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NAS JACKSONVILLE
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PARTNERING TEAM MEETING MINUTES 14 JANUARY 2013 WITH UPCOMING AGENDA

NAS JACKSONVILLE FL
3/13/2013
PARTNERING TEAM

NAS JACKSONVILLE PARTNERING TEAM MEETING MINUTES

January 14 – 15, 2013

Jacksonville, Florida

Attendees:

Mark Peterson
Adrienne Wilson
Tim Curtin
Tim Flood, Facilitator
Sarah Reed, NAVFAC SE
Todd Haverkost, Resolutions Consultants

David Grabka - Gate/Timekeeper
Eric Davis - Chair
Pete Dao
Julie Johnson – Scribe
Mike Singletary, NAVFAC SE
Jeffrey King, USGS Modeler

Mike Maughon, Tetra Tech
Brian Rebar, Solutions-IES

Jane Beason, NAS Jacksonville (Day 1)
Laura Smith, Tetra Tech (Day 2)

Evan Cox, James Wang and Dave Reynolds, Geosyntec via telecom
Rachel Klinger, Geosyntec

1.0 Team Meeting and Introduction

1.1 Team member greeting, introductions, and check in – Done
1.2 Assignment of Team Roles: Chair – Eric Davis;
Gate/Timekeeper – David Grabka; Scribe – Julie Johnson
1.3 Read Team Ground Rules – Ground rules were read by team members and attendees.

2.0 Initial Agenda Items

2.1 Review, submit revisions to, and reach consensus on previous meeting minutes. Done

Consensus: Team members approved the minutes (with changes from Dave Grabka) from the November 2012 meeting.

2.2 Report on Assigned Action Items and Parking Lot Items. Done.

2.3 NAVFAC presents current budget execution plan. Just awarded to Solutions some of the petroleum sites, the next set will be Areas B and G and PSCs 46, 47, and 48 and Hangar 1000 monitoring will be awarded. Awarded mowing for OU 1 and PSC 51. Funding for Building 200. Have a remedial design for PSC 55, will probably be a LUC RD. PSC 55 RI/FS will be rolled in with all the other PSC sites. RI/FS for PSC 57, High Power Turn-up Pad.

3.0 Agenda

3.1 Schedules/SCAP/Exit Strategy/FDEP Document Tracker/FFA SMP/ Petroleum SMP: The team was given a copy of the document schedule from Tetra Tech/CH2M Hill and the BOA document tracking schedule. The team discussed the schedule and Todd discussed his schedule. He will provide a copy of his schedule to be incorporated in the Tetra Tech/CH2M Hill schedule and sent to the team.

3.1.1 Team Development – Tim Flood – Jeffrey King welcomed to the team. The team participated in an exercise: MBTI; Count on me for _____; Forgive me if sometimes I_____.

Tim Flood sent out a survey and had small response from the team.

3.2 OU 1– Tim Curtin

LTM Update and Landfill Maintenance – Tim discussed flight hazards from birds (least terns) nesting on buildings. They are considering using OU 1 to encourage nesting by placing gravel on the cap. Tim asked Pete and Dave if there are any concerns from a regulator standpoint.

Also, a skeleton of a bobcat was found on OU 1. Tim said the fencing needs improving in the ditches to keep predators out. Tim said they located the two wells that were missing. The wells are located on the other side of the fence.

Geosyntec was recently awarded the ESTCP contract at NAS Jacksonville. Evan Cox updated LTM PSCs 26 & 27 – Solutions-IES – Brian Rebar gave a presentation of the OU 1 PSCs 26 & 27 groundwater monitoring summary.

- Annual groundwater monitoring event performed by Solutions-IES July 31 to August 1, 2012.
  - OU1-MW-84 and OU1-MW-85 initially could not be found. Sampled on December 5, 2012.
- Water level elevations were gauged in 12 monitoring wells (5 shallow, 7 intermediate).
  - Intermediate well OU1-MW-97 was damaged and was not sampled.
- Groundwater flow direction is toward the southeast towards creek; water levels averaged 1.5 ft higher than when last sampled in November 2010.
- 14 monitoring wells and 2 surface water locations were sampled for the COCs including benzene, 1,1-DCE, 1,2-DCA, *cis/trans*-1,2-DCE, TCE, and vinyl chloride.
- 14 monitoring wells also sampled for natural attenuation parameters of methane, ethane, ethene, chloride, sulfate, sulfide, total organic carbon, iron (total & dissolved), and manganese (total & dissolved).
- Natural Attenuation Parameter Results - Groundwater
  - Chloride ranged from 5.4 to 64.1 mg/L
  - Total iron ranged widely in shallow zone (1,310 to 14,400 mg/L) and intermediate zone (227 to 102,000 mg/L); some evidence of dissolved iron in both zones
  - Total and dissolved manganese ranged from 6.5 to 104 mg/L throughout the aquifer
  - TOC was similar in both the shallow and intermediate zones, overall ranging from 2.1 to 15.3 mg/L
  - Methane ranged from 1.26 to 2,680 µg/L in the shallow zone and from 12.2 to 2,110 µg/L in the intermediate zone.
  - Ethene detections ranged from 1.6 to 8.61 µg/L; ethane detections ranged from 0.46 to 3.0 µg/L
  - Sulfate varied widely, ranging from 13.8 to 213 mg/L in the shallow zone and from 14.4 to 86.8 mg/L in the intermediate zone
  - Sulfide ranged from <0.3 mg/L to 1.9 mg/L
- Contaminants of Concern Results - Groundwater
  - Benzene, *cis*-1,2-DCE, TCE, and vinyl chloride exceeded the GCTLs
    - Benzene exceeded the GCTL in OU1-MW-89 (12.2 µg/L) and OU1-MW-12 (6.1 µg/L)
    - *cis*-1,2-DCE exceeded the GCTL in OU1-MW-19 (147 µg/L)
    - TCE exceeded the GCTL in OU1-MW-18 (16.5 µg/L), OU1-MW-19 (59.9 µg/L) and OU1-MW-22 (16.9 µg/L)
    - Vinyl chloride exceeded the GCTL in OU1-MW-18 (23.3 µg/L), OU1-MW-19 (5.5 µg/L), OU1-MW-22 (9.2 µg/L), OU1-MW-67 (14.8 µg/L), OU1-MW-89 (43.7 µg/L), OU1-MW-100 (2.6 µg/L) and OU1-MW-102 (1.9 µg/L)
    - Contaminants of Concern Results – Surface Water
  - *Cis*-1,2-DCE (0.61 µg/L in OU1-SW-55) was the only COC reported above the lab MDLs
- Summary
  - Benzene in shallow zone has been decreasing toward the remedial goals, but appears to be stable in intermediate zone.

- TCE in both shallow and intermediate zones has been trending toward the remedial goals.
- Vinyl chloride concentrations increased slightly compared to 2011, but in some of the wells, concentrations have been trending toward the remedial goals.

- Recommendations
  - Discontinue sampling of OU1-MW-84, OU1-MW-85 and OU1-MW-98 because COCs have been below the GCTLs since November 2004.
  - Properly abandon damaged well OU1-MW-97.

Consensus: Team agrees to discontinue sample collection at OU1-MW-84 and OU1-MW-85.

3.3 OU 3 –

3.3.1 Groundwater Model Update – Mike Maughon discussed the Mann-Kendall groundwater trend results, time series results, and groundwater tag maps for the October 2012 event.

Area C – The figure shows the new wells and their results in green. Most of the new wells were non detects. Showed the trend results and it shows that the injections in 2004 knocked out TCE and PCE. Cis-1,2-DCE and vinyl chloride are starting to trend down at the sea wall. TCE had a significant upward trend (but still a low concentration) in MW41-C3 (on the edge of the plume as it approaches the sea wall), had low level of PCE and vinyl chloride in this well.

Mike discussed the potential need for a well inside Building 101 and the team's previous consensus to defer the decision until the results of wells installed upgradient and one downgradient right next to the building (nondetect) on the east. The upgradient well had low levels of cis-1,2-DCE and naphthalene at very low levels. Based on that, Mike recommends that there is no need to install a well inside the building.

Consensus: The team agrees there is no need to install a new shallow well inside Building 101 based on the results from the new upgradient (OU3-106-MW38S) and downgradient shallow wells along cross section A – A'.

In Area D, Mike M. said there are lower concentrations of cis-1,2-DCE and PCE below the clay layer compared to above the clay layer upgradient. Mike suggested there is possibly a significant source above the clay; new results (MW35D) at 80 feet had no detections. The DPT results from a previous event showing concentrations of PCE below the clay to depth could have possibly been an anomaly caused by the DPT pulling the contamination down with installation. This changes the CSM and Mike M. said the 3D model will be updated with this new data. Further downgradient there are very low concentrations to non-detects of PCE and TCE.

Tim C. said Tetra Tech is at the site sampling over the next couple of weeks so if anything needs sampling, now's the time.

Action Item: Mike M. will coordinate with Mike S. and Geosyntec to determine location of molecular biological tools (MBT) and Compound specific isotope analysis (CSIA), particularly in the area of Building 106.

Action Item: Mike and Donald to provide Jeffrey King the OU 3 TDS data and conductivity data to support the mixing zone model by next meeting.

Building 780 contamination looks to be localized above the clay as well.

Areas A and B results didn't show much; vinyl chloride is attenuating. Mike M. said Tetra Tech did not sample the wells the BOA contractor is sampling, but their data will be included in the model.

Area E had concentrations of PCE, TCE, and vinyl chloride at GEW04, but not much anywhere else at the site.

Mike S. asked if the clay layer is at Area E. Mike M. is not sure but will find out. (Subsequent review of the RI indicates the clay layer at Area E is 20 to 40 feet thick beginning around 15 feet BLS.)

Areas F and G: The last BOA report showed very low concentrations to non-detect. Mike M. suggested that the BOAs sample all chambers of the wells near the river.

The highest concentrations are downgradient in this area at well JAX-OU3-G14. The source of this contamination is not known. DPT data shows that the contamination is isolated to that area.

Action Item: Mike M. to find out why PCE and TCE values are so different between shallow wells OU3E-MW2S and OU3E-GEW04.

3.3.2 Vapor Intrusion Discussion – Eric Davis - Update Eric said the VI evaluation report was sent to the Navy for review on November 16, 2012. Comments received from Adrienne, Mike Singletary, and Donna Caldwell. Eric said he is still waiting on Tim Curtin's comments.

Eric provided a brief history of the VI process for Jeffrey King's benefit.

Eric showed site figures from pages 66 and 67 of the Evaluation Report and Table 61 showing locations of exceedances. There is no significant VI at any of the 12 highest priority ("worst case") buildings selected during ranking and prioritization process. Eric recommended temporal variability study to evaluate uncertainties.

- Level of effort: Significantly reduced scope (40 to 50 samples comprised of subslab and indoor air – more indoor air).
- Only look at TCE
- Ideally conduct this in winter.
- Focus on Buildings 101, 101C and 103

"Uncertainties exist with respect to temporal variability and the ability to predict future vapor intrusion impacts in select buildings. Evaluation of the data indicates that any further assessment of uncertainties related to temporal variability would be best served by focusing on TCE in Buildings 101, 101C, and 103."

Dave G. said the department is very interested in the attenuation factor of what's in the subsurface (subslab) as to what's detected in the indoor air. He said a default value of 0.1 is often used in calculations to predict indoor concentrations; providing a conservative value. Eric showed Appendix F of the VI evaluation report that discussed the attenuation factor and how it was derived from the conservative EPA values of 10^{-1} and base-specific 10^{-3}. Dave said the more sites that can be screened out at an earlier phase of the project the better; maybe not 10^{-3} but 10^{-2}, etc.

3.3.3 Geosyntec Pilot Study Discussion of electrokinetic-enhanced amendment delivery for remediation of low permeability and heterogeneous subsurface materials. A treatability study for chlorinated solvents in the vicinity of Building 106 area in OU 3 – Evan Cox, presenter and Rachel Klinger.

What's the problem being targeted?

- 20 years of in-situ bioremediation and in situ chemical oxidation experience has led to the understanding that tailing, back diffusion, inaccessibility of low permeability regions, and heterogeneity are likely to prevent the technologies from reaching originally intended endpoints.
- After 15 years of funding research into these technologies, ESTCP has recently identified that one of the highest research needs is treatment of contaminants in low permeability zones (2011 Workshop on Investment Strategies).

EK-Enhanced Amendment Delivery.

- Motivation
  - It's all about delivery!
  - Conventional approaches cannot effectively (cheaply) distribute amendments in low permeability and/or highly heterogeneous materials.

Introduction to Electrokinetics and Electrokinetic Processes. *See attached presentation for figures and charts.*

Discussed electro-migration versus electro-osmosis (see presentation for example). Demonstrated the differences in relative rates of transport in sands and clay. This technology moves uniformly through both sands and clays.

Evan Cox continued the discussion showing how EK represents an innovative solution and how it works.

- Low permeability regions
  - No large pressures required to migrate fluids and amendments into clay and silty strata (pressures do not greatly exceed hydrostatic conditions).
  - Avoid losing most amendments to only a few preferential pathways as commonly seen in hydraulic injection.
  - More controllable and less day-lighting risk than fracking approaches.
  - No need for vapor capture and treatment.

EK enhancement of in situ bioremediation.

Evan showed a conceptual site model of the EK-Bio Field Application.

Evan Cox showed an example field application conducted in Denmark.

Site Background.

- Tight clay till with sand stringers (high heterogeneity)
- PCE DNAPL present in soil cores (both clay and sand)
- Lab microcosm test showed bioaugmentation required to achieve ethene
- Field injection test -limited distribution within/across clays–short-circuiting into sands
- Conventional EISB injection approaches deemed cost-prohibitive; led to EK lab and field tests

Bench-Scale Treatability Study

- 2 test reactors and 1 control (without electricity)
- Duration of operation 60 days

Published results of the demonstration:
X. Mao, J.Wang, A. Ciblak, E.E. Cox, C. Riis, M. Terkelsen, D.B. Gent, A. N. Alshawabkeh (2012), Electrokinetic-enhanced bioaugmentation for remediation of chlorinated solvents contaminated clay, Journal of Hazardous Materials, Volumes 213–214, 311-317.

- ✓ Electric current density of 5 A/m2 lactate transport of 3.2 cm/day
- ✓ Dehalococcoides increased across EK reactors (likely due to electro-osmosis)
- ✓ Vinyl chloride reductase (vcrA) levels increased over time
- ✓ Complete dechlorination of PCE to ethene

Field Pilot Test Objectives

1. Evaluate lactate transport rate under field conditions

2. Evaluate transport and viability of Dehalococcoides through clay under field conditions
3. Evaluate degradation of PCE
4. Gather site-specific operational data for full-scale EK-Bio design

Presentation continued with review of results (see attachment).

ESTCP EK-Bio Demonstration at NAS Jacksonville, FL

Project Team:

- NAVFAC SE-Michael Singletary, Adrienne Wilson
- Geosyntec- Evan Cox, Dr. James Wang, Dr. David Reynolds, Rachel Klinger
- US Army Corps of Engineers ERDC-Dr. David Gent

Technical Objectives:

Demonstrate and quantify the ability to effectively distribute remediation agents across a target low K / heterogeneous area using a direct current (DC) electric field

1. Demonstrate that treatment is induced across the target treatment area
2. Quantify EK system operational parameters to allow design and optimization for full-scale implementation
3. Validate PHT3D-EK as a design too
4. Develop costing information for technology evaluation and use by DoD and remediation practitioners

Project consists of seven tasks:

- Task 1 –Treatability Testing (completed)
- Task 2 -Design & Demonstration Plan
- Task 3 -System Installation
- Task 4 -Baseline Characterization
- Task 5 -Operation & Performance Monitoring
- Task 6 -Model Validation
- Task 7 –Technical Guidance on EK-Bio™ Design & Application

Test Site – OU 3 Building 106 (former dry cleaner, 1962 – 1990

- PCE and TCE released to shallow aquifer; PCE into top few feet of clay layer
  - Interim remedies (AS, SVE) discontinued since 2005
    - 15 –40 mg/L of PCE in pore-water in clay

Task 1 – Treatability Testing:

- DPT soil core from OU 3
- Migrated lactate through core for 28 hours
- Thin-sectioned core, froze sections, analyzed for lactate
- Calculated lactate migration rate of 3 –5 cm/day

Task 2 – System Design:

- 4-inch PVC electrode wells
- Screened to target clay unit
- Electrode : 3/8-in MMO coated titanium rod (~ 5 ft long)
- Cross-circulation between electrodes
- Lactate-based electrolyte solution in electrode wells and supply wells
- Ability to adjust pH
- Maintain zero hydraulic head between electrodes
- PLC-based system control
- Power supply unit : 3-phase AC input; capable of 15 kW DC output for ~ 600V / 24A

- Target current settings : ~ 3 A at each electrode
- 3-Phase Operation : each phase ~ 90 days EK (with ~ 1 month no electricity between phases)
- Varying electric field configurations between phases
- Different tracers in individual phases

Integrated Treatment of Sands and Clays:

- Combined approach now under design to treat surficial permeable sands
- Injection into shallow contaminated zone coupled with EK in clays
- Shallow remediation may be held off until proof-of-concept in clays is satisfactory

Tasks 4 & 5 – Operation and Performance Monitoring:

During operation and post-operation monitoring
In addition to auto-acquisition system –

- bi-weekly field visits for the 1st two months
- transition to monthly
- system inspections and calibrations + field measurements + sampling / lab

Field samples collected for analyses –

- groundwater and soil core sampling
- contaminant degradation
- tracer
- geochemistry
- biomarkers (Dehalococcoides and vcrA)

Task 6 – Model validation:

- PHT3D-EK has been validated against laboratory studies
  - Individual processes at small scale
- Few existing data sets at the field scale –low data density
- Proposed Dem/Val will create a unique data set for final verification of PHT3D-EK
- A validated and verified model will allow more efficient design and cost savings with future implementations of EK

Tim asked how many volts would be put into the ground. James Wang said 80 to 100 volts. Tim asked if the equipment would be underground. James said his proposal included underground. Evan said that Health and Safety would be paramount.

Tim said he has difficulty getting non US citizens on station. Evan said he and Dave Reynolds would be visiting at some point; however, Rachel will be the field head.

Pete wanted to know if lactate was the only amendment. Evan said lactate is the primary and may bioaugment with KB1, sodium hydroxide may be added to the anode.

Concerns expressed by Tim Curtin is possible impact of this electricity to communication lines, since the emergency communications for the southeast is very near this site. Adrienne and Tim recommend that Geosyntec address these concerns prior to mobilization because the stakeholders will be asking these questions.

3.3.4 Area A – IES-Solutions - Brian Rebar gave a presentation of the Area A groundwater monitoring summary. Presentation is provided as an attachment to the minutes.

- Annual groundwater monitoring event performed by Solutions-IES July 31, 2012.
- Water level elevations were gauged in 8 monitoring wells (4 shallow, 4 intermediate).
- Groundwater flow direction in shallow zone is south-southwest.

- Groundwater flow direction in intermediate zone is heading south from the source area.
- 8 monitoring wells and 2 storm water locations were sampled for the COCs including 1,1-DCE, *cis/trans*-1,2-DCE, 1,1,2-TCA, TCE and vinyl chloride.
- Contaminants of Concern Results - Groundwater
  - Exceedances of the GCTLs for *cis*-1,2-DCE (2,490 µg/L) and vinyl chloride (136 µg/L) in OU3A-GEW-01
  - Exceedances of the TCE GCTL in OU3A-GEW-01 (18,600 µg/L) and OU3A-MW-5I (24.8 µg/L)
- Contaminants of Concern Results – Surface Water from Storm Drain
  - Collected from two locations along the storm sewer drain on Wright Street
  - No COCs were detected above the laboratory MDL in either sample
- Summary
  - Shallow zone
    - Only OU3A-GEW-01 contains concentrations of TCE, *cis*-1,2-DCE and vinyl chloride above the GCTLs.
    - Concentrations of TCE, *cis*-1,2-DCE and VC have decreased since 2006.
    - Intermediate zone
    - Only OU3A-MW-5I contains TCE above the GCTL; this is the first reported detection above the GCTL since 2002.
    - Surface water from storm drain
    - No COCs detected above laboratory detection limits.
- Recommendations
  - Continue annual sampling to monitor natural attenuation. Next groundwater sampling event is scheduled for July 2013.

Pete asked to try to sample the sites together at the same time each year. Pete recommended streamlining sampling and reporting as much as possible for efficiency. Brian R. will work on making that happen.

Action Item: Brian Rebar will work on streamlining all the sites into the same sampling frequency in order to get the sampling at the same time.

3.4 OU 6 – PSC 52 Hangar 1000 – No update.

3.5 OU 7 – PSC 46 Update – DRMO – Eric nothing new to report. Groundwater data report submitted.

3.6 OU 8 – PSC 47 – Eric Davis – Annual Report for Pesticide shop went out to the Navy on December 18, 2012.

3.7 OU 9 – PSC 45 – Building 200 – Mark P. The draft RI report was sent to the team for review and comment in December 2012. Comments are due by March 21, 2013 (90 day FFA deadline).

3.8 OU 10 – MRP Sites – Final Tier II UFP SAP was sent to the Team in December, 2012. Tim C. and Adrienne said the Barb Becker is planning on being on site in February 2013. Mark confirmed that they will be on site first or second week of February 2013.

3.9 OU 11 - PSC Sites with LUCs and no RODs and PSC 55– No update.

3.10 Petroleum Sites

Eric said this site is waiting on an MNA approval order for Gas Hill. Dave asked if he was given an MNA plan, Eric said yes FDEP was given this. Eric said the MNA plan was issued in 2009 or 2010 and feels that some of this information would need to be updated. Dave said the update to the MNA plan can be done via a groundwater monitoring report by adding a statement recommending MNA and giving the plan. All recommendation supporting data should be included in the monitoring report (i.e., identify source well, perimeter well, compliance well, etc.). Adrienne asked for the Generic MNA approval order.

3.10.1 Gas Hill (PCA 4) – IES-Solutions – Brian Rebar presented a groundwater monitoring summary updating the team on activities conducted at Gas Hill Fuel Farm. See attachments for presentation.

- Second semiannual groundwater monitoring event of 2012 was performed by Solutions-IES on September 12-13, 2012. Third event since MNA Plan was submitted.
- Water level elevations were gauged in 34 monitoring wells.
- Groundwater flow was radial from the center of the site in the shallow zone which is consistent with previous reports. Deep groundwater flow appears to be heading towards the east.
- 25 monitoring wells (20 shallow, 5 deep) were sampled for the COCs of BTEX, naphthalene, PAHs including 1- & 2-methylnaphthalene, and TRPH.
  - Unable to sample JAX159-GH-32 (under water).
- 7 monitoring wells (6 shallow, 1 deep) were also sampled for natural attenuation parameters of nitrite, nitrate, ferrous iron, sulfide, sulfate, alkalinity, and methane.
- Natural Attenuation Indicator Parameter Results
  - Nitrite and nitrate were all less than 0.13 mg/L
  - Ferrous iron ranged from 5.2 to 38.2 mg/L in shallow aquifer
  - Sulfate ranged 9.2 to 28.9 mg/L in shallow aquifer
  - Alkalinity ranged from 81.6 to 387 mg/L in the shallow aquifer
  - Methane ranged from 1,320 to 9,140 µg/L (except for 1 well)
- Contaminants of Concern Results
  - Benzene was reported above the GCTL in 6 wells (4 shallow, 2 deep)
    - Shallow wells JAX159-GH-14 (316 µg/L), JAX159-GH-15 (88.8 µg/L), JAX159-GH-44 (29.0 µg/L), and JAX159-GH-48 (14.9 µg/L)
    - Deep wells JAX159-GH-23 (159 µg/L), and JAX159-GH-27 (95 µg/L)
  - Ethylbenzene exceeded the GCTL in 1 shallow well (JAX159-GH-15 at 33.8 µg/L)
  - Xylenes were reported above the GCTL in 2 wells
    - Shallow well JAX159-GH-15 (215 µg/L)
    - Deep well JAX159-GH-23 (29.8 µg/L)
  - Naphthalene exceeded the GCTL in 2 wells
    - Shallow wells JAX159-GH-43 (54.0 µg/L) and JAX159-GH-44 (77.7 µg/L)
    - Naphthalene results from 8270SIM scan were 14.2 µg/L and 24.5 µg/L, respectively

Action Item: Dave to ask which method is preferable, EPA Methods 8260 or 8270SIM for reporting Naphthalene.

  - TRPH was reported above the GCTL in 3 wells
    - Shallow wells JAX159-GH-41 (8,150 µg/L), JAX159-GH-42 (5,970 µg/L) and JAX159-GH-43 (77,600 µg/L)
- Recommendations
  - Only report naphthalene under 8270 SIM since results from both methods are conflicting and the EPA Method 8270 SIM scan is more accurately able to detect PAH compounds such as naphthalene.

- Continue semiannual sampling and reporting. Next sampling event will be performed in March 2013.

Dave commented that the site is bound / delineated.

3.10.2 Hawkins's Property – IES Solutions – Brian Rebar presented groundwater monitoring summary for PCA 16, Hawkins Property. Presentation is provided as an attachment.

- First groundwater monitoring event since 2006 was performed by Solutions-IES on June 20, 2012.
- Water level elevations were gauged in 10 monitoring wells; 7 shallow or Zone A (~3-8 ft bgs), 3 deep or Zone B (~13-18 ft bgs).
- Groundwater flow is to the south-southeast in both the shallow and deep zones.
- 10 monitoring wells (7 shallow, 3 deep) were sampled for VOCs, SVOCs and TRPH.
- Contaminants of Concern Results
  - Naphthalene was the only COC that exceeded the GCTL (14 µg/L) in JAX-PCA16-MW05B (18.8 µg/L).
  - Two constituents, isopropyl benzene and 1,2,4-trimethylbenzene, exceeded their respective GCTLs in 4 monitoring wells.
    - Both constituents not historically reported. Not considered COCs.
  - TRPH was not reported above the GCTL in any of the wells sampled.
- Summary
  - Site considered area of concern at this time.
  - Next monitoring event scheduled for January 2013. Sampling 6 monitoring wells MW-02, MW-5B, MW-11A, MW-12A, MW-14A, MW-17A.
  - Will analyze for COCs: naphthalene, 1-methylnaphthalene and 2-methylnaphthalene.

Tim Curtin said that a lady from First Coast Energy to use the Navy's monitoring wells to take some samples. Tim hasn't heard back from her and doesn't have her contact information.

3.10.3 PCA 25- Boat House Area – IES Solutions - Brian Rebar presented groundwater monitoring summary for PCA 25 UST Site 119. Presentation is provided as an attachment.

- The second quarterly groundwater monitoring event since implementing the MNA Plan was performed by Solutions-IES on November 8, 2012.
- Water level elevations were gauged in 16 monitoring wells and groundwater flow direction is towards the southeast.
- 6 monitoring wells (5 shallow, 1 intermediate) were sampled for COCs:
  - VOCs : benzene and vinyl chloride
  - PAHs : 1- & 2-methylnaphthalene, benzo(a)anthracene and benzo(b)fluoranthene
  - TRPH
  - Lead
- Contaminants of Concern Results
  - Vinyl chloride was reported above the GCTL in shallow well JAXPCA25-TF-MW11 (1.7 µg/L)
  - 1-Methylnaphthalene exceeded the GCTL in shallow well JAX25-MW09 (28.8 µg/L)
- Summary
  - Fifth consecutive event where VC exceeded the GCTL in shallow well JAXPCA25-TF-MW11 (1.7 µg/L). Concentrations appear relatively stable and do not show a decreasing trend toward the GCTL.
  - First time 1-methylnaphthalene exceeded the GCTL in shallow well JAX25-MW09 (28.8 µg/L) since May 2008.

- Anomalous exceedances of the GCTLs for vinyl chloride in JAX25-MW09 and 1-methylnaphthalene in JAX25-MW16I in August 2012 were not confirmed in November 2012.

- Recommendations
  - Remove monitoring wells JAX25-MW03 and JAX25-MW13 from the monitoring program since they are both upgradient and haven't had an exceedance of the GCTLs since prior to August 2008.

    Dave said to make the recommendation in the report explaining no exceedances and then drop them from monitoring, but Dave said to keep in the water level monitoring.

Consensus: Team agrees that monitoring wells JAX25-MW03 and JAX25-MW13 be dropped from the monitoring program since they are both upgradient and haven't had an exceedance of GCTLs sine prior to August 2008.

- Add JAX25-MW07 to the monitoring program to monitor COC concentrations downgradient from JAX25-MW09.

- Continue quarterly monitoring and reporting. The next groundwater monitoring event will be conducted in February 2013.

Brian asked about removing MW15 and Dave said to keep it one more round and Adrienne agreed.

3.10.4 Kemen Test Cell – Site UST 000026 (PCA 26) – not funded yet. Nothing to report.

3.10.5 Firefighter Training Facility (OU 2) – IES – Solutions Brian Rebar presented a groundwater monitoring summary to the team.

- Solutions-IES performed the second semiannual groundwater monitoring event of 2012 on September 13, 2012.
- Water level elevations were gauged in 10 monitoring wells and the water table was over 4 feet higher than during the previous four sampling events.
- Groundwater flow was to the southeast in the shallow zone. The January 2011 and January 2012 reports both show groundwater flow in a northeast direction.
- 4 monitoring wells (2 shallow, 2 deep) were sampled for the COCs of BTEX and TRPH.
- Contaminants of Concern Results
  - Benzene was reported above the GCTL in 3 wells
  - Shallow downgradient well FFF-MW-07 (2.4 µg/L)
  - Deep source well FFF-PMW-6D (1.1 µg/L) and newly installed deep downgradient well FFF-MW-15D (2.8 µg/L)
  - TRPH exceeded the GCTL in all 4 wells
  - Shallow source FFF-MW-13 (9,990 µg/L) and shallow downgradient FFF-MW-07 (9,850 µg/L)
  - Deep source FFF-PMW-6D (6,120 µg/L) and deep downgradient FFF-MW-15D (6,640 µg/L)
- Summary
  - Benzene and TRPH exceeded the GCTLs in up to four wells in September 2012.
  - Exceedances of the GCTLs were reported in the shallow (FFF-MW-07) and deep (FFF-MW-15D) downgradient compliance wells in September 2012.

Dave said that these are technically not compliance wells due to the exceedances. Adrienne suggested waiting until the next round of sampling to make decisions on additional compliance well installation.

- Recommend continued monitoring to evaluate benzene and TRPH concentrations in shallow and deep downgradient wells to evaluate if concentrations are decreasing.
- Next annual groundwater monitoring event will be conducted September 2013.

3.11 PSC 38 – Torpedo Rework Facility – Laura Smith - Second phase of sampling was conducted, wells have been installed, and sampling is complete. Laura said she received the validated results last Thursday (January 10, 2013). The results suggest additional data is needed. The RI deadline is June 2013. Laura presented the proposed sampling plan. See presentation in Attachments.

Proposed Soil Sampling Plan – Round 3

- Delineate to SCTLs – 9 additional soil sample locations for metals only
- Delineate to PALs – at least 25 additional soil sample locations; 25 for metals, 2 for pesticides
- Note: PALs exceeded which do not exceed SCTLs are related to USEPA – RISK: USEPA Regions 3, 6, and 9 Risk-Based Migration to Groundwater Soil Screening Levels.

Proposed Groundwater Sampling Plan – Round 3

- Collect groundwater samples using temporary wells at distances of approximately 50 feet from groundwater exceedances.
- Sample locations which would have resulted in drilling within buildings were eliminated from the plan due to the sensitive nature of the activities performed within the buildings.
- Analyses to be performed
    - Metals – 5 samples including one field duplicate
    - VOCs – 5 samples including one field duplicate
    - SVOCs – 3 samples including one field duplicate

Consensus: The team agreed to delineate soil contamination to the SCTLs and not the PALs at PSC 38.

Dave suggested using the 95% UCL based on the data we have now.

Consensus: The team agreed to the installation of four additional wells. All four will be sampled for metals and VOCs, two wells to be sampled for SVOCs. The wells will be surveyed and the groundwater flow direction will be determined.

3.12 PSC 56 – NEX Gas Station – Nothing to report. Site has been transferred to the IR Program. Not funded.

3.14 PSC 57 S-3 High Power Turn-up Pad – Todd said the SAP will be submitted February 1, 2013.

3.15 OU 5 – PSC 51 IES-Solutions - Brian Rebar presented a groundwater monitoring summary for OU 5 PSC 51. Presentation is provided as an attachment.

- Annual groundwater monitoring event was performed by Solutions-IES August 1-2, 2012.
- Water level elevations were gauged in 7 monitoring wells (6 shallow, 1 deep).
- Groundwater flow direction is toward the southeast towards creek; water levels averaged 3.75 feet higher than when last sampled in June 2011.
- 7 monitoring wells and 3 surface water locations were sampled for the COCs BTEX, 1,1-DCE, *cis/trans*-1,2-DCE, TCE, vinyl chloride, and naphthalene.
- All 10 locations also sampled for natural attenuation parameters of methane, ethane, ethene, alkalinity, ammonia, chloride, iron (total & dissolved), manganese (total & dissolved), nitrate, nitrite, sulfate, orthophosphate, sulfide, and total organic carbon.

- Seven monitoring wells were analyzed in the field for carbon dioxide, sulfide and ferrous iron.
- Natural Attenuation Parameter Results - Groundwater
  - Alkalinity ranged from 42.5 to 50.2 mg/L in the source area compared to <2.5 to 14.1 mg/L upgradient, downgradient, and in the deep groundwater
  - Ammonia-N and ortho-phosphate generally absent from groundwater
  - Chloride ranged from 5.5 to 18.6 mg/L
  - Total iron ranged from <0.035 to 4.06 mg/L; dissolved iron ranged from <0.035 to 2.37 mg/L)
  - Total and dissolved manganese ranged from 0.0012 to 0.0306 mg/L
  - Methane ranged from 16.6 to 99.7 µg/L in the shallow source and downgradient compared to 1.0 to 4.0 µg/L upgradient
  - Ethane and ethene were not reported above laboratory detection limits
  - Nitrate-N ranged from 0.068 to 0.50 mg/L; nitrite-N was not reported above laboratory detection limits
  - Sulfate ranged 4.9 to 11.3 mg/L in shallow groundwater; below laboratory detection limit in deep groundwater
  - Sulfide concentrations were less than 1.1 mg/L
  - TOC was higher in the source area (13.8 mg/L maximum) than upgradient/downgradient (2.2. mg/L maximum)
- Natural Attenuation Parameter Results – Surface Water
  - Alkalinity, chloride, methane, orthophosphate and sulfate had lower midstream concentrations than upstream or downstream.
  - TOC was higher midstream (67.1 mg/L) than either upstream (25.5 µg/L) or downstream (27.8 µg/L).
  - Ammonia, iron, manganese, nitrate and sulfide had similar concentrations at all three locations.
  - Ethane, ethene and nitrite were not detected above the laboratory MDL**.**
- Contaminants of Concern Results - Groundwater
  - Benzene was the only detected COC reported above the remedial goals in source area well PSC51-DPT-04 (1.9 µg/L) and downgradient well PSC51-MW-08S (1.3 µg/L)
  - No COCs reported above the Milestone Objectives
- Contaminants of Concern Results – Surface Water
  - Toluene was detected at each location. Concentrations ranged from 0.28 to 1.0 µg/L, which are far below the FDEP SWCTL
  - No evidence of toluene in groundwater
- Summary
  - Since monitoring started in 1999, COCs have decrease and trended towards established remedial goals.
  - MNA is working effectively to reduce COCs.
  - The small amount of residual benzene (<1.9 µg/L) in source area well PSC51-MW-08S and one downgradient well is far below the Milestone concentration of 49 µg/L projected for Year 8.
  - NA parameters in the stream suggest that groundwater is discharging to the stream, but COCs are not impacting the stream.
- Recommendations
  - Discontinue monitoring NA parameters in surface water. The natural attenuation data for groundwater samples is sufficient enough to evaluate if aquifer conditions at PSC 51 support and sustain MNA.

