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MINUTES AND AGENDA FOR RESTORATION ADVISORY BOARD MEETING HELD 14 MAY  
2009 NAS SOUTH WEYMOUTH MA  
05/14/2009  
NAVAL AIR STATION SOUTH WEYMOUTH



# Naval Air Station South Weymouth, MA Restoration Advisory Board (RAB) Meeting Minutes May 14, 2009

## 1. INTRODUCTIONS/ APPROVAL OF PRIOR MEETING MINUTES

Mary Skelton Roberts opened the meeting at approximately 7:00 PM. M. Skelton Roberts introduced John Goodrich, also a facilitator with the Massachusetts Office of Dispute Resolution (MODR), who will be taking over the RAB meetings from M. Skelton Roberts since she is leaving MODR. She requested that all attendees, including RAB members, regulators, and audience members, introduce themselves. She noted that the meeting agenda, handouts, and the sign-in sheet were available on the back table. The sign-in sheet for the meeting is provided as Attachment A to this meeting summary. M. Skelton Roberts asked if everyone had time to read the minutes from the March 2009 RAB meeting and if there were any comments. There were no comments on the minutes.

M. Skelton Roberts then reviewed the ground rules for the meeting and reminded the meeting attendees that the focus of the meeting is cleanup issues; redevelopment issues will be placed on the 'parking lot.' She reviewed the guidelines for the meeting and reminded the participants when asking questions to wait to speak until they are acknowledged, to state their names and affiliations, and to speak clearly or into the microphone when they have questions.

M. Skelton Roberts then reviewed the agenda for the meeting. The meeting agenda and the Action Item Tracking List are provided as Attachment B to this meeting summary. In accordance with the agenda, the presentation and discussion would be followed by the Updates and Action Items portion of the meeting.

## 2. PRESENTATION

M. Skelton Roberts introduced Phoebe Call (Tetra Tech NUS) to give the presentation on the Solvent Release Area (SRA).

P. Call stated that objectives of the presentation are to review the components of the RI field program, describe the nature and extent of contamination, identify probable sources of contamination, summarize the human health and ecological risk assessments, and to present conclusions and next steps.

The SRA is located in Weymouth (Slide 2). The Site is approximately 8-acres, and is roughly bounded by Pidgeon Road to the north, the East Mat Ditch to the south, and wetlands to the east and west. The SRA

is predominantly a forested wetland system, vegetated by white pine, red maple and dense undergrowth. The former Pistol Range covers about 2 acres at the south end of the Site. A removal action was completed at the Pistol Range and the Site closed out via a Record of Decision in 2004.

The objectives of the Remedial Investigation were to collect data to characterize the Site, identify the source(s) of contamination, determine the nature and extent of contamination, evaluate contaminant migration on the Site, and identify any potential human health and ecological risks posed by site-related contaminants. The Site was originally selected as a background location, and soil samples were first collected in 1998 (Slide 3). These samples contained chlorinated VOCs, so in 2003 to 2004 field events were conducted to evaluate the extent of VOCs in groundwater and the potential tetrachloroethene (PCE) source. A geophysical survey was conducted in 2004 to identify potential buried metallic objects. Surface scrap and metal debris were identified and removed.

Based on the findings of these investigations the Site was renamed the SRA, IR Site 11, in early 2005 and a Remedial Investigation (RI) was planned. The 2006 RI focused on defining the nature and extent of contamination in the soil, groundwater, surface water, and sediment.

Surface geophysics was used to define the bedrock surface (seismic refraction) and locate water-bearing fracture zones (very low frequency). Another geophysics technique, 2-D resistivity, was also used to determine the areas to target for well placement. Soil and bedrock borings were installed to define the extent of the potential source areas and to install monitoring wells (Slide 4).

The soil sampling program included surface soil sampling and subsurface soil borings (Slide 5). The soil borings were completed in two phases. The first series was completed to evaluate the potential source areas and to install groundwater monitoring wells. The second series of borings was completed to better define the extent of VOC contamination in the suspected source area.

For the groundwater investigation (Slide 6), the bedrock boreholes were left open and borehole geophysics was conducted to gain additional information on water bearing fractures and groundwater flow in the bedrock. This information was used to select intervals within the borehole to conduct discrete interval sampling. Based on the results of the discrete interval sampling, two intervals within each borehole were selected to be completed as bedrock monitoring wells. Monitoring wells were installed in the overburden as well. All of the existing and newly installed wells on the Site were developed to create a good hydraulic connection with the surrounding aquifer. A full round of groundwater sampling was conducted from November to December 2006, and based on discussions with the regulatory agencies, a limited round of groundwater sampling was conducted in December 2007 to better delineate the source area.

