF 5035 FIELD KITS ? Ø

NUMBER OF LAB FILTERED METALS ? Ø

SUMMARY OF COMMENTS:

TECHNICIAN SIGNATURE/DATE F.M. 04.29.08 TECHNICIAN SIGNATURE/DATE JC 4-29-08 ASBD 12/17/07

4.1 4

F57197: Chain of Custody
Page 2 of 2

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.11 3

Client Sample ID:	CEF-016-GW-DUP01-042608		
Lab Sample ID:	F57197-6	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J038176.D	50	05/09/08	KW	n/a	n/a	VJ2459
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	50	15	ug/l	
75-25-2	Bromoform	[redacted]	50	14	ug/l	
108-90-7	Chlorobenzene	[redacted]	50	10	ug/l	
75-00-3	Chloroethane	[redacted]	100	23	ug/l	
67-66-3	Chloroform	[redacted]	50	11	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	250	61	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	50	15	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	50	13	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	50	12	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	50	10	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	50	13	ug/l	
124-48-1	Dibromochloromethane	[redacted]	50	10	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	50	14	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	50	12	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	50	12	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	50	10	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	50	11	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	50	10	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	50	11	ug/l	
74-83-9	Methyl bromide	[redacted]	100	27	ug/l	
74-87-3	Methyl chloride	[redacted]	100	19	ug/l	
75-09-2	Methylene chloride	[redacted]	250	50	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	50	15	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	50	19	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	50	15	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	50	13	ug/l	
79-01-6	Trichloroethylene	[redacted]	50	19	ug/l	
75-01-4	Vinyl chloride	[redacted]	50	17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-DUP01-042608		
Lab Sample ID:	F57197-6	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-DUP01-042608		
Lab Sample ID:	F57197-6A	Date Sampled:	04/26/08
Matrix:	AQ - Groundwater Filtered	Date Received:	04/29/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	225000	300	15	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]
Manganese	1990	15	1.0	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6433
(2) Prep QC Batch: MP14304

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Raw Data: J038175.D

Accutest Laboratories

Report of Analysis

3.9 3

Client Sample ID:	CEF-016-GW-EW2-042608		
Lab Sample ID:	F57197-5	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J038175.D	5	05/09/08	KW	n/a	n/a	VJ2459
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	5.0	1.5	ug/l	
75-25-2	Bromoform	[redacted]	5.0	1.4	ug/l	
108-90-7	Chlorobenzene	[redacted]	5.0	1.0	ug/l	
75-00-3	Chloroethane	[redacted]	10	2.3	ug/l	
67-66-3	Chloroform	[redacted]	5.0	1.1	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	25	6.1	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	5.0	1.5	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	5.0	1.3	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	5.0	1.2	ug/l	I
107-06-2	1,2-Dichloroethane	[redacted]	5.0	1.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	5.0	1.3	ug/l	
124-48-1	Dibromochloromethane	[redacted]	5.0	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	5.0	1.4	ug/l	I
10061-01-5	cis-1,3-Dichloropropene	[redacted]	5.0	1.2	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	5.0	1.2	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	5.0	1.0	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	5.0	1.1	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	5.0	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	5.0	1.1	ug/l	
74-83-9	Methyl bromide	[redacted]	10	2.7	ug/l	
74-87-3	Methyl chloride	[redacted]	10	1.9	ug/l	
75-09-2	Methylene chloride	[redacted]	25	5.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	5.0	1.5	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	5.0	1.9	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	5.0	1.5	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	5.0	1.3	ug/l	
79-01-6	Trichloroethylene	[redacted]	[redacted]	1.9	ug/l	
75-01-4	Vinyl chloride	[redacted]	[redacted]	1.7	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-016-GW-EW2-042608		
Lab Sample ID:	F57197-5	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-EW2-042608		
Lab Sample ID:	F57197-5A	Date Sampled:	04/26/08
Matrix:	AQ - Groundwater Filtered	Date Received:	04/29/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	187000	300	15	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]
Manganese	1470	15	1.0	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6433
(2) Prep QC Batch: MP14304

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.7 3

Client Sample ID:	CEF-016-GW-IW3-042608		
Lab Sample ID:	F57197-4	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J037996.D	5	05/03/08	AB	n/a	n/a	VJ2452
Run #2 [a]	J038200.D	5	05/10/08	KW	n/a	n/a	VJ2460

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	1.5 U	5.0	1.5	ug/l	
75-25-2	Bromoform	1.4 U	5.0	1.4	ug/l	
108-90-7	Chlorobenzene	1.0 U	5.0	1.0	ug/l	
75-00-3	Chloroethane	2.3 U	10	2.3	ug/l	
67-66-3	Chloroform	1.1 U	5.0	1.1	ug/l	
110-75-8	2-Chloroethyl vinyl ether	6.1 U	25	6.1	ug/l	
56-23-5	Carbon tetrachloride	1.5 U	5.0	1.5	ug/l	
75-34-3	1,1-Dichloroethane	1.3 U	5.0	1.3	ug/l	
75-35-4	1,1-Dichloroethylene	1.2 U	5.0	1.2	ug/l	
107-06-2	1,2-Dichloroethane	1.0 U	5.0	1.0	ug/l	
78-87-5	1,2-Dichloropropane	1.3 U	5.0	1.3	ug/l	
124-48-1	Dibromochloromethane	1.0 U	5.0	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	2.2	5.0	1.4	ug/l	I
10061-01-5	cis-1,3-Dichloropropene	1.2 U	5.0	1.2	ug/l	
541-73-1	m-Dichlorobenzene	1.2 U	5.0	1.2	ug/l	
95-50-1	o-Dichlorobenzene	1.0 U	5.0	1.0	ug/l	
106-46-7	p-Dichlorobenzene	1.1 U	5.0	1.1	ug/l	
156-60-5	trans-1,2-Dichloroethylene	1.0 U	5.0	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	1.1 U	5.0	1.1	ug/l	
74-83-9	Methyl bromide	2.7 U	10	2.7	ug/l	
74-87-3	Methyl chloride	1.9 U	10	1.9	ug/l	
75-09-2	Methylene chloride	5.0 U	25	5.0	ug/l	
71-55-6	1,1,1-Trichloroethane	3.0	5.0	1.5	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	1.9 U	5.0	1.9	ug/l	
79-00-5	1,1,2-Trichloroethane	1.5 U	5.0	1.5	ug/l	
127-18-4	Tetrachloroethylene	1.3 U	5.0	1.3	ug/l	
79-01-6	Trichloroethylene	2.5	5.0	1.9	ug/l	
75-01-4	Vinyl chloride	1.7 U	5.0	1.7	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%	107%	87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-016-GW-IW3-042608		
Lab Sample ID:	F57197-4	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	128%	103%	76-127%
2037-26-5	Toluene-D8	100%	98%	86-112%
460-00-4	4-Bromofluorobenzene	108%	125%	84-120%

(a) Confirmation run.
(b) Outside control limits
(c) Outside control limits.