Dave agreed there is no reason to continue NA parameters in surface water at this time.

  - Discontinue use of field test kits for sulfide and ferrous iron because laboratory analysis for sulfide and ferrous iron is already being conducted.
  - Discontinue sampling upgradient wells PSC51-DPT-03 and PSC51-MW-15S since there have been no exceedances of the GCTLs since prior to 2007.
  - Discontinue groundwater and surface water sample analysis for naphthalene. Naphthalene has not been detected above the FDEP GCTL in groundwater since

December 1999, and has not been detected above the FDEP SWCTL in surface water since monitoring began in October 2004.

Consensus: The team agreed that NA parameters in surface water can be discontinued; discontinue use of field test kits for sulfide and ferrous iron (continue analysis with laboratory), discontinue sampling upgradient wells PSC51 – DPT-03 and MW-15S, and discontinue groundwater and surface water sample analysis for naphthalene.

4.0 Miscellaneous

4.1 Proposed Construction Update – Tim Curtin – Tim gave an update of proposed construction and current construction projects.

- NAS Jacksonville won the Installation Excellence award for large installation for the second year in a row.
- New AMAG forms, deleting the social security from the form and uses middle names.
- Moving along on the new marina.
- New project to renovate the golf course. Fairway and cart path replacement. Not sure of the exact location.
- Waste water reuse project is in phase II installing a pipeline to Casa Linda Lake to water the golf course. Phase III will install a pipeline and spray irrigation field at the south antenna farm.
- Two big projects starting in November that will shut down the runway for over a year. Diverting to Cecil Field. Demolishing several hangars.
- Project to demolish the old BOQ has been cancelled.
- The Mulberry Cove shoreline restoration is moving along. Should start sometime soon.

4.2 Tier II Update – Sarah Reed. Last meeting was December 2012. Sarah will update the team at the next meeting.

4.3 Institutional Controls Implementation Plans Update – Tim Curtin – Tim did his inspections and sent out the annual reports. Tim took down the signs at PSCs 41 and 43 and stopped inspecting those sites.

4.4 RCRA Activities – The RCRA group at FDEP is pushing to have a pre-application meeting/meetings (permit application) 3-4 months prior, to identify any major outstanding issues before the application goes in.

Jane discussed the permit expiring May 2014 and she said they are working on the draft now. She discussed that the draft will be submitted to FDEP in the fall. Proposing to close Building 762 former OTTO fuel storage building, because it is never used. Jane said they will continue to sample Building 101S.

There is a potential new SWMU at the south antenna farm. A contractor did some horizontal drilling for utilities for the new P-8 training facility on Yorktown Ave. and discharged the water and drilling mud into a pond in the south antenna farm. Jane said that they did TCLP . She is waiting to hear from FDEP regarding status of the site (SWMU or not).

The FDEP RCRA people want to have a pre-permit application meeting. Adrienne asked Jane to communicate with Beth regarding the process and Beth will keep Adrienne in the loop.

4.5 Exit Strategy Review – **BOLD ALL CHANGES.** Dave would like a copy

4.6 BOA Contracts Update and Schedule. BOA contractor (Solutions-IES) attended day 1 of the meeting and gave updates on sites they are working on.

4.7 CNO Award – nothing new.

5.0 Meeting Closing

5.1 Review Meeting Consensus Items – Done

5.2 Review Meeting Understandings – None

5.3 Review Action Items – Done

5.4 Next Meeting Proposed Agenda Changes

5.5 Set the future meeting dates in advance.

Meeting Date	Meeting Time	Location	Meeting Chairman
3/12/13 3/13/13	1 p.m. to 5:00 p.m. 8:00 a.m. to 12:00 noon	Jacksonville	Dave Grabka
5/23/13	8:00 am to 5:00 pm	Jacksonville	Todd Haverkost
7/23/13 7/24/13	1 p.m. to 5:00 p.m. 8:00 a.m. to 12:00 noon	TBD	Mark Peterson
9/17/13 9/18/13	1 p.m. to 5:00 p.m. 8:00 a.m. to 12:00 noon	TBD	Adrienne Wilson
11/12/13 11/13/13	1 p.m. to 5:00 p.m. 8:00 a.m. to 12:00 noon	TBD	Tim Curtin

5.6 Set the next meeting location, duration, and roles

- Location – Jacksonville
- Dates – March 12-13, 2013
- Duration – two half days
- Chair – Dave Grabka
- Gate/Timekeeper – Todd Haverkost
- Scribe – Julie Johnson

5.7 Facilitator Plus/Deltas – Done

Plus
Jeffrey King
Guest's Presentations

Deltas
Presentations running over, Dave's fault
Meeting on Monday
Plane malfunction causing stress to Pete and Eric

Site	CONSENSUS ITEMS
	Team approves meeting minutes (with changes from Dave Grabka) from November 2012 meeting
PCA 25	Team agrees that monitoring wells JAX25-MW03 and JAX25-MW13 from the monitoring program can be eliminated since they are both upgradient and haven't had an exceedance of GCTLs since prior to August 2008.
OU 5 PSC 51	The team agreed that NA parameters in surface water can be discontinued; discontinue use of field test kits for sulfide and ferrous iron (continue analysis with laboratory), discontinue sampling upgradient wells PSC51 – DPT-03 and MW-15S, and discontinue groundwater and surface water sample analysis for naphthalene.
OU 1 PSCs 26 & 27	Team agrees to discontinue sample collection at OU1-MW-84 and OU1-MW-85.
OU 3 groundwater	The team agrees there is no need to install a new shallow well inside Building 101 based on the results from the new upgradient (OU3-106-MW38S) and downgradient (OU3D-MW55S) shallow wells along cross section A – A'.
PSC 38	The team agreed to delineate soil contamination to the SCTLs and not the PALs at PSC 38.
PSC 38	The team agreed to the installation of four additional wells. All four will be sampled for metals and VOCs, two wells to be sampled for SVOCs. The wells will be surveyed and the groundwater flow direction will be determined.
Agenda Item No.	**PARKING LOT**
	A potential success story, identifying plume reduction project at OU 3 Area A, which will reduce requirements for HAZWOPER training (CNO award due in December 2012). Team due every other year and the installation done every year.
	Yellow Water Weapons Housing Area – Dave Grabka wants to discuss this. Part of Site 15 (sweeping for MEC) Natural Resource Corridor. Public Safety. Tim said the station is looking at getting rid of that area. Tim said nobody wants the road (causing hold up). Dave said the main concern is the part of yellow water Site 15 extends out to the area between the ball field and the old fence line. Confirm that the LUCs will be acceptable for both sites. LUC = only good for a pass through (hiking, biking, horseback riding; no attractors). Tim checking on status of transfer (November 2012). Tim said it has to be approved by congress.
	Building 200 Wash Rack Carbon TET associated with PSC 45.

ACTION ITEMS

Action Item No.	Responsible Party	Status	Due Date	Site	Action Item
Action Items from May 15 - 16, 2012 Meeting					
A-30512	Eric	Done	Next Meeting	PSC 47	Eric to meet with Adrienne and Mike S. regarding the MNA /metals evaluation at PSC 47 by next meeting.

ACTION ITEMS

Action Item No.	Responsible Party	Status	Due Date	Site	Action Item
Action Items from September 6, 2012 Meeting					
A-50912	Laura S	Working	Next Meeting	OU 3, VI discussion	Laura S. to provide the Jacksonville Partnering team with the information regarding the Colorado EPA Region 8 VI study, summa canister vs. what other type that was 20 percent the cost of summa canister.
Action Items from January 14-15, 2013 Meeting					
A-10113	Dave	Done	Next Meeting	PCA 4, Gas Hill Fuel Farm	Dave to ask which method is preferable, 8260 or 8270SIM for reporting Naphthalene. 8270SIM is better, it is more suited for analysis of Naphthalene.
A-20113	Brian R.	Done	Next Meeting	Solutions IES	Brian Rebar will work on streamlining all the sites into the same sampling frequency in order to get the sampling at the same time.
A-30113	Julie	Done	1/15/13	Document Review Status	Julie to send out FFA deadline reminder for PSC 45 RI review to the team.
A-40113	Mark P	Done	1/16/13	OU 3/OU 4	Mark to look for recent EPA comments to the OU 3 and OU 4 LUC RDs.
A-50113	Mike M.	Working	1/31/13	OU 3 GW	Mike M. will coordinate with Mike S. and Geosyntec to determine location of molecular biological tools (MBT) and Compound specific isotope analysis (CSIA), particularly in the area of Building 106.
A-60113	Mike M. and Donald H	OBE	Next meeting	OU 3 GW	Mike M. and Donald H. to provide Jeffrey King the OU 3 TDS data and conductivity data to support the mixing zone model by next meeting.
A-70113	Mike M	Done	1/31/13	OU 3 Area E	Mike M. to find out why PCE and TCE values are so different between shallow wells OU3E-MW2S and OU3E-GEW04. (Review of the RI indicates OU3E-MW2S is screened at the water table from 4.5 to 9.5 feet BLS. OU3E-GEW04 is screened on top of the clay layer from 11 to 16 feet BLS. The clay layer in this area is about 20 to 40 feet thick beginning around 15 feet BLS.)

NAS Jacksonville Team Agenda
Jacksonville, Florida
March 12-13, 2013

Chair – Dave Grabka
Gate/Timekeeper – Todd Haverkost
Scribe – Julie Johnson

	Item	Description	Presenter	Time	Objectives
	1.0	**TEAM MEETING AND INTRODUCTIONS**	Team		
	1.1	Team member Greeting, Introductions, and Check-in; Guest Introductions	Team		
	1.2	Assignment of Team Meeting Organization: Chair, Gate/Time Keeper, Scribe	Chair		
	1.3	Read Team Ground Rules	Team		
	2.0	**INITIAL AGENDA ITEMS FOR EACH MEETING**			
	2.1	Review, submit revisions to, and reach consensus on previous meeting minutes	Team		
	2.2	Reports on assigned action items and parking lot items	Team		
	2.3	NAVFAC presents current budget execution plan	Adrienne		
	3.0	**AGENDA**			
	3.1	Schedules/SCAP/Exit Strategy/FDEP Document Tracker/FFA SMP/Petroleum SMP, FFA Review	Team		
		3.1.1 Team Development –	Tim Flood		
	3.2	OU-1			
		3.2.1 LTM Update and Landfill Maintenance	Tim		
	3.3	OU-3			
		3.3.1 Groundwater Model Update	Donald/Mike		
		3.3.2 Vapor Intrusion Update	Eric		
	3.4	OU-6 – PSC 52 – Hangar 1000	Donald		
	3.5	OU-7 – PSC 46 DRMO update	Eric		
	3.6	OU-8 – PSC 47 – Pesticide Shop	Eric		
	3.7	OU-9 – PSC 45-Building 200 Wash Rack (groundwater only)			
	3.8	OU 10 - MRP Sites	Todd		
	3.9	OU 11 - PSC Sites with LUCs and no RODs and PSC 55 –			
	3.10	Petroleum Sites			
		Gas Hill	Eric		
		Hawkins			
		PCA 25			
		Kemen Test Cell			
		Firefighter Training Facility (OU 2)			
	3.11	PSC 38 -	Alan		
	3.12	PSC 56 – NEX Gas Station	Alan		
	3.13	PSC 57 S-3 High Power Turn-up Pad	Alan		
	4.0	**MISCELLANEOUS**			
	4.1	Proposed Construction Update	Tim		
	4.2	Tier II Update			
	4.3	Institutional Controls Implementation Update	Tim		
	4.4	RCRA Activities –			
	4.5	Exit Strategy Review	Mark		

	Item	Description	Presenter	Time	Objectives
	4.6	BOA Contracts Update	Adrienne		
	4.7	CNO Award			
	5.0	**MEETING CLOSING**			
	5.1	Review Meeting Consensus Items			
	5.2	Review Meeting Understandings			
	5.3	Review Action Items			
	5.4	Next Meeting Proposed Agenda			
	5.5	Set Dates for Future Meetings			
	5.6	Set the Next Meeting Location, Duration, and Roles			
	5.7	Facilitator Plus/Deltas			

REGION: 04

SITE NAME: JACKSONVILLE NAVAL AIR STATION
CITY: JACKSONVILLE **ST:** FL **FED FAC:** Yes **SSID:** 04CJ **SITE CATEGORY:** FEDERAL FACILITY
PRIMARY RPM: Dao, Peter **EPA ID:** FL6170024412 **ARCHIVE:** No **SECTION CODE:** FFB-FL, AL, MS
PRIMARY OSC: **SITE ID:** 0401214 **NPL STATUS:** F
SITE ASSESSMENT MANAGER: **NON-NPL STATUS:**

OU	Action/ Subaction		LD	Take Over	QUAL	CRIT	Plan Start	Actual Start	Plan Comp	Actual Comp	Prior Yr Obl (000)	Current Yr Obl (000)	Plan Yr Obl (000)	Fin Typ	Spc Acc	Plan Cntr Veh	Plan FY/Q	Fund Stat	Bud Src Code	SCAP Notes
00	-- SITEWIDE																			
00	DISCVRY	DS001	FF							02/12/88	0	0								
00	PA	PA001	FF		H			01/30/83		01/30/83	0	0								NPL
00	SI	SI 001	FF		H					03/31/86	0	0								NPL
00	PROPOSED	NP001	F							07/14/89	0	0								
00	NPL FINL	NF001	F							11/21/89	0	0								
00	DELETION	ND001	F				09/30/14		09/30/22		0	0								
00	IAG	FI 001	FE				12/31/89	12/30/89	03/31/90	10/23/90	0	0								
00	FF FYR	VY001	FF					11/01/00	09/30/01	09/25/01	0	0								
00	FYR Due	WE001	FF						09/30/01	09/25/01	0	0								
00	CI	CR001	CO								0	0								
00	Rest Brd	BX001	FF					03/31/95			0	0								
00	FF O/S	OX001	FF								9	0								For All OU's
00	CLSOUT R	CQ002	F						12/31/19		0	0								
00	FF FYR	VY002	FF						09/25/06	03/01/06	0	0								
00	FYR Due	WE002							09/25/06	03/01/06	0	0								
00	FF FYR	VY003	FF						05/01/11	09/29/11	0	0								
00	FYR Due	WE003	FF						03/01/11	09/29/11	0	0								
00	FYR Addend	W\001	FF						09/29/16		0	0								
00	FF FYR	VY004	FF						03/01/16		0	0								
00	FYR Due	WE004	FF						03/01/16		0	0								
00	REUSE CHK	XC001	EP						09/30/07	09/26/07	0	0								
00	SWRAU	BZ001	EP						12/15/20		0	0								
01	-- CHILD STREET LF & PCB STORAGE																			
01	FF RI/FS	LW001	FF				12/31/90	10/08/90	09/30/96	08/03/98	0	0								OU1
01	ROD	RO002	FF		U				03/31/98	08/03/98	0	0								OU1
01	FF RD	LX 004	FF		U		12/31/96	03/10/97	01/01/98	08/13/97	0	0								OU1
01	FF RA	LY 004	FF		IR		01/01/98	10/01/97	09/30/05	03/18/05	0	0								OU1, MNA
01	FF RI/FS	LW003	FF				12/30/93	12/21/93	09/30/94	09/29/94	7	0								LNAPL
01	ROD	RO011	FF						09/30/94	09/29/94	0	0								LNAPL
01	FF RD	LX 001	FF				12/30/94	12/01/93	12/31/94	12/05/94	0	0								LNAPL
01	FF RA	LY 002	FF		IR		03/31/95	03/20/95	09/30/05	03/18/05	0	0								LNAPL
01	Env Prog	GF002	FF							02/16/96	0	0								

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PRIMARY RPM: Dao, Peter EPA ID: FL6170024412 ARCHIVE: No SECTION CODE: FFB-FL, AL, MS
PRIMARY OSC: SITE ID: 0401214 NPL STATUS: F
SITE ASSESSMENT MANAGER: NON-NPL STATUS:

OU	Action/ Subaction	LD	Take Over	QUAL	CRIT	Plan Start	Actual Start	Plan Comp	Actual Comp	Prior Yr Obl (000)	Current Yr Obl (000)	Plan Yr Obl (000)	Fin Typ	Spc Acc	Plan Cntr Veh	Plan FY/Q	Fund Stat	Bud Src Code	SCAP Notes
02	-- INDUST WASTE WATER TREAT PLT																		
02	FF RI/FS	LW002	FF		U	09/30/92	07/01/92	12/31/98	03/19/99	3	0								OU2
02	FF RI/FS	LW006	FF			12/30/94	10/01/94	06/30/95	09/21/95	0	0								PSC 42
02	ROD	RO003	FF		U			09/30/95	09/21/95	0	0								IROD PSC 42
02	FF RA	LY 006	FF		FR	5 03/31/95	03/06/95	03/31/98	03/18/98	0	0								PS 41
02	FF RD	LX 003	FF			09/30/95	09/21/95	09/30/96	10/23/95	0	0								PSC 42
02	FF RA	LY 003	FF		FR	09/30/96	02/12/96	03/31/98	03/18/98	0	0								PSC 42
02	FF RD	LX 002	FF			12/30/94	07/01/94	12/31/94	12/07/94	0	0								PSC 2,41,43
02	FF RI/FS	LW004	FF			12/30/93	12/21/93	09/30/94	09/29/94	6	0								PSC 2,41,43
02	ROD	RO012	FF					09/29/94	09/29/94	0	0								PSC 2,41,43
02	FF RA	LY 008	FF		FR	5 03/31/95	03/06/95	12/31/96	09/09/97	0	0								PS 43
02	ROD	RO013	FF					12/31/98	03/19/99	0	0								OU2
02	FF RA	LY 007	FF		FR	5 03/31/95	03/06/95	12/31/98	03/05/99	0	0								PS 2
03	-- INDUSTRIAL COMPLEX																		
03	FF RI/FS	LW007	FF			03/30/98	02/27/98	03/31/00	09/28/00	0	0								
03	FF RI/FS	LW005	FF			03/31/00	12/17/93	12/31/03	03/02/04	47	0								Area A&E: FDEP Req'd
03	ROD	RO010	FF					03/31/00	09/28/00	0	0								AreaBCDFG,16,106,780
03	FF RD	LX 005	FF		U	12/31/00	01/11/01	12/30/16		0	0								Area F: Chem. Ox
03	FF RA	LY 005	FF		U	08/30/13		03/30/17		0	0								Area F
03	FF RV	LV 001	FF	TN	S	04/06/92	04/11/92	04/30/92	04/17/92	0	0								
03	ROD	RO020	FF					10/30/06	10/02/06	0	0								Area A
03	ROD	RO022	FF		R			12/30/16		0	0								Area E
03	FF RD	LX 007	FF			09/30/01	07/18/01	12/30/02	07/18/01	0	0								Area B&G: MNA
03	FF RD	LX 008	FF			03/26/01	03/26/01	05/30/01	06/13/01	0	0								Area C, D: HRC
03	FF RD	LX 009	FF			06/30/02	06/26/02	06/30/02	06/26/02	0	0								PSC 16
03	FF RD	LX 010	FF			10/30/06	10/02/06	10/30/06	10/02/06	0	0								Area A
03	FF RA	LY 010	FF		IR	12/30/02	07/18/01	12/30/10	12/17/10	0	0								Area B&G
03	FF RA	LY 011	FF		IR	09/30/02	08/12/02	05/31/06	05/31/06	0	0								Area C, D: HRC
03	FF RA	LY 012	FF		IR	12/30/02	09/28/00	03/30/17		0	0								106/780: Air Sparge
03	FF RA	LY 013	FF		IR	06/30/02	06/26/02	12/30/05	03/18/05	0	0								PSC 16
03	FF RA	LY 018	FF		FR	09/30/07	10/02/06	09/30/07	10/02/06	0	0								Area A
04	-- CASA LINDA LAKE (PSC-21)																		
04	FF RI/FS	LW008	FF				08/15/97	12/31/99	09/28/00	0	0								

REGION: 04

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SECTION CODE: FFB-FL, AL, MS

OU	Action/ Subaction	LD	Take Over	QUAL	CRIT	Plan Start	Actual Start	Plan Comp	Actual Comp	Prior Yr Obl (000)	Current Yr Obl (000)	Plan Yr Obl (000)	Fin Typ	Spc Acc	Plan Cntr Veh	Plan FY/Q	Fund Stat	Bud Src Code	SCAP Notes
04	-- CASA LINDA LAKE (PSC-21)																		
04	ROD	RO014	FF					12/31/99	09/28/00	0	0								PSC 21
04	FF RD	LX 006	FF			06/30/02	12/06/01	06/30/02	12/06/01	0	0								PSC 21
04	FF RA	LY 009	FF		FR	12/06/01	12/06/01	09/30/04	09/30/03	0	0								PSC 21
05	-- PSC 51																		
05	ROD	RO016	FF					09/30/05	09/22/05	0	0								PSC 51
05	FF RA	LY 014	FF		IR	09/30/05	09/22/05	12/30/05	09/22/05	0	0								Cl Solvents/LUC
06	-- HANGER 1OOO, PSC 52																		
06	FF RI/FS	LW011	FF			12/30/00	11/30/00	04/15/07	03/21/07	0	0								DNAPL Investigation
06	ROD	RO021	FF					04/15/07	03/21/07	0	0								Hgr 1000 ROD
06	FF RA	LY 015	FF		IR	03/15/07	03/21/07	04/15/07	03/21/07	0	0								CL Solv Plume/IC
07	-- PSC 46 DRMO																		
07	FF RI/FS	LW009	FF			06/30/01	03/19/01	09/30/05	09/22/05	0	0								DRMO
07	ROD	RO018	FF					09/30/05	09/22/05	0	0								
07	FF RA	LY 016	FF		FR	09/30/05	09/22/05	06/30/12	05/09/12	0	0								
08	-- PSC 47 PESTICIDE SHOP																		
08	FF RV	LV 002	FF			10/01/07	11/27/07	06/30/09	04/21/09	0	0								
08	FF RI/FS	LW010	FF			10/30/01	07/28/01	09/30/08	09/30/08	0	0								Pesticide Shop
08	ROD	RO019	FF					09/30/08	09/30/08	0	0								See Comments
08	FF RD	LX 011	FF			06/30/09	11/07/08	11/15/09	09/30/09	0	0								
08	FF RA	LY 017	FF		IR	11/15/09	09/30/09	08/30/10	09/15/10	0	0								
09	-- PSC 45 BLDG 200 WASH RACK																		
09	FF RI/FS	LW012	FF			05/01/11	05/09/11	05/01/14		0	0								
10	-- MMRP																		
10	FF RI/FS	LW013	FF			05/30/12	07/03/12	12/30/14		0	0								MMRP sites
11	-- LUC SITES																		
11	FF RI/FS	LW014	FF			12/30/13		12/30/14		0	0								LUC sites
										72	0	0							
												0	B						
												0	P						

** END OF SITE SUMMARY **

TOTAL NUMBER OF SITES IN REPORT: 1

Facility Document Reviews

FEDERAL FACILITIES DATABASE

List of document reviews within the Federal Facilities database that were previously tracked in the DODTRS.xls spreadsheet. The documents are grouped by Facility and sorted with the most recent documents first.

JACKSONVILLE NAVAL AIR STATION (NAS JAX)

1006 Document Reviews

Document Title	Date In	Date Out	Explanation	BC/RPM	Comments
Draft Remedial Investigation Report, PSC 45, OU 9, Building 200 Washrack, December 19, 2012	12/27/2012			DPG	w/CD
Final Remedial Investigation UFPSAP OU 10 MRP Sites, December 3, 2012	12/6/2012			DPG	Ltrs/Signature Pg w/CD
Final FFA Site Management Plan CY2013 & Response to Comments, December 3, 2012	12/5/2012			DPG	w/CD
Draft Final Tier II Sampling & Analysis Plan, MRP, Remedial Investigation, Former Machine Gun Range Complex, November 2012,	11/9/2012	11/16/2012		DPG	
Final Tier II SAP for Hangar 1000 (Replacement Pages & Living CD for CTO JM66 w/Final Version & Other Documents Submitted Under this CTO	10/29/2012			DPG	Transmittal, 3 Maps & 2 CDs
Draft 2002 Annual Groundwater Monitoring Report, OU 5, PSC 51, October 23, 2012	10/26/2012			DPG	w/CD
Land Use Control Remedial Design, OU 7-DRMO, Revision 1, October 19, 2012	10/24/2012			DPG	w/CD
Revised Redline/Strikeout Verson & Revised Responses to David Grabka's Original Comments	10/15/2012	11/5/2012		DPG	
Draft Sampling & Analysis Plan, FSP&QAPP, Annual Monitoring, OU 5, PSC 51, OU 1, PSCs 26 & 27, and OU 3 - Area A, Rev 2, October 3, 2012	10/9/2012			DPG	
Final UFP SAP, Groundwater Monitoring PCA 25, UST Site 119-Fuel Transfer Sump	9/27/2012	11/1/2012		DPG	
Response to Comments - Draft Site Assessment Report, PCA 25, UST Site 119 Fuel Transfer Sump, September 12, 2012	9/12/2012			DPG	
Site Assessment Report, PCA 25, UST Site 119 Fuel Transfer Sump, September 10, 2012	9/12/2012	11/1/2012		DPG	w/CD
Final 2013 Federal Facilities Agreement Site Management Plan Amendment, August 28, 2012	9/11/2012			DPG	

Document Title	Date In	Date Out	Explanation	BC/RPM	Comments
Draft Tier II Sampling & Analysis Plan, Munitions Response Program, Remedial Investigation of Former Machine Gun Range Complex, April 2012	9/9/2012	11/5/2012		DPG	
Draft Tier II Sampling & Analysis Plan (FSP & QAPP), August 2012, MRP - Remedial Investigation of Former Machine Gun Range Complex	9/6/2012			DPG	
Response to Comments from Partnering Team on Draft Draft Tier II Sampling & Analysis Plan (FSP & QAPP), August 2012, MRP - Remedial Investigation of Former Machine Gun Range Compl	9/6/2012			DPG	
Draft Site Investigation Report PSC 55, August 2012	9/4/2012	10/11/2012		DPG	
B101S Groundwater Monitoring Results, June 2012, (July 13, 2012)	7/27/2012			DPG	w/CD
Draft Aite Assessment Report for Petroleum Contaminated Area 25, UST Site 119 Fuel Transfer Sump, July 2, 2012	7/19/2012	7/30/2012		DPG	
Draft Rev 2, Sampling & Analysis Plan, FSP&QAPP, July 2012, Groundwater Monitoring-PCA 25, UST Site 119 Fuel Transfer Sump	7/10/2012	7/16/2012		DPG	w/CD
Draft Semiannual Monitored Natural Attenuation Evaluation Report OU 6, Hangar 1000, July 3, 2012	7/5/2012			DPG	
Draft Work Plan & Draft UFPSAP, OU 3 Phase II - Vapor Intrusion Evaluation, Response to Comments, May 2012 (May 23, 2012)	5/25/2012	7/19/2012		DPG	w/CD
Draft After Action Report (AAR), MR for Soil/Sediment Remediation, OU7, PSC 46 - Defense Reutilization & Marketing Office, Revision 00, January 2012, (May 2, 2012)	5/8/2012			DPG	w/CD
Draft Final Sampling & Analysis Plan (FSP & QAPP), April 2012, Groundwater Monitoring - Petroleum Contaminated Area (PCA) 15, Fire Fighting Training Facility, (April 25, 2012)	4/27/2012			DPG	w/CD
Draft Remedial Action Completion Report, Soil/Sediment Remediation & Groundwater Sampling OU 7, PSC 46 - Defense Reutilization & Marketing Office, Rev 01, April 2012, (April 19, 2012)	4/24/2012			DPG	w/CD
Draft Tier II Sampling & Analysis Plan MRP, Remedial Investigation - Former Machine Gun Range Complex, April 2012, (April 12, 2012)	4/12/2012	7/9/2012		DPG	w/CD
January 2012 RCRA Groundwater Sampling Report - Polishing Pond, March 2012, (April 9, 2012)	4/11/2012		NRR	DPG	w/CD -- RCRA
Semi-Annual Groundwater Monitoring Report - Hangar 101S, December 2011 Sampling Event, (March 27, 2012)	3/30/2012		NRR	DPG	w/CD -- RCRA
OU 2 - Petroleum Contaminated Area 15, Former Fire Fighter Training Area, January 2012 Sampling Event Letter Report, March 23, 2012	3/26/2012	8/22/2012		DPG	w/CD

Document Title	Date In	Date Out	Explanation	BC/RPM	Comments
Draft OU 3, Phase II Vapor Intrusion, Evaluation Work Plan, Revision 02, March 2012, (March 22, 2012)	3/23/2012	4/12/2012		DPG	w/CD
Final Tier II SAP - (PSC 52) Hangar 1000, Monitored Natural Attenuation Sampling, OU 6, March 2012, (March 7, 2012)	3/9/2012	3/8/2012		DPG	w/CD
Draft Land Use Control Remedial Design OU 3, (January 30, 2012)	2/3/2012			DPG	w/CD
Draft Land Use Control Remedial Design OU 4 - Casa Linda Lake, (January 30, 2012)	2/3/2012			DPG	w/CD
Draft Land Use Control Remedial Design OU 7, (January 30, 2012)	2/3/2012			DPG	w/CD
Final Land Use Control Remedial Design OU 1, (January 19, 2012)	2/1/2012			DPG	
Final Sampling & Analysis Plan (FSP & QAPP) - Phase I Remedial Investigation, PSC 38 & Responses to Additional Comments, Revision 3, (January 24, 2012)	2/1/2012		NRR	DPG	w/2 CDs
Final Sampling & Analysis Plan (FSP & QAPP), Phase I Remedial Investigation, PSC 38, Revision 3, (January 2012)	1/23/2012	1/23/2012		DPG	Received By E-Mail
Draft Project Completion Report-Soil/Sediment Remediation & Groundwater Sampling OU 7 - PSC 46-Defense Reutilization & Marketing Office, Revision 00, (January 2012)	1/11/2012			DPG	w/CD
Final Sampling & Analysis Plan (Field Sampling Plan & Quality Assurance Project Plan) - Phase I Remedial Investigation - Potential Source of Contamination 38--Torpedo Rework Facility, (December 2011)	12/14/2011	1/13/2012		DPG	w/CD
Final Summary Form for Final Five-Year Review - OUs 1, 2, 3, 4, 5, 6, 7 & 8, Revision 2, (December 12, 2011)	12/14/2011		NRR	DPG	w/CD
OU 2 - Petroleum Contaminated Area 15 - Former Fire Fighter Training Area, July 2011 Sampling Event Letter Report, (December 2, 2011)	12/5/2011	3/30/2012		DPG	
Site Assessment Report - NEX Gas Station - Former Underground Storage Tanks 880-6 & 880-7, (December 2011)	12/2/2011	2/28/2012		DPG	w/CD
Draft Tier II Sampling & Analysis Plan - Monitored Natural Attenuation Sampling OU 6 (Potential Source of Contamination 52, Hangar 1000), (October 2011)	10/26/2011	2/20/2012		DPG	
Health & Safety Plan for Monitored Natural Attenuation Sampling - Hangar 1000, (October 2011)	10/13/2011		NRR	DPG	
Final Annual Monitored Natural Attenuation Evaluation Report, OU 6-Hangar 1000, (October 2011)	10/11/2011			DPG	w/CD

Document Title	Date In	Date Out	Explanation	BC/RPM	Comments
Final 2011 Annual Groundwater Monitoring Report - Potential Source of Contamination 47, Revision 01, (October 2011)	10/6/2011			DPG	w/CD
Response to Comments - Draft Land Use Control Remedial Design, OU 1, (September 22, 2011)	9/23/2011		NRR	DPG	EPA Comments
Hangar 101S June 2011 Sampling Event, (August 24, 2011)	9/22/2011		NRR	DPG	w/CD -- RCRA
Errata Pages for Final Five-Year Review for Ous 1, 2, 3, 4, 5, 6, 7 & 8, Revision 2, (September 6, 2011)	9/7/2011		NRR	DPG	w/CD
Work Plan Revision, Revision No 3, Monitored Natural Attenuation Plan, Petroleum Contaminated Area 4 - Gas Hill Fuel Farm, (June 5, 2011)	9/6/2011	10/5/2011		DPG	Received By E-Mail
Final Federal Facilities Agreement Site Management Plan Amendment, Calendar Year 2012	8/16/2011	10/14/2011		DPG	Received By E-Mail
2011 Annual Groundwater Monitoring Report - PSC 47, Revision 01, (August 2011)	8/15/2011	9/13/2011		DPG	w/CD
Draft-Final Sampling & Analysis Plan (SAP) (Field Sampling Plan & Quality Assurance Project Plan) - Phase I Remedial Investigation, PSC 38-Torpedo Rework Facility, Revision 1, (August 2011)	8/11/2011			DPG	w/CD
Final Explosive Safety Submission (ESS) Including Amendment 2, (Munitions Response for Soil/Sediment Remediation OU 7, PSC46) - DLA SE (Formerly DRMO), (July 28, 22011)	8/2/2011		NRR	DPG	Letter w/CD
Draft Site Assessment Report, NEX Gas Station - Former Underground Storage Tanks 880-6 & 880-7, (July 2011)	8/1/2011	10/7/2011		DPG	w/CD
Draft Site Assessment Report - Petroleum Contaminated Area 25 - UST Site 119 Fuel Transfer Sump, Rev 0, (July 2011)	7/19/2011			DPG	w/CD
Final Site Investigation Report, Potential Source of Contamination 45 - Building 200 Wash Rack, (July 2011)	7/19/2011	8/31/2011		DPG	w/CD
Annual Sampling Report - Long-Term Monitoring Program, OU 3, Area A, (May 31, 2011)	7/12/2011			DPG	w/CD
Explosives Safety Submission for MR for Soil/Sediment Remediation, OU 7, Potential Source of Contamination 46 - Defense Reutilization & Marketing Office (Amendment No. 01), (June 2011)	7/11/2011		NRR	DPG	Letter w/CD
Final Sampling & Analysis Plan (Field Sampling Plan & Quality Assurance Project Plan) - Site Investigation - PSC 55, Rev 1, (June 2011)	7/1/2011		NRR	DPG	w/CD
Draft-Final Sampling & Analysis Plan (Field Sampling Plan & Quality Assurance Project Plan) - Site Investigation for PSC 55, (June 2011)	6/22/2011	6/23/2011		DPG	w/CD