Surface water and sediment sampling was conducted in the East Mat Ditch and the east and west drainage ditches. Passive Diffusion Bag samples were collected in the East Mat Ditch to determine the extent of VOC groundwater discharge to the East Mat Ditch. Staff gauges and stream piezometers were also installed to evaluate the groundwater and surface water interaction. A wetland delineation verification and an ecological assessment were performed.

The soil, groundwater, surface water, and sediment samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Soil samples were also analyzed for grain size and TOC. The data were validated and screened against risk-based screening criteria, Base background values, and drinking water MCLs.

The sampling results indicated that different compounds were detected in different media (Slide 7). VOCs were the predominant site contaminant, and were found mainly in the groundwater. SVOCs (mainly PAHs), were detected in soil and sediment, with fewer detections in surface water and groundwater. Pesticides were detected infrequently and at low concentrations in groundwater, soil, and sediment, and were not detected in surface water. PCBs were detected in the sediment, soil, and one surface water location, but not in the groundwater. Metals were detected frequently in all media, but most concentrations were below Base background values.

The conclusion drawn from the data was that there must have been a release of solvents, likely due to direct disposal on the ground surface since there was no confirmed spill. The highest concentrations were in the center of the Site and the maximum concentration was 12,000 µg/L.

M. Parsons asked what the depth to groundwater is. The depth to groundwater ranged from almost ground surface to approximately 6 feet below ground surface. M. Parsons remembered that during previous investigations, the deeper samples had higher concentrations. What was the deepest sample taken? P. Call responded that the deepest groundwater samples were collected from the bedrock wells (approximately 80 feet); the overburden wells were less than 25 feet bgs. The VOCs will travel in groundwater, rather than remain in the soil. M. Parsons asked if the water came to the surface, could the contaminants evaporate. P. Call stated that it depended on the VOC. PCE will breakdown to TCE, 1,2'-DCE and eventually vinyl chloride. Vinyl chloride is the most volatile compound in this process, and is the most likely to volatilize. M. Parsons asked for confirmation that PCE was used in dry cleaning and was known to cause cancer. Yes, PCE is used in dry cleaning and is known to cause cancer.

M. Byram asked for clarification on the depth of bedrock and how far samples were taken in bedrock. D. Barney responded that the top of bedrock is at approximately 20 feet below ground surface (bgs), so the deepest sample was collected approximately 60 feet into bedrock.

P. Scannell asked how many and in what area the bedrock borings were completed. P. Call stated that the bedrock borings were located throughout the 8 acres. D. Barney added that 8 bedrock borings were advanced and two nested monitoring wells were installed in each bedrock boring, at discrete intervals. P. Scannell asked if this process is the only method for detecting fractures in the bedrock. D. Barney mentioned that geophysics was used in the beginning of the field program; one can either core bedrock to look for fractures or use geophysics on an open borehole to detect fractures in bedrock.

P. Call continued the presentation with a discussion of the risk assessments. The human health risk assessment was performed and the contaminants of potential concern (COPCs) were identified for the different media. Slide 8 presents the types and numbers of COPCs for each media; Slide 9 presents the Human Health Risk Assessment Conclusions. There was no risk associated with the current site use scenarios. For future site use scenarios, risk was associated with the adult/child resident and the construction worker. For future residents, the risk is driven by groundwater being used as drinking water. As currently zoned, the Site would be available for open recreation, not resident use. However, if groundwater were to be used, the contaminants of concern include, cis-1,2-DCE, PCE, TCE, vinyl chloride, pentachlorophenol, 3,3-dichlorobenzidine, arsenic, barium, manganese, and vanadium. For the future construction worker, the risk would come from the trench air and soil, specifically PCE volatilizing into the air and vanadium in soil dust.

D. Galluzzo asked if the plan is to use groundwater as irrigation water, does using this water pose a risk to the resident. P. Call noted that the development plan envisions using groundwater for irrigation at the golf course. She stated she didn't think that the irrigation well would be near the SRA, but would be in the other drainage basin on the Base. D. Barney stated groundwater used for irrigation was not evaluated as an exposure risk. The more conservative approach was taken and exposure to drinking water was evaluated.

M. Parsons asked if groundwater from SRA could be drawn into the irrigation well. It was noted that the distance from SRA is important in looking at a potential zone of influence of a well used for irrigation. Due to the distance between the SRA and likely location for a pumping well it is highly unlikely that groundwater from the SRA would be drawn into the irrigation well.

