

N00102.AR.002803
NSY PORTSMOUTH
5090.3a

RESTORATION ADVISORY BOARD MEETING MINUTES, SLIDES, AND AGENDA 11
SEPTEMBER 2012 NSY PORTSMOUTH ME
9/11/2012
NSY PORTSMOUTH

**Portsmouth Naval Shipyard
Restoration Advisory Board Meeting
Kittery Town Hall, Kittery, Maine
September 11, 2012**

Attendees

Restoration Advisory Board (RAB) members at the meeting included the following:

- RAB Community Members:
 - Doug Bogen
 - Peter Britz
 - Mary Marshall
- Navy RAB Members:
 - Lisa Joy, Portsmouth Naval Shipyard (PNS)
 - Linda Cole, Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic Remedial Project Manager (RPM)
 - Elizabeth Middleton, NAVFAC Mid-Atlantic RPM
- Regulatory Representatives:
 - Matt Audet, United States Environmental Protection Agency (USEPA)
 - Iver McLeod, Maine Department of Environmental Protection (MEDEP)
 - David Wright, MEDEP
- Other Participants:
 - Matt Thyng (NAVFAC, Public Works Department – Maine Environmental Division)
 - Carolyn Lepage, Technical Assistance Grant (TAG) technical advisor to Seacoast Anti-Pollution League (SAPL)
 - Paul Dombrowski (Resolution Consultants)
 - Bill Deane (Shaw Environmental and Infrastructure (Shaw E&I))
 - Deborah Cohen (Tetra Tech)

The following RAB members were not in attendance:

- RAB Community Members:
 - Diana McNabb
 - Jack McKenna
 - Roger Wells
- Natural Resource Trustees:
 - Doug Grout, New Hampshire Fish and Game Department;
 - Denis-Marc Nault, Maine Department of Marine Resources
 - Ken Finkelstein, National Oceanic and Atmospheric Administration
 - Ken Munney, United States Fish and Wildlife Service

Opening Statements:

Doug Bogen, Community Co-Chair, opened the meeting with introductions of all in attendance. With sadness, it was noted that Michele Dionne, a Community RAB member, passed away in July 2012. Her commitment to the RAB and in particular her insight on biology and coastal ecology were highlighted. Information on a memorial service at the Wells National Estuarine Research Reserve on 23 September was provided.

Lisa Joy, Navy RAB Co-Chair, welcomed all attendees and noted the Navy's appreciation of the open dialogue in previous meetings. She asked that community members raise questions on any aspect of activities of interest or concern.

Environmental Restoration Program Status and Updates:

Linda Cole, Navy RPM, presented the status and updates on the Environmental Restoration (ER) program at the Shipyard. The foremost update was that Ms. Cole will be transferring to a Navy assignment in Djibouti for one year starting in late September 2012. Liz Middleton of NAVFAC will be taking the place as RPM for PNS. Dominic O'Connor of NAVFAC will be overseeing construction activities for Remedial Action (RA) at Operable Unit 2 (OU2).

The status update presentation is attached to the minutes and presented updates for ER activities work at each OU and Site 30. The status presentation began with a fiscal summary of the ER activities at the Shipyard. It was noted that some of the money budgeted for Fiscal Year (FY) 2013, approximately \$5.0 million, will actually be awarded in FY 2012, and that the actual amount shown for FY 2012 (shown as \$4.9 million) will likely be higher and the FY 2013 budget will be lower when presented at future RAB meetings. Some of this shift is to fund the RA activities for OU2.

The following are update highlights on the OUs:

- OU1 (Site 10: Former Battery Acid Tank No. 24). The RA is complete and scheduled asphalt repairs outside of Building 238 were completed in June 2012. The Navy is now preparing the Construction Completion Report (CCR). USEPA asked about the CCR schedule, and it was noted that the report was being reviewed by the Navy with estimated submittal of the draft document in mid-October. In addition, it was noted that the second round of post-RA groundwater sampling is scheduled for November. Further discussion of OU1 groundwater sampling was presented in another presentation at the RAB meeting.
- OU2 (Site 6: Defense Reutilization and Marketing Office (DRMO) Storage Yard, Site 29: Former Teepee Incinerator Site, and DRMO Impact Area). The draft Remedial Design (RD) (60%) document was submitted in April 2012. The Navy is currently resolving regulatory comments that were received from USEPA and MEDEP, and the Responses to Comments will be sent out to the regulators shortly. It was stated that approximately \$1.5 million was spent in FY 2012 to fund the waste disposal area (within Site 29) portion of the remediation. The DRMO area (Site 6 and portion of Site 29) RA will be performed by Shaw E&I and managed by William Deane. The waste disposal area RA

activities will be managed by AQVIQ Environmental Services, an Alaskan Native firm who have done much work for NAVFAC over last few years. Dominic O'Connor of NAVFAC will oversee the OU2 RA work. It was noted that the DRMO area portion was funded during FY 2011, and Shaw is further ahead with preparations by working on the RA work plan in parallel with the RD. AQVIQ will also prepare a RA work plan for regulatory review. Each area will require a separate CCR.