Document Title	Date In	Date Out	Explanation	BC/RPM	Comments
Work Sheet 1 Additional Page - Final SAP (FSP & QAPP) for Extended SI for PSC 5, 8, 9, 29, 31, 32, & 50, Revision 3, (June 10, 2011)	6/14/2011		NRR	DPG	
Health & Safety Plan for PSCs 38, 45, & 55, (June 7, 2011)	6/10/2011		NRR	DPG	
Health & Safety Plan for PSCs 5, 8, 9, 29, 31, 32, & 50, (June 7, 2011)	6/10/2011		NRR	DPG	
Sampling & Analysis Plan (FSP & QAPP) - Remedial Investigation - PSC 45-Former Building 200 Wash Rack Disposal Pit, Rev 1, (May 2011)	6/10/2011		NRR	DPG	
Final Five-Year Review for OUs 1, 2, 3, 4, 5, 6, 7, & 8, Revision 2, (May 26, 2011)	6/1/2011	7/12/2011		DPG	
Response to Comments for Draft-Final Five-Year Review for OUs 1, 2, 3, 4, 5, 6, 7, & 8, (May 2011)	6/1/2011	7/12/2011		DPG	
Sampling & Analysis Plan (Field Sampling Plan & Quality Assurance Project Plan), Extented Site Investigation for PSC Sites 5, 8, 9, 29, 31, 32, & 50, Revision 3, (May 2011)	5/27/2011		NRR	DPG	
Work Plan MR for Soil/Sediment Remediation at OU 7, PSC 46 - Defense Reutilization & Marketing Office, Revision 01, (May 2011)	5/19/2011			DPG	
Ocala National Forest Property Near Salt Springs, FL - Project Completion Report, AV-8 Harrier Crash Site Remediation - Excavation of Aircraft Debris & Petroleum-Contaminated Soil, Revision 01, (March 2011) -- "Mishap July 18, 2010"	5/18/2011	8/11/2011		DPG	
Annual Monitoring Report - Long-Term Monitoring Program Potential Source of Contamination 51, (October 2010)	5/9/2011			DPG	Received By E-Mail
Operating/Corrective Action/Post-Closure Permit 72437-HO-009 - Field Investigation of off Station Migration of Chlorinated solvent Constituents, (April 21, 2011)	4/27/2011		NRR	DPG	RCRA
January 2011 Biannual Monitoring Report OU 3, Site 11 Area B & Site 15 Area G	4/26/2011			DPG	w/CD
January 2011 Semiannual Monitoring Report OU 2 - Fire Fighter Training Facility, (April 2011)	4/26/2011	3/30/2012		DPG	w/CD
Explosives Safety Submission, Munitions Response - Soil/Sediment Remediation OU 7, Potential Source of Contamination 46 - Defense Reutilization & Marketing Office, (January 2011)	4/15/2011		NRR	DPG	w/CD
Interim Explosives Safety Submission Approval, Munitions Response - Soil/Sediment Remediation OU 7, Potential Source of Contamination 46 - Defense Reutilization & Marketing Office, (March 17, 2011)	4/15/2011		NRR	DPG	

Document Title	Date In	Date Out	Explanation	BC/RPM	Comments
Draft Sampling & Analysis Plan (Field Sampling Plan & Quality Assurance Project Plan), April 2011 - Remedial Investigation - Potential Source of Contamination (PSC) 45 -- Former Building 200 Wash Rack Disposal Pit	4/7/2011		OBR	DPG	w/CD
RCRA Groundwater Sampling Report January 2011, (March 2011)	3/31/2011		NRR	DPG	w/CD, RCRA
Draft Letter Report OU 11, Terrestrial February-March 2010 Ground-Water Monitoring & Follow-Up Soil Assessment, (March 2011)	3/25/2011	10/5/2011		DPG	Received By E-Mail
Response to Comments & Annual Groundwater Monitoring Report Replacement Pages for PSC 47, Revision 01, (March 2010)	3/22/2011	6/10/2011		DPG	w/2 CDs
Hangar 101S December 2010 Sampling Event, (February 24, 2011)	3/3/2011		NRR	DPG	w/CD, RCRA
Five Year Review--OUs 1, 2, 3, 4, 5, 6, 7, & 8, Revision 1, (February 2011) and Response to Comments for Draft Five Year Review--OUs 1, 2, 3, 4, 5, 6, 7, & 8, (February 24, 2011)	2/28/2011	3/21/2011		DPG	w/CD
2010 Annual Groundwater Monitoring Report - Petroleum Contaminated Area 4-Gas Hill Fuel Farm, Revision 01, (February 2011)	2/4/2011	4/8/2011		DPG	w/CD
Site Library Documents Through July 2010 (DVD 1 - 1980-1999, DVD 2 - 2000-2006, & DVD 3 - 2007-2010)	1/21/2011		NRR	DPG	
Draft Annual Monitored Natural Attenuation Evaluation Report OU 6 - Hangar 1000, (December 2010)	12/23/2010	1/7/2011		DPG	w/CD
Draft Sampling & Analysis Plan (SAP) (Field Sampling Plan & Quality Assurance Project Plan) - Site Investigation for Potential Sources of Contamination 55, (December 2010)	12/23/2010	1/10/2011		DPG	w/CD
Draft Semi-annual Monitored Natural Attenuation Evaluation Report OU 6 - Hangar 1000, (December 21, 2010)	12/22/2010	1/7/2011		DPG	
OU 3 Vapor Intrusion Screening Evaluation Report, Revision 01, (December 2010)	12/16/2010	3/28/2011		DPG	w/CD
Remedial Action Completion Report - Areas B & G at OU 3, (December 13, 2010)	12/15/2010	5/3/2011		DPG	w/CD
Administrative Record & Site Library Updates (AR Documents Prepared Through July 2010)	11/18/2010		NRR	DPG	Letter w/CD
Draft Five-Year Review - OUs 1, 2,3, 4, 5, 6, 7 & 8, Rev 0, (November 2010)	11/12/2010		OBR	DPG	w/CD
Annual Monitoring Report, Year 6, May & June 2010 - Long-Term Monitoring Program - Potential Source of Contamination 51, (October 2010)	11/2/2010	1/7/2011		DPG	w/CD

NAS Jacksonville Partnering Team Document Review Status

Date of Status: 13-Mar-2013

No.	Document Name	Distribution (email or hardcopy)	Date Submitted (or to be submitted)	Deadline for Comments of draft (45 days to comment)	FFA Deadline for Comments of draft (90 days to comment)	Navy Deadline for Redline & RTC& draft final (45 days)	Navy Deadline for draft final submittal (60 days)	Navy Deadline for Extension Letter (10 days prior to deadline for Final or 20 days after DF submittal)	Deadline for Final letter of approval (30 days) **	Comments Received from				
										FDEP	EPA	NAVFAC SE RPM	NAVFAC SE Chemist	NAS JAX
Tetra Tech Documents														
1	Draft OU 4 LUC RD (email to Pete Dao) Sent hardcopy 2/2/12 CTO 19 AND 154	email 12/30/11 hard copy (2/2/12)	30-Dec-2011								X	X	NA	X
2	Draft OU 3 LUC RD CTO 19 AND CTO 154	hard copy	30-Jan-2012								X	X	NA	X
3	Final Annual Monitoring Report - Hangar 1000 - RTC from team CTO 152A	hard copy	10-Oct-2011									X	NA	X
4	Draft Potential Source of Contamination (PSC) 55 SI Report CTO JM19	hard copy	31-Aug-2012							X		X	NA	X
5	Dft-Fnl Response to Comments and Redline Site Assessment Report for PCA 25 (CTO 0003) w/ MNA Work Plan CTO 0003	hard copy	10-Sep-2012								NA			
6	Potential Source of Contamination (PSC) 45 RI Report CTO 112	hard copy	21-Dec-2012	**4-Feb-2013**	**21-Mar-2013**	**5-May-2013**	**20-May-2013**	**9-Jun-2013**					NA	X
7	Potential Source of Contamination (PSC) 38 RI/FS Report CTO JM19	hard copy	30-Jun-2013											
CH2MHILL Documents														
1	Draft Final Building 106 AS/SVE System Decommissioning Work Plan	email	5-Jul-2011	NA	NA	NA	NA	NA	NA			X	X	X
2	Draft Final VI Work Plan	NIRIS and HC replacement pages	24-May-2012							X				
3	Draft Final VI UFP-SAP	NIRIS and HC replacement pages	24-May-2012							X				
4	Draft Final LUC RD - DRMO	hard copy	30-Jan-2012	NA	NA	NA	NA	NA	NA			X	X	X
5	DRMO Letter to EPD Stating Start Date of Remedy	email	March? Letter Prepared by HILL, to be submitted by Navy	NA	NA	NA	NA	NA	NA	NA		X	X	X
6	Draft Final Pesticide Shop Work Plan Revision XX (JM40)	email	18-Dec-2012	NA	NA	NA	NA	NA	NA			X	X	X
7	Draft Final Building 106 AS/SVE System Decommissioning Construction Completion Report	hard copy	30-Sep-2012											
8	Draft 2012 Gas Hill Annual Groundwater Monitoring Report	hard copy	5-Nov-2012											
9	Draft 2012 Pesticide Shop Annual Groundwater Monitoring Report	hard copy	18-Dec-2012											
10	Draft OU3 Vapor Intrusion Evaluation Report	hard copy	16-Nov-2012											
11	Draft DRMO RACR	hard copy	19-Apr-2012									X	N/A	X
12	Draft DRMO Project Completion Report	hard copy	9-Jan-2012									X	N/A	X
13	Draft DRMO After Action Report	hard copy	9-Jan-2012									X	N/A	X

X = Comments have been received from this reviewer
Blank = No comments have been received from this reviewer
Shaded - Documents to be submitted in the next 30 days.
NA = no review required by this reviewer.

** The regulators will issue a letter approving the draft-final as final if no dispute resolution.

FFA Review time restrictions: 22-Mar-2012 21-May-2012

NAS Jacksonville Partnering Team Document Review Status

Date of Status: 11-Jan-2013

No.	Document Name	Distribution (email or hardcopy)	Date Submitted (or to be submitted)	Deadline for Comments of Draft (45 days to comment)	FFA Deadline for Comments of Draft (90 days to comment)	Navy Deadline for Redline & RTC & Draft Final (45 days)	Navy Deadline for Draft Final Submittal (60 days)	Navy Deadline for Extension Letter (10 days prior to deadline for Final or 20 days after DF submittal)	Deadline for Final letter of approval (30 days) **	Comments Received from						Solutions-IES To Do	NAVFAC To Do	Budget	Invoiced	Remaining Budget
										FDEP	EPA	NAVFAC SE RPM	NAVFAC Legal	NAVFAC SE Chemist	NAS JAX					
			Solutions IES	LTM																
1	B101S APP/HASP - **Complete**	Draft: email Final: HC+CD	23-Mar-2012 6-Jun-2012	7-May-2012	21-Jun-2012	5-Aug-2012	20-Aug-2012	30-Aug-2012	9-Sep-2012	NA	NA	NA	NA	NA	X					
2	B101S UFP SAP - **Complete**	Draft: email Draft Rev 2: HC+CD Final: 4 HC+CDs	23-Mar-2012 6-Jun-2012 17-Aug-2012	7-May-2012	21-Jun-2012	5-Aug-2012	20-Aug-2012	30-Aug-2012	9-Sep-2012	NA	NA	X	NA	X	X					
3	B101S Groundwater Monitoring Results, June 2012 - **Complete**	Draft: email Final: 4 HC+CDs	18-Jul-2012 19-Jul-2012	1-Sep-2012	16-Oct-2012	30-Nov-2012	15-Dec-2012	25-Dec-2012	4-Jan-2013	NA	NA	NA	NA	NA	X					
4	B101S Groundwater Monitoring Results, December 2012	Draft: email Final: 4 HC+CDs	28-Feb-2012	13-Apr-2012	28-May-2012	12-Jul-2012	27-Jul-2012	6-Aug-2012	16-Aug-2012	NA	NA	NA	NA	NA		Prepare December 2012 Draft Report				
5	FFTF APP	Draft: email Final: HC+CD	25-Jan-2012	10-Mar-2012	24-Apr-2012	8-Jun-2012	23-Jun-2012	3-Jul-2012	13-Jul-2012	NA	NA	NA	NA	NA	X	Prepare Final APP		$ 67,464.00	$ 44,081.76	$ 23,382.24
6	FFTF UFP SAP	Draft: email Draft Rev 2: HC+CD Final: 4 HC+CDs	25-Jan-2012 26-Apr-2012	10-Mar-2012	24-Apr-2012	8-Jun-2012	23-Jun-2012	3-Jul-2012	13-Jul-2012		NA	X	NA	X	X		Request comments from FDEP on Draft Final UFP SAP			
7	FFTF Semi-Annual Groundwater Monitoring Report (September 2012)	Draft: email Final: 4 HC+CDs	14-Dec-2012	28-Jan-2013	14-Mar-2013	28-Apr-2013	13-May-2013	23-May-2013	2-Jun-2013		NA	X	NA	NA		Submit Draft Rev 2 to team for review				
8	FFTF Semi-Annual Groundwater Monitoring Report (March 2013)	Draft: email Final: 4 HC+CDs	31-May-2013	15-Jul-2013	29-Aug-2013	13-Oct-2013	28-Oct-2013	7-Nov-2013	17-Nov-2013		NA		NA	NA		Frequency may be reduced to annual, so March 2013 sampling event may not be conducted				
9	Gas Hill APP	Draft: email Final: HC+CD	1-May-2012	15-Jun-2012	30-Jul-2012	13-Sep-2012	28-Sep-2012	8-Oct-2012	18-Oct-2012	NA	NA	NA	NA	N/A	X	Prepare Final APP				
10	Gas Hill UFP SAP	Draft: email Draft Rev 2: HC+CD Final: 4 HC+CDs	1-May-2012	15-Jun-2012	30-Jul-2012	13-Sep-2012	28-Sep-2012	8-Oct-2012	18-Oct-2012		N/A	X	NA	X	X	Submit Draft Rev 2 to team for review				
11	Gas Hill Semi-Annual Groundwater Monitoring Report (September 2012)	Draft: email Final: 4 HC+CDs	30-Nov-2012	14-Jan-2013	28-Feb-2013	14-Apr-2013	29-Apr-2013	9-May-2013	19-May-2013		NA	X	NA	NA		Submit Draft Rev 2 to team for review				
12	Gas Hill Semi-Annual Groundwater Monitoring Report (March 2013)	Draft: email Final: 4 HC+CDs	31-May-2013	15-Jul-2013	29-Aug-2013	13-Oct-2013	28-Oct-2013	7-Nov-2013	17-Nov-2013		NA		NA	NA		Perform March 2013 sampling event				
13	PCA 25 UST Site 119 APP	Draft: email Final: HC+CD	16-May-2012	30-Jun-2012	14-Aug-2012	28-Sep-2012	13-Oct-2012	23-Oct-2012	2-Nov-2012	N/A	NA	NA	NA	NA	X	Prepare Final APP				
14	PCA 25 UST Site 119 UFP SAP	Draft: email Draft Rev 2: HC+CD Final: 4 HC+CDs	16-May-2012 9-Jul-2012 26-Sep-2012	30-Jun-2012	14-Aug-2012	28-Sep-2012	13-Oct-2012	23-Oct-2012	2-Nov-2012		NA	X	NA	X	X		Request approval from FDEP on Final UFP SAP			
15	PCA 25 UST Site 119 Quarterly Groundwater Monitoring Report (August 2012)	Draft: email Final: 4 HC+CDs	1-Nov-2012	16-Dec-2012	30-Jan-2013	16-Mar-2013	31-Mar-2013	10-Apr-2013	20-Apr-2013		NA	X	NA	NA		Submit Draft Rev 2 to team for review		$ 246,593.00	$ 64,437.84	$ 182,155.16
16	PCA 25 UST Site 119 Quarterly Groundwater Monitoring Report (November 2012)	Draft: email Final: 4 HC+CDs	20-Jan-2013	6-Mar-2013	20-Apr-2013	4-Jun-2013	19-Jun-2013	29-Jun-2013	9-Jul-2013		NA		NA	NA		Prepare and submit Draft to Adrienne for review				
17	PCA 25 UST Site 119 Quarterly Groundwater Monitoring Report (February 2013)	Draft: email Final: 4 HC+CDs	30-Apr-2013	14-Jun-2013	29-Jul-2013	12-Sep-2013	27-Sep-2013	7-Oct-2013	17-Oct-2013		NA		NA	NA		Perform February 2013 sampling event				
18	PCA 25 UST Site 119 Annual Groundwater Monitoring Report (May 2013)	Draft: email Final: 4 HC+CDs	31-Jul-2013	14-Sep-2013	29-Oct-2013	13-Dec-2013	28-Dec-2013	7-Jan-2014	17-Jan-2014		NA		NA	NA		Perform May 2013 sampling event				
19	Hawkins Property APP	Draft: email Final: HC+CD	15-Jun-2012	30-Jul-2012	13-Sep-2012	28-Oct-2012	12-Nov-2012	22-Nov-2012	2-Dec-2012	NA	NA	NA	NA	NA	X	Prepare Final APP				
20	Hawkins Property Sampling	Draft: email Draft Rev 2: HC+CD Final: 4 HC+CDs									NA		NA			Perform sampling event scheduled for week of 1/14/13. May not prepare UFP SAP.				
21	OU-5 PSC 51, OU-1 PSCs 26&27, OU-3 Area A APP	Draft: email Final: HC+CD	14-Jun-2012	29-Jul-2012	12-Sep-2012	27-Oct-2012	11-Nov-2012	21-Nov-2012	1-Dec-2012	NA	NA	NA	NA	NA	X	Prepare Final APP				
22	OU-5 PSC 51, OU-1 PSCs 26&27, OU-3 Area A UFP SAP	Draft: email Draft Rev 2: HC+CD Final: 4 HC+CDs	13-Jul-2012 5-Oct-2012	27-Aug-2012	11-Oct-2012	25-Nov-2012	10-Dec-2012	20-Dec-2012	30-Dec-2012		NA	X	NA	X	X		Request comments from FDEP on Draft Final UFP SAP			
23	OU-5 PSC 51 Annual Groundwater Monitoring Report	Draft: email Final: 4 HC+CDs	2-Oct-2012	16-Nov-2012	31-Dec-2012	14-Feb-2013	1-Mar-2013	41344	41354		X	X	NA	NA			Request comments from FDEP and Tim on Draft report	$ 45,318.00	$ 44,105.43	$ 1,212.57
24	OU-1 PSCs 26&27 Annual Groundwater Monitoring Report	Draft: email Final: 4 HC+CDs	26-Oct-2012	10-Dec-2012	24-Jan-2013	10-Mar-2013	25-Mar-2013	4-Apr-2013	14-Apr-2013		NA	X	NA	NA		Incorporate Adrienn's comments and submit Draft Rev 2 for team review				
25	OU-3 Area A Annual Groundwater Monitoring Report	Draft: email Final: 4 HC+CDs	30-Oct-2012	14-Dec-2012	28-Jan-2013	14-Mar-2013	29-Mar-2013	8-Apr-2013	18-Apr-2013		NA	X	NA	NA		Incorporate Adrienn's comments and submit Draft Rev 2 for team review				
26	Polishing Pond APP	Draft: email Final: HC+CD	9-Nov-2012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	X	Distribute Final APP				
27	Polishing Pond UFP SAP	Draft: email Draft Rev 2: HC+CD Final: 4 HC+CDs	9-Nov-2012	NA	NA	NA	NA	NA	NA	X	NA	X	NA	X	X	Distribute Final UFP SAP		$ 21,235.00	$ 6,404.05	$ 14,830.95

X = Comments have been received from this reviewer
Blank = No comments have been received from this reviewer
Shaded - Documents to be submitted in the next 30 days.
NA = no review required by this reviewer.

** The regulators will issue a letter approving the draft-final as final if no dispute resolution.

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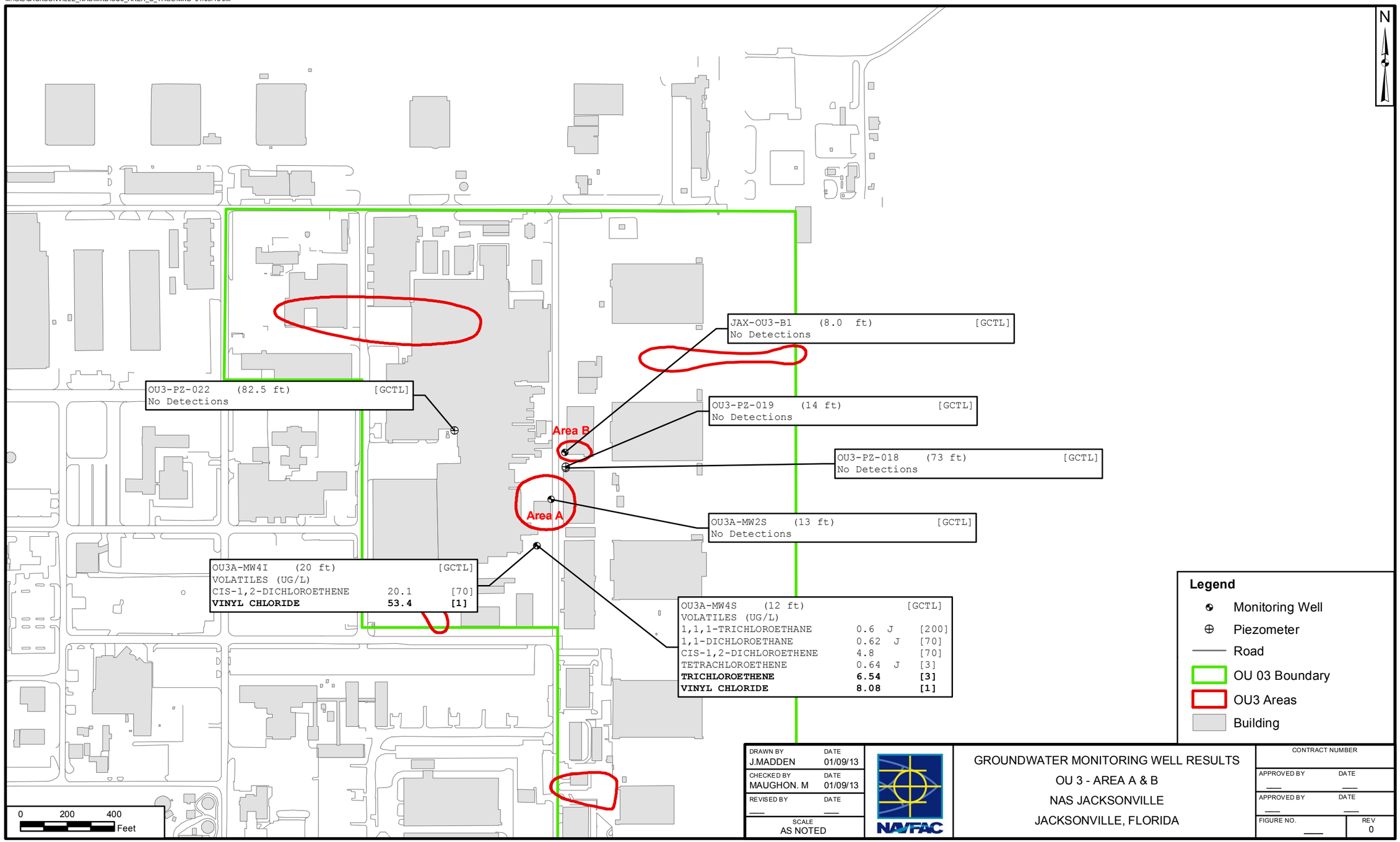

DRAWN BY J.MADDEN	DATE 01/09/13	GROUNDWATER MONITORING WELL RESULTS	CONTRACT NUMBER
CHECKED BY MAUGHON. M	DATE 01/09/13	OU 3 - AREA A & B	APPROVED BY ___ DATE ___
REVISED BY ___	DATE ___	NAS JACKSONVILLE	APPROVED BY ___ DATE ___
SCALE AS NOTED		JACKSONVILLE, FLORIDA	FIGURE NO. ___ REV 0

NAVFAC

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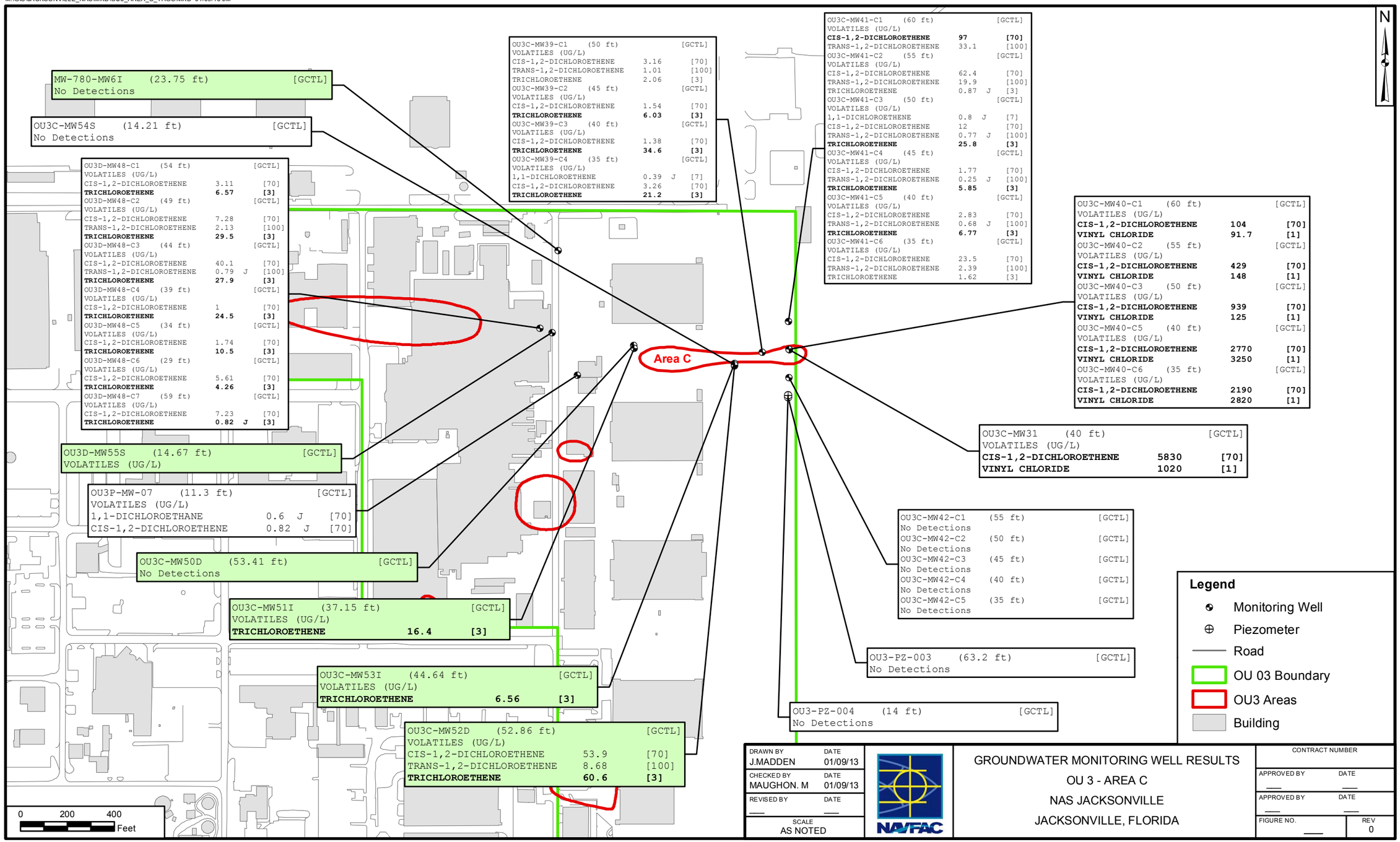

DRAWN BY J.MADDEN	DATE 01/09/13	GROUNDWATER MONITORING WELL RESULTS	CONTRACT NUMBER
CHECKED BY MAUGHON. M	DATE 01/09/13	OU 3 - AREA C	APPROVED BY ___ DATE ___
REVISED BY ___	DATE ___	NAS JACKSONVILLE	APPROVED BY ___ DATE ___
SCALE AS NOTED	NAVFAC	JACKSONVILLE, FLORIDA	FIGURE NO. ___ REV 0

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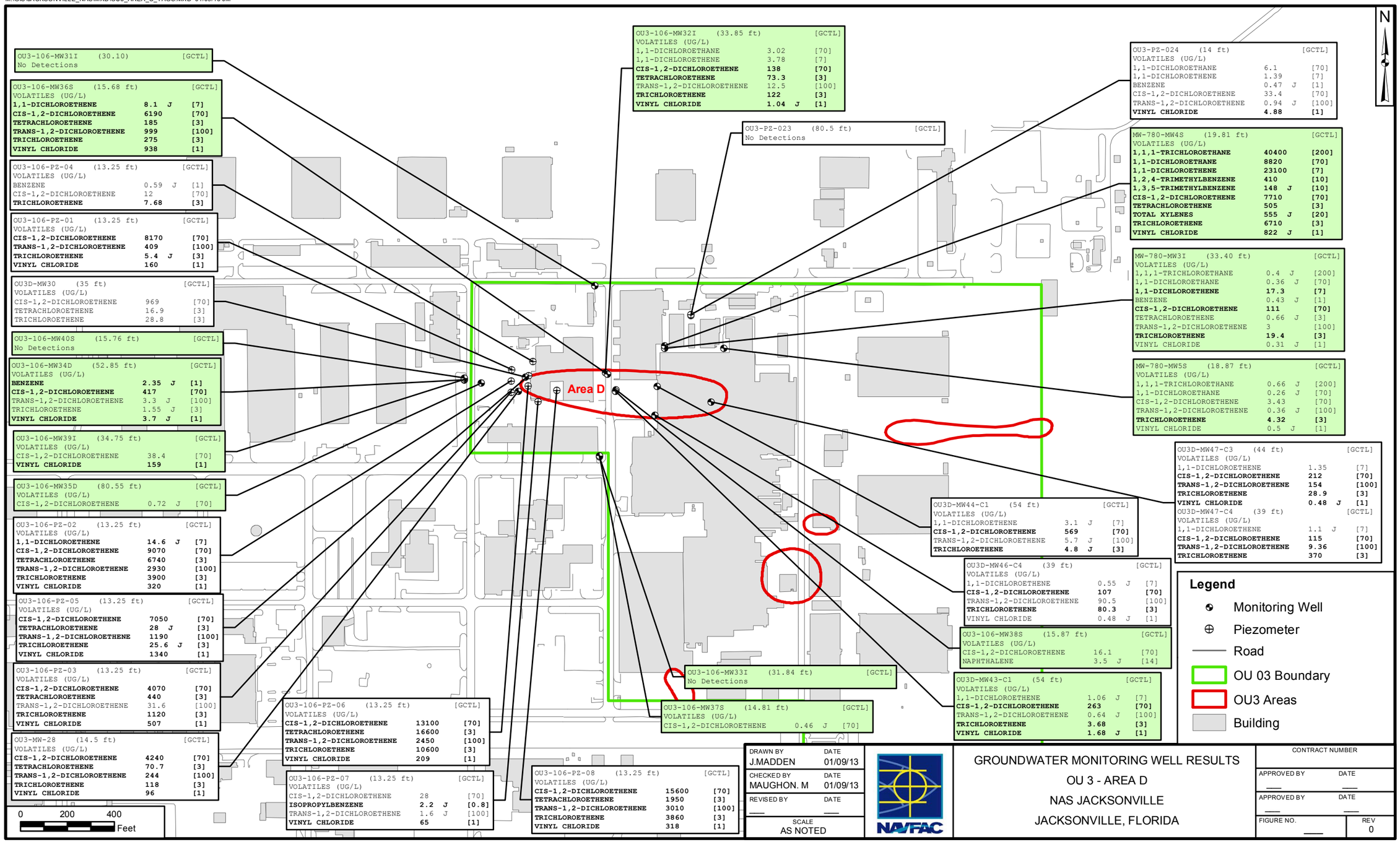

OU3-106-MW31I (30.10) [GCTL]
No Detections

OU3-106-MW36S (15.68 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHENE	**8.1**	**J**	**[7]**
CIS-1,2-DICHLOROETHENE	**6190**		**[70]**
TETRACHLOROETHENE	**185**		**[3]**
TRANS-1,2-DICHLOROETHENE	**999**		**[100]**
TRICHLOROETHENE	**275**		**[3]**
VINYL CHLORIDE	**938**		**[1]**

OU3-106-PZ-04 (13.25 ft) [GCTL]
VOLATILES (UG/L)

BENZENE	0.59	J	[1]
CIS-1,2-DICHLOROETHENE	12		[70]
TRICHLOROETHENE	**7.68**		**[3]**

OU3-106-PZ-01 (13.25 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	**8170**		**[70]**
TRANS-1,2-DICHLOROETHENE	**409**		**[100]**
TRICHLOROETHENE	**5.4**	**J**	**[3]**
VINYL CHLORIDE	**160**		**[1]**

OU3D-MW30 (35 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	969	[70]
TETRACHLOROETHENE	16.9	[3]
TRICHLOROETHENE	28.8	[3]

OU3-106-MW40S (15.76 ft) [GCTL]
No Detections

OU3-106-MW34D (52.85 ft) [GCTL]
VOLATILES (UG/L)

BENZENE	**2.35**	**J**	**[1]**
CIS-1,2-DICHLOROETHENE	**417**		**[70]**
TRANS-1,2-DICHLOROETHENE	3.3	J	[100]
TRICHLOROETHENE	1.55	J	[3]
VINYL CHLORIDE	**3.7**	**J**	**[1]**

OU3-106-MW39I (34.75 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	38.4	[70]
VINYL CHLORIDE	**159**	**[1]**

OU3-106-MW35D (80.55 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	0.72	J	[70]