D. Galluzzo wanted to know if drinking this water is harmful, why it wouldn't be harmful once it is aerated and used for irrigation. P. Call stated that in a human health risk assessment, the groundwater used for

drinking water scenario assumes higher exposure rates than groundwater used for irrigation. The use of higher exposure factors would result in a greater risk with the drinking water scenario.

An ecological risk assessment was also performed and VOCs, SVOCs, pesticides, PCBs and metals were determined to be COPCs in surface soil, sediments, groundwater and surface water (Slide 10). There were no ecological risks identified in either the terrestrial receptors or aquatic receptors (in sediment) (Slide 11).

D. Galluzzo asked for clarification. Could he plant and harvest a garden on this soil and there would be no risk to him? K. Keckler stated the ecological risk assessment looked at the risk to the plants and animals, and did not look at the risk to humans from eating these plants. That scenario can be evaluated, but it was not. D. Chaffin added that it was not necessary to evaluate every scenario, because the scenarios that have been evaluated have shown a threat to human health, so a remedy needs to be put in place. Since the future resident drinking groundwater is one of the more conservative scenarios in this case, the remedy used to address that risk should also address any risks associated with less conservative scenarios.

In conclusion, there were contaminants detected in all media, with the predominant COC being PCE in groundwater. The source of contamination is likely disposal of solvents on the ground surface. The potential risks to human health are mainly from future residential use of groundwater as drinking water and to a future construction worker due to exposure to volatile organics in a trench (Slide 12). There were no ecological impacts. The Draft RI report was submitted in September 2008. In addressing the comments from the regulators, it was decided that additional data collection was necessary. Due to the risks that have been identified to date a Feasibility Study will be needed to evaluate remedial alternatives to address these risks.

The additional field activities planned at SRA include installation of overburden and bedrock monitoring wells to better define groundwater flow and the extent of groundwater contamination, collect and analyze soil samples from new borings, and collect and analyze groundwater samples from newly installed wells. Additional field activities are planned for July 2009. Comments have been received on the Draft Work Plan, and the Work Plan is being revised. The new data will be combined with the existing 2006 and 2007 data in the draft final RI Report. A final RI Report is scheduled for December 2009. The Draft Feasibility Study Report is expected in October 2009.

M. Parsons stated that growing of gardens should be looked at as a scenario because there are plans in the development for areas to be used as public gardens. She is not sure if it is in this location.

D. Chaffin noted that the remedy would have to address these concerns. For a current user there is no significant risk related to this site, in fact all the risk associated with this site comes from the potential future use, which is what is driving the need for a remedial action.

A comment was made that the information presented seems to validate concerns of the public that there is no record of how this area became contaminated and it is linked to just dumping something on the ground. D. Barney noted there were near-by (within walking distance) activities (hobby shop) that could be related to the source of the site contamination. A question was asked: How could just dumping something in one spot contaminant an 8-acre site? B. Olsen responded by drawing a schematic of how solvents could have been poured onto the ground and as it rains it becomes diluted and eventually enters the groundwater. As the solvent migrates downward through the soil there is volatilization and a decrease in the concentration level. As solvents enter the groundwater, the groundwater disperses it and creates a plume. He noted that the concentrations are actually dilute compared to what was dumped on the ground surface. It does not take much to create a problem, such as the concentrations seen at SRA. These contaminants volatilize in soil fairly quickly and, as evident at SRA, are predominantly found in the groundwater.

A question was asked if all contaminants found are related to solvents. The response noted that some of the contaminants found are probably not related to a solvent spill. Some contaminants are found at very low concentrations at discrete locations and are not a risk. The big problem is the PCE in the groundwater at this Site.

D. Galluzzo asked why the Building 81 and Building 82 sites haven't been fenced off. D. Barney responded that both Building 81 and Building 82 are fenced.

P. Scannell asked if the mobile lab found any VOCs that were not otherwise identified. P. Call clarified that the mobile lab was a more cost effective, efficient way to quickly analyze a large number of samples. So the mobile lab is used more for screening and to obtain preliminary data as to which compounds are located on a site. Analytical laboratories will provide a more complete data set with full QA/QC, which is required for risk assessments.

P. Scannell asked if there was a reason why sampling was conducted in the winter. D. Barney stated in the winter, it is harder to get surface soil/sediment samples. It does not affect what is in the soil or groundwater. It does have an affect on volatile compounds, because less will volatilize. There are reasons for performing sampling at various times of the year. While spring rains could increase concentrations by moving through contaminated soils, the rains could also dilute the groundwater samples, so that is why samples are collected at different times of the year. For the SRA RI, sample

collection in the winter was a result of the sequencing of the RI field activities following approval of the SRA RI Work Plan.