For the DRMO Impact Area, it is anticipated that the draft final CCR will be submitted to the regulators in November 2012. The Navy has several questions for MEDEP, primarily about figures, and will discuss with MEDEP at the completion of the RAB meeting. After resolving those issues, the Navy will prepare the draft final document.

- OU3 (Site 8: Jamaica Island Landfill (JILF), Site 9: Former Mercury Burial Sites, and Site 11: Former Waste Oil Tanks Nos. 6 and 7). It was reported that the Round 11 monitoring and inspection was performed by Tetra Tech in May 2012, and included groundwater sampling for arsenic, landfill gas monitoring, and minor maintenance. The draft data package from Round 11 is currently under regulatory review. The Second Five-Year Review for the Shipyard was completed in May 2012. OU3 had the first completed Record of Decision (ROD), so the Five-Year Review process is tied to OU3. The Second Five-Year Review report can be viewed at the Rice and Portsmouth libraries as well on the Shipyard's new public website that was discussed later during the RAB meeting.
- OU4 (Site 5: Former Industrial Waste Outfalls and Offshore Areas Potentially Impacted by PNS Onshore ER Program Sites). The final Feasibility Study (FS) report is in production and will be submitted in September 2012. The Proposed Remedial Action Plan (PRAP) is undergoing Navy review. In accordance with the Federal Facilities Agreement (FFA), the draft PRAP must be submitted within 90 days of the draft final FS (September 26).
- OU7 (Site 32: Topeka Pier Site): The draft FS was submitted in May 2012, and regulatory comments were received in July/August 2012 from USEPA and MEDEP. The Navy anticipates submitting responses to comments in September 2012. Since the PRAP needs to be submitted 90 days after draft final FS, Tetra Tech is working in parallel with the FS such that the submission PRAP will be on schedule.
- OU9 (Site 34: Former Oil Gasification Plant, Building 62). The Remedial Investigation was finalized in June 2012. The internal draft FS is being reviewed by the Navy.
- Site 30: (Former Galvanizing Plant, Building 184). Submittal of the draft CCR has been delayed for the Navy to further evaluate crystalline growth. The Navy's chemist is finalizing the review. It was noted that the inside of Building 184 has been renovated, including repainting, new lights, new bathroom, and heaters. The building is going to be used for offices and other Navy activities.

At the completion of the status and updates presentation, additional discussion occurred on budgets and funding. For FY 2013, the RA for OU4 is the major item to be funded. MEDEP asked a question about sequestration of the federal budget and the impact on the Shipyard ER activities. The Navy responded that it is currently assuming that federal funding is operating normally. It was noted that generally very little money is funded in the first quarter of any FY, with the exception of activities classified as "must fund," which include operating groundwater treatment plants to maintain plume capture. Many Navy activities get funded in the second quarter of each FY. The Navy stated that Congress has not passed a budget and there are several dynamics in play, including the presidential election. None of PNSY issues are considered "must fund," and RAs do not get funded in the first quarter of the FY. However, the Navy does not anticipate any cuts to ER budgets submitted years ago.

Regulator Updates:

Matthew Audet, USEPA RPM, began by noting that schedules are very important to the federal government, and he looks closely at the schedules in the Site Management Plan (SMP) to estimate level of effort and budgets. Despite the uncertainty with budget issues, he did not anticipate any impact to USEPA with respect to RA reviews as Superfund is generally considered critical. Iver McLeod, MEDEP RPM, noted that he received and approved the Response to Comments on the draft SMP for FY 2013. MEDEP further noted that during summer 2012 numerous reports were reviewed, and there are currently no items under review. Both USEPA and MEDEP agreed that everything is going well and they have not noted any serious problems with recent documents.

Integrating Sustainability into Remedial Design Using SiteWise:

Deborah Cohen, Tetra Tech, shared the presentation that she and Ms. Cole prepared for the Battelle Remediation conference in May 2012 in Monterey, CA. SiteWise is a tool developed by the Navy, Army Corps of Engineers and Battelle to do environmental footprint evaluations. SiteWise is free software that uses a series of Excel spreadsheets to provide an easy to use platform. The evaluation is currently being used in FS reports, including the OU7 FS. SiteWise can evaluate various steps in the CERCLA process including Remedial Investigation, Remedial Action, and Long Term Management (LTM). Environmental metrics that SiteWise evaluates include energy consumption, greenhouse gas emissions, criteria air pollutants (NOX, SOX, Particulate Matter), water impacts, and worker safety. The presentation noted that green remediation does fit into the CERCLA remedy selection process; however, a "greener alternative" cannot be selected if it is not protective of human health and the environment.