OU3-106-PZ-02 (13.25 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHENE	**14.6**	**J**	**[7]**
CIS-1,2-DICHLOROETHENE	**9070**		**[70]**
TETRACHLOROETHENE	**6740**		**[3]**
TRANS-1,2-DICHLOROETHENE	**2930**		**[100]**
TRICHLOROETHENE	**3900**		**[3]**
VINYL CHLORIDE	**320**		**[1]**

OU3-106-PZ-05 (13.25 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	**7050**		**[70]**
TETRACHLOROETHENE	**28**	**J**	**[3]**
TRANS-1,2-DICHLOROETHENE	**1190**		**[100]**
TRICHLOROETHENE	**25.6**	**J**	**[3]**
VINYL CHLORIDE	**1340**		**[1]**

OU3-106-PZ-03 (13.25 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	**4070**	**[70]**
TETRACHLOROETHENE	**440**	**[3]**
TRANS-1,2-DICHLOROETHENE	31.6	[100]
TRICHLOROETHENE	**1120**	**[3]**
VINYL CHLORIDE	**507**	**[1]**

OU3-MW-28 (14.5 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	**4240**	**[70]**
TETRACHLOROETHENE	**70.7**	**[3]**
TRANS-1,2-DICHLOROETHENE	**244**	**[100]**
TRICHLOROETHENE	**118**	**[3]**
VINYL CHLORIDE	**96**	**[1]**

OU3-106-MW32I (33.85 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHANE	3.02		[70]
1,1-DICHLOROETHENE	3.78		[7]
CIS-1,2-DICHLOROETHENE	**138**		**[70]**
TETRACHLOROETHENE	**73.3**		**[3]**
TRANS-1,2-DICHLOROETHENE	12.5		[100]
TRICHLOROETHENE	**122**		**[3]**
VINYL CHLORIDE	**1.04**	**J**	**[1]**

OU3-PZ-023 (80.5 ft) [GCTL]
No Detections

OU3-PZ-024 (14 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHANE	6.1		[70]
1,1-DICHLOROETHENE	1.39		[7]
BENZENE	0.47	J	[1]
CIS-1,2-DICHLOROETHENE	33.4		[70]
TRANS-1,2-DICHLOROETHENE	0.94	J	[100]
VINYL CHLORIDE	**4.88**		**[1]**

MW-780-MW4S (19.81 ft) [GCTL]
VOLATILES (UG/L)

1,1,1-TRICHLOROETHANE	**40400**		**[200]**
1,1-DICHLOROETHANE	**8820**		**[70]**
1,1-DICHLOROETHENE	**23100**		**[7]**
1,2,4-TRIMETHYLBENZENE	**410**		**[10]**
1,3,5-TRIMETHYLBENZENE	**148**	**J**	**[10]**
CIS-1,2-DICHLOROETHENE	**7710**		**[70]**
TETRACHLOROETHENE	**505**		**[3]**
TOTAL XYLENES	**555**	**J**	**[20]**
TRICHLOROETHENE	**6710**		**[3]**
VINYL CHLORIDE	**822**	**J**	**[1]**

MW-780-MW3I (33.40 ft) [GCTL]
VOLATILES (UG/L)

1,1,1-TRICHLOROETHANE	0.4	J	[200]
1,1-DICHLOROETHANE	0.36	J	[70]
1,1-DICHLOROETHENE	**17.3**		**[7]**
BENZENE	0.43	J	[1]
CIS-1,2-DICHLOROETHENE	**111**		**[70]**
TETRACHLOROETHENE	0.66	J	[3]
TRANS-1,2-DICHLOROETHENE	3		[100]
TRICHLOROETHENE	**19.4**		**[3]**
VINYL CHLORIDE	0.31	J	[1]

MW-780-MW5S (18.87 ft) [GCTL]
VOLATILES (UG/L)

1,1,1-TRICHLOROETHANE	0.66	J	[200]
1,1-DICHLOROETHANE	0.26	J	[70]
CIS-1,2-DICHLOROETHENE	3.43		[70]
TRANS-1,2-DICHLOROETHENE	0.36	J	[100]
TRICHLOROETHENE	**4.32**		**[3]**
VINYL CHLORIDE	0.5	J	[1]

OU3D-MW47-C3 (44 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHENE	1.35		[7]
CIS-1,2-DICHLOROETHENE	**212**		**[70]**
TRANS-1,2-DICHLOROETHENE	**154**		**[100]**
TRICHLOROETHENE	**28.9**		**[3]**
VINYL CHLORIDE	**0.48**	**J**	**[1]**

OU3D-MW47-C4 (39 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHENE	1.1	J	[7]
CIS-1,2-DICHLOROETHENE	**115**		**[70]**
TRANS-1,2-DICHLOROETHENE	**9.36**		**[100]**
TRICHLOROETHENE	**370**		**[3]**

OU3D-MW44-C1 (54 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHENE	3.1	J	[7]
CIS-1,2-DICHLOROETHENE	**569**		**[70]**
TRANS-1,2-DICHLOROETHENE	5.7	J	[100]
TRICHLOROETHENE	**4.8**	**J**	**[3]**

OU3D-MW46-C4 (39 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHENE	0.55	J	[7]
CIS-1,2-DICHLOROETHENE	**107**		**[70]**
TRANS-1,2-DICHLOROETHENE	90.5		[100]
TRICHLOROETHENE	**80.3**		**[3]**
VINYL CHLORIDE	0.48	J	[1]

OU3-106-MW38S (15.87 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	16.1		[70]
NAPHTHALENE	3.5	J	[14]

OU3D-MW43-C1 (54 ft) [GCTL]
VOLATILES (UG/L)

1,1-DICHLOROETHENE	1.06	J	[7]
CIS-1,2-DICHLOROETHENE	**263**		**[70]**
TRANS-1,2-DICHLOROETHENE	0.64	J	[100]
TRICHLOROETHENE	**3.68**		**[3]**
VINYL CHLORIDE	**1.68**	**J**	**[1]**

OU3-106-MW33I (31.84 ft) [GCTL]
No Detections

OU3-106-MW37S (14.81 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	0.46	J	[70]

OU3-106-PZ-06 (13.25 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	**13100**	**[70]**
TETRACHLOROETHENE	**16600**	**[3]**
TRANS-1,2-DICHLOROETHENE	**2450**	**[100]**
TRICHLOROETHENE	**10600**	**[3]**
VINYL CHLORIDE	**209**	**[1]**

OU3-106-PZ-07 (13.25 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	28		[70]
ISOPROPYLBENZENE	**2.2**	**J**	**[0.8]**
TRANS-1,2-DICHLOROETHENE	1.6	J	[100]
VINYL CHLORIDE	**65**		**[1]**

OU3-106-PZ-08 (13.25 ft) [GCTL]
VOLATILES (UG/L)

CIS-1,2-DICHLOROETHENE	**15600**	**[70]**
TETRACHLOROETHENE	**1950**	**[3]**
TRANS-1,2-DICHLOROETHENE	**3010**	**[100]**
TRICHLOROETHENE	**3860**	**[3]**
VINYL CHLORIDE	**318**	**[1]**

Legend

- Monitoring Well
- Piezometer
- Road
- OU 03 Boundary
- OU3 Areas
- Building

DRAWN BY J.MADDEN	DATE 01/09/13	
CHECKED BY MAUGHON. M	DATE 01/09/13	
REVISED BY ___	DATE ___	
SCALE AS NOTED		

NAVFAC

GROUNDWATER MONITORING WELL RESULTS
OU 3 - AREA D
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NUMBER
APPROVED BY ___ DATE ___
APPROVED BY ___ DATE ___
FIGURE NO. ___ REV 0

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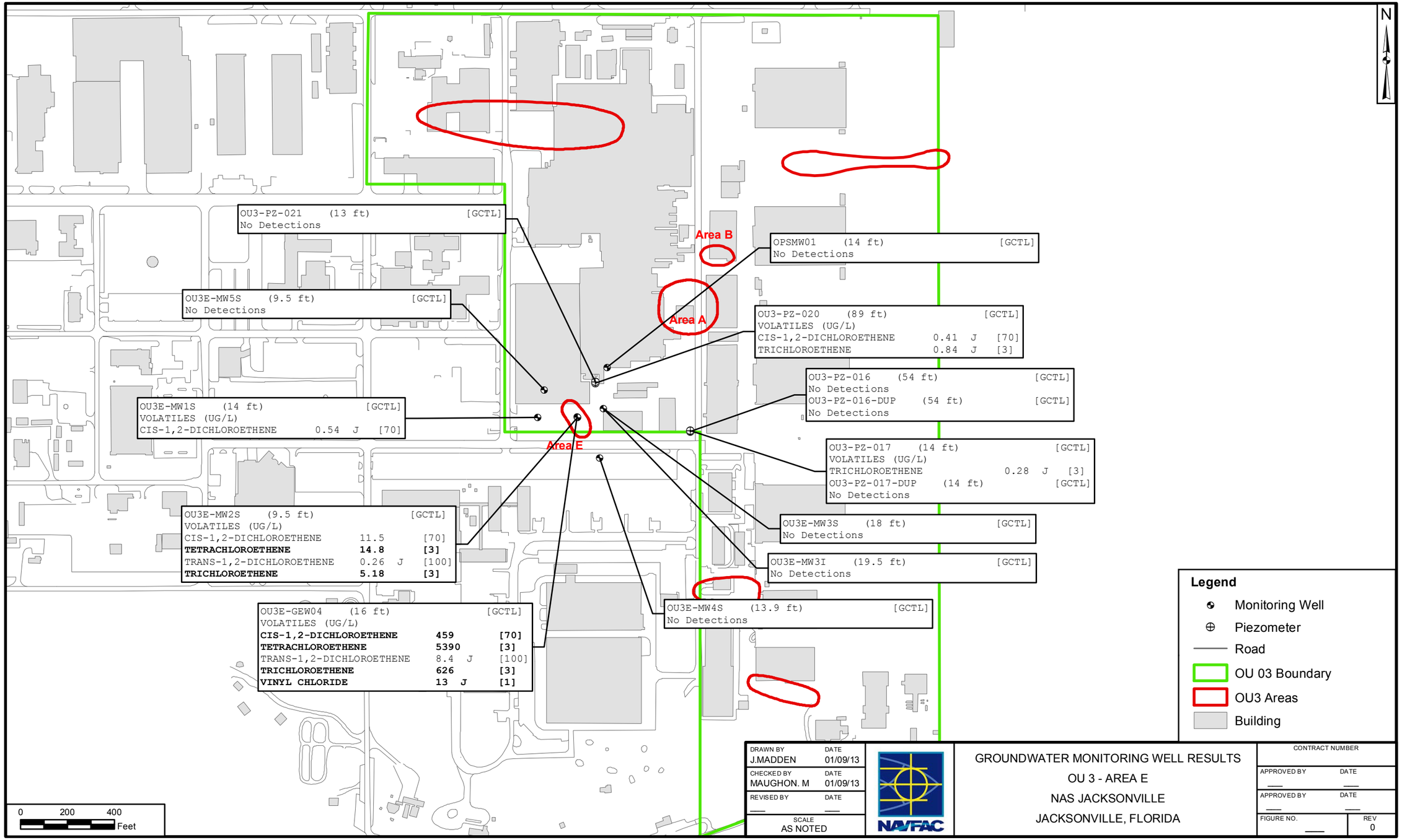

DRAWN BY	DATE
J.MADDEN	01/09/13
CHECKED BY	DATE
MAUGHON. M	01/09/13
REVISED BY	DATE
—	—
SCALE	
AS NOTED	

NAVFAC

GROUNDWATER MONITORING WELL RESULTS
OU 3 - AREA E
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NUMBER	
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
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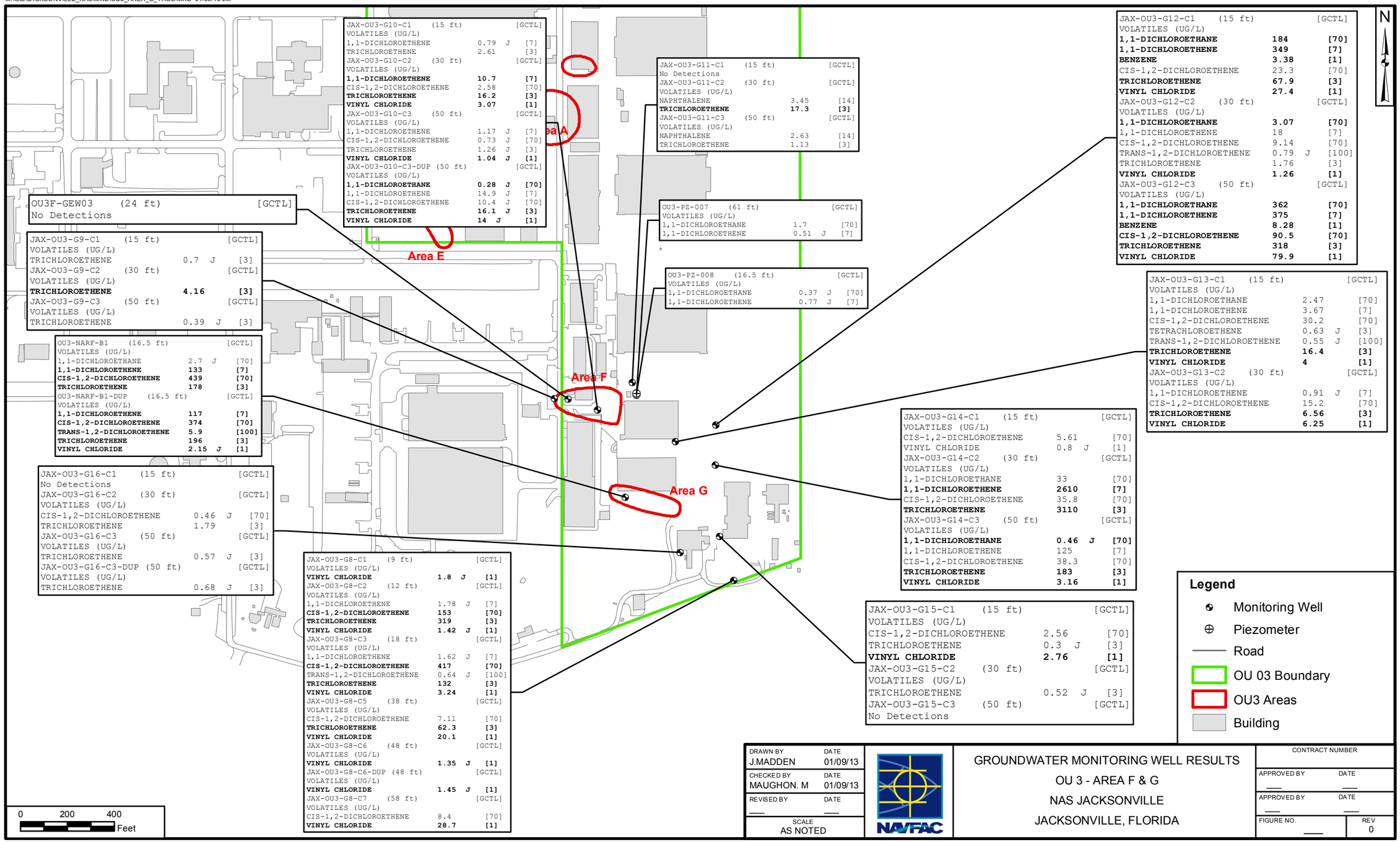

DRAWN BY J.MADDEN	DATE 01/09/13	GROUNDWATER MONITORING WELL RESULTS OU 3 - AREA F & G NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NUMBER
CHECKED BY MAUGHON. M	DATE 01/09/13		APPROVED BY ___ DATE ___
REVISED BY ___	DATE ___		APPROVED BY ___ DATE ___
SCALE AS NOTED			FIGURE NO. ___ REV 0

NAVFAC

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	11	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
JAX-OU3-G10-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G10-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G10-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G11-C1	--	--	--	--	0.86	Y	--	--	--	--	--	--
JAX-OU3-G11-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G11-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G12-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G12-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G12-C3	--	--	--	--	1.25	Y	--	--	--	--	--	--
JAX-OU3-G13-C1	--	--	--	--	0.31	Y	--	--	--	--	--	--
JAX-OU3-G13-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G13-C3	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G14-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G14-C2	--	--	--	--	1.40	N	--	--	--	--	--	--
JAX-OU3-G14-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G15-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G15-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G15-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G16-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G16-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G16-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C2	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
JAX-OU3-G8-C3	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
JAX-OU3-G8-C4	8	1	0.500	1	2.09	Y	8	No Trend	12	No Trend	16	No Trend
JAX-OU3-G8-C5	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
JAX-OU3-G8-C6	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
JAX-OU3-G8-C7	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G9-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G9-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G9-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-GEW02	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	25	19	0.184	0.9	2.02	Y	0.841	Significant Upward Trend	1.282	No Trend	1.645	No Trend
MW-780-2	24	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
MW-780-MW3I	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-MW4S	--	--	--	--	--	N	--	--	--	--	--	--
MW-780-MW5S	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-MW6I	--	--	--	--	--	Y	--	--	--	--	--	--
OPSMW01	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-106-MW31I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW32I	--	--	--	--	--	N	--	--	--	--	--	--
OU3-106-MW33I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW34D	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW35D	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW36S	--	--	--	--	--	N	--	--	--	--	--	--
OU3-106-MW37S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW38S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW39I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW40S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-PZ-01	31	-283	0.000	-4.842	1.20	Y	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
OU3-106-PZ-02	31	42	0.243	0.697	0.82	N	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-03	31	-171	0.002	-2.89	0.72	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3-106-PZ-04	31	-313	0.000	-5.475	1.24	Y	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
OU3-106-PZ-05	30	-232	0.000	-4.125	0.75	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
OU3-106-PZ-06	30	-139	0.007	-2.464	0.52	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
OU3-106-PZ-07	31	135	0.003	2.794	3.85	Y	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
OU3-106-PZ-08	30	-143	0.006	-2.534	0.57	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
OU3A-MW2S	4	-3	0.271	-3	1.50	Y	4	No Trend	6	No Trend	6	No Trend
OU3A-MW4I	--	--	--	--	1.73	Y	--	--	--	--	--	--
OU3A-MW4S	4	2	0.375	2	1.70	Y	4	No Trend	6	No Trend	6	No Trend
OU3C-MW31	7	0	0.000	0	2.64	Y	7	No Trend	11	No Trend	13	No Trend
OU3C-MW39	8	1	0.500	1	1.62	Y	8	No Trend	12	No Trend	16	No Trend
OU3C-MW40	9	0	0.540	0	2.98	Y	10	No Trend	14	No Trend	18	No Trend
OU3C-MW41-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW41-C2	--	--	--	--	1.40	Y	--	--	--	--	--	--
OU3C-MW41-C3	7	0	0.000	0	1.69	Y	7	No Trend	11	No Trend	13	No Trend
OU3C-MW41-C4	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW41-C5	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW41-C6	4	-3	0.271	-3	1.69	Y	4	No Trend	6	No Trend	6	No Trend
OU3C-MW42-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW42-C2	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3C-MW42-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW42-C4	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW42-C5	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW50D	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW51I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW52D	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW53I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW54S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	5	-8	0.042	-8	1.67	N	6	Significant Downward Trend	8	Significant Downward Trend	8	Significant Downward Trend
OU3D-MW43	7	-9	0.119	-9	1.74	Y	7	Significant Downward Trend	11	No Trend	13	No Trend
OU3D-MW44	6	-1	0.500	-1	2.32	Y	7	No Trend	9	No Trend	11	No Trend
OU3D-MW46	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW47	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3D-MW48	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3D-MW55S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-GEW04	--	--	--	--	0.08	N	--	--	--	--	--	--
OU3E-MW1S	4	1	0.500	1	1.25	Y	4	No Trend	6	No Trend	6	No Trend
OU3E-MW2S	4	0	0.625	0	1.77	N	4	No Trend	6	No Trend	6	No Trend
OU3E-MW3I	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW3S	4	-3	0.271	-3	2.00	Y	4	No Trend	6	No Trend	6	No Trend
OU3E-MW4S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW5S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3F-GEW03	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-MW-28	31	-180	0.001	-3.043	0.98	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
OU3-NARF-B1	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-003	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-004	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-007	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3-PZ-008	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-016	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3-PZ-017	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-018	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-019	--	--	--	--	0.00	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3-PZ-020	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	0.00	Y	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	11	-48	0.000	-3.67	0.78	Y	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
X-OU3-G10-	--	--	--	--	1.17	N	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	0.08	N	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	1.21	N	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.76	N	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	1.18	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	1.39	N	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.91	N	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.30	N	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.80	N	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.55	N	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.09	N	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.62	N	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.79	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.96	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.01	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	1.02	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	0.09	Y	--	--	--	--	--	--
AX-OU3-G8-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-C	4	2	0.375	2	0.82	N	4	No Trend	6	No Trend	6	Stable
AX-OU3-G8-C	4	0	0.625	0	0.54	N	4	No Trend	6	No Trend	6	Stable
AX-OU3-G8-C	8	10	0.138	10	1.07	Y	8	Significant Upward Trend	12	No Trend	16	No Trend
AX-OU3-G8-C	4	2	0.375	2	1.32	N	4	No Trend	6	No Trend	6	No Trend
AX-OU3-G8-C	4	-4	0.167	-4	1.54	Y	4	Significant Downward Trend	6	No Trend	6	No Trend
AX-OU3-G8-C	--	--	--	--	1.10	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.74	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.04	N	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.99	Y	--	--	--	--	--	--
X-OU3-GEW	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	26	48	0.143	1.069	4.48	N	0.841	Significant Upward Trend	1.282	No Trend	1.645	No Trend
MW-780-2	25	14	0.331	0.437	4.94	Y	0.841	No Trend	1.282	No Trend	1.645	No Trend
W-780-MW3	--	--	--	--	--	N	--	--	--	--	--	--
W-780-MW4	--	--	--	--	--	N	--	--	--	--	--	--
W-780-MW5	--	--	--	--	--	N	--	--	--	--	--	--
W-780-MW6	--	--	--	--	--	Y	--	--	--	--	--	--
OPSMW01	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW4	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-PZ-0	31	-216	0.000	-3.671	0.81	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	31	80	0.090	1.343	0.69	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Stable
U3-106-PZ-0	31	-165	0.003	-2.788	0.59	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	31	-259	0.000	-4.446	1.65	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	30	-172	0.001	-3.067	0.60	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	31	-263	0.000	-4.456	0.79	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	31	125	0.006	2.507	3.99	Y	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
U3-106-PZ-0	30	-259	0.000	-4.611	0.75	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
OU3A-MW2S	4	-3	0.271	-3	2.00	Y	4	No Trend	6	No Trend	6	No Trend
OU3A-MW4I	--	--	--	--	1.73	Y	--	--	--	--	--	--
OU3A-MW4S	4	-4	0.167	-4	1.34	N	4	Significant Downward Trend	6	No Trend	6	No Trend
OU3C-MW31	7	-14	0.025	-14	1.58	Y	7	Significant Downward Trend	11	Significant Downward Trend	13	Significant Downward Trend
OU3C-MW39	8	-4	0.360	-4	1.91	N	8	No Trend	12	No Trend	16	No Trend
OU3C-MW40	9	-12	0.130	-12	1.95	N	10	Significant Downward Trend	14	No Trend	18	No Trend
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.72	Y	--	--	--	--	--	--
U3C-MW41-0	7	19	0.001	19	1.38	N	7	Significant Upward Trend	11	Significant Upward Trend	13	Significant Upward Trend
U3C-MW41-0	--	--	--	--	0.28	N	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.05	N	--	--	--	--	--	--
U3C-MW41-0	4	0	0.625	0	0.69	Y	4	No Trend	6	No Trend	6	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW50I	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW51	--	--	--	--	--	N	--	--	--	--	--	--
U3C-MW52I	--	--	--	--	--	N	--	--	--	--	--	--
U3C-MW53	--	--	--	--	--	N	--	--	--	--	--	--
U3C-MW54S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	5	-2	0.408	-2	0.79	N	6	No Trend	8	No Trend	8	Stable
OU3D-MW43	7	-11	0.068	-11	1.06	N	7	Significant Downward Trend	11	Significant Downward Trend	13	No Trend
OU3D-MW44	7	-8	0.155	-8	1.21	N	7	Significant Downward Trend	11	No Trend	13	No Trend
OU3D-MW46	5	4	0.242	4	1.08	N	6	No Trend	8	No Trend	8	No Trend
OU3D-MW47	7	-7	0.191	-7	0.98	N	7	Significant Downward Trend	11	No Trend	13	Stable
OU3D-MW48	7	1	0.500	1	1.11	N	7	No Trend	11	No Trend	13	No Trend
OU3D-MW55S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-GEW04	--	--	--	--	0.17	N	--	--	--	--	--	--
OU3E-MW1S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW2S	4	0	0.625	0	1.64	N	4	No Trend	6	No Trend	6	No Trend
OU3E-MW3I	--	--	--	--	1.63	Y	--	--	--	--	--	--
OU3E-MW3S	4	-3	0.271	-3	2.00	Y	4	No Trend	6	No Trend	6	No Trend
OU3E-MW4S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW5S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3F-GEW0	--	--	--	--	1.67	Y	--	--	--	--	--	--
OU3-MW-28	31	-40	0.254	-0.663	0.67	N	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-NARF-B	--	--	--	--	1.49	N	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	0.99	Y	--	--	--	--	--	--
OU3-PZ-003	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-004	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-007	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3-PZ-008	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-016	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3-PZ-017	--	--	--	--	0.48	Y	--	--	--	--	--	--
OU3-PZ-018	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-019	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-020	--	--	--	--	1.23	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	0.95	Y	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	11	-13	0.169	-0.96	0.99	Y	0.841	Significant Downward Trend	1.282	No Trend	1.645	Stable
X-OU3-G10-	--	--	--	--	1.13	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	1.36	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	1.39	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	1.19	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.45	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.54	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.39	N	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.77	N	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.51	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.03	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.19	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.12	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	1.02	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	1.18	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.23	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	0.77	Y	--	--	--	--	--	--
X-OU3-G8-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G8-C	4	4	0.167	4	0.75	N	4	Significant Upward Trend	6	No Trend	6	Stable
X-OU3-G8-C	4	4	0.167	4	1.66	N	4	Significant Upward Trend	6	No Trend	6	No Trend
X-OU3-G8-C	8	-10	0.138	-10	1.16	Y	8	Significant Downward Trend	12	No Trend	16	No Trend
X-OU3-G8-C	4	2	0.375	2	1.69	Y	4	No Trend	6	No Trend	6	No Trend
X-OU3-G8-C	4	1	0.500	1	1.91	Y	4	No Trend	6	No Trend	6	No Trend
X-OU3-G8-C	--	--	--	--	1.40	Y	--	--	--	--	--	--
X-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-GEW	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	25	101	0.010	2.338	1.32	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
MW-780-2	24	98	0.007	2.456	1.20	Y	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
W-780-MW3	--	--	--	--	--	N	--	--	--	--	--	--
W-780-MW4	--	--	--	--	--	N	--	--	--	--	--	--
W-780-MW5	--	--	--	--	--	Y	--	--	--	--	--	--
W-780-MW6	--	--	--	--	--	Y	--	--	--	--	--	--
OPSMW01	--	--	--	--	1.19	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW4	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-PZ-0	30	-217	0.000	-3.855	0.76	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	30	-64	0.130	-1.126	0.46	N	0.841	Significant Downward Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	30	-23	0.347	-0.393	0.59	N	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	30	47	0.206	0.821	0.96	N	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	29	115	0.016	2.14	0.71	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
U3-106-PZ-0	30	154	0.003	2.738	0.50	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
U3-106-PZ-0	30	-58	0.154	-1.017	0.92	Y	0.841	Significant Downward Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	29	139	0.005	2.592	0.61	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
OU3A-MW2S	--	--	--	--	0.87	Y	--	--	--	--	--	--
OU3A-MW4I	--	--	--	--	1.08	N	--	--	--	--	--	--
OU3A-MW4S	--	--	--	--	1.71	Y	--	--	--	--	--	--
OU3C-MW31	7	13	0.035	13	0.31	N	7	Significant Upward Trend	11	Significant Upward Trend	13	Significant Upward Trend
OU3C-MW39	8	4	0.360	4	2.81	Y	8	No Trend	12	No Trend	16	No Trend
OU3C-MW40	9	-6	0.306	-6	0.72	N	10	No Trend	14	No Trend	18	Stable
U3C-MW41-0	--	--	--	--	0.03	N	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.96	Y	--	--	--	--	--	--
U3C-MW41-0	7	18	0.003	18	1.47	Y	7	Significant Upward Trend	11	Significant Upward Trend	13	Significant Upward Trend
U3C-MW41-0	--	--	--	--	0.41	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.16	Y	--	--	--	--	--	--
U3C-MW41-0	4	-4	0.167	-4	0.77	Y	4	Significant Downward Trend	6	No Trend	6	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW50I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW51	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW52I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW53	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW54S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	5	0	0.592	0	0.74	N	6	No Trend	8	No Trend	8	Stable
OU3D-MW43	7	3	0.386	3	1.68	N	7	No Trend	11	No Trend	13	No Trend
OU3D-MW44	6	8	0.102	8	1.73	N	7	Significant Upward Trend	9	No Trend	11	No Trend
OU3D-MW46	5	0	0.592	0	0.91	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW47	6	6	0.186	6	1.43	N	7	Significant Upward Trend	9	No Trend	11	No Trend
OU3D-MW48	7	16	0.010	16	1.04	Y	7	Significant Upward Trend	11	Significant Upward Trend	13	Significant Upward Trend
OU3D-MW55S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-GEW04	--	--	--	--	0.11	N	--	--	--	--	--	--
OU3E-MW1S	--	--	--	--	0.90	Y	--	--	--	--	--	--
OU3E-MW2S	--	--	--	--	1.09	Y	--	--	--	--	--	--
OU3E-MW3I	--	--	--	--	1.50	Y	--	--	--	--	--	--
OU3E-MW3S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW4S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW5S	--	--	--	--	0.82	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3F-GEW0	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-MW-28	30	237	0.000	4.219	0.77	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
OU3-NARF-B	--	--	--	--	0.52	N	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	0.98	Y	--	--	--	--	--	--
OU3-PZ-003	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-004	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-007	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-008	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-016	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-017	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-018	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-019	--	--	--	--	1.18	Y	--	--	--	--	--	--
OU3-PZ-020	--	--	--	--	1.22	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	0.50	N	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	11	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
X-OU3-G10-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	1.23	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	1.19	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.71	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	1.19	Y	--	--	--	--	--	--
AX-OU3-G8-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-C	4	-3	0.271	-3	1.03	Y	4	No Trend	6	No Trend	6	No Trend
AX-OU3-G8-C	4	3	0.271	3	1.34	Y	4	No Trend	6	No Trend	6	No Trend
AX-OU3-G8-C	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
AX-OU3-G8-C	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
AX-OU3-G8-C	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
AX-OU3-G8-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-GEW	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	25	116	0.001	2.971	1.35	Y	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
MW-780-2	24	15	0.233	0.73	1.24	Y	0.841	No Trend	1.282	No Trend	1.645	No Trend
W-780-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
W-780-MW4	--	--	--	--	--	Y	--	--	--	--	--	--
W-780-MW5	--	--	--	--	--	Y	--	--	--	--	--	--
W-780-MW6	--	--	--	--	--	Y	--	--	--	--	--	--
OPSMW01	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW4	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-PZ-0	31	-211	0.000	-3.579	1.83	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	31	-115	0.026	-1.943	0.46	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	31	-76	0.101	-1.276	1.38	Y	0.841	Significant Downward Trend	1.282	No Trend	1.645	No Trend
U3-106-PZ-0	31	-80	0.088	-1.352	1.38	Y	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	No Trend
U3-106-PZ-0	30	-46	0.211	-0.803	0.67	N	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	31	43	0.238	0.714	0.61	N	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	31	-229	0.000	-3.876	1.13	Y	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	30	216	0.000	3.841	0.61	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
OU3A-MW2S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3A-MW4I	--	--	--	--	1.73	Y	--	--	--	--	--	--
OU3A-MW4S	--	--	--	--	1.68	Y	--	--	--	--	--	--
OU3C-MW31	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3C-MW39	8	13	0.072	13	1.41	Y	8	Significant Upward Trend	12	Significant Upward Trend	16	No Trend
OU3C-MW40	9	1	0.500	1	2.64	Y	10	No Trend	14	No Trend	18	No Trend
U3C-MW41-0	--	--	--	--	0.03	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.97	Y	--	--	--	--	--	--
U3C-MW41-0	7	6	0.236	6	1.56	Y	7	No Trend	11	No Trend	13	No Trend
U3C-MW41-0	--	--	--	--	0.80	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	1.15	Y	--	--	--	--	--	--
U3C-MW41-0	4	-2	0.375	-2	0.96	Y	4	No Trend	6	No Trend	6	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW50I	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW51	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW52I	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW53	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW54S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW43	7	6	0.236	6	1.19	Y	7	No Trend	11	No Trend	13	No Trend
OU3D-MW44	6	9	0.068	9	1.59	Y	7	Significant Upward Trend	9	Significant Upward Trend	11	No Trend
OU3D-MW46	5	-4	0.242	-4	1.04	Y	6	No Trend	8	No Trend	8	No Trend
OU3D-MW47	6	5	0.235	5	1.73	Y	7	No Trend	9	No Trend	11	No Trend
OU3D-MW48	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3D-MW55S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-GEW04	--	--	--	--	0.13	Y	--	--	--	--	--	--
OU3E-MW1S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW2S	--	--	--	--	1.16	Y	--	--	--	--	--	--
OU3E-MW3I	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW3S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW4S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW5S	--	--	--	--	0.00	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3F-GEW0	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-MW-28	31	206	0.000	3.508	1.52	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
OU3-NARF-B	--	--	--	--	0.97	Y	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-003	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-004	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-007	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-008	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-016	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-017	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-018	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-019	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-020	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	1.22	Y	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	11	1	0.500	0	1.36	Y	0.841	No Trend	1.282	No Trend	1.645	No Trend
X-OU3-G10-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	1.37	N	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	1.40	N	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	1.26	N	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.17	N	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.68	N	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.83	N	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.20	N	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.73	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	1.37	N	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	1.00	N	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-C	--	--	--	--	1.61	N	--	--	--	--	--	--
AX-OU3-G8-C	4	-4	0.167	-4	1.04	N	4	Significant Downward Trend	6	No Trend	6	No Trend
AX-OU3-G8-C	4	3	0.271	3	1.89	N	4	No Trend	6	No Trend	6	No Trend
AX-OU3-G8-C	8	7	0.237	7	2.06	Y	8	No Trend	12	No Trend	16	No Trend
AX-OU3-G8-C	4	3	0.271	3	1.98	N	4	No Trend	6	No Trend	6	No Trend
AX-OU3-G8-C	4	3	0.271	3	1.77	N	4	No Trend	6	No Trend	6	No Trend
AX-OU3-G8-C	--	--	--	--	1.41	N	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-GEW	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	26	77	0.044	1.703	4.04	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
MW-780-2	25	71	0.038	1.77	3.86	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
W-780-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
W-780-MW4	--	--	--	--	--	N	--	--	--	--	--	--
W-780-MW5	--	--	--	--	--	Y	--	--	--	--	--	--
W-780-MW6	--	--	--	--	--	Y	--	--	--	--	--	--
OPSMW01	--	--	--	--	0.90	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	N	--	--	--	--	--	--
U3-106-MW4	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-PZ-0	31	-291	0.000	-4.934	1.73	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	31	-333	0.000	-5.648	1.07	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	31	-26	0.335	-0.427	1.61	N	0.841	No Trend	1.282	No Trend	1.645	No Trend
U3-106-PZ-0	31	146	0.007	2.466	0.94	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
U3-106-PZ-0	30	265	0.000	4.731	2.13	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
U3-106-PZ-0	31	114	0.027	1.921	0.93	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
U3-106-PZ-0	31	-303	0.000	-5.134	0.77	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
U3-106-PZ-0	30	159	0.002	2.819	1.19	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
OU3A-MW2S	4	-4	0.167	-4	1.98	N	4	Significant Downward Trend	6	No Trend	6	No Trend
OU3A-MW4I	--	--	--	--	0.90	N	--	--	--	--	--	--
OU3A-MW4S	4	-4	0.167	-4	1.19	N	4	Significant Downward Trend	6	No Trend	6	No Trend
OU3C-MW31	7	19	0.001	19	1.30	N	7	Significant Upward Trend	11	Significant Upward Trend	13	Significant Upward Trend
OU3C-MW39	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
OU3C-MW40	9	14	0.090	14	1.58	N	10	Significant Upward Trend	14	Significant Upward Trend	18	No Trend
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW50I	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW51	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW52I	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW53	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW54S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW43	7	9	0.119	9	2.61	N	7	Significant Upward Trend	11	No Trend	13	No Trend
OU3D-MW44	6	3	0.360	3	2.19	N	7	No Trend	9	No Trend	11	No Trend
OU3D-MW46	5	2	0.408	2	0.98	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW47	6	3	0.360	3	1.69	Y	7	No Trend	9	No Trend	11	No Trend
OU3D-MW48	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3D-MW55S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-GEW04	--	--	--	--	0.53	N	--	--	--	--	--	--
OU3E-MW1S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW2S	4	-3	0.271	-3	1.44	Y	4	No Trend	6	No Trend	6	No Trend
OU3E-MW3I	--	--	--	--	1.34	Y	--	--	--	--	--	--
OU3E-MW3S	4	-3	0.271	-3	1.99	Y	4	No Trend	6	No Trend	6	No Trend
OU3E-MW4S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW5S	4	1	0.500	1	1.54	Y	4	No Trend	6	No Trend	6	No Trend