M. Parsons asked if groundwater samples were collected during the summer. P. Call stated that the discrete interval sampling, for VOCs only, was performed in the summer. The data from these samples was used to determine where to place the well screens based on the highest VOC concentrations. The data were not used in the risk assessment. The additional field samples will be conducted in July 2009. D. Chaffin stated that groundwater is not often affected by the weather. M. Parsons noted that the level of the water table will change.

D. Galluzzo asked if the West Gate Landfill is fenced. M. Skelton Roberts stated they would address that question at the end of the meeting.

### **3. UPDATES AND ACTION ITEMS**

#### Action Items:

Provide photographs of landfill reuse with parking on cap – A. Malewicz supplied the RAB with photos of capped landfills that are being reused for different purposes. These are just examples, and will not necessarily be recommended as reuse options for West Gate Landfill. B. Olsen stated that the Portsmouth Naval Shipyard has a ball field and a parking lot on a landfill. K. Keckler stated that sites in Groton, CT have a museum and a parking lot.

Provide update on selection of the Independent Observer – A. Malewicz stated that she hasn't heard an update from Dave DeLorenzo, but she does know there have been inquiries about applying for this position. If there are any direct questions you can call Dave DeLorenzo. Everything may not be in place yet, but it is in the works.

Provide update on TAG/TASC funding – K. Keckler stated that there was a notice of availability in the Patriot Ledger and the Weymouth News as part of the TAG process. It is a 30-day notification and expires May 29, 2009. On the TASC funding, they are waiting to hear back from EPA headquarters. The next step will be for the TASC contractor to meet with the public group.

Prepare and distribute list of constructed sewage treatment systems similar in design to that proposed by SSTDTC – J. Young supplied M. Skelton Roberts with a list which was distributed to the RAB.

M. Skelton Roberts asked each of the Leads to provide updates to the list of Update Items and stated that the EPA would also be providing an update.

RAB Administrative Actions: D. Barney stated that there were no updates.

MassDEP Update: D. Chaffin stated there was nothing to report.

IR/EBS Program Site Update: D. Barney stated that the SRA field work is being planned and the Work Plan is being revised. Six additional sites are in various stages of additional data collection. The six sites are: Building 82, Building 81, West Gate Landfill, Industrial Area, RIA 62, and RIA 111. The field program for Building 82 is in progress now, and the remaining sites are in Work Plan stages. The programs are planned to address uncertainties and data gaps.

There are two sites, Main Gate and AOC 55C, for which Engineering Evaluations/Cost Analyses (EE/CAs) are being prepared. EE/CAs are brief descriptions of potential actions that could be taken to quickly address the site contaminants. At both of these locations Navy is proposing that the actions be to excavate and dispose of impacted material off-site.

A Remedial Action Work Plan for the former sewage treatment plant (STP) is being completed. The remedial action at STP is excavation and off-site disposal and/or recycling of the impacted soils and sediments.

FOST/FOSL Update: There is no status change.

SSTTDC Update: S. Ivas stated that Jim Young could not be here tonight. The groundwater discharge permit is the only permit that has been filed. They are in Stage 2 of 4, and at Stage 4 of the review process the public gets to comment. He also supplied a list of planned permits.

D. Galluzzo repeated his question about whether or not the West Gate Landfill is fenced and if there are signs. D. Barney stated that there are signs and a 6-foot chain link fence was installed. Recently the fence was taken down so that the field work at WGL could occur. When field work is complete, the fence will be reinstalled to restrict access.

A question was asked about the design for the West Gate Landfill. D. Barney stated that the pre-design investigation (PDI) is a necessary step in developing the design to implement the action selected in the ROD. P. Scannell asked if the remediation was being held up due to LNR. D. Barney responded, quite the contrary, and that the WGL remediation is moving forward. The Navy will soon contract with a firm to prepare the design.

M. Parsons asked what the timetable was for capping the landfill. K. Keckler said that after the PDI field program is complete (mid-June), they will continue into the design phase. They will know the layers of the cap, the footprint, and what debris needs to be pulled back. There will not be a chain link fence around the capped landfill. D. Barney stated that data being collected now will support the design.

P. Scannell asked if there was concern about the location of the new wastewater facility. D. Barney stated that the areas where the Navy would not be comfortable with the wastewater facility have been restricted. It cannot be built on WGL and RDA, for example.