The presentation focused on a case study where sustainability was integrated into the RD process. For the conference the Shipyard and OU were not specified; however, the case study was for OU2. The selected remedy for the area was excavation and offsite disposal for soil exceeding industrial use criteria. For the SiteWise evaluation, two options compared were off-site disposal and soil rinsing for the excavation soils, and both of these options were evaluated in the FS for OU2. SiteWise showed that production of materials was one of the biggest

contributions to environmental impact, and the input from residual handling and disposal is directly proportional to the distance for a disposal facility. On-site soil washing was concluded to have a lower environmental footprint, but it was pointed out that equipment use was greater for this option. The SiteWise case study also showed how inputs can be improved using RD details compared to FS assumptions to improve understanding of environmental footprint estimations. Another observation of the evaluation was that LTM had a much greater calculated environmental footprint than the RA activities, which is the opposite of what is generally expected. The difference was associated with the contribution of particulate matter from asphalt paving in the future. Additional scenarios were then run with maintenance repair of smaller areas more frequently, which resulted in a reduction in environmental footprint from lower production of materials. Other aspects for further optimization include reducing the volume of material disposed off-site, use of local construction materials, and reuse/recycle of materials.

Ms. Cole discussed how the SiteWise model has not yet been validated, and the Navy is investigating how to collect data in the field during the RA to confirm and quantify assumptions. One example discussed was idling time for equipment. Mr. Deane added that fuel usage is a major concern during construction for cost purpose, but he would like to evaluate fuel usage from turning vehicles on and off more often compared to letting them run longer.

Mr. Audet noted that he believed the tool was better for RD/RA optimization than for remedy selection. The Navy anticipates using SiteWise will be standard practice in FS documents going forward; however, the nine CERCLA selection criteria will be the focus of remedy selection.

OU1 and OU3 Groundwater Sampling Update

Ms. Cohen presented the February and May 2012 groundwater sampling results for OU1 and OU3, respectively. The presentation slides are attached to the minutes.

At OU1, the RA was completed from November 2011 to March 2012 that excavated lead contaminated soil. The ROD included groundwater monitoring to check for adverse effects to groundwater as a result of the soil excavation. The first groundwater sampling was completed in February 2012, approximately one to two weeks after the completion of most of the excavation. Depending on the depth of the well screen, some wells were sampled at high tide and others sampled at low tide. The laboratory results for lead in the February samples were primarily less than detection limits (non-detect or 'U'). Lead was detected in monitoring well BA-MW05, where historically higher concentrations of lead have been detected; however, the concentration in February 2012 was lower than previous rounds. All detected lead concentrations were below risk-based action levels specified in the January 2012 Sampling and Analysis Plan (SAP): 800 ug/L for human health (construction worker exposure) and 22,680 ug/L for ecological (offshore exposure). The SAP also specified a decision flow process, such that if a potential significant increase was noted in the first round of sampling, the Navy would perform monitoring three months later (May), and if not then the second round of sampling would be nine months later (November). USEPA asked if the decision process included a third round of sampling. The SAP was intended to be flexible and includes provisions that if low lead

concentrations are measured in Round 2 then no further sampling would be performed and if higher concentrations are detected in Round 2 the Navy would discuss with the regulators the potential need for future sampling. Ms. Carolyn Lepage asked about the total lead concentration in well BA-MW04 being the same order of magnitude as the 2006 event. Tetra Tech agreed that the February 2012 results was similar to previous, but was greater than more than ten times less than the human health risk-based action level and did not show an increase in concentration. Mr. Peter Britz asked about sampling at high tide and low tide, and the Navy responded that there was a concern that groundwater concentrations at high and low tide may be different because of the quick flow of water out with the tide, especially in areas that are mostly fill. Therefore, groundwater samples have been collected at high and low tide. However, no significant difference has been noted for samples collected at different times in the tidal cycle.

At OU3, Round 11 of the Post-Remediation Operation, Maintenance, and Monitoring (OM&M) was conducted in May 2012. Groundwater monitoring wells were sampled for analysis of arsenic, and gas probes were monitoring for methane. Methane readings were zero in all in gas probes. During the landfill inspection, the landfill cover system was noted to be in good condition with no land use concerns. Minor maintenance activities were conducted, including filling groundhog and mouse holes, removing vegetation and debris from culverts, and replacing bolts on monitoring wells. In groundwater samples arsenic concentrations remained low compared with the lowest risk-based action level (49 ug/L for human health). Groundwater is not used for drinking, and this risk value was primarily determined by dermal exposure to groundwater migrating offsite to surface water. Elevated total arsenic was measured in well JW-13D during Round 6 (37 ug/L), but the last three rounds (Rounds 9-11) have not measured elevated concentrations. A draft data package summarizing observations and laboratory results was submitted in July 2012. The attendees made note of the high levels of natural occurring arsenic in Maine and New Hampshire and how this is a concern for drinking water in both states.

Mr. Audet asked for an update on placement of field turf on top of the softball field at OU3. Mr. Matt Thyng of NAVFAC Public Works Department – Maine Environmental Division responded that that plan is on hold.

Navy Public Webpage for Portsmouth Naval Shipyard

Ms. Cole presented an introduction and demonstration of Navy public website for the Shipyard. Business cards were presented to the attendees with the web address (<http://go.usa.gov/vvb>). The webpage includes site description and background information, which is primarily taken from the SMP. In addition, there is a Community Outreach tab, and recently the Second Five-Year Review Report was posted here. The public website includes access to the Administrative Record File (ARF) for the Shipyard, and thereby allows the community to download any of the final documents. A document search was demonstrated from the public webpage. The Navy reminded the RAB that it can take a few months to get a document uploaded and available, only final and pre-decision documents are included in the ARF, and for post-decision documents the public can contact the Public Affairs Office (PAO) at the Shipyard. The Navy's goal in

creating this public website is to eliminate information repositories. There is also a links tab which can be populated with links to the USEPA website for the Shipyard as well as press releases about the ER Program.