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3F-GEW0	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-MW-28	31	202	0.000	3.449	1.20	N	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	Significant Upward Trend
OU3-NARF-B	--	--	--	--	1.17	N	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	1.29	Y	--	--	--	--	--	--
OU3-PZ-003	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-004	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-007	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3-PZ-008	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-016	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-017	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-018	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-019	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-020	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	1.44	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	0.96	N	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	10	0	0.000	0	0.00	Y	11	No Trend	17	No Trend	21	Stable
X-OU3-G10-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
AX-OU3-G8-	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-	--	--	--	--	--	Y	--	--	--	--	--	--
AX-OU3-G9-	--	--	--	--	--	Y	--	--	--	--	--	--
AX-OU3-G9-	--	--	--	--	--	Y	--	--	--	--	--	--
AX-OU3-G9-	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	18	-60	0.013	-2.236	2.69	N	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
MW-780-2	17	-81	0.000	-3.298	1.46	Y	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
OPSMW01	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-PZ-0	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3A-MW2S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3A-MW4I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3A-MW4S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW31	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3C-MW39	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3C-MW40	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
U3C-MW41-0	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
U3C-MW41-0	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW42-0	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
U3C-MW42-0	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3D-MW43	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3D-MW44	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW46	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3D-MW47	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW48	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3E-GEW0	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-MW1S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW2S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW3I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-MW3S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW4S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW5S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3F-GEW0	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-MW-28	11	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-NARF-B	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-003	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-004	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-007	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-008	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-016	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-017	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-018	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-019	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-020	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	--	Y	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years?	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	11	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
X-OU3-G10-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G10-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G11-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G12-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G13-	--	--	--	--	--	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G14-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G15-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-G16-	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G8-C	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
AX-OU3-G8-C	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
AX-OU3-G8-C	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
AX-OU3-G8-C	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
AX-OU3-G8-C	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
AX-OU3-G8-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
AX-OU3-G9-C	--	--	--	--	0.00	Y	--	--	--	--	--	--
X-OU3-GEW	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	26	32	0.176	0.932	5.10	Y	0.841	Significant Upward Trend	1.282	No Trend	1.645	No Trend
MW-780-2	25	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
W-780-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
W-780-MW4	--	--	--	--	--	N	--	--	--	--	--	--
W-780-MW5	--	--	--	--	--	Y	--	--	--	--	--	--
W-780-MW6	--	--	--	--	--	Y	--	--	--	--	--	--
OPSMW01	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
J3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years?	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW3	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-MW4	--	--	--	--	--	Y	--	--	--	--	--	--
U3-106-PZ-0	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
U3-106-PZ-0	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3A-MW2S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3A-MW4I	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3A-MW4S	4	5	0.105	5	1.01	Y	4	Significant Upward Trend	6	No Trend	6	No Trend
OU3C-MW31	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3C-MW39	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
OU3C-MW40	9	0	0.540	0	0.00	Y	10	No Trend	14	No Trend	18	Stable
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW41-0	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW42-0	--	--	--	--	0.00	Y	--	--	--	--	--	--
U3C-MW50I	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW51	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW52I	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW53	--	--	--	--	--	Y	--	--	--	--	--	--
U3C-MW54S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW43	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3D-MW44	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3D-MW46	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW47	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3D-MW48	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
U3D-MW55S	--	--	--	--	--	Y	--	--	--	--	--	--
U3E-GEW0	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW1S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW2S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW3I	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW3S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW4S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW5S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years?	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3F-GEW0	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-MW-28	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-NARF-B	--	--	--	--	1.73	Y	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-003	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-004	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-007	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3-PZ-008	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-016	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3-PZ-017	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-018	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-019	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-020	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	0.00	Y	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	10	0	0.000	0	0.00	Y	11	No Trend	17	No Trend	21	Stable
JAX-OU3-G10-C1	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G10-C2	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G10-C3	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G11-C1	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G11-C2	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G11-C3	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G12-C1	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G12-C2	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G12-C3	--	--	--	--	--	N	--	--	--	--	--	--
JAX-OU3-G13-C1	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G13-C2	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G13-C3	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G14-C1	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G14-C2	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G14-C3	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G15-C1	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G15-C2	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G15-C3	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G16-C1	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G16-C2	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G16-C3	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C4	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
JAX-OU3-G8-C5	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C6	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C7	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G9-C1	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G9-C2	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G9-C3	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	17	33	0.060	1.553	1.40	Y	0.841	Significant Upward Trend	1.282	Significant Upward Trend	1.645	No Trend
MW-780-2	16	-1	0.500	0	1.52	Y	0.841	No Trend	1.282	No Trend	1.645	No Trend
OPSMW01	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-PZ-01	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-02	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-03	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-04	12	-9	0.123	-1.159	3.45	Y	0.841	Significant Downward Trend	1.282	No Trend	1.645	No Trend
OU3-106-PZ-05	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-06	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-07	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-08	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3A-MW2S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3A-MW4I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3A-MW4S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW31	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3C-MW39	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3C-MW40	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
OU3C-MW41-C1	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW41-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW41-C3	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3C-MW41-C4	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW41-C5	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW41-C6	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW42-C1	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW42-C2	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3C-MW42-C3	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW42-C4	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW42-C5	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3D-MW43	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3D-MW44	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW46	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3D-MW47	5	4	0.242	4	0.97	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW48	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3E-GEW04	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-MW1S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW2S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW3I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-MW3S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW4S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW5S	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3F-GEW03	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-MW-28	11	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-NARF-B1	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-003	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-004	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-007	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-008	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-016	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-017	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-018	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-019	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-PZ-020	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	--	Y	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
JAX-OU3-B1	11	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
JAX-OU3-G10-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G10-C2	--	--	--	--	1.13	Y	--	--	--	--	--	--
JAX-OU3-G10-C3	--	--	--	--	0.81	Y	--	--	--	--	--	--
JAX-OU3-G11-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G11-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G11-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G12-C1	--	--	--	--	1.37	N	--	--	--	--	--	--
JAX-OU3-G12-C2	--	--	--	--	0.68	Y	--	--	--	--	--	--
JAX-OU3-G12-C3	--	--	--	--	0.12	N	--	--	--	--	--	--
JAX-OU3-G13-C1	--	--	--	--	0.21	Y	--	--	--	--	--	--
JAX-OU3-G13-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G13-C3	--	--	--	--	--	Y	--	--	--	--	--	--
JAX-OU3-G14-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G14-C2	--	--	--	--	0.06	Y	--	--	--	--	--	--
JAX-OU3-G14-C3	--	--	--	--	0.06	Y	--	--	--	--	--	--
JAX-OU3-G15-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G15-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G15-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G16-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G16-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G16-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	1.27	Y	--	--	--	--	--	--
JAX-OU3-G8-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G8-C2	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
JAX-OU3-G8-C3	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
JAX-OU3-G8-C4	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
JAX-OU3-G8-C5	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
JAX-OU3-G8-C6	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
JAX-OU3-G8-C7	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G9-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G9-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-G9-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
JAX-OU3-GEW02	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-1	18	-103	0.000	-3.864	4.00	Y	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
MW-780-2	17	-87	0.000	-3.546	2.25	Y	0.841	Significant Downward Trend	1.282	Significant Downward Trend	1.645	Significant Downward Trend
MW-780-MW3I	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-MW4S	--	--	--	--	--	N	--	--	--	--	--	--
MW-780-MW5S	--	--	--	--	--	Y	--	--	--	--	--	--
MW-780-MW6I	--	--	--	--	--	Y	--	--	--	--	--	--
OPSMW01	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-106-MW31I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW32I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW33I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW34D	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW35D	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW36S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW37S	--	--	--	--	--	Y	--	--	--	--	--	--

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3-106-MW38S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW39I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-MW40S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-106-PZ-01	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-02	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-03	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-04	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-05	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-06	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-07	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-106-PZ-08	13	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3A-MW2S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3A-MW4I	--	--	--	--	1.05	N	--	--	--	--	--	--
OU3A-MW4S	4	0	0.625	0	1.38	Y	4	No Trend	6	No Trend	6	No Trend
OU3C-MW31	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3C-MW39	8	0	0.548	0	0.00	Y	8	No Trend	12	No Trend	16	Stable
OU3C-MW40	9	0	0.540	0	0.00	Y	10	No Trend	14	No Trend	18	Stable
OU3C-MW41-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW41-C2	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW41-C3	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3C-MW41-C4	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW41-C5	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW41-C6	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3C-MW42-C1	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW42-C2	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3C-MW42-C3	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW42-C4	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW42-C5	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3C-MW50D	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW51I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW52D	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW53I	--	--	--	--	--	Y	--	--	--	--	--	--
OU3C-MW54S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3-CW34	--	--	--	--	--	Y	--	--	--	--	--	--
OU3D-MW30	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW43	7	4	0.334	4	1.51	Y	7	No Trend	11	No Trend	13	No Trend
OU3D-MW44	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3D-MW46	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3D-MW47	6	0	0.000	0	0.00	Y	7	No Trend	9	No Trend	11	Stable
OU3D-MW48	7	0	0.000	0	0.00	Y	7	No Trend	11	No Trend	13	Stable
OU3D-MW55S	--	--	--	--	--	Y	--	--	--	--	--	--
OU3E-GEW04	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW1S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW2S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW3I	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3E-MW3S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW4S	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3E-MW5S	4	1	0.500	1	0.93	Y	4	No Trend	6	No Trend	6	Stable

MANN-KENDALL TREND TEST RESULTS

Location	N	S	p-value	Test Statistic	CV	<=GCTL in the past 3 years	Alpha = 0.2		Alpha = 0.1		Alpha = 0.05	
							Critical Value	Trend?	Critical Value	Trend?	Critical Value	Trend?
OU3F-GEW03	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-MW-28	12	0	0.500	0	0.00	Y	0.841	No Trend	1.282	No Trend	1.645	Stable
OU3-NARF-B1	--	--	--	--	1.09	Y	--	--	--	--	--	--
OU3P-MW-07	--	--	--	--	0.31	Y	--	--	--	--	--	--
OU3-PZ-003	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-004	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-007	5	5	0.180	5	1.32	Y	6	Significant Upward Trend	8	No Trend	8	No Trend
OU3-PZ-008	--	--	--	--	1.44	Y	--	--	--	--	--	--
OU3-PZ-016	5	0	0.592	0	0.00	Y	6	No Trend	8	No Trend	8	Stable
OU3-PZ-017	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-018	4	0	0.625	0	0.00	Y	4	No Trend	6	No Trend	6	Stable
OU3-PZ-019	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-020	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-021	--	--	--	--	1.33	Y	--	--	--	--	--	--
OU3-PZ-022	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-023	--	--	--	--	0.00	Y	--	--	--	--	--	--
OU3-PZ-024	--	--	--	--	0.36	Y	--	--	--	--	--	--

Notes:
-- Indicates that there were an insufficient number of samples to run the test.

Null Hypothesis: Ho: There is no trend.
Alternative Hypothesis: HA: There is an upward trend (indicated by a positive value of S).
HA: There is a downward trend (indicated by a negative value of S).

If p-value is less than alpha then reject null hypothesis of no trend.
If absolute value of the test statistic is greater than or equal to the critical value then reject null hypothesis of no trend.
Source: Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, EPA/240/B-06/003. February 2006.

Location	PCE	TCE	cDCE	tDCE	VC	111-TCA	11-DCA	12-DCA	CA
JAX-OU3-B1	Stable	Significant Downward Trend	Stable	Stable	No Trend	Stable	Stable	Stable	Stable
JAX-OU3-G10-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G10-C2	--	--	--	--	--	--	--	--	--
JAX-OU3-G10-C3	--	--	--	--	--	--	--	--	--
JAX-OU3-G11-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G11-C2	--	--	--	--	--	--	--	--	--
JAX-OU3-G11-C3	--	--	--	--	--	--	--	--	--
JAX-OU3-G12-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G12-C2	--	--	--	--	--	--	--	--	--
JAX-OU3-G12-C3	--	--	--	--	--	--	--	--	--
JAX-OU3-G13-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G13-C2	--	--	--	--	--	--	--	--	--
JAX-OU3-G13-C3	--	--	--	--	--	--	--	--	--
JAX-OU3-G14-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G14-C2	--	--	--	--	--	--	--	--	--
JAX-OU3-G14-C3	--	--	--	--	--	--	--	--	--
JAX-OU3-G15-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G15-C2	--	--	--	--	--	--	--	--	--
JAX-OU3-G15-C3	--	--	--	--	--	--	--	--	--
JAX-OU3-G16-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G16-C2	--	--	--	--	--	--	--	--	--
JAX-OU3-G16-C3	--	--	--	--	--	--	--	--	--
JAX-OU3-G8	--	--	--	--	--	--	--	--	--
JAX-OU3-G8-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G8-C2	Stable	Stable	Stable	No Trend	No Trend	Stable	Stable	--	--
JAX-OU3-G8-C3	Stable	Stable	No Trend	No Trend	No Trend	Stable	Stable	--	--
JAX-OU3-G8-C4	No Trend	No Trend	No Trend	Stable	No Trend	Stable	Stable	Stable	Stable
JAX-OU3-G8-C5	Stable	No Trend	No Trend	Stable	No Trend	Stable	Stable	--	--
JAX-OU3-G8-C6	Stable	No Trend	No Trend	Stable	No Trend	Stable	Stable	--	--
JAX-OU3-G8-C7	--	--	--	--	--	--	--	--	--
JAX-OU3-G9-C1	--	--	--	--	--	--	--	--	--
JAX-OU3-G9-C2	--	--	--	--	--	--	--	--	--
JAX-OU3-G9-C3	--	--	--	--	--	--	--	--	--
JAX-OU3-GEW02	--	--	--	--	--	--	--		
MW-780-1	No Trend	No Trend	Significant Upward Trend	Significant Upward Trend	Significant Upward Trend	No Trend	Significant Downward Trend	No Trend	Significant Downward Trend
MW-780-2	Stable	No Trend	Significant Upward Trend	No Trend	Significant Upward Trend	Stable	Significant Downward Trend	No Trend	Significant Downward Trend
MW-780-MW3I	--	--	--	--	--	--	--		

Location	PCE	TCE	cDCE	tDCE	VC	111-TCA	11-DCA	12-DCA	CA
MW-780-MW4S	--	--	--	--	--	--	--		
MW-780-MW5S	--	--	--	--	--	--	--		
MW-780-MW6I	--	--	--	--	--	--	--		
OPSMW01	--	--	--	--	--	--	--	--	--
OU3-106-MW31I	--	--	--	--	--	--	--		
OU3-106-MW32I	--	--	--	--	--	--	--		
OU3-106-MW33I	--	--	--	--	--	--	--		
OU3-106-MW34D	--	--	--	--	--	--	--		
OU3-106-MW35D	--	--	--	--	--	--	--		
OU3-106-MW36S	--	--	--	--	--	--	--		
OU3-106-MW37S	--	--	--	--	--	--	--		
OU3-106-MW38S	--	--	--	--	--	--	--		
OU3-106-MW39I	--	--	--	--	--	--	--		
OU3-106-MW40S	--	--	--	--	--	--	--		
OU3-106-PZ-01	Significant Downward Trend	Significant Downward Trend	Significant Downward Trend	Significant Downward Trend	Significant Downward Trend	Stable	Stable	Stable	Stable
OU3-106-PZ-02	Stable	Stable	Stable	Significant Downward Trend	Significant Downward Trend	Stable	Stable	Stable	Stable
OU3-106-PZ-03	Significant Downward Trend	Significant Downward Trend	Stable	No Trend	No Trend	Stable	Stable	Stable	Stable
OU3-106-PZ-04	Significant Downward Trend	Significant Downward Trend	Stable	No Trend	Significant Upward Trend	Stable	Stable	No Trend	Stable
OU3-106-PZ-05	Significant Downward Trend	Significant Downward Trend	Significant Upward Trend	Stable	Significant Upward Trend	Stable	Stable	Stable	Stable
OU3-106-PZ-06	Significant Downward Trend	Significant Downward Trend	Significant Upward Trend	Stable	Significant Upward Trend	Stable	Stable	Stable	Stable
OU3-106-PZ-07	Significant Upward Trend	Significant Upward Trend	Stable	Significant Downward Trend	Significant Downward Trend	Stable	Stable	Stable	Stable
OU3-106-PZ-08	Significant Downward Trend	Significant Downward Trend	Significant Upward Trend	Significant Upward Trend	Significant Upward Trend	Stable	Stable	Stable	Stable
OU3A-MW2S	No Trend	No Trend	--	--	No Trend	Stable	Stable	--	--
OU3A-MW4I	--	--	--	--	--	--	--	--	--
OU3A-MW4S	No Trend	No Trend	--	--	No Trend	No Trend	No Trend	--	--
OU3C-MW31	No Trend	Significant Downward Trend	Significant Upward Trend	Stable	Significant Upward Trend	Stable	Stable	Stable	Stable
OU3C-MW39	No Trend	No Trend	No Trend	No Trend	Stable	Stable	Stable	Stable	Stable
OU3C-MW40	No Trend	No Trend	Stable	No Trend	No Trend	Stable	Stable	Stable	Stable
OU3C-MW41-C1	--	--	--	--	--	--	--	--	--
OU3C-MW41-C2	--	--	--	--	--	--	--	--	--

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Electrokinetic-Enhanced Amendment Delivery for Remediation of Low Permeability and Heterogeneous Subsurface Materials

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What's the Problem We're Targeting?

- 20 years of in-situ bioremediation and in situ chemical oxidation experience has led to the understanding that tailing, back diffusion, inaccessibility of low permeability regions, and heterogeneity are likely to prevent the technologies from reaching originally intended endpoints.

SERDP DOD • EPA • DOE | ESTCP

- After 15 years of funding research into these technologies, ESTCP has recently identified that one of the highest research needs is treatment of contaminants in low permeability zones (2011 Workshop on Investment Strategies).

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EK-Enhanced Amendment Delivery

- Motivation
  - It's all about delivery!
  - It's a contact sport!
  - Conventional approaches cannot effectively (cheaply) distribute amendments in low permeability and/or highly heterogeneous materials.

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Introduction to Electrokinetics and Electrokinetic Processes

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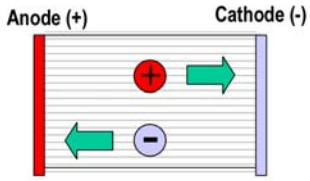
EK – How Does it Work?

Electro-migration

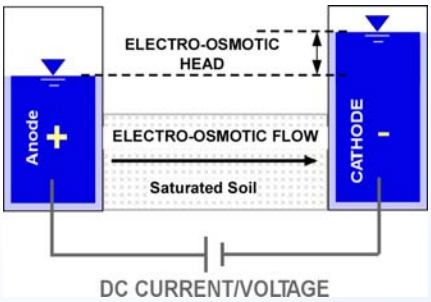
Ions transport in soil pore fluid to electrode opposite in polarity



Anions: negatively charged ions
Cations: positively charged ions

Anode: Positively charged electrode
Cathode: Negatively charged electrode

Electro-osmosis



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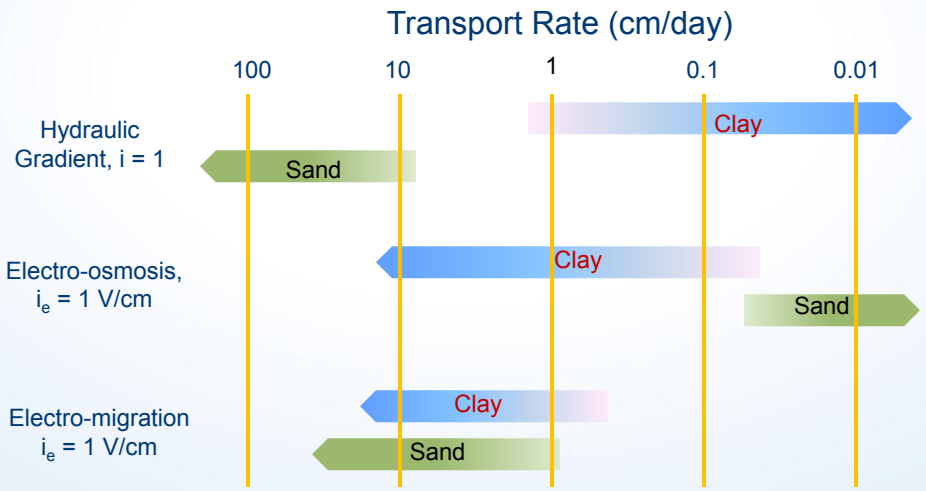
Relative Rates of Transport



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EK Represents An Innovative Solution

- **Low permeability regions**
  - No large pressures required to migrate fluids and amendments into clay and silty strata (pressures do not greatly exceed hydrostatic conditions).
  - Avoid losing most amendments to only a few preferential pathways as commonly seen in hydraulic injection.
  - More controllable and less day-lighting risk than fracking approaches.
  - No need for vapor capture and treatment.

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Technology Maturity

Ionic injection of amendments by electric fields developed since late-1990's

Amendment	Transport Rate (cm/day)	Media (distance)	Program	Citation
Sulfate	20	80 cm sand	Army RTD&E EPA	Acar et al., 1997
Acetate & nitrate	2.0 - 2.6	40 cm silty loam and clay	Army RTD&E	Gent et al., 2001
Citrate	30	4.6 meters heterogeneous marine sediments	ESTCP & NAFAC Southwest	AEC (2000) Granade et al., 2002
Lactate Citrate Permanganate Bromide	3.7- 5 .0 2.6 – 3.5 27 (2-m in sand) 10	40 cm Sand, Silty Clay, & heterogeneous sand w/silty clay	SERDP (ER-1204)	SERDP Report Wu (2005) Wu et al., 2007
Permanganate	400% faster than diffusion	Kaolinite	U. of Western Australia	Reynolds et al., 2008
Lactate & *Dehalococcoides*	~ 3.2 to ~ 4.0	silty clay (Gessie) & Clay till (Denmark)	Army RTD&E & Capital Region Denmark	Mao et al., 2012

voltage gradients ranged from 0.4 to 3.0 V/cm
current densities ranged from 0.5 to 2.0 A/m^2

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EK Enhancement of In Situ Bioremediation

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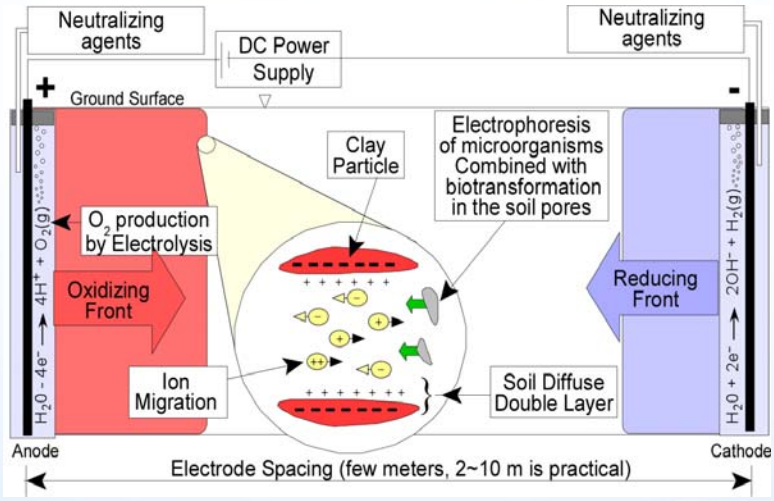
How EK-Bio Works



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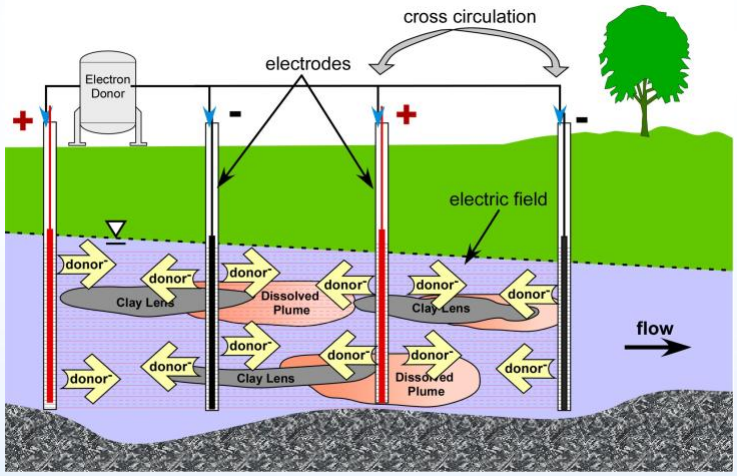
EK-Bio Field Application Concept



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Field Application: Denmark

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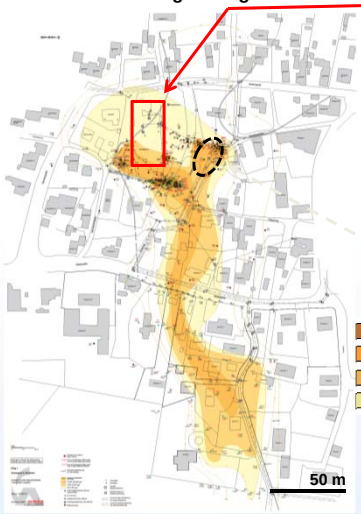
Site Background

1969-1983 industrial facility

PCE used for degreasing



Test site: Hot Spot IV

- 7 PCE DNAPL hot spots
- 300 m long plume in sand layer 2 - 6 m bgs

PCE DNAPL
10.000-100.000 µg CVOC/L
1.000-10.000 µg CVOC/L
100-1.000 µg CVOC/L

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Site Background

- Tight clay till with sand stringers (high heterogeneity)
- PCE DNAPL present in soil cores (both clay and sand)
- Lab microcosm test showed bioaugmentation required to achieve ethene
- Field injection test - limited distribution within/across clays – short-circuiting into sands
- Conventional EISB injection approaches deemed cost-prohibitive; led to EK lab and field tests

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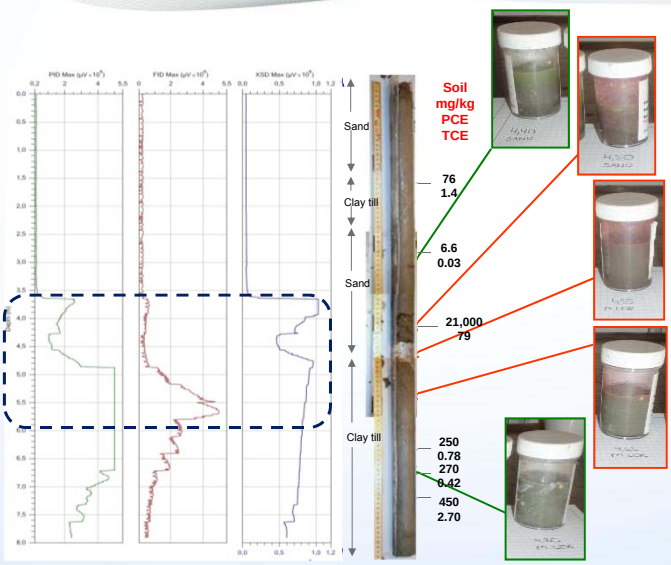
Site Background



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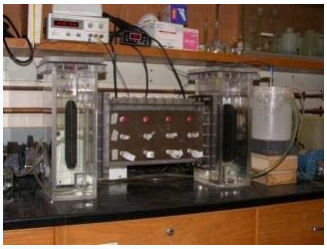
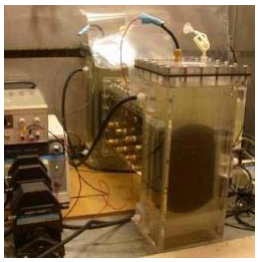
Bench-Scale Treatability Study





- 2 test reactors and 1 control (without electricity)
- Duration of operation 60 days

X. Mao, J.Wang, A. Ciblak, E.E. Cox, C. Riis, M. Terkelsen, D.B. Gent, A. N. Alshawabkeh (2012), Electrokinetic-enhanced bioaugmentation for remediation of chlorinated solvents contaminated clay, Journal of Hazardous Materials, Volumes 213–214, 311-317

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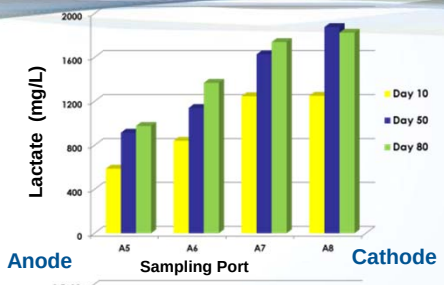
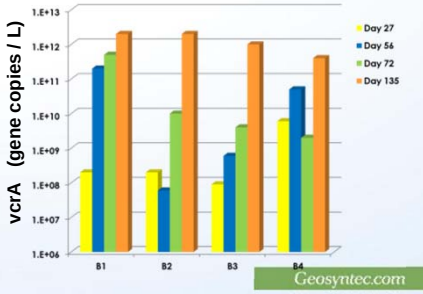
Bench-Scale Treatability Study

- ✓ Electric current density of 5 A/m^2 ⇒ lactate transport of 3.2 cm/day
- ✓ *Dehalococcoides* increased across EK reactors (likely due to electro-osmosis)
- ✓ V*inyl chloride reductase (vcrA)* levels increased over time
- ✓ Complete dechlorination of PCE to ethene





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Field Pilot Test Objectives

1. Evaluate lactate transport rate under field conditions
2. Evaluate transport and viability of *Dehalococcoides* through clay under field conditions
3. Evaluate degradation of PCE
4. Gather site-specific operational data for full-scale EK-Bio design

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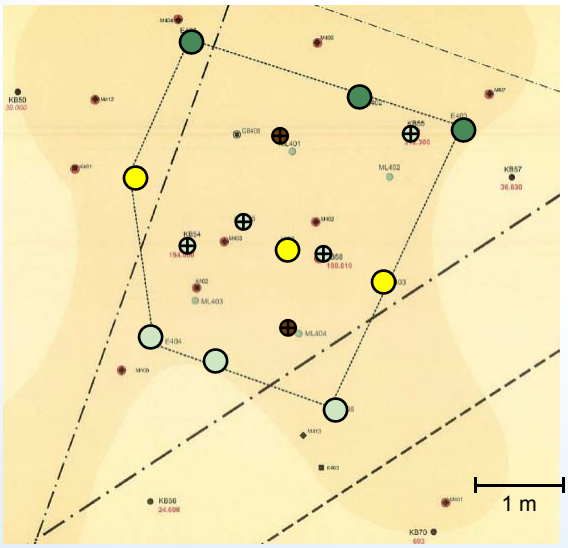
Pilot Test Layout



- Cathode Wells
- Anode Wells
- Lactate Wells
- Groundwater Monitoring Wells
- Soil Sample Locations

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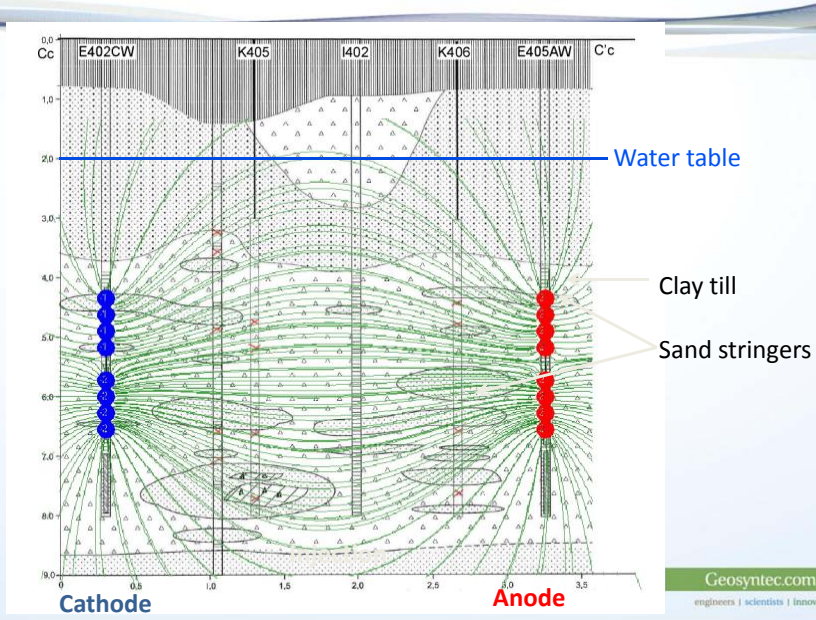
Pilot Test X-Section