D. Galluzzo asked how long the Navy will wait for SSTT/LNR. D. Barney stated that the Navy has a signed term sheet that Navy expects to be honored and fulfilled and the timeframe for the purchase is not specified.

#### Conclusion/Next Meeting

M. Skelton Roberts wrapped up the meeting. Suggestions for topics for the next meeting:

- Photos of field programs
- Five year review
- STP RD/RA
- Maybe 2-3 slides on a variety of topics
- STP, WGL, RIA 111, Small Landfill

D. Galluzzo asked about follow up to the MassDEP Solid Waste meeting. A. Malewicz stated that Bob Johnson is the point of contact and to check with him. There were no minutes prepared for this meeting.

A. Malewicz contacted Natural Heritage regarding the peat issues and wildlife impacts. She will provide the name of her contact, who stated he would answer any questions and was in tune with the needs of the community.

D. Galluzzo requested copies of DEP correspondence. D. Chaffin stated that he brought copies for him.

John Goodrich introduced himself and stated that he will be the new facilitator for RAB meetings.

The next RAB meeting will be the second Thursday in July (July 9, 2009).



# AGENDA

## Naval Air Station South Weymouth, MA Restoration Advisory Board (RAB) Meeting Agenda

May 14, 2009

Conference Center on Shea Memorial Drive

7:00 PM

<i>Agenda Items</i>	<i>Item Lead</i>	<i>Projected Time</i>
<b>1. Introduction, Review of Meeting Notes</b>	<b>Facilitator</b>	<b>7:00 - 7:15</b>
<b>2. Solvent Release Area RI Presentation</b>	<b>Navy</b>	<b>7:15 – 8:15</b>
<b>3. Updates and Action Items</b>	<b>Navy</b>	<b>8:15 – 8:30</b>
<b>4. Questions, Agenda Items, Next Meeting</b>	<b>Facilitator</b>	<b>8:30 – 9:00</b>

**Facilitator:** Mary Skelton-Roberts, Massachusetts Office of Dispute Resolution & Public Collaboration

### Restoration Advisory Board (RAB) Members:

**Abington:** James Lavin, (Alternate: Steve Ivas); Phil Sortin (Alternate: Beth Sortin)

**Hingham:** no current representation

**Rockland:** no current representation

**Weymouth:** James Cunningham (Community Co-Chair); Ken Hayes; Dan McCormack; Steve White

**Navy:** Dave Barney (Navy Co-Chair)

**EPA:** Kimberlee Keckler (Alternate: Bryan Olson)

**MA DEP:** David Chaffin (Alternate: Ann Malewicz)

### BRAC Cleanup Team (BCT) Points of Contact:

**Navy:** Dave Barney, BRAC Environmental Coordinator, Base Realignment and Closure, Program Management Office, Northeast (617) 753-4656  
Email: [david.a.barney@navy.mil](mailto:david.a.barney@navy.mil)

Brian Helland, Remedial Project Manager, Base Realignment and Closure Office, Program Management Office, Northeast (215) 897-4912  
Email: [brian.helland@navy.mil](mailto:brian.helland@navy.mil)

**MassDEP:** David Chaffin, Environmental Engineer, Federal Facilities (617) 348-4005  
Email: [david.chaffin@state.ma.us](mailto:david.chaffin@state.ma.us)

**EPA:** Kimberlee Keckler, Remedial Project Manager, Federal Facilities Section (617) 918-1385 Email: [keckler.kymerlee@epa.gov](mailto:keckler.kymerlee@epa.gov)

**MassDEP Ombudsman:** David DeLorenzo (617) 292-5774, Email: [david.delorenzo@state.ma.us](mailto:david.delorenzo@state.ma.us)