The Navy is very interested in the RAB using this tool and invites comments and questions as part of its efforts to disseminate as much information to the public as possible. The Navy acknowledged its responsibility to keep the content up-to-date, especially community outreach. The public website is also an easy place to post announcements and documents for public review (i.e., PRAP).

Community Remarks:

Ms. Carolyn Lepage asked for follow-up details regarding questions raised during the May 2012 RAB meeting, and the Navy provided verbal responses.

- At Site 30, the results of the crystalline analysis have not yet been released, but will be included in the upcoming CCR.
- For OU7, the estimated high costs for hot-spot excavation in the FS were evaluated further by Tetra Tech. Due to the utilities, contamination at depth, and shoring required for excavation near building, Tetra Tech believes that the costs are valid for the FS level cost estimate. The draft final FS will include additional text on assumptions of the cost estimate in the implementability section.
- Proposed changes to the RAB charter were discussed at the May RAB meeting. The revised charter has not yet been distributed, but the Navy plans to distribute it in September 2012.
- The Navy still plans on submitting a survey on engaging RAB members on alternative days and times for RAB meetings. Ms. Cole noted that she sent a survey to other Navy RPMs to see how the survey works and how to create one that can be distributed. Ms. Middleton will follow up on a RAB survey during the fall. Mr. Bogen noted that the survey should question if new community members should be added to the RAB.

Future Meetings:

Tuesday, December 4, 2012 was proposed for the next RAB meeting.

Portsmouth Naval Shipyard
Restoration Advisory Board Meeting
September 11, 2012

Agenda

- Introductions
- Opening Statements
 - Community Co-Chair
 - Navy Co-Chair
- Installation Restoration Program Status and Updates
- Regulator Updates (USEPA and MEDEP)
- Integrating Sustainability into Remedial Design Using SiteWise
- OU1 and OU3 Groundwater Sampling Update
- Navy Public Web Page for PNSY
- Community Remarks
- Open Discussion and Questions



Installation Restoration Funding History



- **Approximately \$60 Million spent to date**
- **FY 2011 spent \$1.9M**
- **FY 2012 spending plan \$4.9M**
- **FY 2013 spending plan \$5.0M**

- **Estimated \$22.8M for Cost-to-Complete**

1

Portsmouth Naval Shipyard Environmental Restoration Program, September 2012

OPERABLE UNIT 1 (Site 10)



- **Remedial Action (RA)**
 - RA completed
 - Asphalt repairs completed in June 2012**
- **Construction Completion Report**
 - Draft under preparation*
- **Groundwater Monitoring Plan Component of Long Term Management Plan**
 - First round of groundwater collected on 16 Feb 2012
 - Second round of groundwater to be collected in Nov 2012**



2

Portsmouth Naval Shipyard Environmental Restoration Program, September 2012

OPERABLE UNIT 2 (Sites 6 and 29)



- **Pre-Design Tech Memo**
 - Finalized and included in RD
- **Remedial Action**
 - Remedial Design (60%) submitted 30 April 2012
 - **Resolving regulatory comments**
- **LUC RD**
 - Submitted Final 19 March 2012



3

Portsmouth Naval Shipyard Environmental Restoration Program, September 2012

OPERABLE UNIT 2 (DRMO Impact Area)



- **Removal Action conducted in 2010**
 - Soil excavation and off-site disposal
 - No Further Action required
- **Construction Completion Report**
 - **Draft Final to be submitted in November 2012**



4

Portsmouth Naval Shipyard Environmental Restoration Program, September 2012

OPERABLE UNIT 3 (Site 8)



- **OM&M field work - Round 11**
 - Monitoring and inspection completed week of 7 May 2012
 - Draft data package under regulatory review*
- **Second Five Year Review**
 - Finalized 31 May 2012*
 - Electronic version available on public website and in Rice and Portsmouth libraries*



5

Portsmouth Naval Shipyard Environmental Restoration Program, September 2012

OPERABLE UNIT 4 (Site 5 and Offshore Areas of Concern)



- **FS Report**
 - Report will be finalized in September 2012*
- **Proposed Remedial Action Plan**
 - Draft anticipated for submittal September 2012*
- **Interim Offshore Monitoring Plan (IOMP) Update**
 - Round 12 field work anticipated for Spring 2013



6

Portsmouth Naval Shipyard Environmental Restoration Program, September 2012

OPERABLE UNIT 7 (Site 32)



- **FS Report**
 - Draft submitted 18 May 2012
 - *Regulatory comments received in July/August 2012*
 - *Responding to/resolving regulatory comments*
- **Proposed Remedial Action Plan**
 - *Draft to be submitted 90 days after Draft Final FS*



7

Portsmouth Naval Shipyard Environmental Restoration Program, September 2012

OPERABLE UNIT 9 (Site 34)