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.8 3

Client Sample ID:	CEF-016-GW-IW3-042608		
Lab Sample ID:	F57197-4A	Date Sampled:	04/26/08
Matrix:	AQ - Groundwater Filtered	Date Received:	04/29/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	15	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6433
(2) Prep QC Batch: MP14304

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.5 3

Client Sample ID:	CEF-016-GW-MW2-042608		
Lab Sample ID:	F57197-3	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J038148.D	10	05/08/08	JG	n/a	n/a	VJ2457
Run #2	J037979.D	50	05/03/08	AB	n/a	n/a	VJ2452

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	10	2.9	ug/l	
75-25-2	Bromoform	[redacted]	10	2.8	ug/l	
108-90-7	Chlorobenzene	[redacted]	10	2.0	ug/l	
75-00-3	Chloroethane	[redacted]	20	4.6	ug/l	
67-66-3	Chloroform	[redacted]	10	2.1	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	50	12	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	10	2.9	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	10	2.5	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	10	2.3	ug/l	I
107-06-2	1,2-Dichloroethane	[redacted]	10	2.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	10	2.5	ug/l	
124-48-1	Dibromochloromethane	[redacted]	10	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	10	2.8	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	10	2.4	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	10	2.3	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	10	2.0	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	10	2.2	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	10	2.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	10	2.1	ug/l	
74-83-9	Methyl bromide	[redacted]	20	5.4	ug/l	
74-87-3	Methyl chloride	[redacted]	20	3.8	ug/l	
75-09-2	Methylene chloride [a]	[redacted]	50	10	ug/l	I
71-55-6	1,1,1-Trichloroethane	[redacted]	10	2.9	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	10	3.7	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	10	3.0	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	10	2.5	ug/l	
79-01-6	Trichloroethylene	[redacted]	50	19	ug/l	
75-01-4	Vinyl chloride	[redacted]	10	3.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]	[redacted]	87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-016-GW-MW2-042608		
Lab Sample ID:	F57197-3	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	93%	122%	76-127%
2037-26-5	Toluene-D8	97%	101%	86-112%
460-00-4	4-Bromofluorobenzene	94%	102%	84-120%

(a) Suspected laboratory contaminant.
(b) Result is from Run# 2

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.6

3

Client Sample ID:	CEF-016-GW-MW2-042608		
Lab Sample ID:	F57197-3A	Date Sampled:	04/26/08
Matrix:	AQ - Groundwater Filtered	Date Received:	04/29/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	15	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6433
(2) Prep QC Batch: MP14304

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.3

3

Client Sample ID:	CEF-016-GW-MW4-042608		
Lab Sample ID:	F57197-2	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J037995.D	10	05/03/08	AB	n/a	n/a	VJ2452
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	10	2.9	ug/l	
75-25-2	Bromoform	[redacted]	10	2.8	ug/l	
108-90-7	Chlorobenzene	[redacted]	10	2.0	ug/l	
75-00-3	Chloroethane	[redacted]	20	4.6	ug/l	
67-66-3	Chloroform	[redacted]	10	2.1	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	50	12	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	10	2.9	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	10	2.5	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	10	2.3	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	10	2.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	10	2.5	ug/l	
124-48-1	Dibromochloromethane	[redacted]	10	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	10	2.8	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	10	2.4	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	10	2.3	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	10	2.0	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	10	2.2	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	10	2.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	10	2.1	ug/l	
74-83-9	Methyl bromide	[redacted]	20	5.4	ug/l	
74-87-3	Methyl chloride	[redacted]	20	3.8	ug/l	
75-09-2	Methylene chloride [a]	[redacted]	50	10	ug/l	I
71-55-6	1,1,1-Trichloroethane	[redacted]	10	2.9	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	10	3.7	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	10	3.0	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	10	2.5	ug/l	
79-01-6	Trichloroethylene	[redacted]	10	3.8	ug/l	
75-01-4	Vinyl chloride	[redacted]	10	3.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST Laboratories F57197

Accutest Laboratories

Report of Analysis

3.3

3

Client Sample ID:	CEF-016-GW-MW4-042608		
Lab Sample ID:	F57197-2	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	92%		76-127%
2037-26-5	Toluene-D8	90%		86-112%
460-00-4	4-Bromofluorobenzene	106%		84-120%

(a) Suspected laboratory contaminant.

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.4 3

Client Sample ID:	CEF-016-GW-MW4-042608		
Lab Sample ID:	F57197-2A	Date Sampled:	04/26/08
Matrix:	AQ - Groundwater Filtered	Date Received:	04/29/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By		Method	Prep Method
Iron	[redacted]	300	15	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6433
(2) Prep QC Batch: MP14304

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.1 3

Client Sample ID:	CEF-016-GW-MW46I-042608		
Lab Sample ID:	F57197-1	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	J037968.D	10	05/02/08	JG	n/a	n/a	VJ2450
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	10	2.9	ug/l	
75-25-2	Bromoform	[redacted]	10	2.8	ug/l	
108-90-7	Chlorobenzene	[redacted]	10	2.0	ug/l	
75-00-3	Chloroethane	[redacted]	20	4.6	ug/l	
67-66-3	Chloroform	[redacted]	10	2.1	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	50	12	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	10	2.9	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	10	2.5	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	10	2.3	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	10	2.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	10	2.5	ug/l	
124-48-1	Dibromochloromethane	[redacted]	10	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	10	2.8	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	10	2.4	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	10	2.3	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	10	2.0	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	10	2.2	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	10	2.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	10	2.1	ug/l	
74-83-9	Methyl bromide	[redacted]	20	5.4	ug/l	
74-87-3	Methyl chloride	[redacted]	20	3.8	ug/l	
75-09-2	Methylene chloride	[redacted]	50	10	ug/l	I
71-55-6	1,1,1-Trichloroethane	[redacted]	10	2.9	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	10	3.7	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	10	3.0	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	10	2.5	ug/l	
79-01-6	Trichloroethylene	[redacted]	10	3.8	ug/l	
75-01-4	Vinyl chloride	[redacted]	10	3.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-MW46I-042608		
Lab Sample ID:	F57197-1	Date Sampled:	04/26/08
Matrix:	AQ - Ground Water	Date Received:	04/29/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	[redacted]		76-127%
2037-26-5	Toluene-D8	[redacted]		86-112%
460-00-4	4-Bromofluorobenzene	[redacted]		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.2

3

Client Sample ID:	CEF-016-GW-MW46I-042608		
Lab Sample ID:	F57197-1A	Date Sampled:	04/26/08
Matrix:	AQ - Groundwater Filtered	Date Received:	04/29/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	195000	300	15	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]
Manganese	862	15	1.0	ug/l	1	04/30/08	04/30/08	DM	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6433
(2) Prep QC Batch: MP14304

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

ISCO PILOT STUDY SAMPLING EVENT 3 – MAY 5, 2008

CHAIN OF CUSTODY | NUMBER 4558 F57360 PAGE 1 OF 1

FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
Cecil / Site 16	Rob Simcik	412 921-8163	Heather Warberg / Accutest
	FIELD OPERATIONS LEADER: Dave Stefken	PHONE NUMBER: 904 334-7260	ADDRESS: 4405 Vineland Rd. C-15
	CARRIER/WAYBILL NUMBER		CITY, STATE: Orlando, FL 32811