# ACTION ITEMS

## Naval Air Station South Weymouth, MA Restoration Advisory Board (RAB) Meeting

**May 14, 2009 – Next RAB Meeting**

<i>Action Item</i>	<i>Item Lead</i>	<i>Deadline</i>
<b>ACTION ITEMS</b>		
Provide photographs of landfill reuse with parking on cap	A. Malewicz/DEP	Next RAB
Provide update on selection of the Independent Contractor	DEP	Next RAB
Provide update on TAG/TASC funding	EPA	Next RAB
Prepare & distribute list of constructed sewage treatment systems similar in design to that proposed by SSTTDC	J. Young/M. Skelton Roberts	Next RAB
<b>UPDATES</b>		
RAB Administrative Actions	D. Barney	Each RAB
MassDEP Update	D. Chaffin	Each RAB
IR Program Sites Update	D. Barney	Each RAB
EBS Review Item Areas/ Various Removal Action Update	D. Barney	Each RAB
FOST/FOSL Update	D. Barney	Each RAB
SSTTDC Update	J. Young	Each RAB
<b>COMPLETED ITEMS</b>		
Provide the amount of natural habitat acreage (03/09)		
Provide acreage estimate for FOST 5B and FOST 6 property (03/09)		
Provide ACOE 401 permit to those interested (03/09)		
Provide an update on contract for independent observer (03/09)		
Provide various maps with perimeter streets and an acronym list. (10/08)		
Review suggestions to enhance the public participation process. (9/08)		
Provide FOST 3 and 4 Responsiveness Summaries to M. Bromberg (9/08)		
Send email announcing availability of FOST 5A for review (9/08)		
Discuss the parties involved in the cleanup and development of the Base (9/08)		
Provide suggestions to improve the public participation process. (6/08)		
Check location/depth of peat moved to south end of runway. (5/08)		
Determine Navy's role in the Enabling Legislation. (5/08)		
Provide the AOC 55C HHRA to A. Hilbert, J. Rakers, H. Welch. (3/08)		
Investigate issues with movement of peat during development. (1/08)		
Provide copies of EPA health risk requested by M. Bromberg. (1/08)		
Review routing of piping between STP Site and French Stream. (11/07)		
Provide location of Basewide Assessment floc samples. (10/07)		
Provide copies of parking lot response letter. (10/07)		
Provide groundwater data for transferred land (10/07)		
MDPH MS Study update (8/07)		
List of AULs; what and where they are (4/07)		
Provide vernal pools map to J. Cunningham (4/07)		
Copies of figures from Old Swamp River Study by Beta Group, Inc (03/07)		
Provide Hydrogeologic Investigation Tech Memo to D. Galluzzo (03/07)		
Distribute monthly Navy program status/administrative items update (03/07)		