- **RI Report**
 - *Report finalized 8 June 2012*
- **FS Report**
 - *Draft in preparation*



8

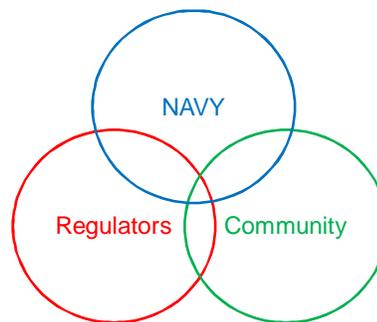
Portsmouth Naval Shipyard Environmental Restoration Program, September 2012



- **Removal Activities completed**
 - **Draft Construction Completion Report *delayed to allow Navy to further evaluate nature of crystalline growth***
 - **Decision Document in preparation**



- **Community Involvement Plan**
 - **Final CIP issued 27 June 2012**





Integrating Sustainability Considerations into Remedial Design

Presented by:

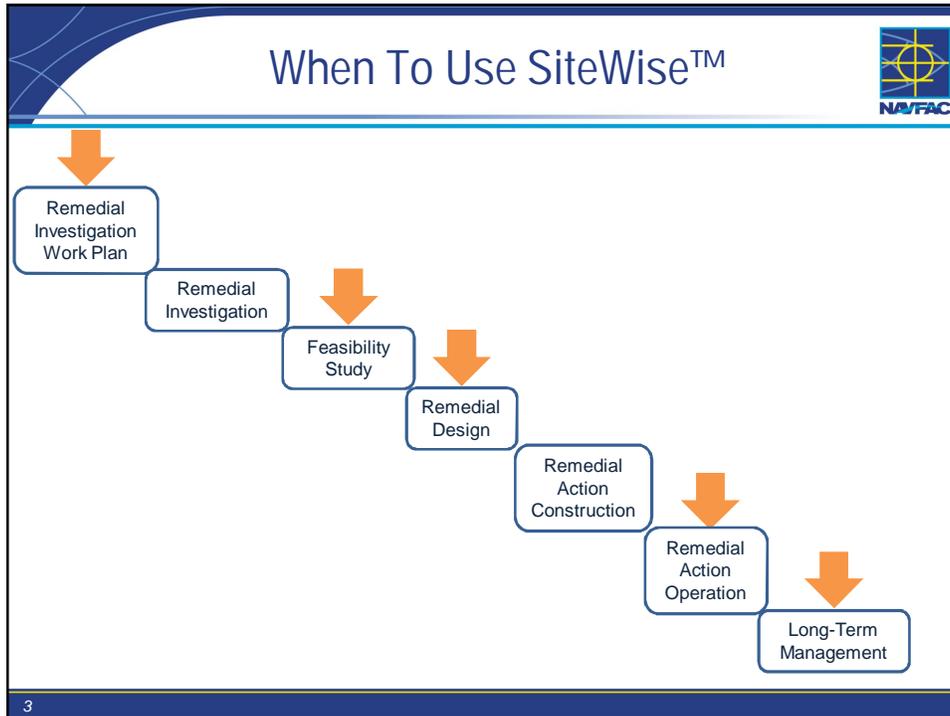
Linda Cole (NAVFAC MIDLANT, Norfolk, VA)

Deborah Cohen (Tetra Tech, Pittsburgh, PA)

Introduction to SiteWise™



- **Helps incorporate green sustainable principles into remediation clean up goals**
- **A life-cycle analysis tool for environmental footprint evaluation**
 - Developed by Battelle, NAVFAC, and Army Corps of Engineers
 - Series of Excel spreadsheets
 - Available at <http://www.ert2.org/t2gsrportal>



Metrics of SiteWise™



<p>Metrics calculated with tool:</p> <ul style="list-style-type: none"> • Energy Consumption – Expressed as BTU • Greenhouse Gas Emissions – Expressed as metric tons of CO₂e • Criteria Air Pollutants – NO_x, SO_x, PM₁₀ in metric tons • Water Impacts – Expressed as gallons • Worker Safety – Accidental injury and death 	<p>Metrics evaluated outside tool:</p> <ul style="list-style-type: none"> • Resource Consumption – Includes land, top soil, surface water and aquifer impacts, landfill space • Ecological Impacts • Community Impacts – Includes noise, traffic, odors
---	--

4

Lessons Learned



- **SiteWise™ and Tetra Tech's GSRx were good tools for optimization considerations at design and LTM stages**
- **Level of confidence increases as input data are refined**
- **Distance to disposal facility has a correlation to environmental impacts**
- **Sensitivity analysis recommended to fully understand tradeoffs of the environmental impacts**

5

Opportunities for Further Optimization



- **Increase waste characterization of excavated soil**
- **Use materials with lower environmental footprint**
- **Use local construction materials**
- **Reduce equipment idling time**
- **Develop a transportation plan**
- **Consider opportunities to reuse and recycle**