TURNAROUND TIME: 3 DAY; ☐ 24 hr. ☒ 72 hr. ☐ 7 day ☐ 14 day

DATE (CCYY)	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	8260 (HALOGEN)	6010 (Filtered) Fe+Mn	6010 (TOTAL) Fe+Mn						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	P	P						
PRESERVATIVE USED									HCL	HNO3	HNO3						
5/5	1110	CCP-016-GW-MW461-02				GW	G		3	1	1						Cool to 4°C
5/5	[illegible]	CCP-016-GW-MW4-02							3	1	1						
5/5	[illegible]	CCP-016-GW-MW2-02							9	3	3						
5/5	[illegible]	CCP-016-GW-IW3-02							3	1	1						
5/5	[illegible]	CCP-016-GW-EW2-02							3	1	1						
5/5	[illegible]	CCP-016-GW-DUP02-02							3	1	1						

	DATE	TIME		DATE	TIME
RELINQUISHED BY: [signature]	5-5-08		1. RECEIVED BY: FX		
2. RELINQUISHED BY: FX	DATE	TIME	2. RECEIVED BY: [signature]	DATE 5-7-08	TIME 0930
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: 24

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

4/02R
FORM NO. TINUS-001

F57360: Chain of Custody
Page 1 of 2

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: F57360 CLIENT: Tetra Tech PROJECT: 112-G00378

DATE/TIME RECEIVED: 5-7-08 09:00 # OF COOLERS RECEIVED: 1 COOLER TEMPS: 2-4

METHOD OF DELIVERY: (FEDEX) UPS ACCUTEST COURIER GREYHOUND DELIVERY OTHER

AIRBILL NUMBERS: 8427 1834 4371

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [ ] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET
- [ ] WET ICE RECEIVED IN COOLER

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [x] TRIP BLANK NOT PROVIDED
- [x] TRIP BLANK NOT ON COC
- [ ] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [ ] SAMPLE LABELS NOT PRESENT ON ALL BOTTLES
- [ ] CORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] TIMES ON COC DOES NOT MATCH LABEL(S)
- [ ] ID'S ON COC DOES NOT MATCH LABEL(S)
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING INSTRUCTIONS
- [ ] UNCLEAR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] 5035 FIELD KIT NOT FROZEN WITHIN 48 HOUR'S
- [ ] RESIDUAL CHLORINE PRESENT

(APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS)

MISC. INFORMATION

NUMBER OF ENCORES ? Ø

NUMBER OF 5035 FIELD KITS ? Ø

NUMBER OF LAB FILTERED METALS ? Ø

SUMMARY OF COMMENTS:

TECHNICIAN SIGNATURE/DATE E.J. 5-7-08 TECHNICIAN SIGNATURE/DATE F.M. 5-7-08 ASBD 12/17/07

4.1 4

F57360: Chain of Custody
Page 2 of 2

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-DUP02-02		
Lab Sample ID:	F57360-6	Date Sampled:	05/05/08
Matrix:	AQ - Ground Water	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By		Method	Prep Method
Iron	[illegible]	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[illegible]	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

3.9

Client Sample ID:	CEF-016-GW-EW2-02		
Lab Sample ID:	F57360-5	Date Sampled:	05/05/08
Matrix:	AQ - Ground Water	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	168000	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	1210	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.7 3

Client Sample ID:	CEF-016-GW-IW3-02		
Lab Sample ID:	F57360-4	Date Sampled:	05/05/08
Matrix:	AQ - Ground Water	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	190000	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	1210	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

ACCUTEST Laboratories F57360

Accutest Laboratories

Report of Analysis

3.5 3

Client Sample ID:	CEF-016-GW-MW2-02		
Lab Sample ID:	F57360-3	Date Sampled:	05/05/08
Matrix:	AQ - Ground Water	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	148000	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

F57360

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-MW4-02		
Lab Sample ID:	F57360-2	Date Sampled:	05/05/08
Matrix:	AQ - Ground Water	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	CEF-016-GW-MW46I-02		
Lab Sample ID:	F57360-1	Date Sampled:	05/05/08
Matrix:	AQ - Ground Water	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

F57360

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-DUP02-02		
Lab Sample ID:	F57360-6A	Date Sampled:	05/05/08
Matrix:	AQ - Groundwater Filtered	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	36500	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	180	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-EW2-02		
Lab Sample ID:	F57360-5A	Date Sampled:	05/05/08
Matrix:	AQ - Groundwater Filtered	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Iron	[illegible]	300	15	ug/l	1	05/08/08	05/09/08 RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[illegible]	15	1.0	ug/l	1	05/08/08	05/09/08 RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.8

3

Client Sample ID:	CEF-016-GW-IW3-02		
Lab Sample ID:	F57360-4A	Date Sampled:	05/05/08
Matrix:	AQ - Groundwater Filtered	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	37000	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	1180	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

ACCUTEST Laboratories
F57360

Accutest Laboratories

Report of Analysis

3.6

3

Client Sample ID:	CEF-016-GW-MW2-02		
Lab Sample ID:	F57360-3A	Date Sampled:	05/05/08
Matrix:	AQ - Groundwater Filtered	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	142000	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	1300	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

3.4 3

Client Sample ID:	CEF-016-GW-MW4-02		
Lab Sample ID:	F57360-2A	Date Sampled:	05/05/08
Matrix:	AQ - Groundwater Filtered	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	[redacted]	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	[redacted]	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.2

3

Client Sample ID:	CEF-016-GW-MW46I-02		
Lab Sample ID:	F57360-1A	Date Sampled:	05/05/08
Matrix:	AQ - Groundwater Filtered	Date Received:	05/07/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	202000	300	15	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	529	15	1.0	ug/l	1	05/08/08	05/09/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6450
(2) Prep QC Batch: MP14355

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

F57360

ISCO PILOT STUDY SAMPLING EVENT 4 – MAY 27, 2008

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 26227 F57798 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00378 / CTO25	Cecil - Site 16	Bob Simcik	412-921-8163	Heather Whorley / Accutest
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
[signature]		David Siefken	904-334-7260	4405 Vineland Road C-15
		CARRIER/WAYBILL NUMBER		CITY, STATE
				ORLANDO FL 32811

STANDARD TAT ☐ 3 DAY
RUSH TAT ☐ 24 hr. ☐ 48 hr. ☒ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G P P
PRESERVATIVE USED: HCL HNO3 HNO3

DATE YEAR 2008	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	TYPE OF [redacted]	COMMENTS
[redacted]	845	CEF-016-GW-MW02-03	[redacted]							chl to 4°C
② [redacted]										

1. RELINQUISHED BY [redacted]	5-28-08 [redacted]			TIME
[redacted] NQUISHED BY FX	[redacted]			TIME 10:00
3. RELINQUISHED BY	DATE [redacted]	3. RECEIVED BY	DATE	TIME
COMMENTS			1.2	

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

4/02R
FORM NO TINUS-001

4.1 4

F57798: Chain of Custody
Page 1 of 2

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: F57798 CLIENT: TETRA TECH PROJECT: 1126 00378 / CT025

DATE/TIME RECEIVED: 5-28-08 10:00 # OF COOLERS RECEIVED: 1 COOLER TEMPS: 1.2

METHOD OF DELIVERY: (FEDEX) UPS ACCUTEST COURIER GREYHOUND DELIVERY OTHER

AIRBILL NUMBERS: 7987 0959 3046

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [ ] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET
- [ ] WET ICE RECEIVED IN COOLER

