INSTALLATION RESTORATION PROGRAM

NAVAL SUPPORT FACILITY
INDIAN HEAD
3838 STRAUSS AVENUE
INDIAN HEAD, MARYLAND
20640-5133

RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES

Date of Meeting: October 18, 2018, 6:00 pm

RAB Member Attendees:
Mr. Joseph Rail (N) *
Mr. Alex Scott (N)
Mr. Curtis Detore (S)

Additional Attendees:
Ms. Tara Carlson (C)
Mr. Andrew Louder (N)
Ms. Tara Meadows (N)
Ms. Jeron Hayes (N)
Mr. Robert Thomson (F)

RAB Members Not in Attendance:
Ms. Karen Wiggen (L)
Mr. Fred Pinkney (F)

* Co-chair

C= Community
F= Federal Official
K= Contractor
L= Local Official
N= Navy Official
R= Newspaper Reporter
S= State Official

Topics Discussed:
1. Arrival/Welcome
Mr. Joseph Rail of the Naval Facilities Engineering Command, Washington (NAVFAC Washington) began the meeting by conducting introductions and welcoming everyone to the Indian Head Senior Center. Copies of RAB presentations and the agenda were offered to anyone in attendance. Mr. Rail then presented the meeting agenda, which is included in Attachment A.

2. RAB Presentations

Presentations and updates were given by Mr. Rail and Mr. Scott of NAVFAC Washington and Mr. Louder of Naval Support Facility Indian Head. Mr. Rail presented the FY19 Budget Update and the Stump Neck Small Arms/Skeet Range Removal Action Update. Mr. Louder presented the Site 17 and Site 57 updates. Mr. Scott presented the SWMU 14 Feasibility Study Overview. Copies of all presentations are included in Attachment D.

3. Comments, Questions and Answers

Numerous comments were made and questions asked during the meeting. These comments, questions and answers are provided in Attachment B. Additional correspondence concerning the Installation Restoration Program (IRP) or the Munitions Response Program (MRP) at the facility can be directed to:

Public Affairs Officer
Naval Support Facility South Potomac
Attn: Public Affairs Officer, Code 00P
6509 Sampson Rd.
Dahlgren, VA 22448-5108
PHONE: (540) 284-0129
FAX: (540) 653-4269
Email: jeron.hayes@navy.mil

4. Meeting Adjourn

Mr. Rail presented the tentative agenda for the next RAB meeting, which is scheduled for October 17, 2019. **Note that a RAB meeting will not be held in the Spring of 2019.** A copy of the draft agenda is included in Attachment C. Mr. Rail then concluded the meeting at 7:30 pm and thanked everyone in attendance.

NAVAL SUPPORT FACILITY INDIAN HEAD
INSTALLATION RESTORATION (IR) PROGRAM
RESTORATION ADVISORY BOARD (RAB) MEETING AGENDA

October 18, 2018

6:00 - 6:05 pm	**ARRIVAL/WELCOME** Mr. Joseph Rail Naval Facilities Engineering Command, Washington (NAVFACWASH) Remedial Project Manager
6:05 – 6:20 pm	**FY19 BUDGET UPDATE** Mr. Joseph Rail
6:20 – 6:40 pm	**STUMP NECK SMALL ARMS/SKEET RANGE REMOVAL ACTION UPDATE** Mr. Joseph Rail
6:40 – 7:00 pm	**SITE 57-BUILDING 292 TCE CONTAMINATION OPTIMIZATION UPDATE** Mr. Andrew Louder
7:00 – 7:15 pm	**SITE 17-DISPOSED METAL PARTS ALONG SHORELINE LTM UPDATE** Mr. Andrew Louder
7:15 – 7:30 pm	**SWMU 14-PHOTOGRAPHIC LAB SEPTIC TANK SYSTEM FEASIBILTIY STUDY OVERVIEW** Mr. Alex Scott
7:30 pm	**ADJOURN**

Attachment A

INSTALLATION RESTORATION PROGRAM

NAVAL SUPPORT FACILITY-
INDIAN HEAD
3838 STRAUSS AVENUE
INDIAN HEAD, MARYLAND
20640-5133

RESTORATION ADVISORY BOARD (RAB) MEETING
COMMENTS, QUESTIONS AND ANSWERS

October 18, 2018

Arrival/Welcome

No questions were asked nor comments made during this topic.