6

 TETRA TECH

Update on Sampling at Operable Units 1 and 3

Portsmouth Naval Shipyard
Date: September 11, 2012

Presenter:
Deborah Cohen, Tetra Tech

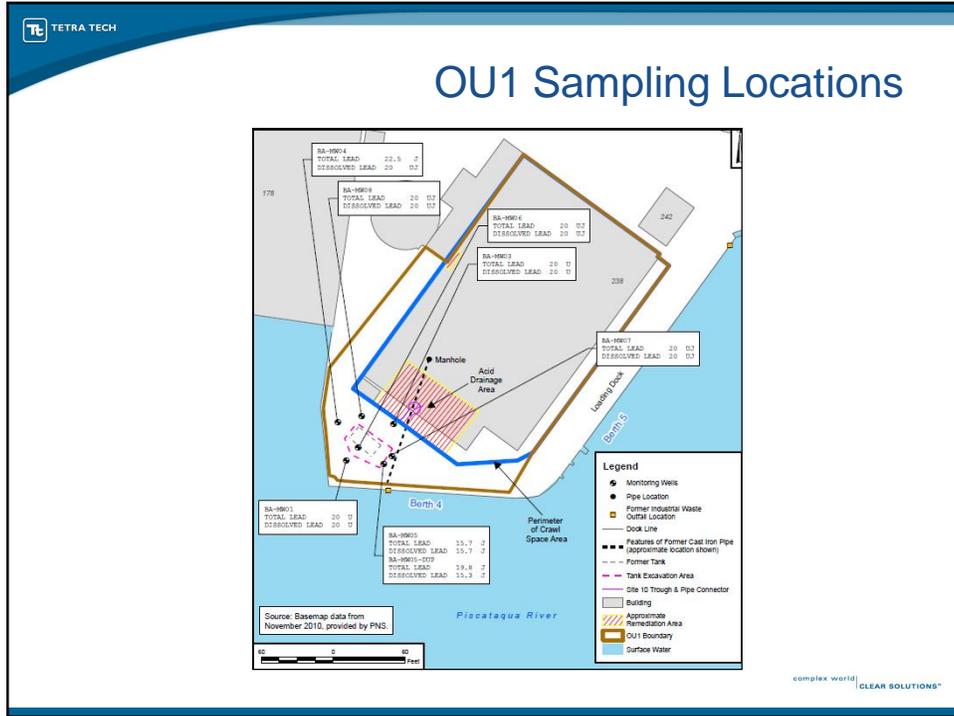
complex world | CLEAR SOLUTIONS®

 TETRA TECH

OU1 Post Remediation Groundwater Sampling

- Conducted as required by the OU1 Record of Decision to determine whether the soil remedial action had an adverse impact on lead concentrations in site groundwater
- In accordance with the January 2012 Sampling and Analysis Plan, Round 1 conducted within one to two weeks of completion of the majority of soil excavation
- Round 1 Data Package finalized in August 2012
- Based on decision flow in SAP, the second round will be in November 2012