# Solvent Release Area Remedial Investigation

Phoebe Call  
Tetra Tech NUS

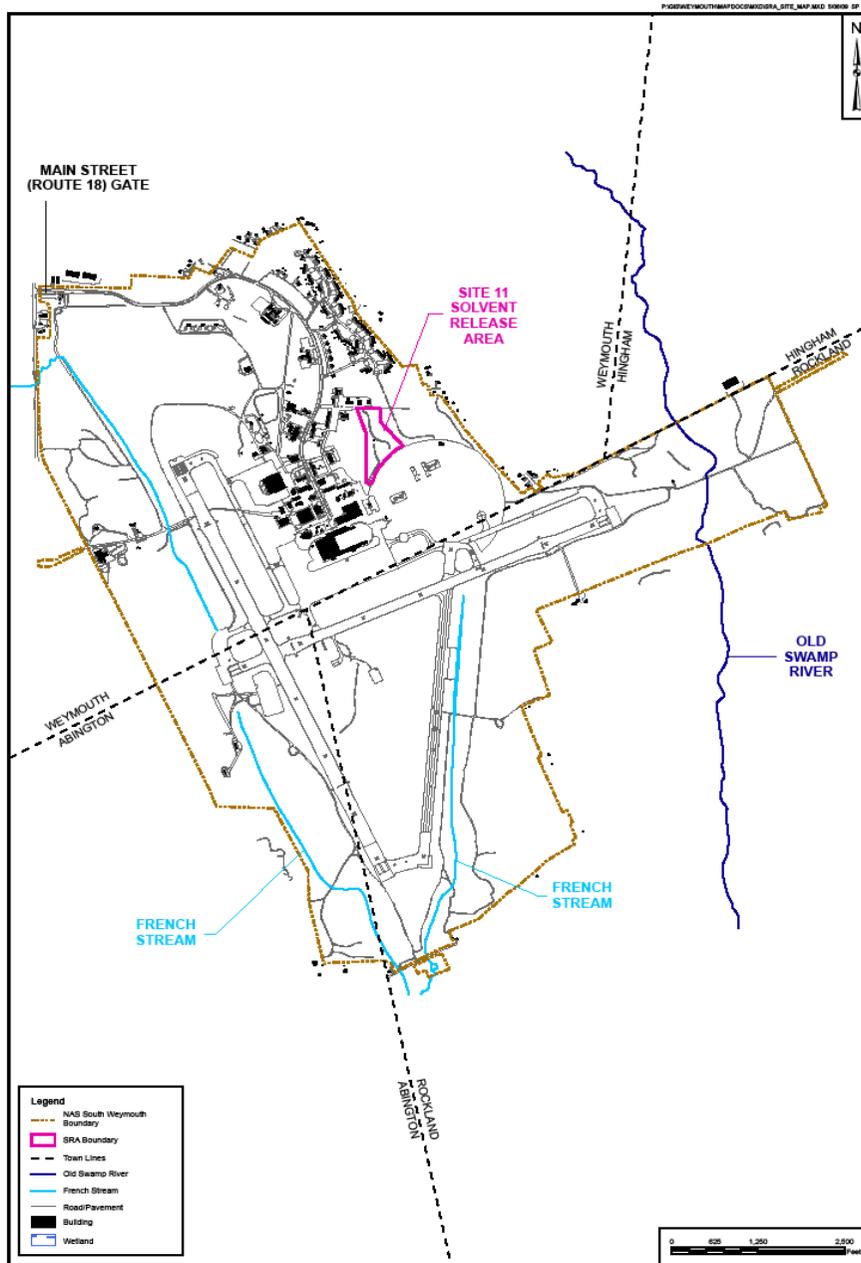
May 14, 2009

Restoration Advisory Board Meeting



# Objectives of Tonight's Presentation

- Review the components of the RI field program
- Describe the nature and extent of contamination
- Identify probable sources of contamination
- Summarize the Human Health and Ecological Risk Assessments
- Present Conclusions and Next Steps



# Location of Solvent Release Area (SRA)

# SRA Background

- Undeveloped 8-acre parcel in Weymouth; Pidgeon Road to north, East Mat Ditch to south, wetlands to east and west
- Vegetated by white pine, red maple and dense undergrowth
- Predominantly a forested wetland system
- Former Pistol Range (AOC 35) comprises 2 acres at south end of SRA, abutting the East Mat Ditch
  - Lead-contaminated soil and de-armament embankment removed in 2002-2003; ROD issued in 2004.

# SRA Looking South –



**Former Pistol Range area in foreground; East Mat in distance**

# Objectives of Remedial Investigation

- Collect, compile, and evaluate data needed to fully characterize the Site
- Identify the source(s) of contamination
- Determine the nature and extent of contamination
- Evaluate contaminant migration on Site
- Identify potential human health and ecological risks posed by Site-related contaminants

# Previous Investigations

- 1998 - Site (RIA 108) selected as EBS background sampling location; chlorinated VOCs (PCE, TCE, 1,2-DCE) detected at soil boring BG-05
- 2003-2004 - Four field events to evaluate the extent of VOCs in groundwater (AOC 108)
- 2004 – Shallow soil sampling program to evaluate potential PCE source
  - EPA mobile lab analyzed soils for PCE, TCE, 1,1,1-TCA
- 2004 – Geophysical survey to identify potential buried metallic objects
  - Surface scrap and metal debris identified and removed

# SRA RI Field Program

AOC 108 renamed SRA (IR Site 11) in early 2005

- Soil Investigation - to define contaminant nature, extent & migration and evaluate geology
- Groundwater Investigation - to define the contaminant nature, extent & migration; and evaluate groundwater flow
- Surface Water/Sediment Investigation - to define contaminant nature and extent and assess migration pathways to surface water/sediment

# RI Field Program

- Surface Geophysics
  - Seismic Refraction – to define the bedrock surface
  - Very Low Frequency (VLF) – to locate potential water-bearing fracture zones
  - 2-D Resistivity – used with VLF to locate bedrock boreholes to intercept & monitor fracture zones
- Soil/Bedrock Investigation
  - Soil Borings – to define extent of the source area
  - Air Rotary Drilling (Bedrock Borings) – to assess contaminants in bedrock groundwater



# Air Rotary Drilling

# RI Field Program (cont.)

- Surface Soil Sampling
- Subsurface Soil Borings
  - 1<sup>st</sup> series of soil borings to evaluate potential source areas and install groundwater monitoring wells
  - 2<sup>nd</sup> series of borings to better define extent of VOC contamination in suspected source area
  - Soil samples collected for evaluation of geology & chemical analysis
  - Coring to confirm bedrock depth and characteristics

# Soil Sampling Set Up



# Screening Soil for VOCs



# RI Field Program (cont.)

- Groundwater Investigation
  - Borehole Geophysics - in bedrock borings
  - Discrete Interval Sampling - in bedrock borings to determine depth of well screen
  - Well Installation - in overburden and bedrock borings
  - Well Development
  - Groundwater Sampling – full round in Nov.-Dec. 2006; limited round in Dec. 2007
  - In-Situ Hydraulic Conductivity Estimates