FY19 BUDGET UPDATE

Question: Do costs associated with the RAB come out of the FY19 budget?

Answer: No, RAB costs and salary costs for employees' labor hours are taken from different funds and are not part of the FY19 budget for cleanup work.

STUMP NECK SMALL ARMS/SKEET RANGE REMOVAL ACTION UPDATE

Question: Which range was used during World War I?

Answer: Historical records show that UXO 14-Marine Rifle Range was used for training during World War I.

Question: Is maectite similar to concrete and is it mixed in-situ?

Answer: Maectite can be mixed in-situ but is not exactly like concrete. It is a chemical treatment process that fixates heavy metals such as lead, which is present at some Stump Neck sites. Maectite will be mixed with excavated contaminated soil which will eventually be sent offsite for disposal.

Question: Is the range that was used during World War I considered culturally significant?

Answer: Yes, portions of UXO 14-Marine Rifle Range are

Attachment B

culturally significant such as a historic watchbox that was used to observe gun testing and firing activities. This area of the site will not be disturbed during excavation.

Question: Why are you spending funds to clean up skeet ranges which are common and still in use throughout the state of Maryland?

Answer: Only the skeet ranges at Indian Head that are closed and have contamination that exceeds background are being addressed.

Question: Why aren't other ranges off the base cleaned up and why don't you still use the Indian Head ranges?

Answer: Offsite ranges on privately owned property may still be in use and are operated under State of Maryland regulations. For the Indian Head ranges, they have been closed for many years and the Navy's mission has changed for this installation. It is focused on propellant and energetics manufacturing and not small arms/skeet range training.

SITE 57-BUILDING 292 TCE CONTAMINATION OPTIMIZATION UPDATE

Question: What does "daylighting" mean?

Answer: Daylighting means that during injection into a well, injectate appears or "daylights" in an unexpected area such as cracks in pavement near a well or in a nearby storm sewer.

Question: Was the recent fieldwork completed at Site 57 considered a pilot study and can it be applied to other sites?

Answer: The latest injection work at Site 57 was a Remedial Action-operation (RA-O) optimization effort to refine the site remedy. Since it was done during the long-term monitoring phase of the site, it wasn't a pilot study. However, it could possibly be used at other sites with similar contamination and be considered a pilot study if it's effectiveness was being tested.

Question: Is the gazebo at the site still being used?

Answer: No, currently the gazebo is closed for use.

Attachment B

SITE 17-DISPOSED METAL PARTS ALONG SHORELINE LTM UPDATE

Question: How long is it expected to take for the groundwater contamination to reach acceptable levels in the north plume where grout bombing took place?

Answer: Modeling estimates that groundwater concentrations will attain cleanup goals in 5-20 years.

SWMU 14-PHOTOGRAPHIC LAB SEPTIC TANK SYSTEM FEASIBILITY STUDY OVERVIEW

Question: How is the public involved in decision making for this site?

Answer: There will be a Proposed Plan put out for a 30-day public review as well as a public meeting. The purpose of the Proposed Plan is to summarize site conditions and present a preferred remedy.

Question: Will there be a public notice in the paper to announce the Proposed Plan review period?

Answer: Yes, a public notice will be run and email notifications and reminders will be sent to RAB members in advance of the review period.

Question: Why is so much funding spent on long-term monitoring (LTM?)

Answer: Most sites with contamination left in place or with groundwater remediation goals that have not been met, are required to undergo LTM until the goals are met.

Question: Why is Alernative 3 (In-Situ Chemical Precipitation, LUCs, LTM, and NA) preferred over Alternative 2 (LUCs, LTM, and NA?)