complex world | CLEAR SOLUTIONS®



OU1 Lead Results

Lead results remained low and did not show a significant increase

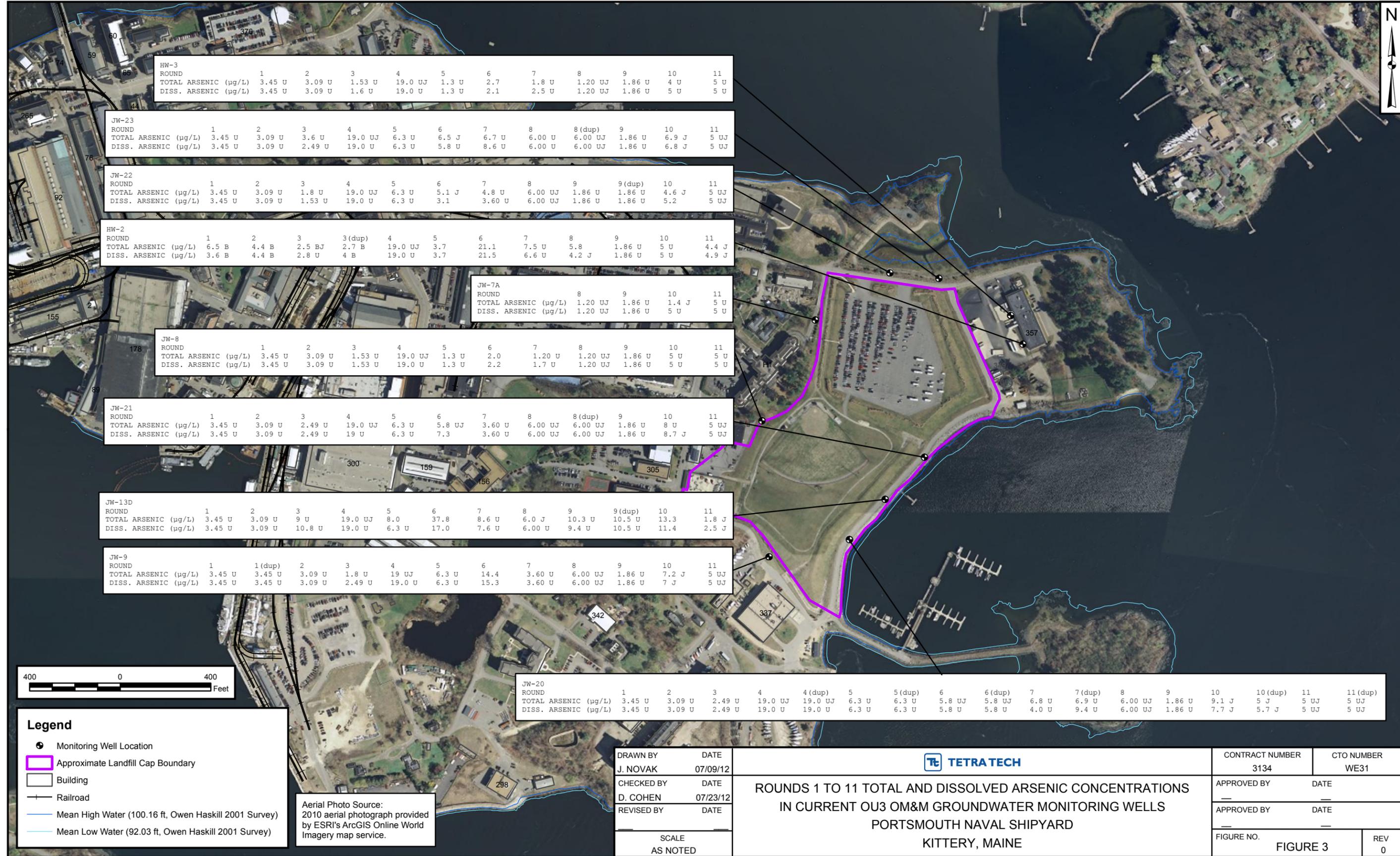
Monitoring Well	Pre-Remediation Lead Groundwater Concentrations (µg/L)						Post-Remediation Lead Groundwater Concentrations (µg/L)	
	1998 Event ⁽¹⁾		2001 Event ⁽²⁾		2006 Event ⁽³⁾		Round 1 Event	
	Total Lead	Dissolved Lead	Total Lead	Dissolved Lead	Total Lead	Dissolved Lead	Total Lead	Dissolved Lead
BA-MW01 ⁽⁴⁾	26.2 U	NA	4.61 U - 10.7 U	3.5 U - 5.4	1.8 U - 12.9	1.8 U	20 U	20 U
BA-MW03 ⁽⁴⁾	NA	NA	7.1 U - 11.9 U	3.9 U - 6.5 U	1.8 U - 2.4	1.8 U	20 U	20 U
BA-MW04 ⁽⁴⁾	NA	NA	30.6 U - 45.8 U	14.4 U - 23.7 U	16.5 - 22.5	14.1 - 18.7	22.5 J	20 U
BA-MW05 ⁽⁴⁾	NA	NA	37 U - 147 J	29.4 U - 22.8	32.9 - 45.2	24.8 - 37.2	15.1 J	15.7 J
BA-MW06 ⁽⁵⁾	NA	NA	NA	NA	10.7 - 11.1	7.5 - 12.2	20 U	20 U
BA-MW07 ⁽⁵⁾	NA	NA	NA	NA	3.8 - 10	2.5 - 4	20 U	20 U
BA-MW08 ⁽⁵⁾	NA	NA	NA	NA	3.1 - 10.5	1.8 - 11.1	20 U	20 U

1 Summary of results from Site 10 Field Investigation (1998) presented in the Remedial Investigation Report for OU1. (Tetra Tech, 2007).
 2 Summary of results from Site 10 Additional Investigation (2001) presented in the Remedial Investigation Report for OU1 (Tetra Tech, 2007).
 3 Summary of results from Data Gap Investigation (2006) presented in the Remedial Investigation Report for OU1 (Tetra Tech, 2007).
 4 Well sampled at low tide.
 5 Well sampled at high tide.

Risk-based Action Levels:
 Human Health - 800 ug/L
 Ecological - 22,680 ug/L

NA- Not Analyzed
 µg/L-microgram per liter

complex world | CLEAR SOLUTIONS®



HW-3											
ROUND	1	2	3	4	5	6	7	8	9	10	11
TOTAL ARSENIC (µg/L)	3.45 U	3.09 U	1.53 U	19.0 UJ	1.3 U	2.7	1.8 U	1.20 UJ	1.86 U	4 U	5 U
DISS. ARSENIC (µg/L)	3.45 U	3.09 U	1.6 U	19.0 U	1.3 U	2.1	2.5 U	1.20 UJ	1.86 U	5 U	5 U

JW-23												
ROUND	1	2	3	4	5	6	7	8	8 (dup)	9	10	11
TOTAL ARSENIC (µg/L)	3.45 U	3.09 U	3.6 U	19.0 UJ	6.3 U	6.5 J	6.7 U	6.00 U	6.00 UJ	1.86 U	6.9 J	5 UJ
DISS. ARSENIC (µg/L)	3.45 U	3.09 U	2.49 U	19.0 U	6.3 U	5.8 U	8.6 U	6.00 U	6.00 UJ	1.86 U	6.8 J	5 UJ