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Pilot Test Infrastructure

Amendment Tanks
Control Room

Cathode wells

Injection wells

Anode wells

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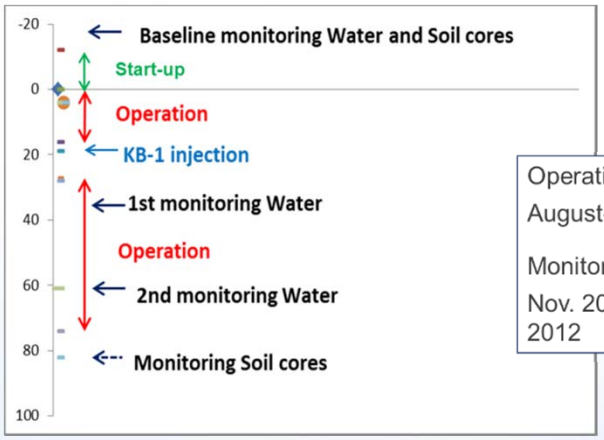
Pilot Test Timeline



Operation:
August-Nov. 2011

Monitoring:
Nov. 2011- May 2012

Monitoring after operation:

- **Groundwater – 3 & 6 months post-test**
- **Soil cores – 7 months post-test**

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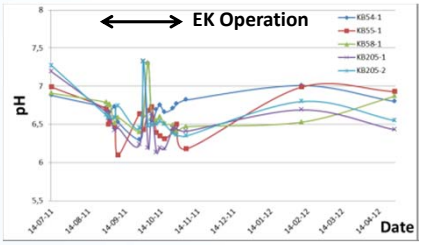
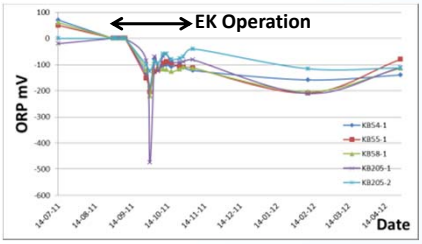
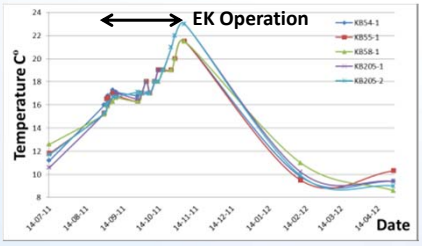
Groundwater Results: Geochemistry







- ✓ Neutral pH
- ✓ Negative ORP
- ✓ Slight increase in temperature (~5 °C), which may benefit biological activities

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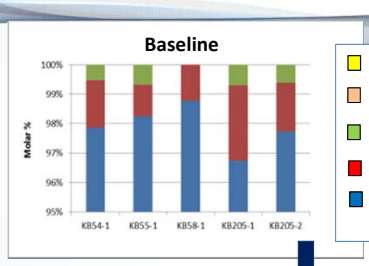
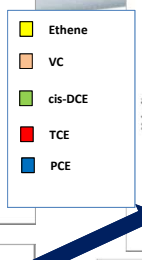
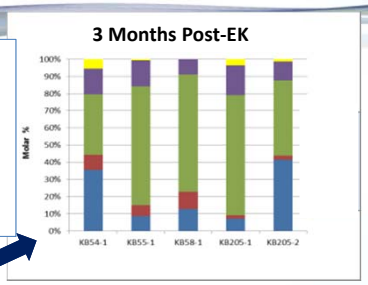
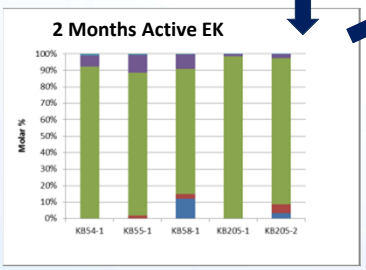
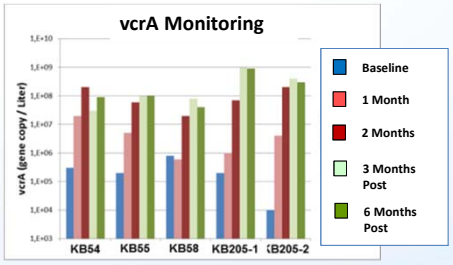
Groundwater Results – VOC Data











- ✓ Increase in Ethene post-EK operation up to 3,700 µg/L
- ✓ Increase in Chloride represents ~190 mg/L PCE degraded (DNAPL dissolution)

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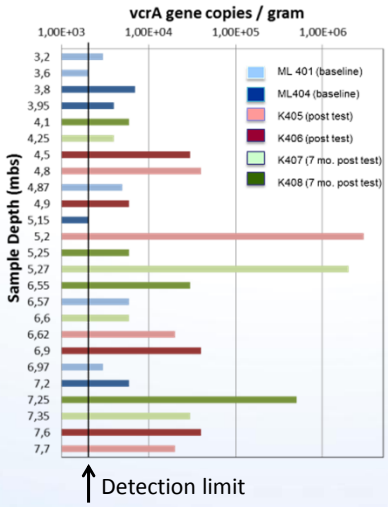
Soil Core Data - Microbial



Post test soil cores sampled 63 days after bioaugmentation

High concentrations of vcrA in samples from clay till --> *Dhc* transport into clay due to EK-processes

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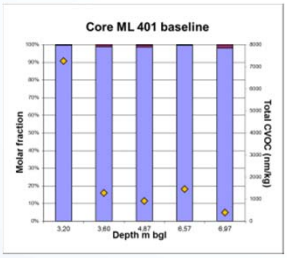
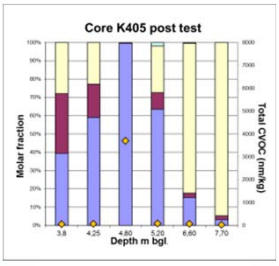
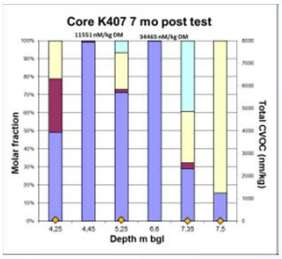
Soil Core Data – VOC Results







- Dechlorination continuing in soil cores post test
- Few samples unaffected by degradation
- Decrease in total CVOC concentrations in most samples

VC
cis DCE
TCE
PCE
Total CVOC

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Full Scale Ahead!

- Full scale EK-Bio construction in Oct/Nov 2012
- Startup in December 2012
- 15 electrodes
- 3,500 yd^3 treatment volume
- 16 months of "power-on" operation

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ESTCP EK-Bio Demonstration at NAS Jacksonville, FL

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Project Team

NAVFAC SE - Michael Singletary, Adrienne Wilson

Geosyntec - Evan Cox, Dr. James Wang, Dr. David Reynolds, Rachel Klinger

US Army Corps of Engineers ERDC - Dr. David Gent

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Technical Objectives

Demonstrate and quantify the ability to effectively distribute remediation agents across a target low K / heterogeneous area using a direct current (DC) electric field

1) Demonstrate that treatment is induced across the target treatment area
2) Quantify EK system operational parameters to allow design and optimization for full-scale implementation
3) Validate PHT3D-EK as a design tool
4) Develop costing information for technology evaluation and use by DoD and remediation practitioners

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Technical Approach

Project consists of seven tasks:

- Task 1 – Treatability Testing (completed)
- Task 2 - Design & Demonstration Plan
- Task 3 - System Installation
- Task 4 - Baseline Characterization
- Task 5 - Operation & Performance Monitoring
- Task 6 - Model Validation
- Task 7 – Technical Guidance on EK-Bio™ Design & Application

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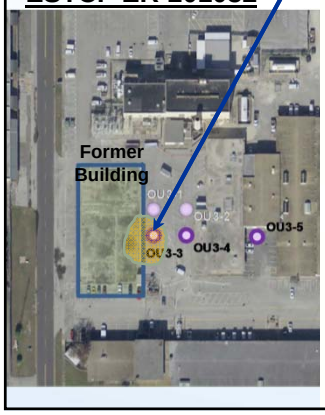
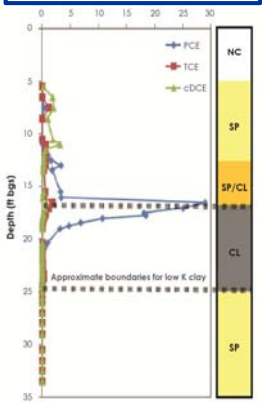
Test Site - OU3 Building 106
(former dry cleaner, 1962 – 1990)

- PCE and TCE released to shallow aquifer; PCE into top few feet of clay layer
- Interim remedies (AS, SVE) discontinued since 2005
- 15 – 40 mg/L of PCE in pore-water in clay

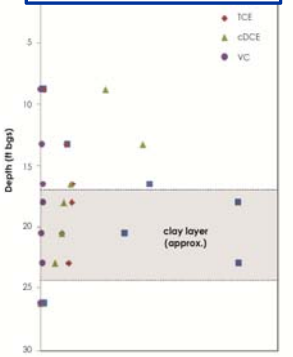
ESTCP ER-201032



Soil CVOC



Pore-Water CVOC



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Task 1 – Treatability Testing

- DPT soil core from OU3
- Migrated lactate through core for 28 hours
- Thin-sectioned core, froze sections, analyzed for lactate
- Calculated lactate migration rate of 3 – 5 cm/day

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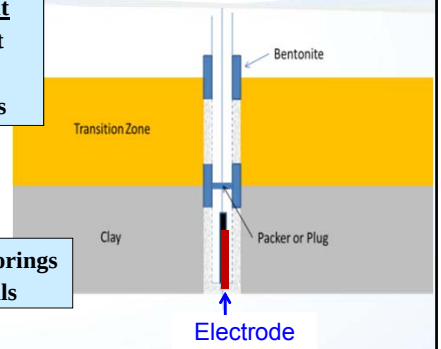
Task 2 – System Design



- 4-inch PVC electrode wells
- Screened to target clay unit
- Electrode : 3/8-in MMO coated titanium rod (~ 5 ft long)

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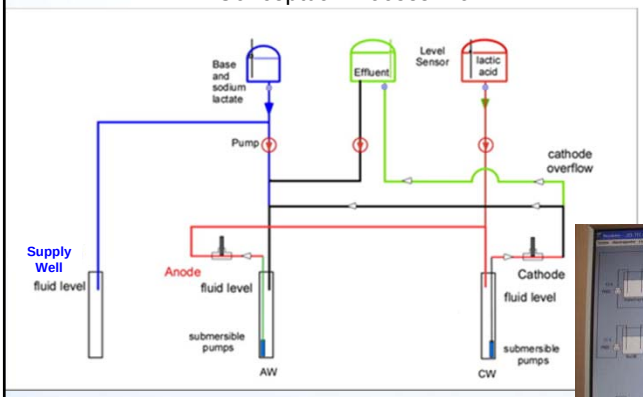
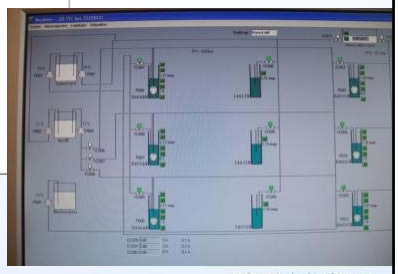
Task 2– System Design

Conceptual Process Flow



- Cross-circulation between electrodes
- Lactate-based electrolyte solution in electrode wells and supply wells
  - Ability to adjust pH
- Maintain zero hydraulic head between electrodes
- PLC-based system control



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Task 2– System Design

Power supply unit : 3-phase AC input; capable of 15 kW DC output for ~ 600V / 24A

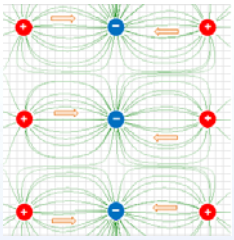
Target current settings : ~ 3 A at each electrode

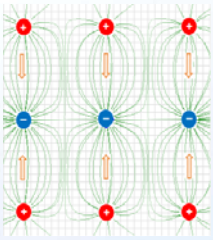
3-Phase Operation : each phase ~ 90 days EK (with ~ 1 month no electricity between phases)

Varying electric field configurations between phases

Different tracers in individual phases

Example Phased-Operation





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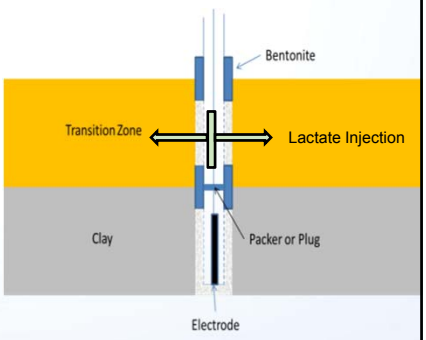
Integrated Treatment of Sands and Clays

- Combined approach now under design to treat surficial permeable sands
- Injection into shallow contaminated zone coupled with EK in clays
- Shallow remediation may be held off until proof-of-concept in clays is satisfactory



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Task 4 & 5 - Operation and Performance Monitoring

<u>During operation + post-operation monitoring</u>

In addition to auto-acquisition system –

- *bi-weekly field visits for the 1st two months*
- *transition to monthly*
- *system inspections and calibrations + field measurements + sampling / lab*

<u>Field samples collected for analyses –</u>

- groundwater and soil core sampling
- contaminant degradation
- tracer
- geochemistry
- biomarkers (*Dehalococcoides* and *vcrA*)

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Task 4 & 5 - Operation and Performance Monitoring

Parameter	Timeframe			Medium	
	Before	During*	Post-EK	Soil	Groundwater
DO / ORP / Temperature / Conductivity	X	X	X		X
Volatile Organic Compounds	X	X	X	X	X
Dissolved Gases	X	X	X		X
Ions	X	X	X		X
Metals	X	X	X	X	X
Total Organic Compound	X	X	X		X
Volatile Fatty Acids	X	X	X	X	X
Microbial (Biomarkers)	X	X	X	X	X
Tracers	X	X			X
Electric Field		X			
Power Input (to electrode)		X			
Current Distribution (to electrode)		X			

* Bi-weekly to monthly monitoring

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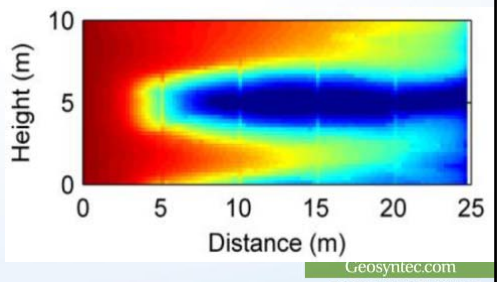
Task 6 – Model Validation

- PHT3D-EK has been validated against laboratory studies
  - Individual processes at small scale
- Few existing data sets at the field scale – low data density
- Proposed Dem/Val will create a unique data set for final verification of PHT3D-EK

- A validated and verified model will allow more efficient design and cost savings with future implementations of EK



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Project Schedule

Task	Q1-2013	Q2	Q3	Q4	Q1-2014	Q2	Q3	Q4	Q1-2015	Q2	Q3	Q4	Q1-2016
1. Site Selection													
2. Pre-Design, Design and Demo Plan													
3. System Installation													
4. Baseline Characterization													
5. O&M													
6. Model Validation													
7. Reporting		SSM		DP								FR	C&P

Decision Point

SSM : Site Selection Memo

DP : Demonstration Plan

FR : Final Technical Report

C&P : Cost & Performance Report

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Questions

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NAS Jacksonville
Groundwater Monitoring Summary for PCA 15 FFTF

January 14, 2013

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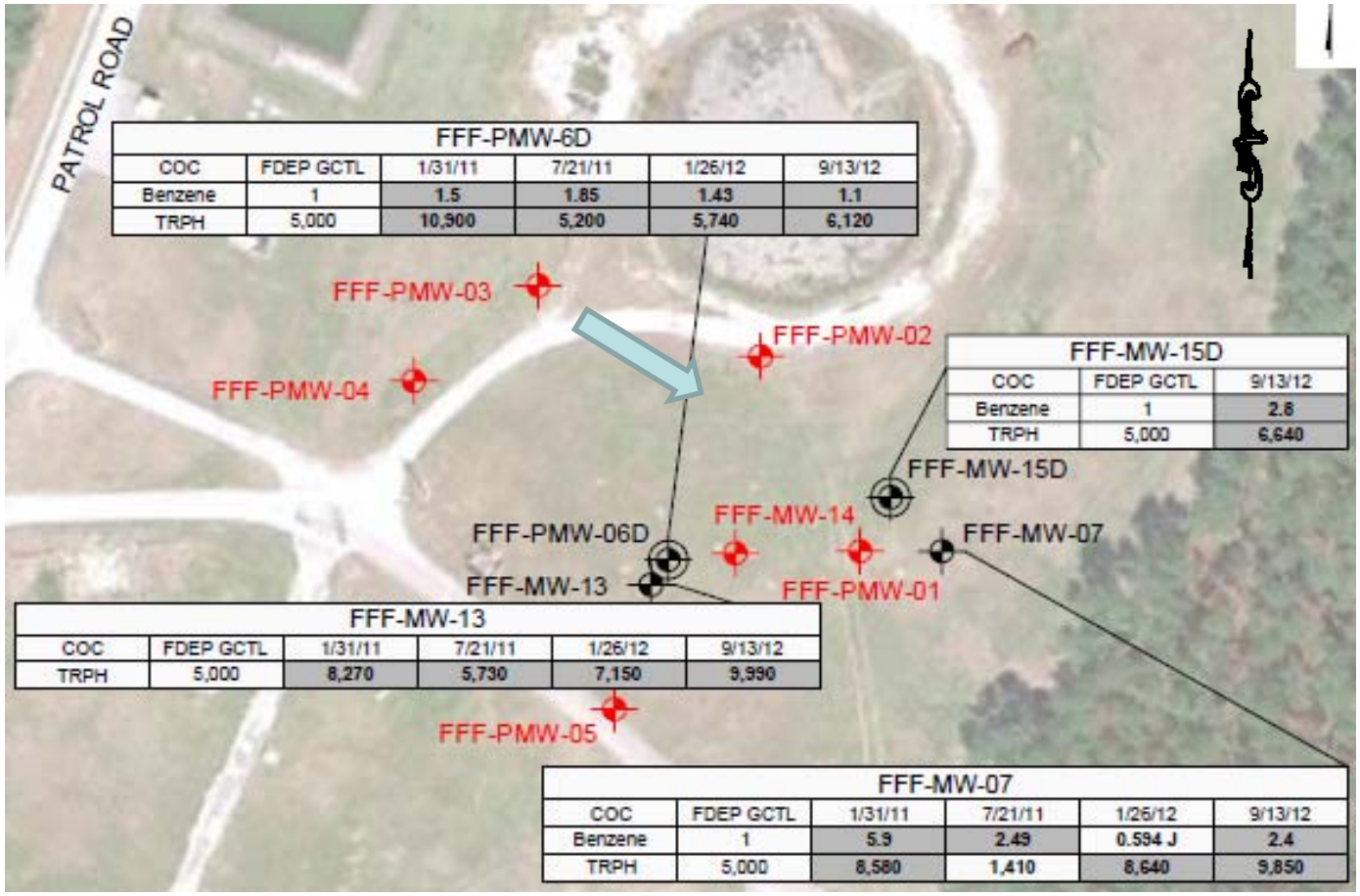
PCA 15 FFTF

- Second semi-annual groundwater monitoring event of 2012 was performed by Solutions-IES on September 13, 2012.
- Water level elevations were gauged in 10 monitoring wells and the water table was over four feet higher than during the previous four sampling events.
- Groundwater flow was to the southeast in the shallow zone. The January 2011 and January 2012 reports both show groundwater flow in a northeast direction.
- 4 monitoring wells (2 shallow, 2 deep) were sampled for the COCs of BTEX and TRPH.

PCA 15 FFTF

- **Contaminants of Concern Results**
  - Benzene was reported above the GCTL in 3 wells
    - Shallow downgradient well FFF-MW-07 (2.4 µg/L)
    - Deep source well FFF-PMW-6D (1.1 µg/L) and newly installed deep downgradient well FFF-MW-15D (2.8 µg/L)
  - TRPH exceeded the GCTL in all 4 wells
    - Shallow source FFF-MW-13 (9,990 µg/L) and shallow downgradient FFF-MW-07 (9,850 µg/L)
    - Deep source FFF-PMW-6D (6,120 µg/L) and deep downgradient FFF-MW-15D (6,640 µg/L)

PCA 15 FFTF



FFF-PMW-6D					
COC	FDEP GCTL	1/31/11	7/21/11	1/26/12	9/13/12
Benzene	1	1.5	1.85	1.43	1.1
TRPH	5,000	10,900	5,200	5,740	6,120

FFF-MW-15D		
COC	FDEP GCTL	9/13/12
Benzene	1	2.8
TRPH	5,000	6,640

FFF-MW-13					
COC	FDEP GCTL	1/31/11	7/21/11	1/26/12	9/13/12
TRPH	5,000	8,270	5,730	7,150	9,990

FFF-MW-07					
COC	FDEP GCTL	1/31/11	7/21/11	1/26/12	9/13/12
Benzene	1	5.9	2.49	0.594 J	2.4
TRPH	5,000	8,580	1,410	8,640	9,850

LEGEND

SHALLOW MONITORING WELL

DEEP MONITORING WELL

SHALLOW MONITORING WELL (NOT SAMPLED)

18.5 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)

IMPLIED GROUNDWATER FLOW DIRECTION

NOTES:

1) WELL COORDINATES PROVIDED BY TETRA TECH, INC.
2) AERIAL IMAGERY PROVIDED BY GOOGLE EARTH 2010.
3) CONCENTRATIONS SHOWN IN ug/L.

0 100 200

SCALE IN FEET

PCA 15 FFTF

- **Summary**
  - Benzene and TRPH exceeded the GCTLs in up to four wells in September 2012.
  - Exceedances of the GCTLs were reported in the shallow (FFF-MW-07) and deep (FFF-MW-15D) downgradient compliance wells in September 2012.
  - Recommend continued monitoring to evaluate benzene and TRPH concentrations in shallow and deep downgradient wells to evaluate if concentrations are decreasing.
  - Next annual groundwater monitoring event will be conducted September 2013.

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NAS Jacksonville
Groundwater Monitoring Summary for
PCA 4 Gas Hill Fuel Farm

January 14, 2013

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PCA 4 Gas Hill Fuel Farm

- Second semi-annual groundwater monitoring event of 2012 was performed by Solutions-IES on September 12-13, 2012. Third event since MNA Plan was submitted.
- Water level elevations were gauged in 34 monitoring wells.
- Groundwater flow was radial from the center of the site in the shallow zone which is consistent with previous reports. Deep groundwater flow appears to be heading towards the east.

PCA 4 Gas Hill Fuel Farm

- **25 monitoring wells (20 shallow, 5 deep) were sampled for the COCs of BTEX, naphthalene, PAHs including 1- & 2-methylnaphthalene, and TRPH.**
  - Unable to sample JAX159-GH-32 (under water).
- **7 monitoring wells (6 shallow, 1 deep) were also sampled for natural attenuation parameters of nitrite, nitrate, ferrous iron, sulfide, sulfate, alkalinity, and methane.**

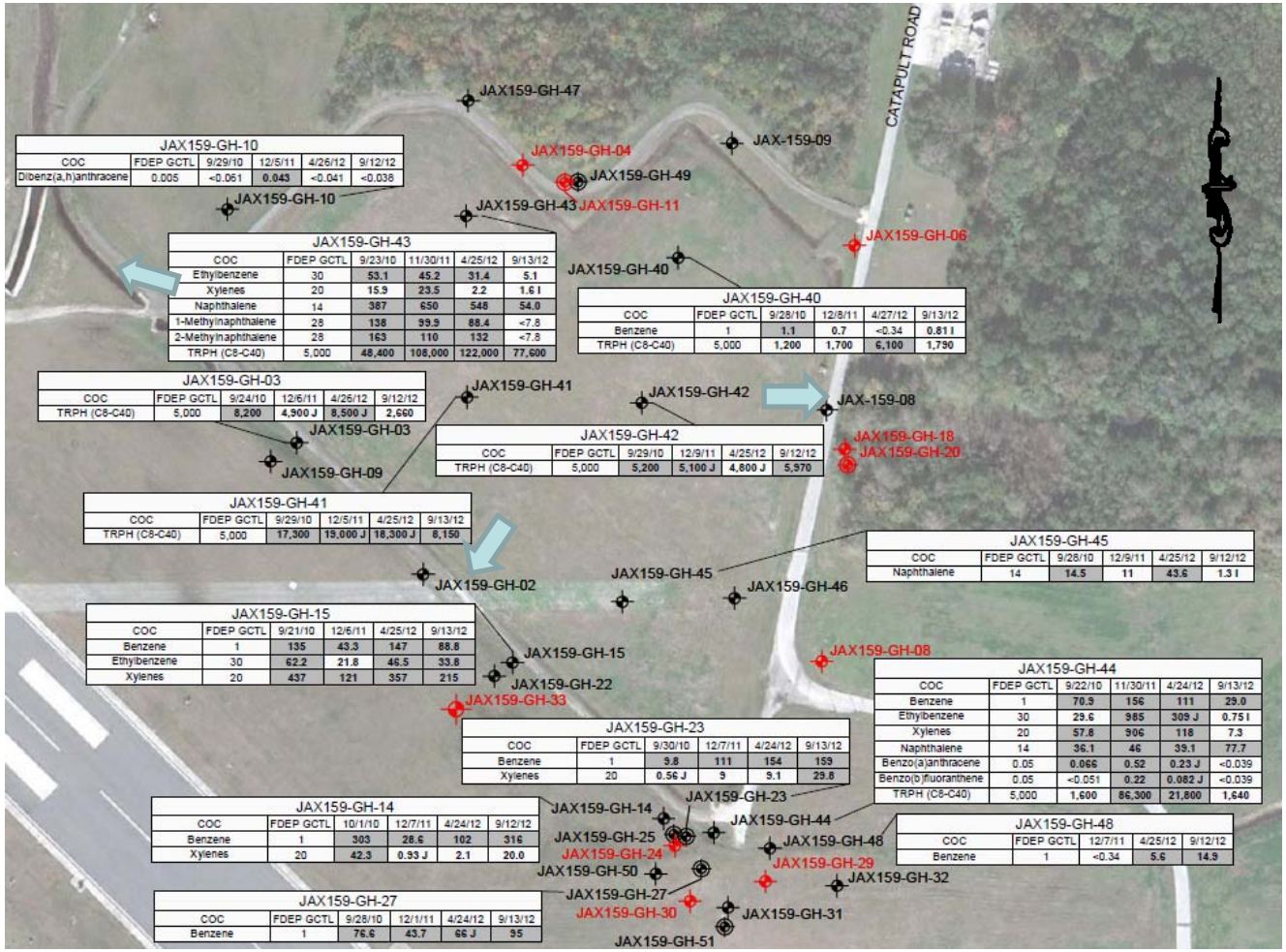
PCA 4 Gas Hill Fuel Farm

- **Natural Attenuation Indicator Parameter Results**
  - Nitrite and nitrate were all less than 0.13 mg/L
  - Ferrous iron ranged from 5.2 to 38.2 mg/L in shallow aquifer
  - Sulfate ranged 9.2 to 28.9 mg/L in shallow aquifer
  - Alkalinity ranged from 81.6 to 387 mg/L in the shallow aquifer
  - Methane ranged from 1,320 to 9,140 µg/L (except for 1 well)

PCA 4 Gas Hill Fuel Farm

- **Contaminants of Concern Results**
  - Benzene was reported above the GCTL in 6 wells (4 shallow, 2 deep)
    - Shallow wells JAX159-GH-14 (316 µg/L), JAX159-GH-15 (88.8 µg/L), JAX159-GH-44 (29.0 µg/L), and JAX159-GH-48 (14.9 µg/L)
    - Deep wells JAX159-GH-23 (159 µg/L), and JAX159-GH-27 (95 µg/L)
  - Ethylbenzene exceeded the GCTL in 1 shallow well (JAX159-GH-15 at 33.8 µg/L)
  - Xylenes were reported above the GCTL in 2 wells
    - Shallow well JAX159-GH-15 (215 µg/L)
    - Deep well JAX159-GH-23 (29.8 µg/L)
  - Naphthalene exceeded the GCTL in 2 wells
    - Shallow wells JAX159-GH-43 (54.0 µg/L) and JAX159-GH-44 (77.7 µg/L)
    - Naphthalene results from 8270SIM scan were 14.2 µg/L and 24.5 µg/L, respectively
  - TRPH was reported above the GCTL in 3 wells
    - Shallow wells JAX159-GH-41 (8,150 µg/L), JAX159-GH-42 (5,970 µg/L) and JAX159-GH-43 (77,600 µg/L)

PCA 4 Gas Hill Fuel Farm



JAX159-GH-10					
COC	FDEP GCTL	9/29/10	12/5/11	4/26/12	9/12/12
Dibenz(a,h)anthracene	0.005	<0.061	0.043	<0.041	<0.038

JAX159-GH-43					
COC	FDEP GCTL	9/23/10	11/30/11	4/25/12	9/13/12
Ethylbenzene	30	53.1	45.2	31.4	5.1
Xylenes	20	15.9	23.5	2.2	1.6 I
Naphthalene	14	387	650	548	54.0
1-Methylnaphthalene	28	138	99.9	88.4	<7.8
2-Methylnaphthalene	28	163	110	132	<7.8
TRPH (C8-C40)	5,000	48,400	108,000	122,000	77,600

JAX159-GH-40					
COC	FDEP GCTL	9/28/10	12/8/11	4/27/12	9/13/12
Benzene	1	1.1	0.7	<0.34	0.81 I
TRPH (C8-C40)	5,000	1,200	1,700	6,100	1,790

JAX159-GH-03					
COC	FDEP GCTL	9/24/10	12/6/11	4/26/12	9/12/12
TRPH (C8-C40)	5,000	8,200	4,900 J	8,500 J	2,660

JAX159-GH-42					
COC	FDEP GCTL	9/29/10	12/9/11	4/25/12	9/12/12
TRPH (C8-C40)	5,000	5,200	5,100 J	4,800 J	5,970

JAX159-GH-41					
COC	FDEP GCTL	9/29/10	12/5/11	4/25/12	9/13/12
TRPH (C8-C40)	5,000	17,300	19,000 J	18,300 J	8,150

JAX159-GH-45					
COC	FDEP GCTL	9/28/10	12/9/11	4/25/12	9/12/12
Naphthalene	14	14.5	11	43.6	1.3 I

JAX159-GH-15					
COC	FDEP GCTL	9/21/10	12/6/11	4/25/12	9/13/12
Benzene	1	135	43.3	147	88.8
Ethylbenzene	30	62.2	21.8	46.5	33.8
Xylenes	20	437	121	357	215

JAX159-GH-44					
COC	FDEP GCTL	9/22/10	11/30/11	4/24/12	9/13/12
Benzene	1	70.9	156	111	29.0
Ethylbenzene	30	29.6	985	309 J	0.75 I
Xylenes	20	57.8	906	118	7.3
Naphthalene	14	36.1	46	39.1	77.7
Benzo(a)anthracene	0.05	0.066	0.52	0.23 J	<0.039
Benzo(b)fluoranthene	0.05	<0.051	0.22	0.082 J	<0.039
TRPH (C8-C40)	5,000	1,600	86,300	21,800	1,640

JAX159-GH-23					
COC	FDEP GCTL	9/30/10	12/7/11	4/24/12	9/13/12
Benzene	1	3.8	111	154	159
Xylenes	20	0.56 J	9	9.1	29.8

JAX159-GH-14					
COC	FDEP GCTL	10/1/10	12/7/11	4/24/12	9/12/12
Benzene	1	303	28.6	102	316
Xylenes	20	42.3	0.93 J	2.1	20.0

JAX159-GH-48				
COC	FDEP GCTL	12/7/11	4/25/12	9/12/12
Benzene	1	<0.34	5.6	14.9

JAX159-GH-27					
COC	FDEP GCTL	9/28/10	12/1/11	4/24/12	9/13/12
Benzene	1	76.6	43.7	66 J	95

LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- SHALLOW MONITORING WELL (NOT SAMPLED)
- DEEP MONITORING WELL (NOT SAMPLED)

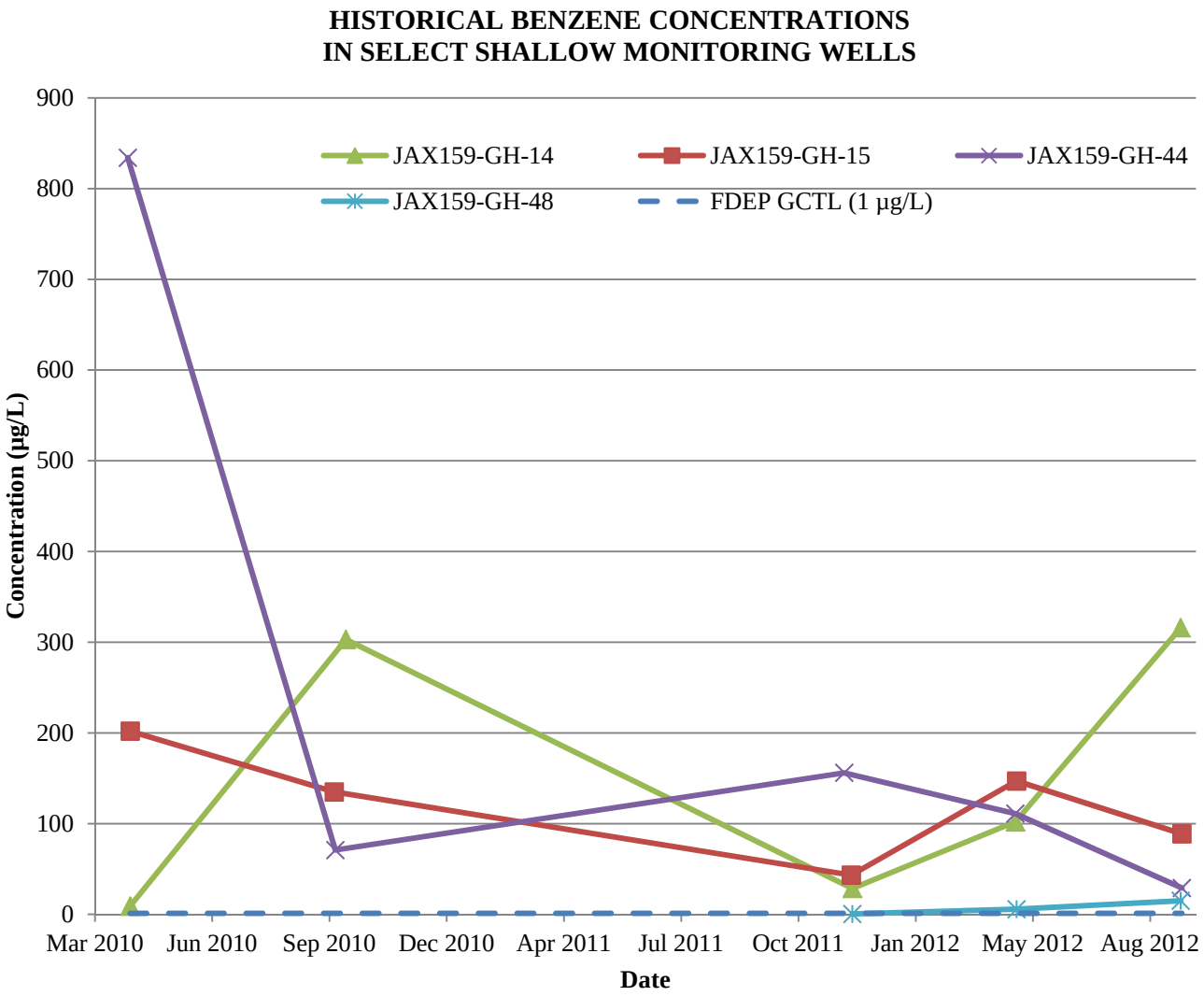
NOTES:

1) WELL COORDINATES PROVIDED BY CH2M HILL.
2) AERIAL IMAGERY PROVIDED BY GOOGLE EARTH 2011.
3) CONCENTRATIONS SHOWN IN ug/L.