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [ ] TRIP BLANK NOT PROVIDED
- [ ] TRIP BLANK NOT ON COC
- [ ] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [ ] SAMPLE LABELS NOT PRESENT ON ALL BOTTLES
- [ ] CORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] TIMES ON COC DOES NOT MATCH LABEL(S)
- [ ] ID'S ON COC DOES NOT MATCH LABEL(S)
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING INSTRUCTIONS
- [ ] UNCLEAR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] 5035 FIELD KIT NOT FROZEN WITHIN 48 HOUR'S
- [ ] RESIDUAL CHLORINE PRESENT

(APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS)

MISC. INFORMATION

NUMBER OF ENCORES ? _____

NUMBER OF 5035 FIELD KITS ? _____

NUMBER OF LAB FILTERED METALS ? _____

SUMMARY OF COMMENTS: _____

TECHNICIAN SIGNATURE/DATE JC 5-28-08 TECHNICIAN SIGNATURE/DATE F.M. 5-28-08 ASBD 12/17/07

4.1 4

F57798: Chain of Custody
Page 2 of 2

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.3

Client Sample ID:	CEF-016-GW-IW3-03		
Lab Sample ID:	F57798-2	Date Sampled:	05/27/08
Matrix:	AQ - Ground Water	Date Received:	05/28/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	N0026980.D	2	05/29/08	MM	n/a	n/a	VN1126
Run #2	J038686.D	5	05/29/08	JG	n/a	n/a	VJ2477

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	2.0	0.58	ug/l	
75-25-2	Bromoform	[redacted]	2.0	0.56	ug/l	
108-90-7	Chlorobenzene	[redacted]	2.0	0.40	ug/l	
75-00-3	Chloroethane	[redacted]	4.0	0.92	ug/l	
67-66-3	Chloroform	[redacted]	2.0	0.42	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	10	2.4	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	2.0	0.58	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	2.0	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	2.0	0.46	ug/l	I
107-06-2	1,2-Dichloroethane	[redacted]	2.0	0.40	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	2.0	0.50	ug/l	
124-48-1	Dibromochloromethane	[redacted]	2.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	2.0	0.56	ug/l	I
10061-01-5	cis-1,3-Dichloropropene	[redacted]	2.0	0.48	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	2.0	0.46	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	2.0	0.40	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	2.0	0.44	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	2.0	0.40	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	2.0	0.42	ug/l	
74-83-9	Methyl bromide	[redacted]	4.0	1.1	ug/l	
74-87-3	Methyl chloride	[redacted]	4.0	0.76	ug/l	
75-09-2	Methylene chloride [a]	[redacted]	10	2.0	ug/l	I
71-55-6	1,1,1-Trichloroethane	[redacted]	2.0	0.58	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	2.0	0.74	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	2.0	0.60	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	2.0	0.50	ug/l	
79-01-6	Trichloroethylene	[redacted]	5.0	1.9	ug/l	
75-01-4	Vinyl chloride	[redacted]	2.0	0.68	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]	[redacted]	87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST F57798

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-IW3-03		
Lab Sample ID:	F57798-2	Date Sampled:	05/27/08
Matrix:	AQ - Ground Water	Date Received:	05/28/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	107%	91%	76-127%
2037-26-5	Toluene-D8	102%	100%	86-112%
460-00-4	4-Bromofluorobenzene	107%	100%	84-120%

(a) Suspected laboratory contaminant.
(b) Result is from Run# 2

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-MW2-03		
Lab Sample ID:	F57798-1	Date Sampled:	05/27/08
Matrix:	AQ - Ground Water	Date Received:	05/28/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	N0026979.D	10	05/29/08	MM	n/a	n/a	VN1126
Run #2	J038677.D	50	05/29/08	JG	n/a	n/a	VJ2477

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	10	2.9	ug/l	
75-25-2	Bromoform	[redacted]	10	2.8	ug/l	
108-90-7	Chlorobenzene	[redacted]	10	2.0	ug/l	
75-00-3	Chloroethane	[redacted]	20	4.6	ug/l	
67-66-3	Chloroform	[redacted]	10	2.1	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	50	12	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	10	2.9	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	10	2.5	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	10	2.3	ug/l	I
107-06-2	1,2-Dichloroethane	[redacted]	10	2.0	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	10	2.5	ug/l	
124-48-1	Dibromochloromethane	[redacted]	10	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	10	2.8	ug/l	I
10061-01-5	cis-1,3-Dichloropropene	[redacted]	10	2.4	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	10	2.3	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	10	2.0	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	10	2.2	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	10	2.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	10	2.1	ug/l	
74-83-9	Methyl bromide	[redacted]	20	5.4	ug/l	
74-87-3	Methyl chloride	[redacted]	20	3.8	ug/l	
75-09-2	Methylene chloride [a]	[redacted]	50	10	ug/l	I
71-55-6	1,1,1-Trichloroethane	[redacted]	10	2.9	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	10	3.7	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	10	3.0	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	10	2.5	ug/l	
79-01-6	Trichloroethylene	[redacted]	50	19	ug/l	
75-01-4	Vinyl chloride	[redacted]	10	3.4	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]	[redacted]	87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-016-GW-MW2-03		
Lab Sample ID:	F57798-1	Date Sampled:	05/27/08
Matrix:	AQ - Ground Water	Date Received:	05/28/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	107%	93%	76-127%
2037-26-5	Toluene-D8	103%	99%	86-112%
460-00-4	4-Bromofluorobenzene	107%	102%	84-120%

(a) Suspected laboratory contaminant.
(b) Result is from Run# 2

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	CEF-016-GW-MW2-03		
Lab Sample ID:	F57798-1	Date Sampled:	05/27/08
Matrix:	AQ - Ground Water	Date Received:	05/28/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	11000	300	15	ug/l	1	05/28/08	05/29/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	1390	15	1.0	ug/l	1	05/28/08	05/29/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6492
(2) Prep QC Batch: MP14463

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

ACCUTEST Laboratories
F57798

Accutest Laboratories

Report of Analysis

3.4 3

Client Sample ID:	CEF-016-GW-IW3-03		
Lab Sample ID:	F57798-2A	Date Sampled:	05/27/08
Matrix:	AQ - Groundwater Filtered	Date Received:	05/28/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method
Iron	138000	300	15	ug/l	1	05/28/08	05/29/08 RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	930	15	1.0	ug/l	1	05/28/08	05/29/08 RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6492
(2) Prep QC Batch: MP14463

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

ACCUTEST LABORATORIES F57798

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-IW3-03		
Lab Sample ID:	F57798-2A	Date Sampled:	05/27/08
Matrix:	AQ - Groundwater Filtered	Date Received:	05/28/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	138000	300	15	ug/l	1	05/28/08	05/29/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	930	15	1.0	ug/l	1	05/28/08	05/29/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6492
(2) Prep QC Batch: MP14463

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

ISCO PILOT STUDY SAMPLING EVENT 5 – JUNE 3, 2008

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 26335 F57952 PAGE 1 OF 1

PROJECT NO:	112G00378 / CTO 25
FACILITY:	Cecil / Site 16
SAMPLERS (SIGNATURE)	K. Wilt
PROJECT MANAGER	Rob Simcik
PHONE NUMBER	412-921-8163
FIELD OPERATIONS LEADER	Kevin Weichert
PHONE NUMBER	904-334-7260
CARRIER/WAYBILL NUMBER	
LABORATORY NAME AND CONTACT:	Heather Wendy / Accutest
ADDRESS	4405 Vineland Rd. C-15
CITY, STATE	Orlando, FL 32811