# Groundwater Sampling – December 2007



# RI Field Program (cont.)

- Surface Water Sampling and Analysis
  - East Mat Ditch
  - East and West Drainage Ditches
- Sediment Sampling And Analysis
- Passive Diffusion Bag Sampling in EMD
  - To determine extent of VOC groundwater discharge to EMD
- Staff gauge/stream piezometer installation
  - To evaluate groundwater/surface water interaction

# RI Field Program (cont.)

- Wetland Delineation Verification
  - Data Review
  - Field Investigation
- Ecological Assessment
  - Data Review
  - Field reconnaissance of plant species, soil strata, wildlife habitat, wildlife observations

# Data Analyses and Evaluation

- Analyzed soil, groundwater, surface water, sediment samples for: VOCs, SVOCs, pesticides, PCBs & metals. Soil also analyzed for grain size and TOC.
- Validated all data.
- Evaluated and screened data against risk-based screening criteria, Base background values, drinking water MCLs.

# Contaminant Presence

- VOCS – Predominant site contaminants, mainly in GW. Infrequent detections & low concentrations in soil, sediment, SW.
- SVOCs (mainly PAHs) – Detected in soil and sediment; fewer detections in SW and GW.
- Pesticides – Generally infrequent detections at low concentrations in GW, soil, sediment. No detections in SW.
- PCBs – Detected in sediment, soil, one SW location. No detections in GW.
- Metals – Frequent detections in all media, most below Base background values.

# Sources of Contamination

- Releases of solvents
  - Likely direct disposal on the ground surface
  - No confirmed spill
  - Area is undeveloped land, used briefly for recreation
- East Mat Ditch
  - Reports of debris disposal and drainage of aircraft fuel tanks to the EMD
  - Removal actions have been performed to address PCB, SVOC and metals hot spots
  - Highest PCB concentrations in EMD sediment

# Human Health Risk Assessment COPCs

- Surface Soil: 4 SVOCs, 1 PCB, 3 metals
- Subsurface Soil: 1 VOC, 2 SVOCs, 3 metals
- Groundwater: 5 VOCs, 2 SVOCs, 5 metals
- Surface Water: 2 VOCs, 1 PCB, 1 metal
- Sediment: 5 SVOCs, 1 PCB, 3 metals,
- Indoor air: 4 VOCs

# Human Health Risk Assessment Conclusions

Receptors Evaluated	Did risks exceed regulatory thresholds?	
	Cancer Risks	Non-Cancer Risks
Current Site Use Scenarios		
Adolescent Trespasser	No	No
Future Site Use Scenarios		
Adult/Child Resident	Yes	Yes
Adolescent Trespasser	No	No
Adult/Youth Recreational User	No	No
Construction Worker	Yes	Yes
Maintenance Worker	No	No

# Human Health Risk Assessment COCs

## Future Resident - Groundwater as drinking water

- VOCs: cis-1,2-DCE, PCE, TCE, vinyl chloride
- SVOC: pentachlorophenol, 3,3-dichlorobenzidine
- Metals: arsenic, barium, manganese, vanadium

## Future Construction Worker – Trench air and soil

- VOCs: PCE (volatilizing into air from groundwater in trench)
- Metals: vanadium (in soil dust)

# Ecological Risk Assessment COPCs

- Surface Soil: 3 VOCs, 4 SVOCs, 4 pesticides, 7 metals
- Sediment : 2 VOC, 18 SVOCs, 7 pesticides, 1 PCB, 3 metals
- Surface Water : 2 VOCs, 2 SVOCs, 1 PCB, 6 metals

# Ecological Risk Assessment Conclusions

Receptors Evaluated	Did risks exceed regulatory thresholds?
Terrestrial Receptors	
Invertebrates	No
Plants	No
Wildlife	No
Aquatic Receptors (in sediment)	
Invertebrates	No
Aquatic Organisms	No

# Conclusions

- Contaminants detected in all media; predominant COC is PCE in groundwater.
- Source of contamination is likely disposal of solvents on the ground surface
- Potential risks to human health mainly from:
  - Future residential use of groundwater as drinking water
  - Future construction worker due to exposure to volatile organics in a trench.
- No ecological impacts.
- Additional data collection field activities planned.
- Feasibility study needed to evaluate remedial alternatives.

# Next Steps

- Draft RI Report issued September 29, 2008
- Supplemental field work planned in response to EPA and MassDEP comments
- Work Plan Addendum in draft form; field work planned for July 2009
- Final RI Report scheduled for December 2009
- Draft Feasibility Study Report expected in October 2009