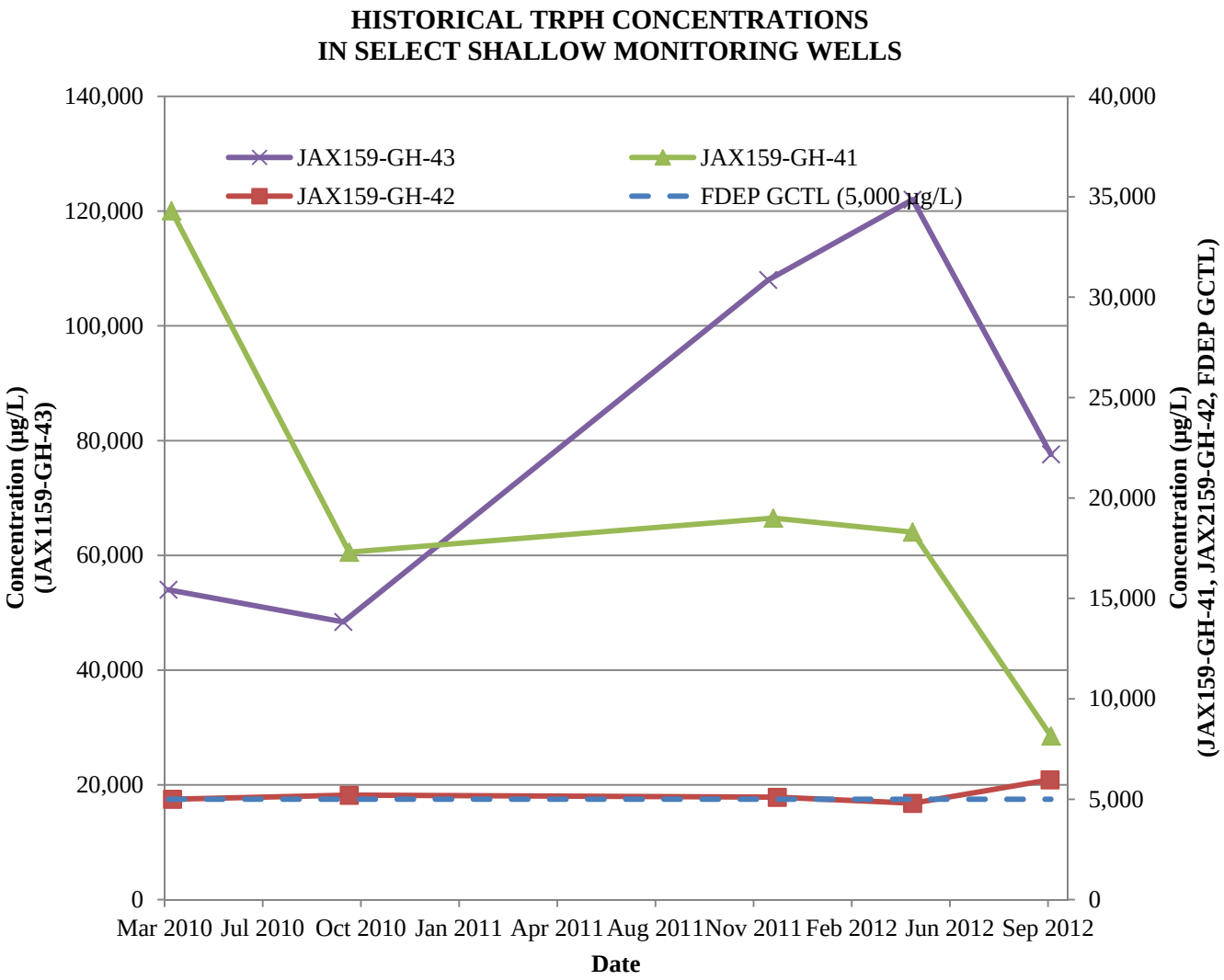
0 150 300

SCALE IN FEET

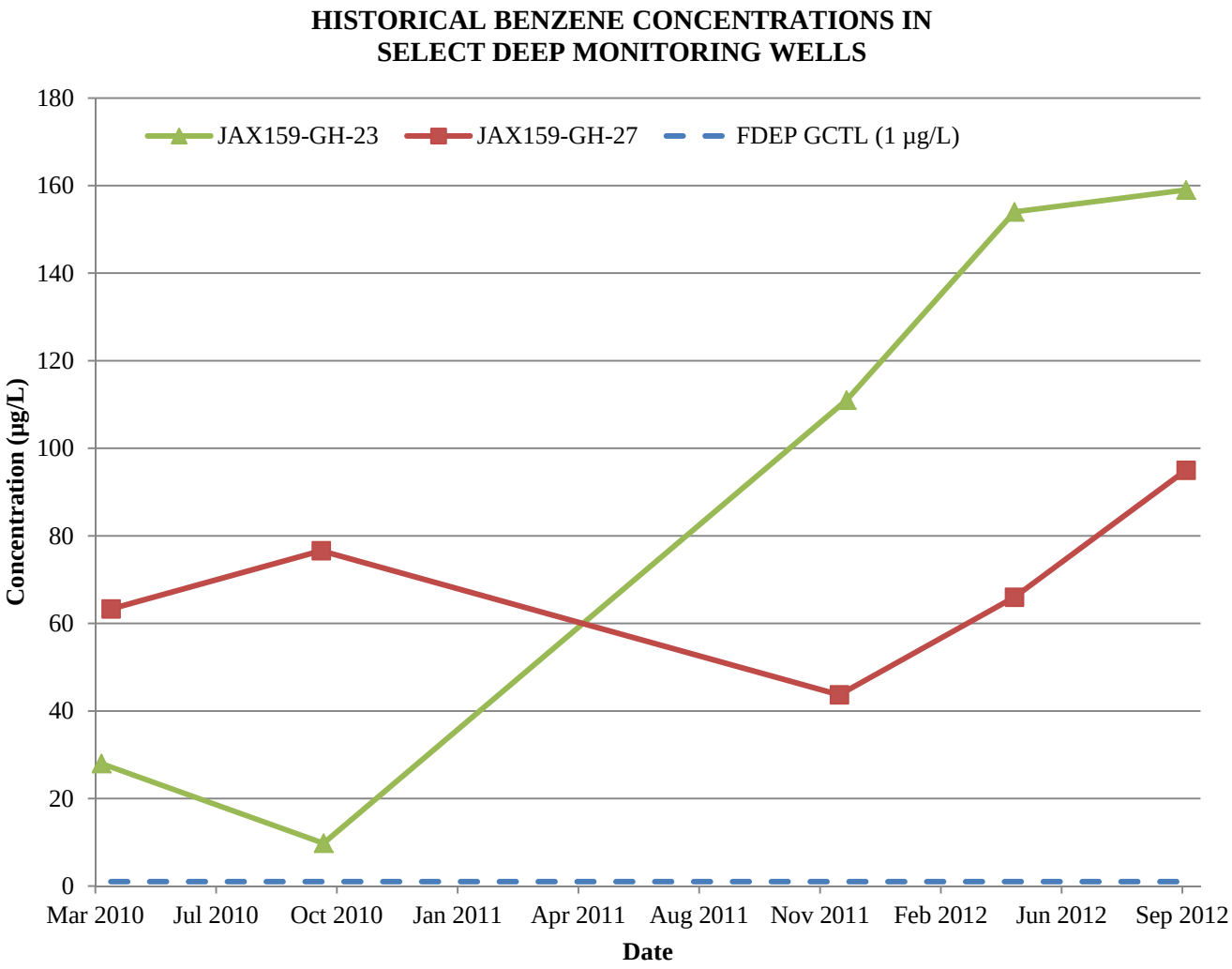
PCA 4 Gas Hill Fuel Farm



PCA 4 Gas Hill Fuel Farm



PCA 4 Gas Hill Fuel Farm



PCA 4 Gas Hill Fuel Farm

- **Recommendations**
  - Only report naphthalene under 8270 SIM since results from both methods are conflicting and the EPA Method 8270 SIM scan is more accurately able to detect PAH compounds such as naphthalene.
  - Continue semi-annual sampling and reporting. Next sampling event will be performed in March 2013.

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NAS Jacksonville
Groundwater Monitoring Summary for
PCA 25 UST Site 119

January 14, 2013

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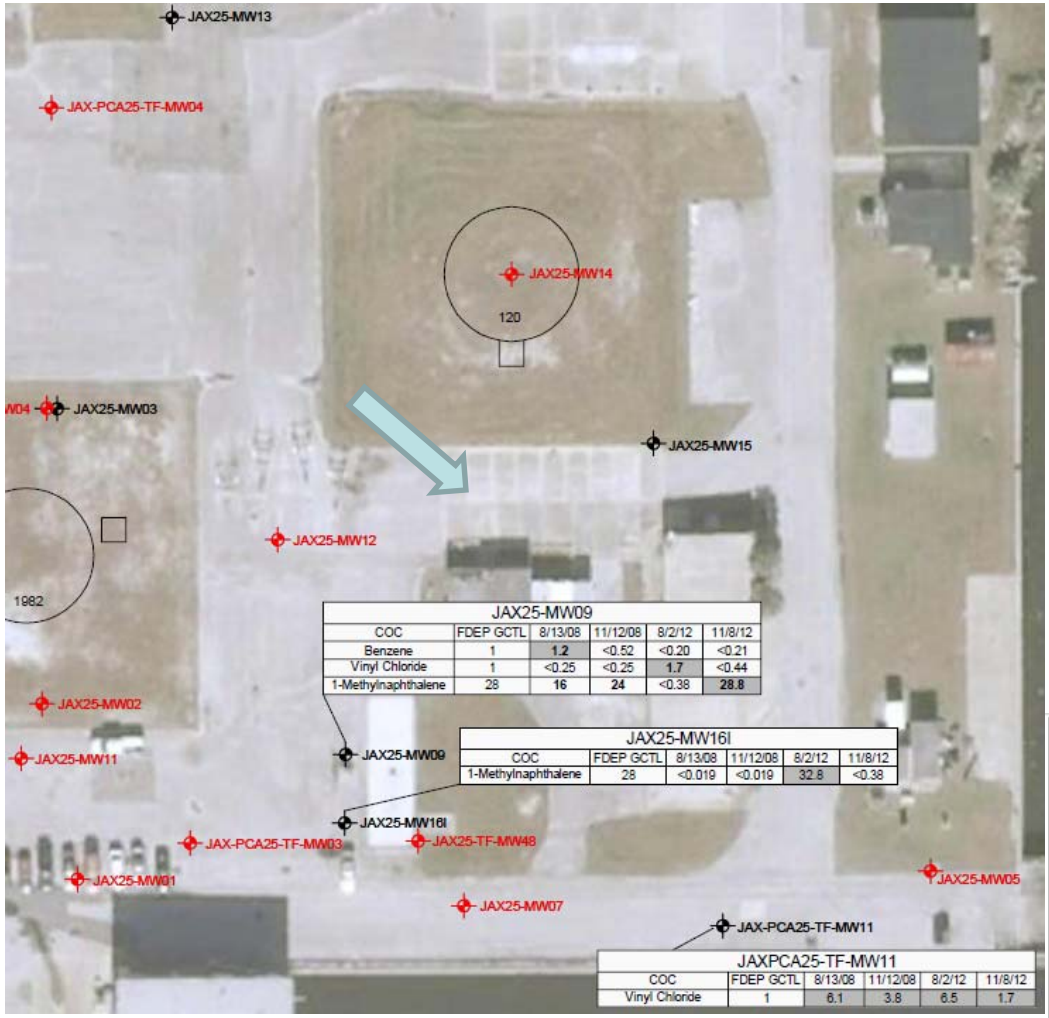
PCA 25 UST Site 119

- **The second quarterly groundwater monitoring event since implementing the MNA Plan was performed by Solutions-IES on November 8, 2012.**
- **Water level elevations were gauged in 16 monitoring wells and groundwater flow direction is towards the southeast.**
- **6 monitoring wells (5 shallow, 1 intermediate) were sampled for COCs:**
  - VOCs : benzene and vinyl chloride
  - PAHs : 1- & 2-methylnaphthalene, benzo(a)anthracene and benzo(b)fluoranthene
  - TRPH
  - Lead

PCA 25 UST Site 119

- **Contaminants of Concern Results**
  - Vinyl chloride was reported above the GCTL in shallow well JAXPCA25-TF-MW11 (1.7 µg/L)
  - 1-Methylnaphthalene exceeded the GCTL in shallow well JAX25-MW09 (28.8 µg/L)

PCA 25 UST Site 119



JAX25-MW09

COC	FDEP GCTL	8/13/08	11/12/08	8/2/12	11/8/12
Benzene	1	**1.2**	<0.52	<0.20	<0.21
Vinyl Chloride	1	<0.25	<0.25	**1.7**	<0.44
1-Methylnaphthalene	28	**16**	**24**	<0.38	**28.8**

JAX25-MW16I

COC	FDEP GCTL	8/13/08	11/12/08	8/2/12	11/8/12
1-Methylnaphthalene	28	<0.019	<0.019	32.8	<0.38

JAXPCA25-TF-MW11

COC	FDEP GCTL	8/13/08	11/12/08	8/2/12	11/8/12
Vinyl Chloride	1	6.1	3.8	6.5	1.7

LEGEND

FORMER AST LOCATION

MONITORING WELL (SAMPLED)

MONITORING WELL (NOT INCLUDED IN SAMPLING PROGRAM)

0 50 100

SCALE IN FEET

PCA 25 UST Site 119

- **Summary**
  - Fifth consecutive event where VC exceeded the GCTL in shallow well JAXPCA25-TF-MW11 (1.7 µg/L). Concentrations appear relatively stable and do not show a decreasing trend toward the GCTL.
  - First time 1-methylnaphthalene exceeded the GCTL in shallow well JAX25-MW09 (28.8 µg/L) since May 2008.
  - Anomalous exceedances of the GCTLs for VC in JAX25-MW09 and 1-methylnaphthalene in JAX25-MW16I in August 2012 were not confirmed in November 2012.

PCA 25 UST Site 119

- **Recommendations**
  - Remove monitoring wells JAX25-MW03 and JAX25-MW13 from the monitoring program since they are both upgradient and haven't had an exceedance of the GCTLs since prior to August 2008.
  - Add JAX25-MW07 to the monitoring program to monitor COC concentrations downgradient from JAX25-MW09.
  - Continue quarterly monitoring and reporting. The next groundwater monitoring event will be conducted in February 2013.

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NAS Jacksonville
Groundwater Monitoring Summary for PCA 16 Hawkins Property

January 14, 2013

Solutions-IES
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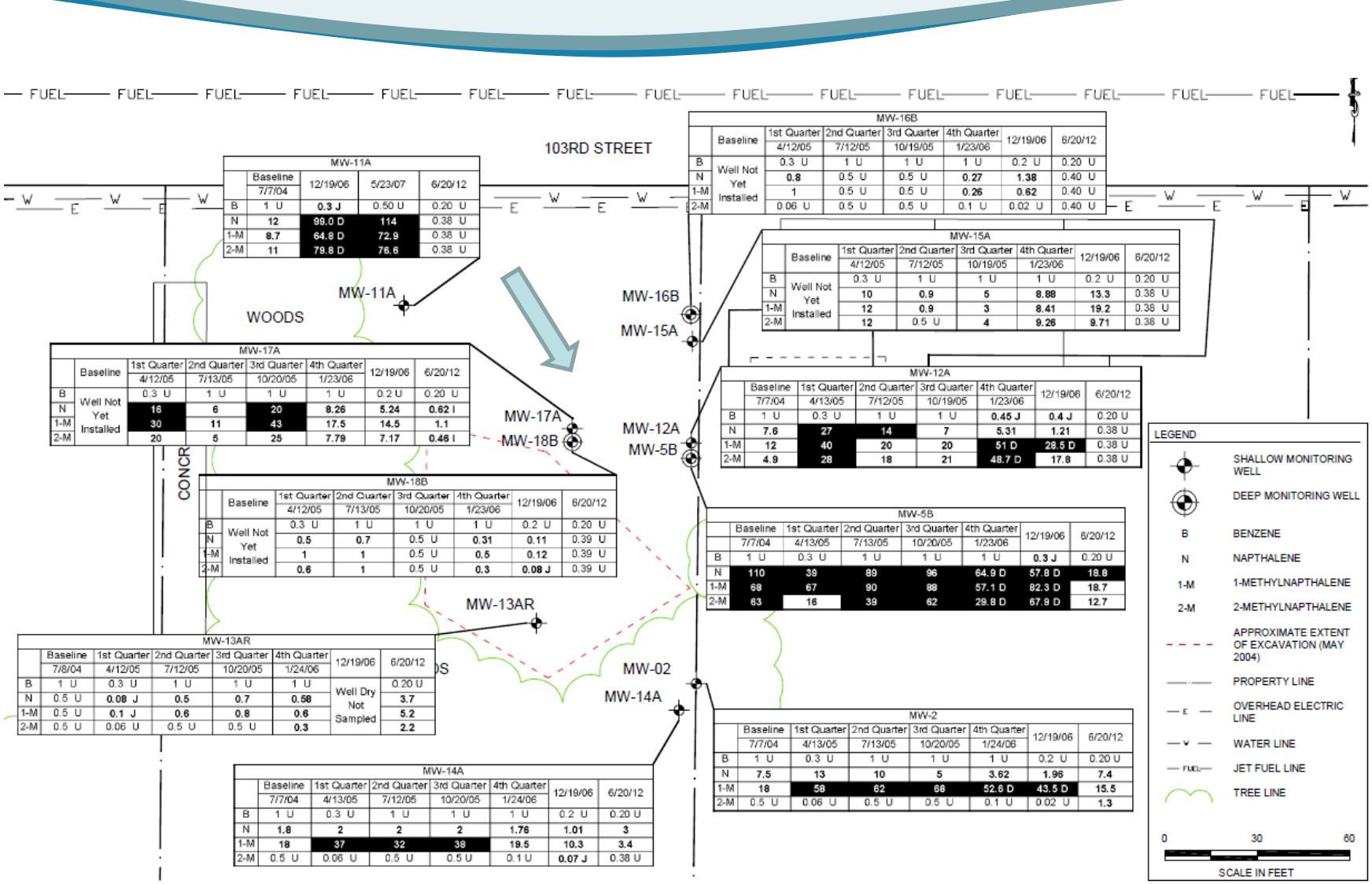
PCA 16 Hawkins Property

- First groundwater monitoring event since 2006 was performed by Solutions-IES on June 20, 2012.
- Water level elevations were gauged in 10 monitoring wells; 7 shallow or Zone A (~3-8 ft bgs), 3 deep or Zone B (~13-18 ft bgs).
- Groundwater flow is to the south-southeast in both the shallow and deep zones.
- 10 monitoring wells (7 shallow, 3 deep) were sampled for VOCs, SVOCs and TRPH.

PCA 16 Hawkins Property

- **Contaminants of Concern Results**
  - Naphthalene was the only COC that exceeded the GCTL in JAX-PCA16-MW05B (18.8 µg/L).
  - Two constituents, isopropylbenzene and 1,2,4-trimethylbenzene, exceeded their respective GCTLs in 4 monitoring wells.
    - Both constituents not historically reported. Not considered COCs.
  - TRPH was not reported above the GCTL in any of the wells sampled.

PCA 16 Hawkins Property



MW-11A

	Baseline 7/7/04	12/19/06	5/23/07	6/20/12
B	1 U	0.3 J	0.50 U	0.20 U
N	12	99.0 D	114	0.38 U
1-M	8.7	64.8 D	72.9	0.38 U
2-M	11	79.8 D	76.6	0.38 U

MW-16B

	Baseline	1st Quarter 4/12/05	2nd Quarter 7/12/05	3rd Quarter 10/19/05	4th Quarter 1/23/06	12/19/06	6/20/12
B	Well Not Yet Installed	0.3 U	1 U	1 U	1 U	0.2 U	0.20 U
N		0.8	0.5 U	0.5 U	0.27	1.38	0.40 U
1-M		1	0.5 U	0.5 U	0.26	0.62	0.40 U
2-M		0.06 U	0.5 U	0.5 U	0.1 U	0.02 U	0.40 U

MW-15A

	Baseline	1st Quarter 4/12/05	2nd Quarter 7/12/05	3rd Quarter 10/19/05	4th Quarter 1/23/06	12/19/06	6/20/12
B	Well Not Yet Installed	0.3 U	1 U	1 U	1 U	0.2 U	0.20 U
N		10	0.9	5	8.88	13.3	0.38 U
1-M		12	0.9	3	8.41	19.2	0.38 U
2-M		12	0.5 U	4	9.26	9.71	0.38 U

MW-17A

	Baseline	1st Quarter 4/12/05	2nd Quarter 7/13/05	3rd Quarter 10/20/05	4th Quarter 1/23/06	12/19/06	6/20/12
B	Well Not Yet Installed	0.3 U	1 U	1 U	1 U	0.2 U	0.20 U
N		16	6	20	8.26	5.24	0.62 I
1-M		30	11	43	17.5	14.5	1.1
2-M		20	5	25	7.79	7.17	0.46 I

MW-12A

	Baseline 7/7/04	1st Quarter 4/13/05	2nd Quarter 7/12/05	3rd Quarter 10/19/05	4th Quarter 1/23/06	12/19/06	6/20/12
B	1 U	0.3 U	1 U	1 U	0.45 J	0.4 J	0.20 U
N	7.6	27	14	7	5.31	1.21	0.38 U
1-M	12	40	20	20	51 D	28.5 D	0.38 U
2-M	4.9	28	18	21	48.7 D	17.8	0.38 U

MW-18B

	Baseline	1st Quarter 4/12/05	2nd Quarter 7/13/05	3rd Quarter 10/20/05	4th Quarter 1/23/06	12/19/06	6/20/12
B	Well Not Yet Installed	0.3 U	1 U	1 U	1 U	0.2 U	0.20 U
N		0.5	0.7	0.5 U	0.31	0.11	0.39 U
1-M		1	1	0.5 U	0.5	0.12	0.39 U
2-M		0.6	1	0.5 U	0.3	0.08 J	0.39 U

MW-5B

	Baseline 7/7/04	1st Quarter 4/13/05	2nd Quarter 7/13/05	3rd Quarter 10/20/05	4th Quarter 1/23/06	12/19/06	6/20/12
B	1 U	0.3 U	1 U	1 U	1 U	0.3 J	0.20 U
N	110	39	89	96	64.9 D	57.8 D	18.8
1-M	68	67	90	88	57.1 D	82.3 D	18.7
2-M	63	16	39	62	29.8 D	67.9 D	12.7

MW-13AR

	Baseline 7/8/04	1st Quarter 4/12/05	2nd Quarter 7/12/05	3rd Quarter 10/20/05	4th Quarter 1/24/06	12/19/06	6/20/12
B	1 U	0.3 U	1 U	1 U	1 U	Well Dry Not Sampled	0.20 U
N	0.5 U	0.08 J	0.5	0.7	0.58		3.7
1-M	0.5 U	0.1 J	0.6	0.8	0.6		5.2
2-M	0.5 U	0.06 U	0.5 U	0.5 U	0.3		2.2

MW-2

	Baseline 7/7/04	1st Quarter 4/13/05	2nd Quarter 7/13/05	3rd Quarter 10/20/05	4th Quarter 1/24/06	12/19/06	6/20/12
B	1 U	0.3 U	1 U	1 U	1 U	0.2 U	0.20 U
N	7.5	13	10	5	3.62	1.96	7.4
1-M	18	58	62	68	52.6 D	43.5 D	15.5
2-M	0.5 U	0.06 U	0.5 U	0.5 U	0.1 U	0.02 U	1.3

MW-14A

	Baseline 7/7/04	1st Quarter 4/13/05	2nd Quarter 7/12/05	3rd Quarter 10/20/05	4th Quarter 1/24/06	12/19/06	6/20/12
B	1 U	0.3 U	1 U	1 U	1 U	0.2 U	0.20 U
N	1.8	2	2	2	1.76	1.01	3
1-M	18	37	32	38	19.5	10.3	3.4
2-M	0.5 U	0.06 U	0.5 U	0.5 U	0.1 U	0.07 J	0.38 U

PCA 16 Hawkins Property

- **Summary**
  - Site considered area of concern at this time.
  - Next monitoring event scheduled for January 2013. Sampling 6 monitoring wells MW-02, MW-5B, MW-11A, MW-12A, MW-14A, MW-17A.
  - Will analyze for COCs: naphthalene, 1-methylnapthalene and 2-methylnapthalene.

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NAS Jacksonville
Groundwater Monitoring Summary for
OU-5 PSC 51

January 14, 2013

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OU-5 PSC 51

- Annual groundwater monitoring event was performed by Solutions-IES August 1-2, 2012.
- Water level elevations were gauged in 7 monitoring wells (6 shallow, 1 deep).
- Groundwater flow direction is toward the southeast towards creek; water levels averaged 3.75 ft higher than when last sampled in June 2011.

OU-5 PSC 51

- **7 monitoring wells and 3 surface water locations were sampled for the COCs BTEX, 1,1-DCE, *cis/trans*-1,2-DCE, TCE, VC and naphthalene.**
- **All 10 locations also sampled for natural attenuation parameters of methane, ethane, ethene, alkalinity, ammonia, chloride, iron (total & dissolved), manganese (total & dissolved), nitrate, nitrite, sulfate, orthophosphate, sulfide, and total organic carbon.**
- **Seven monitoring wells were analyzed in the field for carbon dioxide, sulfide and ferrous iron.**

OU-5 PSC 51

- **Natural Attenuation Parameter Results - Groundwater**
  - Alkalinity ranged from 42.5 to 50.2 mg/L in the source area compared to <2.5 to 14.1 mg/L upgradient, downgradient, and in the deep groundwater
  - Ammonia-N and ortho-phosphate generally absent from groundwater
  - Chloride ranged from 5.5 to 18.6 mg/L
  - Total iron ranged from <0.035 to 4.06 mg/L; dissolved iron ranged from <0.035 to 2.37 mg/L)
  - Total and dissolved manganese ranged from 0.0012 to 0.0306 mg/L
  - Methane ranged from 16.6 to 99.7 µg/L in the shallow source and downgradient compared to 1.0 to 4.0 µg/L upgradient
  - Ethane and ethene were not reported above laboratory detection limits
  - Nitrate-N ranged from 0.068 to 0.50 mg/L; nitrite-N was not reported above laboratory detection limits
  - Sulfate ranged 4.9 to 11.3 mg/L in shallow groundwater; below laboratory detection limit in deep groundwater
  - Sulfide concentrations were less than 1.1 mg/L
  - TOC was higher in the source area (13.8 mg/L maximum) than upgradient/downgradient (2.2. mg/L maximum)

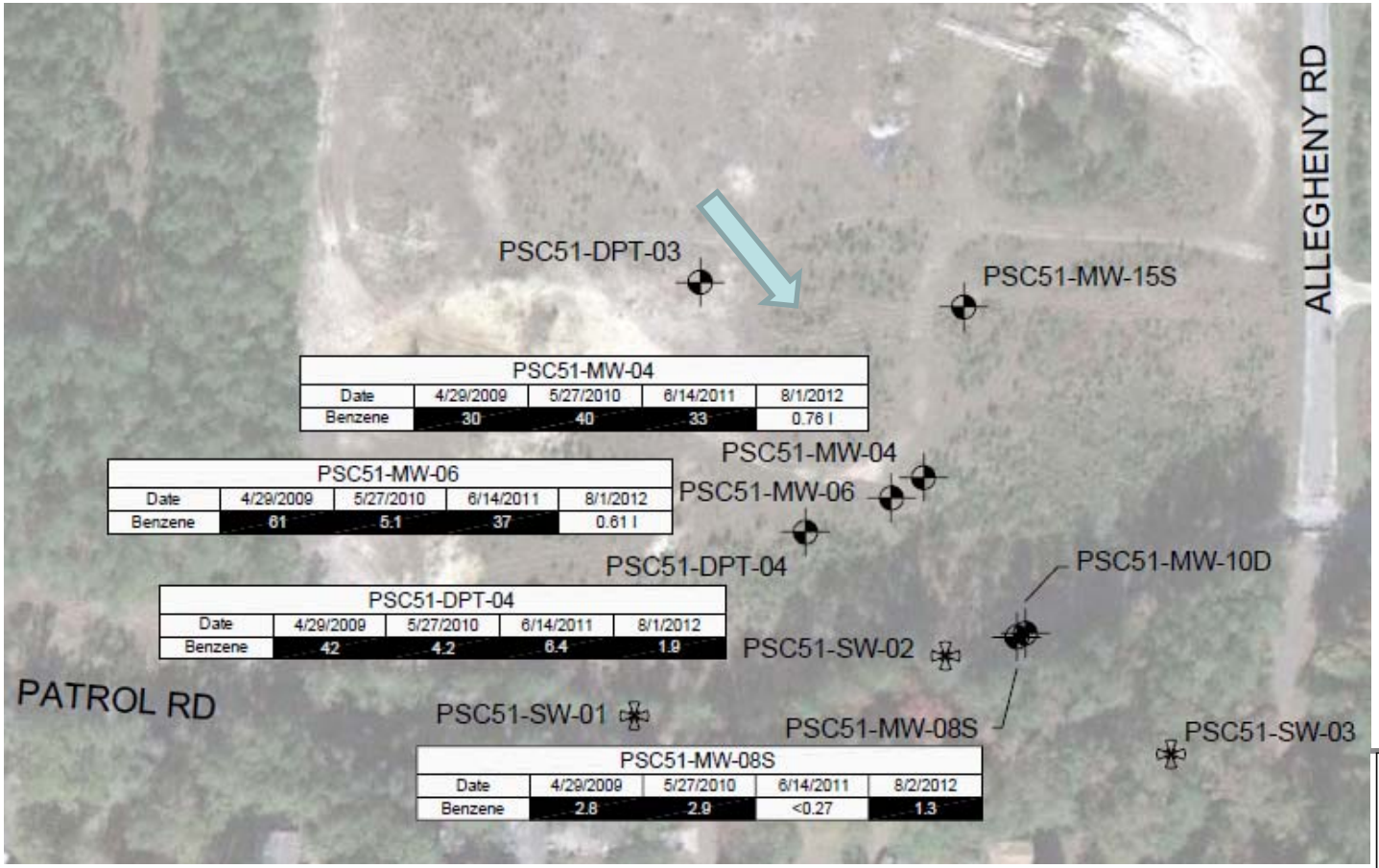
OU-5 PSC 51

- **Natural Attenuation Parameter Results – Surface Water**
  - Alkalinity, chloride, methane, orthophosphate and sulfate had lower midstream concentrations than upstream or downstream.
  - TOC was higher midstream (67.1 mg/L) than either upstream (25.5 µg/L) or downstream (27.8 µg/L).
  - Ammonia, iron, manganese, nitrate and sulfide had similar concentrations at all three locations.
  - Ethane, ethene and nitrite were not detected above the laboratory MDL.