STANDARD TAT ☐ 3 DAY
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☒ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G / P / P

PRESERVATIVE USED: HCL / HNO3 / HNO3

TYPE OF ANALYSIS: 8260 (Halogen) / Gold (Filtered) Fe+Mn / Gold (total) Fe+Mn

	DATE YEAR 2008	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	8260 (Halogen)	Gold (Filtered) Fe+Mn	Gold (total) Fe+Mn						COMMENTS
1	6/3	0832	CEE-016-GW-MW2-04				GW	G	5	3	1	1						Cool to 4°C
2		0925	CEE-016-GW-TW3-04				GW	G	5	3	1	1						

1. RELINQUISHED BY: K. Wilt	DATE: 6-3-08	TIME: 1400	1. RECEIVED BY: FEDEX	DATE	TIME
2. RELINQUISHED BY: FEDEX	DATE	TIME	2. RECEIVED BY: Felipe Montoya 6-4-08	DATE: 6-4-08	TIME: 0930
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 3.0 4/02R FORM NO TINUS-001

4.1 4

F57952: Chain of Custody
Page 1 of 2

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: F57952 CLIENT: Tetra tech PROJECT: 112G00378/CT025

DATE/TIME RECEIVED: 06-04-08 0930 # OF COOLERS RECEIVED: ___ COOLER TEMPS: ___

METHOD OF DELIVERY: (FEDEX) UPS ACCUTEST COURIER GREYHOUND DELIVERY OTHER

AIRBILL NUMBERS: 790518974238

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [ ] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET
- [x] WET ICE RECEIVED IN COOLER

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [x] TRIP BLANK NOT PROVIDED
- [x] TRIP BLANK NOT ON COC
- [ ] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [ ] SAMPLE LABELS NOT PRESENT ON ALL BOTTLES
- [ ] CORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] TIMES ON COC DOES NOT MATCH LABEL(S)
- [ ] ID'S ON COC DOES NOT MATCH LABEL(S)
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING INSTRUCTIONS
- [ ] UNCLEAR COMPOSITING INSTRUCTIONS //
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] 5035 FIELD KIT NOT FROZEN WITHIN 48 HOUR'S
- [ ] RESIDUAL CHLORINE PRESENT

(APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS)

MISC. INFORMATION

NUMBER OF ENCORES ? Ø

NUMBER OF 5035 FIELD KITS ? Ø

NUMBER OF LAB FILTERED METALS ? Ø

SUMMARY OF COMMENTS: ___

TECHNICIAN SIGNATURE/DATE F.M. 06-04-08 TECHNICIAN SIGNATURE/DATE ___ ASBO 12/17/07

4.1 4

F57952: Chain of Custody
Page 2 of 2

Raw Data: [redacted]D

Accutest Laboratories

Report of Analysis

3.3

3

Client Sample ID:	CEF-016-GW-IW3-04		
Lab Sample ID:	F57952-2	Date Sampled:	06/03/08
Matrix:	AQ - Ground Water	Date Received:	06/04/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F028624.D	1	06/05/08	MM	n/a	n/a	VF671
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	1.0	0.20	ug/l	
75-25-2	Bromoform	[redacted]	1.0	0.33	ug/l	
108-90-7	Chlorobenzene	[redacted]	1.0	0.22	ug/l	
75-00-3	Chloroethane	[redacted]	2.0	0.48	ug/l	
67-66-3	Chloroform	[redacted]	1.0	0.28	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	5.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	1.0	0.22	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	1.0	0.24	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	1.0	0.54	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	1.0	0.34	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	1.0	0.21	ug/l	
124-48-1	Dibromochloromethane	[redacted]	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	1.0	0.21	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	1.0	0.23	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	1.0	0.22	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	1.0	0.45	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	1.0	0.21	ug/l	
74-83-9	Methyl bromide	[redacted]	2.0	0.78	ug/l	
74-87-3	Methyl chloride	[redacted]	2.0	0.61	ug/l	I
75-09-2	Methylene chloride	[redacted]	5.0	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	1.0	0.33	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	1.0	0.21	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	1.0	0.26	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	1.0	0.22	ug/l	
79-01-6	Trichloroethylene	[redacted]	1.0	0.32	ug/l	
75-01-4	Vinyl chloride	[redacted]	1.0	0.30	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.3

3

Client Sample ID:	CEF-016-GW-IW3-04		
Lab Sample ID:	F57952-2	Date Sampled:	06/03/08
Matrix:	AQ - Ground Water	Date Received:	06/04/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	107%		76-127%
2037-26-5	Toluene-D8	98%		86-112%
460-00-4	4-Bromofluorobenzene	104%		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.1 3

Client Sample ID:	CEF-016-GW-MW2-04		
Lab Sample ID:	F57952-1	Date Sampled:	06/03/08
Matrix:	AQ - Ground Water	Date Received:	06/04/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F028623.D	5	06/05/08	MM	n/a	n/a	VF671
Run #2	F028650.D	10	06/06/08	MM	n/a	n/a	VF673

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	1.0 U	5.0	1.0	ug/l	
75-25-2	Bromoform	1.7 U	5.0	1.7	ug/l	
108-90-7	Chlorobenzene	1.1 U	5.0	1.1	ug/l	
75-00-3	Chloroethane	2.4 U	10	2.4	ug/l	
67-66-3	Chloroform	1.4 U	5.0	1.4	ug/l	
110-75-8	2-Chloroethyl vinyl ether	5.0 U	25	5.0	ug/l	
56-23-5	Carbon tetrachloride	1.1 U	5.0	1.1	ug/l	
75-34-3	1,1-Dichloroethane	1.2 U	5.0	1.2	ug/l	
75-35-4	1,1-Dichloroethylene	2.7 U	5.0	2.7	ug/l	
107-06-2	1,2-Dichloroethane	1.7 U	5.0	1.7	ug/l	
78-87-5	1,2-Dichloropropane	1.1 U	5.0	1.1	ug/l	
124-48-1	Dibromochloromethane	1.0 U	5.0	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	1.6	5.0	1.0	ug/l	I
10061-01-5	cis-1,3-Dichloropropene	1.1 U	5.0	1.1	ug/l	
541-73-1	m-Dichlorobenzene	1.2 U	5.0	1.2	ug/l	
95-50-1	o-Dichlorobenzene	1.0 U	5.0	1.0	ug/l	
106-46-7	p-Dichlorobenzene	1.1 U	5.0	1.1	ug/l	
156-60-5	trans-1,2-Dichloroethylene	2.3 U	5.0	2.3	ug/l	
10061-02-6	trans-1,3-Dichloropropene	1.1 U	5.0	1.1	ug/l	
74-83-9	Methyl bromide	3.9 U	10	3.9	ug/l	
74-87-3	Methyl chloride	3.1 U	10	3.1	ug/l	
75-09-2	Methylene chloride	5.0 U	25	5.0	ug/l	
71-55-6	1,1,1-Trichloroethane	1.7 U	5.0	1.7	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	1.1 U	5.0	1.1	ug/l	
79-00-5	1,1,2-Trichloroethane	1.3 U	5.0	1.3	ug/l	
127-18-4	Tetrachloroethylene	1.1 U	5.0	1.1	ug/l	
79-01-6	Trichloroethylene	3.2 U	10	3.2	ug/l	
75-01-4	Vinyl chloride	1.5 U	5.0	1.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]	[redacted]	87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-016-GW-MW2-04		
Lab Sample ID:	F57952-1	Date Sampled:	06/03/08
Matrix:	AQ - Ground Water	Date Received:	06/04/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	108%	106%	76-127%
2037-26-5	Toluene-D8	97%	97%	86-112%
460-00-4	4-Bromofluorobenzene	103%	103%	84-120%