JW-22												
ROUND	1	2	3	4	5	6	7	8	9	9 (dup)	10	11
TOTAL ARSENIC (µg/L)	3.45 U	3.09 U	1.8 U	19.0 UJ	6.3 U	5.1 J	4.8 U	6.00 UJ	1.86 U	1.86 U	4.6 J	5 UJ
DISS. ARSENIC (µg/L)	3.45 U	3.09 U	1.53 U	19.0 U	6.3 U	3.1	3.60 U	6.00 UJ	1.86 U	1.86 U	5.2	5 UJ

HW-2												
ROUND	1	2	3	3 (dup)	4	5	6	7	8	9	10	11
TOTAL ARSENIC (µg/L)	6.5 B	4.4 B	2.5 BJ	2.7 B	19.0 UJ	3.7	21.1	7.5 U	5.8	1.86 U	5 U	4.4 J
DISS. ARSENIC (µg/L)	3.6 B	4.4 B	2.8 U	4 B	19.0 U	3.7	21.5	6.6 U	4.2 J	1.86 U	5 U	4.9 J

JW-7A				
ROUND	8	9	10	11
TOTAL ARSENIC (µg/L)	1.20 UJ	1.86 U	1.4 J	5 U
DISS. ARSENIC (µg/L)	1.20 UJ	1.86 U	5 U	5 U

JW-8											
ROUND	1	2	3	4	5	6	7	8	9	10	11
TOTAL ARSENIC (µg/L)	3.45 U	3.09 U	1.53 U	19.0 UJ	1.3 U	2.0	1.20 U	1.20 UJ	1.86 U	5 U	5 U
DISS. ARSENIC (µg/L)	3.45 U	3.09 U	1.53 U	19.0 U	1.3 U	2.2	1.7 U	1.20 UJ	1.86 U	5 U	5 U

JW-21												
ROUND	1	2	3	4	5	6	7	8	8 (dup)	9	10	11
TOTAL ARSENIC (µg/L)	3.45 U	3.09 U	2.49 U	19.0 UJ	6.3 U	5.8 UJ	3.60 U	6.00 UJ	6.00 UJ	1.86 U	8 U	5 UJ
DISS. ARSENIC (µg/L)	3.45 U	3.09 U	2.49 U	19 U	6.3 U	7.3	3.60 U	6.00 UJ	6.00 UJ	1.86 U	8.7 J	5 UJ

JW-13D												
ROUND	1	2	3	4	5	6	7	8	9	9 (dup)	10	11
TOTAL ARSENIC (µg/L)	3.45 U	3.09 U	9 U	19.0 UJ	8.0	37.8	8.6 U	6.0 J	10.3 U	10.5 U	13.3	1.8 J
DISS. ARSENIC (µg/L)	3.45 U	3.09 U	10.8 U	19.0 U	6.3 U	17.0	7.6 U	6.00 U	9.4 U	10.5 U	11.4	2.5 J

JW-9												
ROUND	1	1 (dup)	2	3	4	5	6	7	8	9	10	11
TOTAL ARSENIC (µg/L)	3.45 U	3.45 U	3.09 U	1.8 U	19 UJ	6.3 U	14.4	3.60 U	6.00 UJ	1.86 U	7.2 J	5 UJ
DISS. ARSENIC (µg/L)	3.45 U	3.45 U	3.09 U	2.49 U	19.0 U	6.3 U	15.3	3.60 U	6.00 UJ	1.86 U	7 J	5 UJ

JW-20																	
ROUND	1	2	3	4	4 (dup)	5	5 (dup)	6	6 (dup)	7	7 (dup)	8	9	10	10 (dup)	11	11 (dup)
TOTAL ARSENIC (µg/L)	3.45 U	3.09 U	2.49 U	19.0 UJ	19.0 UJ	6.3 U	6.3 U	5.8 UJ	5.8 UJ	6.8 U	6.9 U	6.00 UJ	1.86 U	9.1 J	5 J	5 UJ	5 UJ
DISS. ARSENIC (µg/L)	3.45 U	3.09 U	2.49 U	19.0 U	19.0 U	6.3 U	6.3 U	5.8 U	5.8 U	4.0 U	9.4 U	6.00 UJ	1.86 U	7.7 J	5.7 J	5 UJ	5 UJ



Legend

- Monitoring Well Location
- Approximate Landfill Cap Boundary
- Building
- Railroad
- Mean High Water (100.16 ft, Owen Haskill 2001 Survey)
- Mean Low Water (92.03 ft, Owen Haskill 2001 Survey)

Aerial Photo Source:
2010 aerial photograph provided
by ESRI's ArcGIS Online World
Imagery map service.

DRAWN BY	DATE
J. NOVAK	07/09/12
CHECKED BY	DATE
D. COHEN	07/23/12
REVISED BY	DATE
SCALE	AS NOTED

TETRA TECH

**ROUNDS 1 TO 11 TOTAL AND DISSOLVED ARSENIC CONCENTRATIONS
IN CURRENT OU3 OM&M GROUNDWATER MONITORING WELLS
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE**

CONTRACT NUMBER	CTO NUMBER
3134	WE31
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE 3	0