OU-5 PSC 51

- **Contaminants of Concern Results - Groundwater**
  - Benzene was the only detected COC reported above the remedial goals in source area well PSC51-DPT-04 (1.9 µg/L) and downgradient well PSC51-MW-08S (1.3 µg/L)
  - No COCs reported above the Milestone Objectives
- **Contaminants of Concern Results – Surface Water**
  - Toluene was detected at each location. Concentrations ranged from 0.28 to 1.0 µg/L, which are far below the FDEP SWCTL
  - No evidence of toluene in groundwater

OU-5 PSC 51



PSC51-MW-04				
Date	4/29/2009	5/27/2010	6/14/2011	8/1/2012
Benzene	30	40	33	0.76 I

PSC51-MW-06				
Date	4/29/2009	5/27/2010	6/14/2011	8/1/2012
Benzene	61	5.1	37	0.61 I

PSC51-DPT-04				
Date	4/29/2009	5/27/2010	6/14/2011	8/1/2012
Benzene	42	4.2	6.4	1.9

PSC51-MW-08S				
Date	4/29/2009	5/27/2010	6/14/2011	8/2/2012
Benzene	2.8	2.9	<0.27	1.3

LEGEND

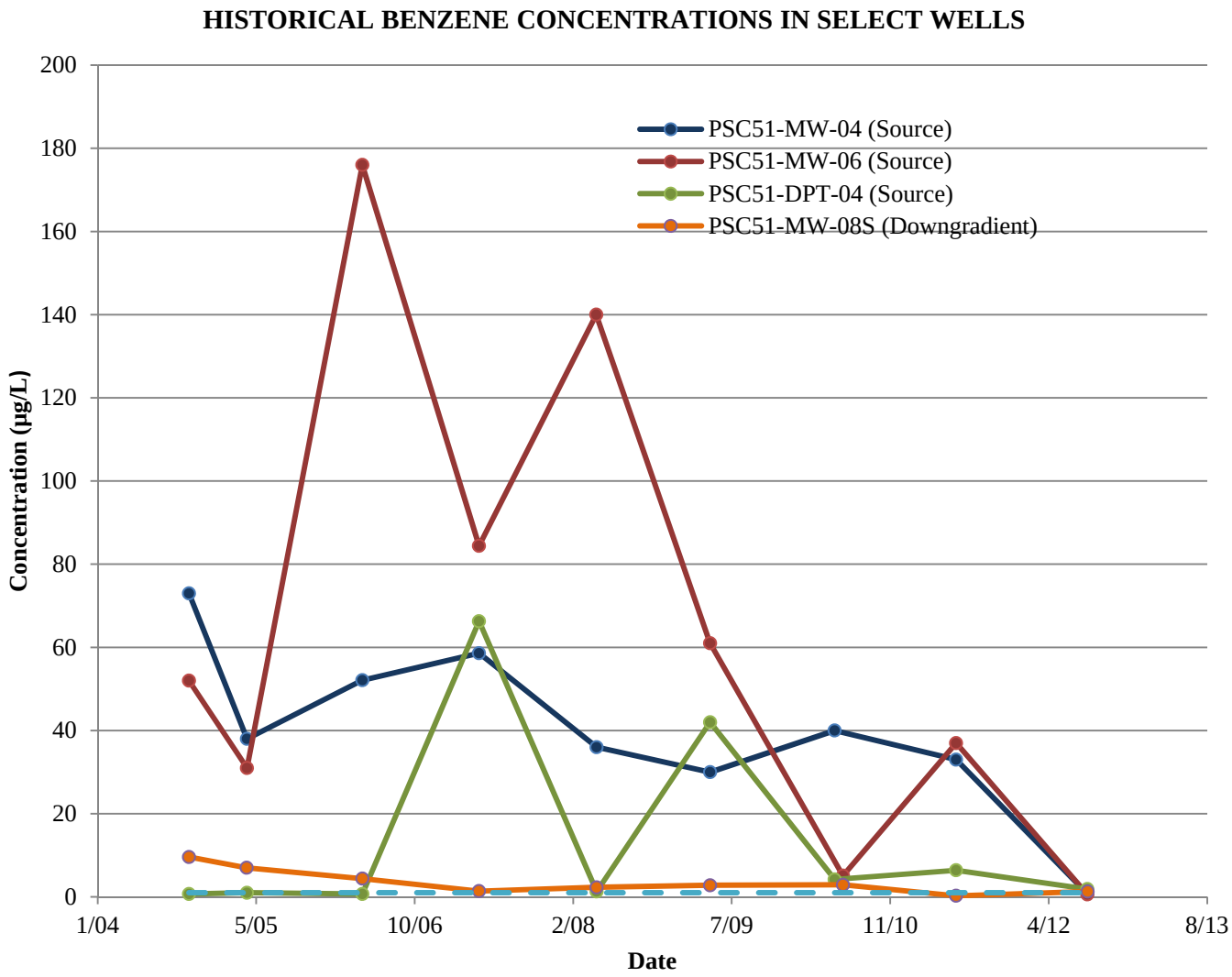
MONITORING WELL

SURFACE WATER SAMPLE LOCATION

0 150 300

SCALE IN FEET

OU-5 PSC 51


HISTORICAL BENZENE CONCENTRATIONS IN SELECT WELLS
PSC51-MW-04 (Source)
PSC51-MW-06 (Source)
PSC51-DPT-04 (Source)
PSC51-MW-08S (Downgradient)
Concentration (µg/L)
200
180
160
140
120
100
80
60
40
20
0
1/04
5/05
10/06
2/08
7/09
11/10
4/12
8/13
Date

OU-5 PSC 51

- **Summary**
  - Since monitoring started in 1999, COCs have decrease and trended towards established remedial goals.
  - MNA is working effectively to reduce COCs.
  - The small amount of residual benzene (<1.9 µg/L) in source area well PSC51-MW-08S and one downgradient well is far below the Milestone concentration of 49 µg/L projected for Year 8.
  - NA parameters in the stream suggest that groundwater is discharging to the stream, but COCs are not impacting the stream.

OU-5 PSC 51

- **Recommendations**
  - Discontinue monitoring NA parameters in surface water. The natural attenuation data for groundwater samples is sufficient enough to evaluate if aquifer conditions at PSC 51 support and sustain MNA.
  - Discontinue use of field test kits for sulfide and ferrous iron because laboratory analysis for sulfide and ferrous iron is already being conducted.
  - Discontinue sampling upgradient wells PSC51-DPT-03 and PSC51-MW-15S since there have been no exceedances of the GCTLs since prior to 2007.
  - Discontinue groundwater and surface water sample analysis for naphthalene. Naphthalene has not been detected above the FDEP GCTL in groundwater since December 1999, and has not been detected above the FDEP SWCTL in surface water since monitoring began in October 2004.

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NAS Jacksonville
Groundwater Monitoring Summary for
OU-1 PSCs 26 & 27

January 14, 2013

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OU-1 PSCs 26 & 27

- **Annual groundwater monitoring event performed by Solutions-IES July 31 to August 1, 2012.**
  - OU1-MW-84 and OU1-MW-85 initially could not be found. Sampled on December 5, 2012.
- **Water level elevations were gauged in 12 monitoring wells (5 shallow, 7 intermediate).**
  - Intermediate well OU1-MW-97 was damaged and was not sampled.
- **Groundwater flow direction is toward the southeast towards creek; water levels averaged 1.5 ft higher than when last sampled in November 2010.**

OU-1 PSCs 26 & 27

- **14 monitoring wells and 2 surface water locations were sampled for the COCs including benzene, 1,1-DCE, 1,2-DCA, *cis/trans*-1,2-DCE, TCE and VC.**
- **14 monitoring wells also sampled for natural attenuation parameters of methane, ethane, ethene, chloride, sulfate, sulfide, total organic carbon, iron (total & dissolved), and manganese (total & dissolved).**

OU-1 PSCs 26 & 27

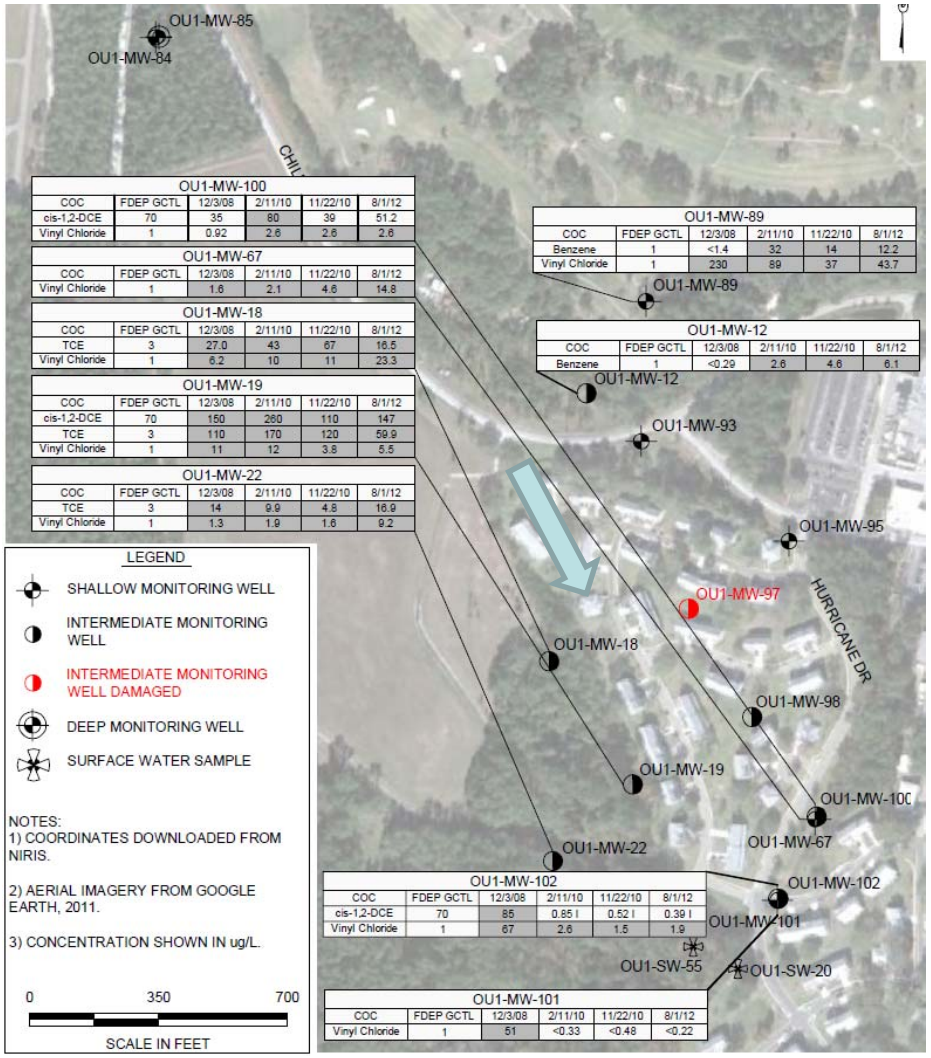
- **Natural Attenuation Parameter Results - Groundwater**
  - Chloride ranged from 5.4 to 64.1 mg/L
  - Total iron ranged widely in shallow zone (1,310 to 14,400 mg/L) and intermediate zone (227 to 102,000 mg/L); some evidence of dissolved iron in both zones
  - Total and dissolved manganese ranged from 6.5 to 104 mg/L throughout the aquifer
  - TOC was similar in both the shallow and intermediate zones, overall ranging from 2.1 to 15.3 mg/L
  - Methane ranged from 1.26 to 2,680 µg/L in the shallow zone and from 12.2 to 2,110 µg/L in the intermediate zone.
  - Ethene detections ranged from 1.6 to 8.61 µg/L; ethane detections ranged from 0.46 to 3.0 µg/L
  - Sulfate varied widely, ranging from 13.8 to 213 mg/L in the shallow zone and from 14.4 to 86.8 mg/L in the intermediate zone
  - Sulfide ranged from <0.3 mg/L to 1.9 mg/L

OU-1 PSCs 26 & 27

- **Contaminants of Concern Results - Groundwater**
  - Benzene, *cis*-1,2-DCE, TCE and VC exceeded the GCTLs
    - Benzene exceeded the GCTL in OU1-MW-89 (12.2 µg/L) and OU1-MW-12 (6.1 µg/L)
    - *cis*-1,2-DCE exceeded the GCTL in OU1-MW-19 (147 µg/L)
    - TCE exceeded the GCTL in OU1-MW-18 (16.5 µg/L), OU1-MW-19 (59.9 µg/L) and OU1-MW-22 (16.9 µg/L)
    - VC exceeded the GCTL in OU1-MW-18 (23.3 µg/L), OU1-MW-19 (5.5 µg/L), OU1-MW-22 (9.2 µg/L), OU1-MW-67 (14.8 µg/L), OU1-MW-89 (43.7 µg/L), OU1-MW-100 (2.6 µg/L) and OU1-MW-102 (1.9 µg/L)

- **Contaminants of Concern Results – Surface Water**
  - *Cis*-1,2-DCE (0.61 µg/L in OU1-SW-55) was the only COC reported above the lab MDLs

OU-1 PSCs 26 & 27



OU1-MW-100

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
cis-1,2-DCE	70	35	80	39	51.2
Vinyl Chloride	1	0.92	2.6	2.6	2.6

OU1-MW-67

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
Vinyl Chloride	1	1.6	2.1	4.6	14.8

OU1-MW-18

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
TCE	3	27.0	43	67	16.5
Vinyl Chloride	1	6.2	10	11	23.3

OU1-MW-19

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
cis-1,2-DCE	70	150	260	110	147
TCE	3	110	170	120	59.9
Vinyl Chloride	1	11	12	3.8	5.5

OU1-MW-22

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
TCE	3	14	9.9	4.8	16.9
Vinyl Chloride	1	1.3	1.9	1.6	9.2

OU1-MW-89

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
Benzene	1	<1.4	32	14	12.2
Vinyl Chloride	1	230	89	37	43.7

OU1-MW-12

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
Benzene	1	<0.29	2.6	4.6	6.1

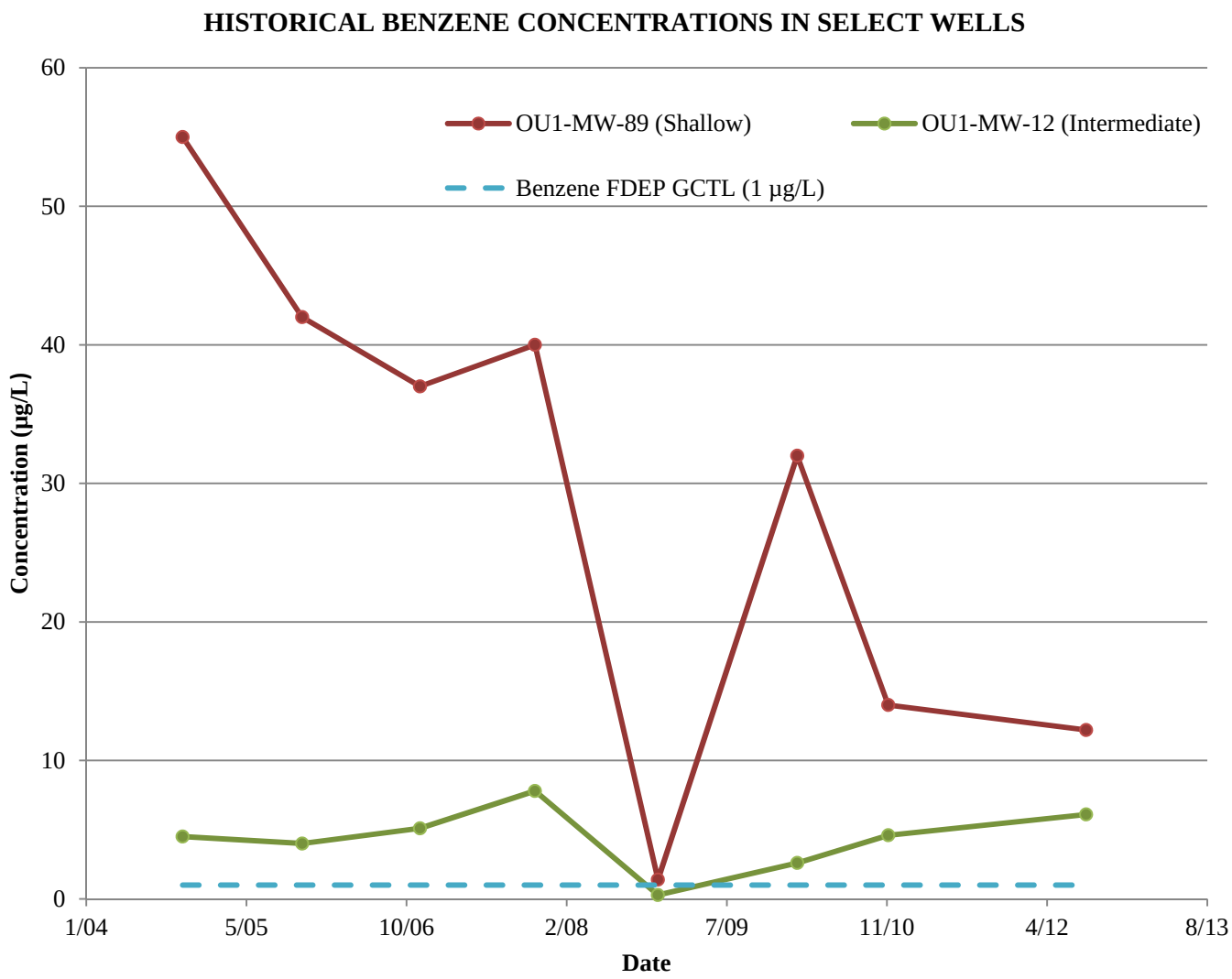
OU1-MW-102

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
cis-1,2-DCE	70	85	0.85 I	0.52 I	0.39 I
Vinyl Chloride	1	67	2.6	1.5	1.9

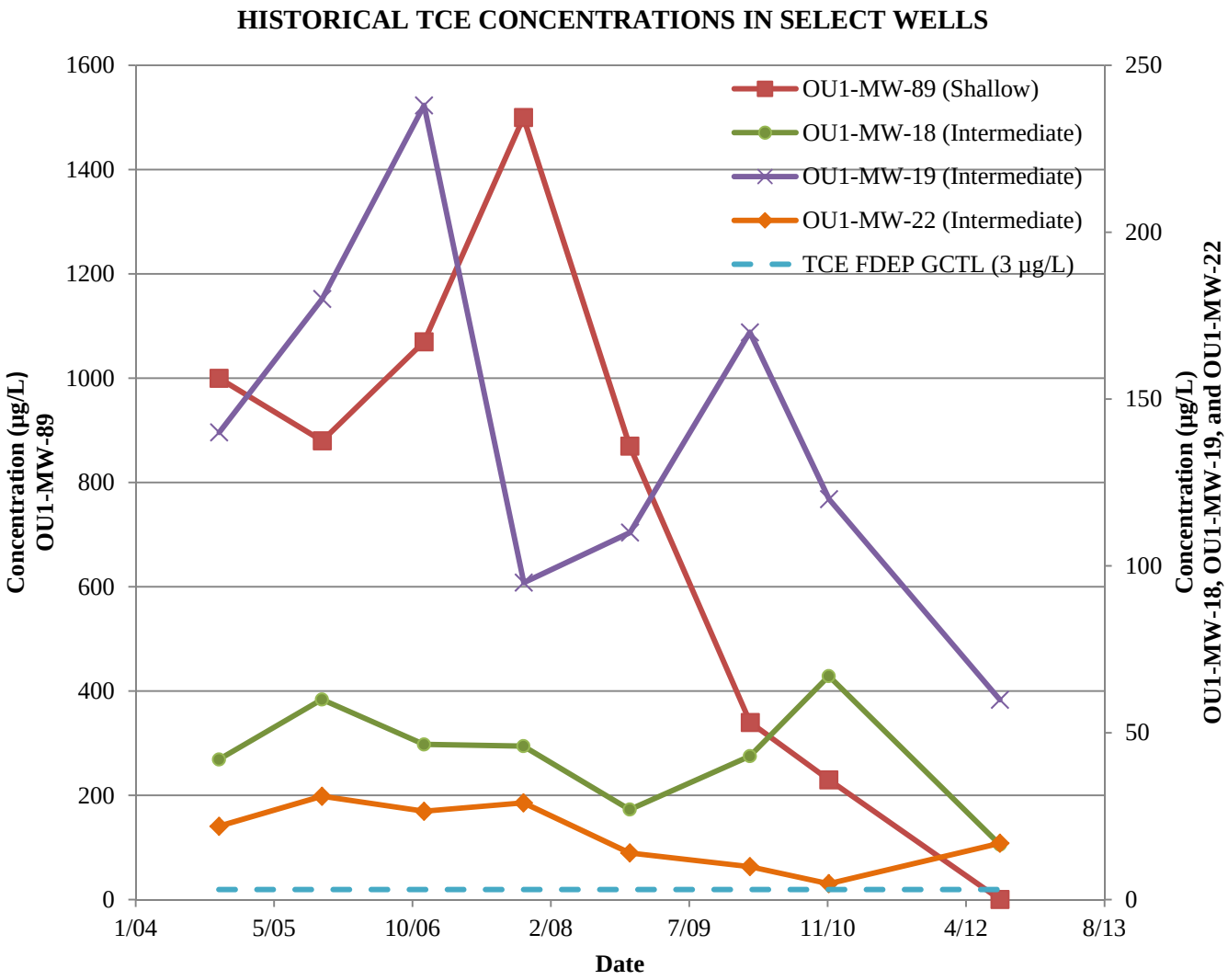
OU1-MW-101

COC	FDEP GCTL	12/3/08	2/11/10	11/22/10	8/1/12
Vinyl Chloride	1	51	<0.33	<0.48	<0.22

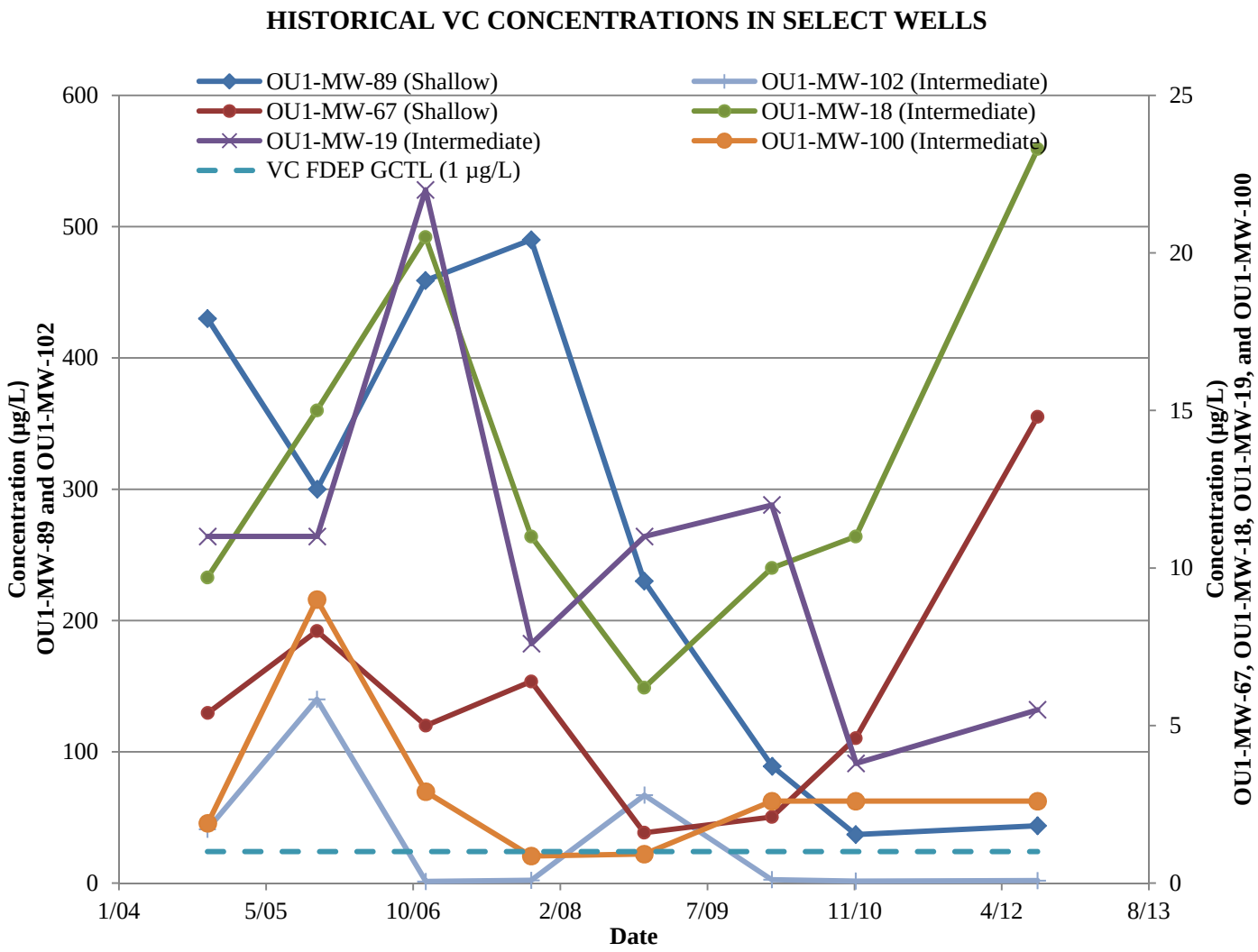
OU-1 PSCs 26 & 27



OU-1 PSCs 26 & 27



OU-1 PSCs 26 & 27



OU-1 PSCs 26 & 27

- **Summary**
  - Benzene in shallow zone has been decreasing toward the remedial goals, but appears to be stable in intermediate zone.
  - TCE in both shallow and intermediate zones has been trending toward the remedial goals.
  - VC concentrations increased slightly compared to 2011, but in some of the wells, concentrations have been trending toward the remedial goals.

- **Recommendations**
  - Discontinue sampling of OU1-MW-84, OU1-MW-85 and OU1-MW-98 because COCs have been below the GCTLs since November 2004.
  - Properly abandon damaged well OU1-MW-97.

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NAS Jacksonville
Groundwater Monitoring Summary for
OU-3 Area A

January 14, 2013

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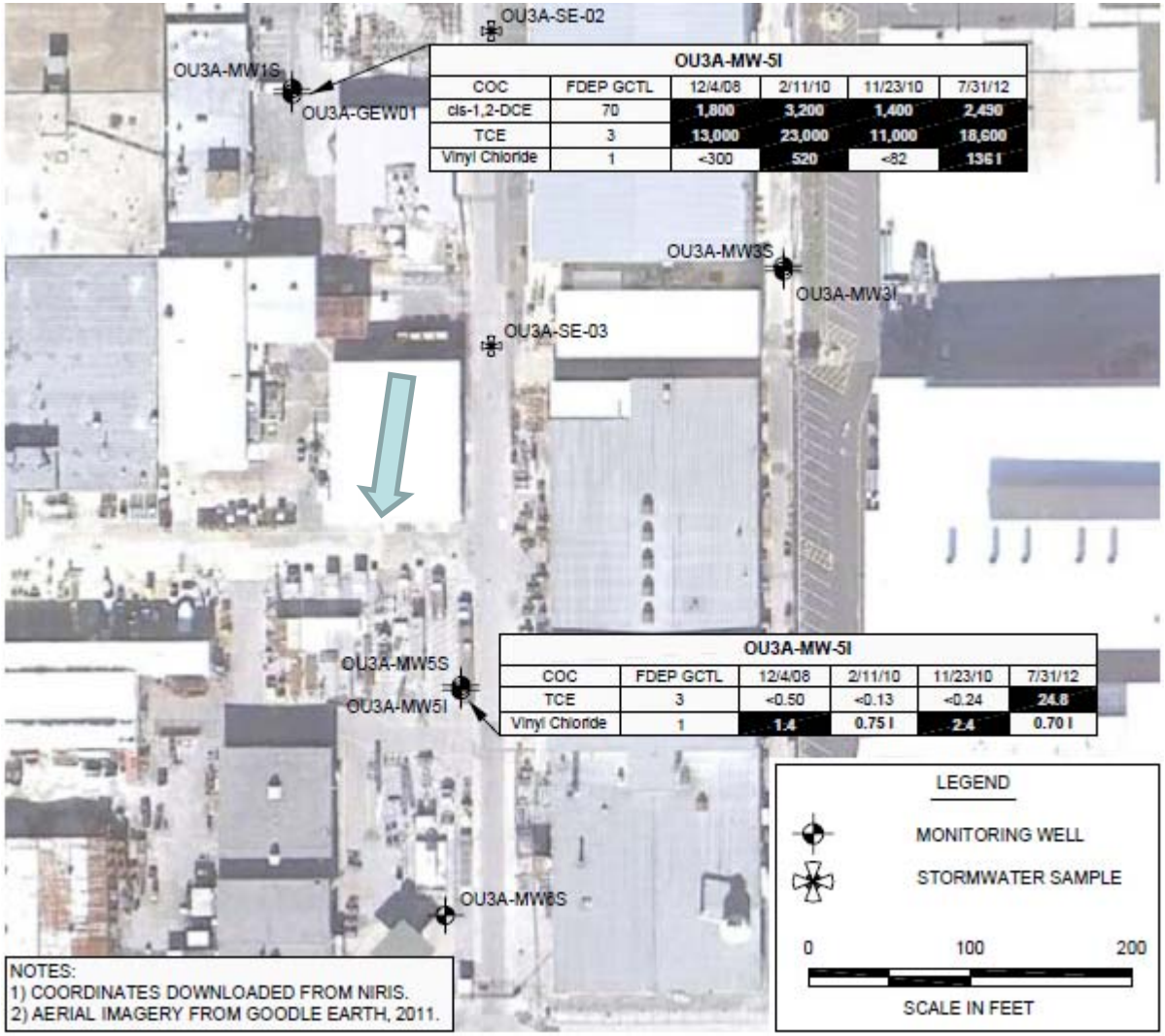
OU-3 Area A

- **Annual groundwater monitoring event performed by Solutions-IES July 31, 2012.**
- **Water level elevations were gauged in 8 monitoring wells (4 shallow, 4 intermediate).**
- **Groundwater flow direction in shallow zone is south-southwest towards St. Johns River.**
- **Groundwater flow direction in intermediate zone is heading south from the source area.**
- **8 monitoring wells and 2 stormwater locations were sampled for the COCs including 1,1-DCE, *cis/trans*-1,2-DCE, 1,1,2-TCA, TCE and VC.**

OU-3 Area A

- **Contaminants of Concern Results - Groundwater**
  - Exceedances of the GCTLs for *cis*-1,2-DCE (2,490 µg/L) and VC (136 µg/L) in OU3A-GEW-01
  - Exceedances of the TCE GCTL in OU3A-GEW-01 (18,600 µg/L) and OU3A-MW-5I (24.8 µg/L)
- **Contaminants of Concern Results – Surface Water from Storm Drain**
  - Collected from two locations along the storm sewer drain on Wright Street
  - No COCs were detected above the laboratory MDL in either sample

OU-3 Area A



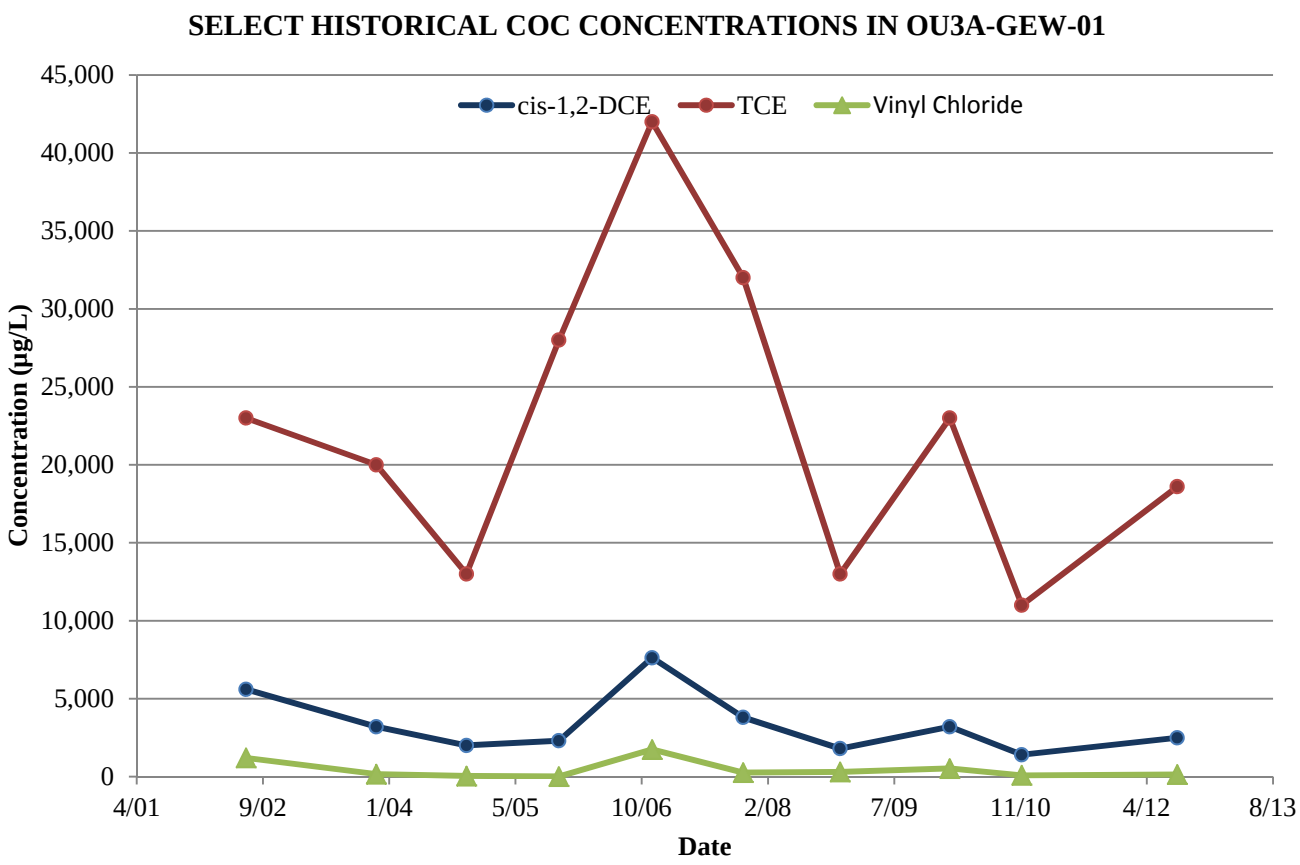
OU3A-MW-5I

COC	FDEP GCTL	12/4/08	2/11/10	11/23/10	7/31/12
cis-1,2-DCE	70	1,800	3,200	1,400	2,490
TCE	3	13,000	23,000	11,000	18,600
Vinyl Chloride	1	<300	520	<82	136 I

OU3A-MW-5I

COC	FDEP GCTL	12/4/08	2/11/10	11/23/10	7/31/12
TCE	3	<0.50	<0.13	<0.24	24.8
Vinyl Chloride	1	1.4	0.75 I	2.4	0.70 I

OU-3 Area A


SELECT HISTORICAL COC CONCENTRATIONS IN OU3A-GEW-01
cis-1,2-DCE
TCE
Vinyl Chloride
Concentration (µg/L)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
4/01
9/02
1/04
5/05
10/06
2/08
7/09
11/10
4/12
8/13
Date

OU-3 Area A

- **Summary**
  - Shallow zone
    - Only OU3A-GEW-01 contains concentrations of TCE, *cis*-1,2-DCE and VC above the GCTLs.
    - Concentrations of TCE, *cis*-1,2-DCE and VC have decreased since 2006.
  - Intermediate zone
    - Only OU3A-MW-5I contains TCE above the GCTL; this is the first reported detection above the GCTL since 2002.
  - Surface water from storm drain
    - No COCs detected above laboratory detection limits.

- **Recommendations**
  - Continue annual sampling to monitor natural attenuation. Next groundwater sampling event is scheduled for July 2013.

FEPA EXIT STRATEGY REPORT

Installation: NAS Whiting Field
Preparation Date: xxxx
Prepared By: RPM X

Site ID	Site Name	Milestone / Submittal	Baseline Date	Commitment Date	Projected Date	Completion Date	Exit Strategy	Comments
	Basewide							
		Five Year Review						
		IRACR						
		RACR						
Site 4	North AVGAS Tank Sludge Disposal							
		Record of Decision						
		Remedy in Place						
		Construction Complete						
		Remedy Complete						
		Site Closeout						
		SMP Deadlines						
Site 7	South AVGAS Tank Sludge Disposal							
		Record of Decision						
		Remedy in Place						
		Construction Complete						
		Remedy Complete						
		Site Closeout						
		SMP Deadlines						
Site 1438/1439	Leaking Above Ground AVGAS Tanks							
		Record of Decision						
		Remedy in Place						
		Construction Complete						
		Remedy Complete						
		Site Closeout						
		SMP Deadlines						