(a) Result is from Run# 2

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	CEF-016-GW-MW2-04		
Lab Sample ID:	F57952-1	Date Sampled:	06/03/08
Matrix:	AQ - Ground Water	Date Received:	06/04/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	187000	300	15	ug/l	1	06/06/08	06/06/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	1320	15	1.0	ug/l	1	06/06/08	06/06/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6520
(2) Prep QC Batch: MP14535

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

Accutest Laboratories

Report of Analysis

3.3

Client Sample ID:	CEF-016-GW-IW3-04		
Lab Sample ID:	F57952-2	Date Sampled:	06/03/08
Matrix:	AQ - Ground Water	Date Received:	06/04/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	108000	300	15	ug/l	1	06/06/08	06/06/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	1010	15	1.0	ug/l	1	06/06/08	06/06/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6520
(2) Prep QC Batch: MP14535

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result >= MDL but < RL

Accutest Laboratories

Report of Analysis

3.2

3

Client Sample ID:	CEF-016-GW-MW2-04		
Lab Sample ID:	F57952-1A	Date Sampled:	06/03/08
Matrix:	AQ - Groundwater Filtered	Date Received:	06/04/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	26000	300	15	ug/l	1	06/06/08	06/06/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	1140	15	1.0	ug/l	1	06/06/08	06/06/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6520
(2) Prep QC Batch: MP14535

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

ACCUTEST F57952

Accutest Laboratories

Report of Analysis

3.4 3

Client Sample ID:	CEF-016-GW-IW3-04		
Lab Sample ID:	F57952-2A	Date Sampled:	06/03/08
Matrix:	AQ - Groundwater Filtered	Date Received:	06/04/08
		Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	59200	300	15	ug/l	1	06/06/08	06/06/08	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	997	15	1.0	ug/l	1	06/06/08	06/06/08	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA6520
(2) Prep QC Batch: MP14535

RL = Reporting Limit = PQL
MDL = Method Detection Limit

U = Indicates a result < MDL
I = Indicates a result > = MDL but < RL

ACCUTEST F57952

ISCO PILOT STUDY SAMPLING EVENT 6 – JUNE 17, 2008

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 2532 F58263 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 25/112600375	Site 16 / Cell	Rob Sinnick	412 921 8163	Accutest / Heather W
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
R.C.		Dave Siefken	904 334 7260	4405 Vineland Rd - C-15
		CARRIER/WAYBILL NUMBER		CITY, STATE
				Orlando, FL

STANDARD TAT ☐ 5 Day TAT
RUSH TAT ☑ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

	DATE YEAR 2008	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, OC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOC 8260	6010	Filtered (Perm)	Non Filtered (Perm)						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)										G	P	P							
PRESERVATIVE USED										HCL	HNO3	HNO3							
1	6/17	0840	CEF-016-GW-MW61-05				GW	G	5	3	1	1							Cool to 4°C
2		0930	CEF-016-GW-IW3-05						5	3	1	1							
3		1025	CEF-016-GW-MW2-05						5	3	1	1							
4		1100	CEF-016-GW-MW4-05						5	3	1	1							
5		1135	CEF-016-GW-EW2-05						5	3	1	1							
6		1140	CEF-016-GW-EW2-P3-05						5	3	1	1							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-08	1515	1. RECEIVED BY	6/18/08	1515
2. RELINQUISHED BY	6-18-08	1815	2. RECEIVED BY	6-19-08	0800
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

4.1 4

F58263: Chain of Custody
Page 1 of 2

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: F58263 CLIENT: Tetra Tech PROJECT: CTO25/112600278

DATE/TIME RECEIVED: 6.19.08 08:00 # OF COOLERS RECEIVED: 1 COOLER TEMPS: 1.8

METHOD OF DELIVERY: FEDEX UPS ACCUTEST COURIER GREYHOUND DELIVERY OTHER

AIRBILL NUMBERS:

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [ ] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET
- [ ] WET ICE RECEIVED IN COOLER

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [x] TRIP BLANK NOT PROVIDED
- [x] TRIP BLANK NOT ON COC
- [ ] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [ ] SAMPLE LABELS NOT PRESENT ON ALL BOTTLES
- [ ] CORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] TIMES ON COC DOES NOT MATCH LABEL(S)
- [ ] ID'S ON COC DOES NOT MATCH LABEL(S)
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING INSTRUCTIONS
- [ ] UNCLEAR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] 5035 FIELD KIT NOT FROZEN WITHIN 48 HOUR'S
- [ ] RESIDUAL CHLORINE PRESENT

(APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS)

MISC. INFORMATION

NUMBER OF ENCORES ? Ø

NUMBER OF 5035 FIELD KITS ? Ø

NUMBER OF LAB FILTERED METALS ? Ø

SUMMARY OF COMMENTS:

TECHNICIAN SIGNATURE/DATE E.T. 6.19.08 TECHNICIAN SIGNATURE/DATE JC 6-19-08 ASBD 12/17/07

4.1 4

F58263: Chain of Custody
Page 2 of 2

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-EW2-05		
Lab Sample ID:	F58263-5	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F028982.D	1	06/20/08	AB	n/a	n/a	VF688
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	1.0	0.20	ug/l	
75-25-2	Bromoform	[redacted]	1.0	0.33	ug/l	
108-90-7	Chlorobenzene	[redacted]	1.0	0.22	ug/l	
75-00-3	Chloroethane	[redacted]	2.0	0.48	ug/l	
67-66-3	Chloroform	[redacted]	1.0	0.28	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	5.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	1.0	0.22	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	1.0	0.24	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	1.0	0.54	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	1.0	0.34	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	1.0	0.21	ug/l	
124-48-1	Dibromochloromethane	[redacted]	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	1.0	0.20	ug/l	I
10061-01-5	cis-1,3-Dichloropropene	[redacted]	1.0	0.21	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	1.0	0.23	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	1.0	0.22	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	1.0	0.45	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	1.0	0.21	ug/l	
74-83-9	Methyl bromide	[redacted]	2.0	0.78	ug/l	
74-87-3	Methyl chloride	[redacted]	2.0	0.61	ug/l	
75-09-2	Methylene chloride	[redacted]	5.0	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	1.0	0.33	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	1.0	0.21	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	1.0	0.26	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	1.0	0.22	ug/l	
79-01-6	Trichloroethylene	[redacted]	1.0	0.32	ug/l	
75-01-4	Vinyl chloride	[redacted]	1.0	0.30	ug/l	I

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

3.9

3

Client Sample ID:	CEF-016-GW-EW2-05		
Lab Sample ID:	F58263-5	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	111%		76-127%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	103%		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-EW2-P3-05		
Lab Sample ID:	F58263-6	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F028983.D	1	06/20/08	AB	n/a	n/a	VF688
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	1.0	0.20	ug/l	
75-25-2	Bromoform	[redacted]	1.0	0.33	ug/l	
108-90-7	Chlorobenzene	[redacted]	1.0	0.22	ug/l	
75-00-3	Chloroethane	[redacted]	2.0	0.48	ug/l	
67-66-3	Chloroform	[redacted]	1.0	0.28	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	5.0	1.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	1.0	0.22	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	1.0	0.24	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	1.0	0.54	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	1.0	0.34	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	1.0	0.21	ug/l	
124-48-1	Dibromochloromethane	[redacted]	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	1.0	0.21	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	1.0	0.23	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	1.0	0.22	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	1.0	0.45	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	1.0	0.21	ug/l	
74-83-9	Methyl bromide	[redacted]	2.0	0.78	ug/l	
74-87-3	Methyl chloride	[redacted]	2.0	0.61	ug/l	I
75-09-2	Methylene chloride	[redacted]	5.0	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	1.0	0.33	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	1.0	0.21	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	1.0	0.26	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	1.0	0.22	ug/l	
79-01-6	Trichloroethylene	[redacted]	1.0	0.32	ug/l	
75-01-4	Vinyl chloride	[redacted]	1.0	0.30	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-016-GW-EW2-P3-05		
Lab Sample ID:	F58263-6	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	112%		76-127%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	104%		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.3

3

Client Sample ID:	CEF-016-GW-IW3-05		
Lab Sample ID:	F58263-2	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F028979.D	2	06/20/08	AB	n/a	n/a	VF688
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	0.40 U	2.0	0.40	ug/l	
75-25-2	Bromoform	0.66 U	2.0	0.66	ug/l	
108-90-7	Chlorobenzene	0.44 U	2.0	0.44	ug/l	
75-00-3	Chloroethane	0.96 U	4.0	0.96	ug/l	
67-66-3	Chloroform	0.56 U	2.0	0.56	ug/l	
110-75-8	2-Chloroethyl vinyl ether	2.0 U	10	2.0	ug/l	
56-23-5	Carbon tetrachloride	0.44 U	2.0	0.44	ug/l	
75-34-3	1,1-Dichloroethane	0.48 U	2.0	0.48	ug/l	
75-35-4	1,1-Dichloroethylene	1.1 U	2.0	1.1	ug/l	
107-06-2	1,2-Dichloroethane	0.68 U	2.0	0.68	ug/l	
78-87-5	1,2-Dichloropropane	0.42 U	2.0	0.42	ug/l	
124-48-1	Dibromochloromethane	0.40 U	2.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	1.9	2.0	0.40	ug/l	I
10061-01-5	cis-1,3-Dichloropropene	0.42 U	2.0	0.42	ug/l	
541-73-1	m-Dichlorobenzene	0.46 U	2.0	0.46	ug/l	
95-50-1	o-Dichlorobenzene	0.40 U	2.0	0.40	ug/l	
106-46-7	p-Dichlorobenzene	0.44 U	2.0	0.44	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.90 U	2.0	0.90	ug/l	
10061-02-6	trans-1,3-Dichloropropene	0.42 U	2.0	0.42	ug/l	
74-83-9	Methyl bromide	1.6 U	4.0	1.6	ug/l	
74-87-3	Methyl chloride	1.2 U	4.0	1.2	ug/l	
75-09-2	Methylene chloride	2.0 U	10	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	1.3	2.0	0.66	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	0.42 U	2.0	0.42	ug/l	
79-00-5	1,1,2-Trichloroethane	0.52 U	2.0	0.52	ug/l	
127-18-4	Tetrachloroethylene	0.44 U	2.0	0.44	ug/l	
79-01-6	Trichloroethylene	1.8	2.0	0.64	ug/l	
75-01-4	Vinyl chloride	0.92	2.0	0.60	ug/l	I

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST F58263

Accutest Laboratories

Report of Analysis

3.3

3

Client Sample ID:	CEF-016-GW-IW3-05		
Lab Sample ID:	F58263-2	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	109%		76-127%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	103%		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.5

3

Client Sample ID:	CEF-016-GW-MW2-05		
Lab Sample ID:	F58263-3	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F028980.D	20	06/20/08	AB	n/a	n/a	VF688
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	20	4.0	ug/l	
75-25-2	Bromoform	[redacted]	20	6.6	ug/l	
108-90-7	Chlorobenzene	[redacted]	20	4.4	ug/l	
75-00-3	Chloroethane	[redacted]	40	9.6	ug/l	
67-66-3	Chloroform	[redacted]	20	5.6	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	100	20	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	20	4.4	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	20	4.8	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	20	11	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	20	6.8	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	20	4.2	ug/l	
124-48-1	Dibromochloromethane	[redacted]	20	4.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	20	4.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	20	4.2	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	20	4.6	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	20	4.0	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	20	4.4	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	20	9.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	20	4.2	ug/l	
74-83-9	Methyl bromide	[redacted]	40	16	ug/l	
74-87-3	Methyl chloride	[redacted]	40	12	ug/l	
75-09-2	Methylene chloride	[redacted]	100	20	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	20	6.6	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	20	4.2	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	20	5.2	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	20	4.4	ug/l	
79-01-6	Trichloroethylene	[redacted]	20	6.4	ug/l	
75-01-4	Vinyl chloride	[redacted]	20	6.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST F58263

Accutest Laboratories

Report of Analysis

3.5

3

Client Sample ID:	CEF-016-GW-MW2-05		
Lab Sample ID:	F58263-3	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	109%		76-127%
2037-26-5	Toluene-D8	100%		86-112%
460-00-4	4-Bromofluorobenzene	104%		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST F58263

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-MW4-05		
Lab Sample ID:	F58263-4	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F028981.D	10	06/20/08	AB	n/a	n/a	VF688
Run #2	F029004.D	20	06/23/08	AB	n/a	n/a	VF689

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	10	2.0	ug/l	
75-25-2	Bromoform	[redacted]	10	3.3	ug/l	
108-90-7	Chlorobenzene	[redacted]	10	2.2	ug/l	
75-00-3	Chloroethane	[redacted]	20	4.8	ug/l	
67-66-3	Chloroform	[redacted]	10	2.8	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	50	10	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	10	2.2	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	10	2.4	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	10	5.4	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	10	3.4	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	10	2.1	ug/l	
124-48-1	Dibromochloromethane	[redacted]	10	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	10	2.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	[redacted]	10	2.1	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	10	2.3	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	10	2.0	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	10	2.2	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	10	4.5	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	10	2.1	ug/l	
74-83-9	Methyl bromide	[redacted]	20	7.8	ug/l	
74-87-3	Methyl chloride	[redacted]	20	6.1	ug/l	
75-09-2	Methylene chloride	[redacted]	50	10	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	10	3.3	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	10	2.1	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	10	2.6	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	10	2.2	ug/l	
79-01-6	Trichloroethylene	[redacted]	20	6.4	ug/l	
75-01-4	Vinyl chloride	[redacted]	10	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]	[redacted]	87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result > = MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-016-GW-MW4-05		
Lab Sample ID:	F58263-4	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	109%	109%	76-127%
2037-26-5	Toluene-D8	98%	96%	86-112%
460-00-4	4-Bromofluorobenzene	103%	104%	84-120%

(a) Result is from Run# 2

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Raw Data: [redacted]

Accutest Laboratories

Report of Analysis

3.1

3

Client Sample ID:	CEF-016-GW-MW46I-05		
Lab Sample ID:	F58263-1	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F028978.D	2	06/20/08	AB	n/a	n/a	VF688
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Halogenated List

CAS No.	Compound	Result	RL	MDL	Units	Q
75-27-4	Bromodichloromethane	[redacted]	2.0	0.40	ug/l	
75-25-2	Bromoform	[redacted]	2.0	0.66	ug/l	
108-90-7	Chlorobenzene	[redacted]	2.0	0.44	ug/l	
75-00-3	Chloroethane	[redacted]	4.0	0.96	ug/l	
67-66-3	Chloroform	[redacted]	2.0	0.56	ug/l	
110-75-8	2-Chloroethyl vinyl ether	[redacted]	10	2.0	ug/l	
56-23-5	Carbon tetrachloride	[redacted]	2.0	0.44	ug/l	
75-34-3	1,1-Dichloroethane	[redacted]	2.0	0.48	ug/l	
75-35-4	1,1-Dichloroethylene	[redacted]	2.0	1.1	ug/l	
107-06-2	1,2-Dichloroethane	[redacted]	2.0	0.68	ug/l	
78-87-5	1,2-Dichloropropane	[redacted]	2.0	0.42	ug/l	
124-48-1	Dibromochloromethane	[redacted]	2.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	[redacted]	2.0	0.40	ug/l	I
10061-01-5	cis-1,3-Dichloropropene	[redacted]	2.0	0.42	ug/l	
541-73-1	m-Dichlorobenzene	[redacted]	2.0	0.46	ug/l	
95-50-1	o-Dichlorobenzene	[redacted]	2.0	0.40	ug/l	
106-46-7	p-Dichlorobenzene	[redacted]	2.0	0.44	ug/l	
156-60-5	trans-1,2-Dichloroethylene	[redacted]	2.0	0.90	ug/l	
10061-02-6	trans-1,3-Dichloropropene	[redacted]	2.0	0.42	ug/l	
74-83-9	Methyl bromide	[redacted]	4.0	1.6	ug/l	
74-87-3	Methyl chloride	[redacted]	4.0	1.2	ug/l	
75-09-2	Methylene chloride	[redacted]	10	2.0	ug/l	
71-55-6	1,1,1-Trichloroethane	[redacted]	2.0	0.66	ug/l	I
79-34-5	1,1,2,2-Tetrachloroethane	[redacted]	2.0	0.42	ug/l	
79-00-5	1,1,2-Trichloroethane	[redacted]	2.0	0.52	ug/l	
127-18-4	Tetrachloroethylene	[redacted]	2.0	0.44	ug/l	
79-01-6	Trichloroethylene	[redacted]	2.0	0.64	ug/l	
75-01-4	Vinyl chloride	[redacted]	2.0	0.60	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	[redacted]		87-116%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

F58263

Report of Analysis

Client Sample ID:	CEF-016-GW-MW46I-05		
Lab Sample ID:	F58263-1	Date Sampled:	06/17/08
Matrix:	AQ - Ground Water	Date Received:	06/19/08
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-Site 16		

VOA Halogenated List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17060-07-0	1,2-Dichloroethane-D4	107%		76-127%
2037-26-5	Toluene-D8	99%		86-112%
460-00-4	4-Bromofluorobenzene	104%		84-120%

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit = PQL
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

APPENDIX C

ISCO PILOT STUDY PHOTOS

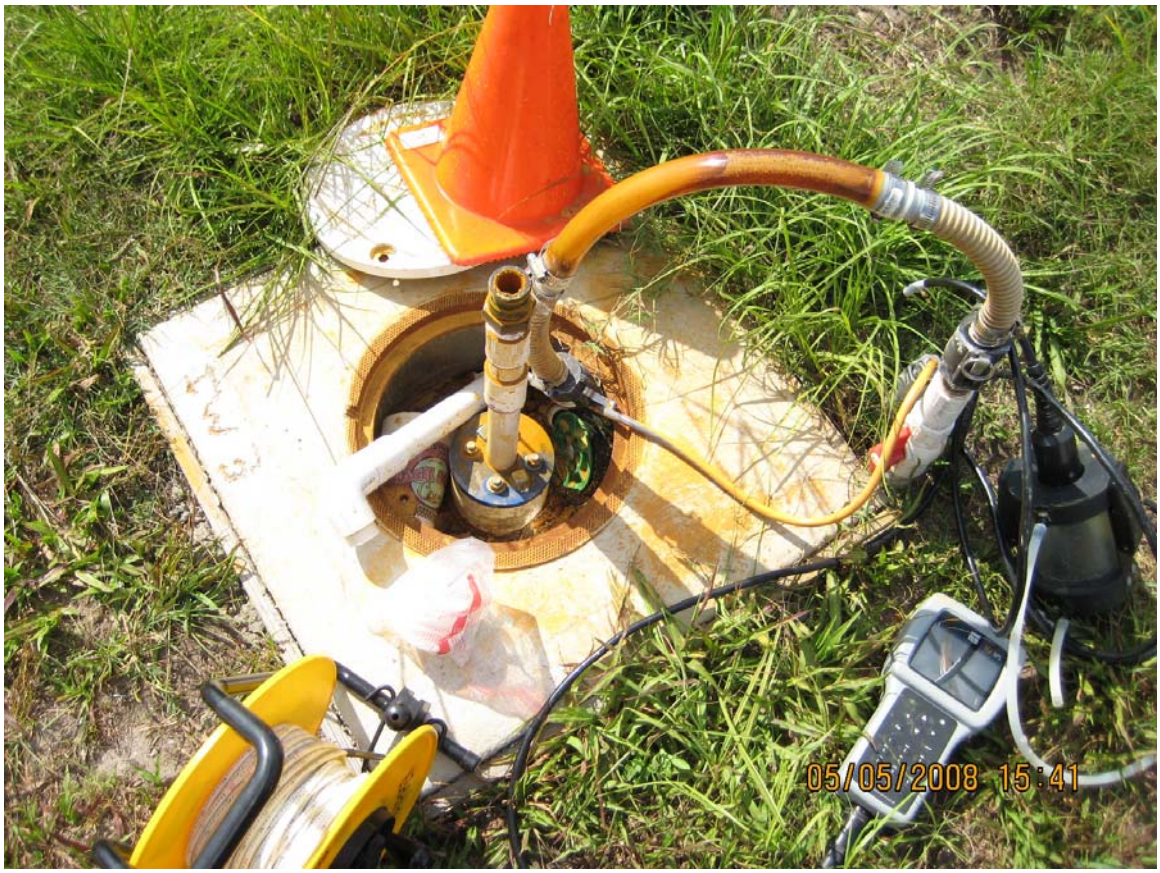


Photo 1: ISCO pilot study injection well equipment set-up.

Photo 2: Precipitate clogging the in-line screen on injection well system.

Photo 3: Precipitate residue on injection well port.

Photo 4: Cleaning the precipitate from injection well port.

Photo 5: Precipitate residue from cleaning injection well port.