Answer: Alternative 3 was found to have the more favorable comparative analysis of critieria over Alternative 2. Alternative 3's proposal for active treatment of the contamination demonstrates more promise, evidenced by the successful pilot study, in achieving site remediation goals. Refer to regulation 40 CFR 300.400 for more information regarding the requirements when evaluating alternatives in a FS.

Attachment B

GENERAL QUESTIONS

Question: Where can the public get the findings of an EPA inspection of open burn/open detonation (OB/OD) areas at Indian Head?

Answer: The EPA multi-media inspection from September 2017 has not been finalized. For more information regarding the multi-media inspection reports, please contact the EPA.

Question: Is a Draft OB/OD permit going to be made available for public review?

Answer: The permit is currently at MDE under review. When MDE finalizes the permit, there will be a public announcement in the Maryland Independent (Charles County) newspaper that the permit is available for the public to review and comment. Note that compliance with RCRA is out of the scope of the Environmental Restoration Program.

Attachment B

NAVAL SUPPORT FACILITY INDIAN HEAD
INSTALLATION RESTORATION (IR) PROGRAM
RESTORATION ADVISORY BOARD (RAB) DRAFT MEETING AGENDA

October 17, 2019

6:00 - 6:05 pm	**ARRIVAL/WELCOME** Mr. Joseph Rail Naval Facilities Engineering Command, Washington (NAVFACWASH) Remedial Project Manager
6:05 – 6:30 pm	**STUMP NECK SMALL ARMS/SKEET RANGE REMOVAL ACTION UPDATE** Mr. Joseph Rail
6:30 – 6:45 pm	**UXO 11-THE VALLEY FEASIBILITY STUDY UPDATE** Mr. Alex Scott
6:45 – 7:00 pm	**SITE 43 FEASIBILITY STUDY UPDATE** Mr. Andrew Louder
7:00 – 7:15 pm	**SITE 57-BUILDING 292 TCE CONTAMINATION OPTIMIZATION UPDATE** Mr. Andrew Louder
7:15 – 7:30 pm	**SITE 67-HOG-OUT FACILITY FEASIBILITY STUDY UPDATE** Mr. Joseph Rail
7:30 – 7:45 pm	**SITE 69-BUILDING 1018 REMEDIAL INVESTIGATION UPDATE** Mr. Joseph Rail
7:45 – 8:00 pm	**SITE 71- BASEWIDE PFOS PRELIMINARY ASSESSMENT** Mr. Alex Scott
8:00 pm	**ADJOURN**

Tentative FY19 RAB Dates:

October 17, 2019

Attachment C

Attachment D- RAB Presentations

FY19 BUDGET & SCHEDULE UPDATE

Presented By
Joseph Rail
Naval Facilities Engineering Command (NAVFAC)
Washington

10/18/18

FY19 Budget & Schedule Update

Approximate budget for FY 2019:

- $2.1 mil for Installation Restoration Program (IRP)
- No funding for Munitions Response Program (MRP)
  (up to $5.7 mil potentially available in FY2020)

Planned work includes:

- Proposed Plan (PP)/Record of Decision (ROD)/Remedial Design (RD)
- Interim Removal Action (IRA)
- Remedial Action-Operation (RA-O)
- Long-Term Monitoring (LTM)

FY19 Budget & Schedule Update

- **PP, ROD, RD for:**
  - Site 69- Building 1018
  - SWMU 14- Photographic Lab Septic Tank System
- **IRA for:**
  - Site 67 – Hog-Out Facility
- **RA-O for:**
  - Site 57 – Building 292 TCE Contamination
- **LTM for:**
  - Site 11 - Caffee Road Landfill
  - Site 12 - Town Gut Landfill
  - Site 21 - Bronson Road Landfill
  - Site 28 - Original Burning Ground
  - Site 36 - Closed Landfill
  - Site 38 - Rum Point Landfill
  - Site 42 - Olsen Road Landfill

Contacts and Questions

Points of Contact:

- **NAVFAC Washington:** Joseph Rail
- **NAVFAC Washington (Base RPM):** Andrew Louder

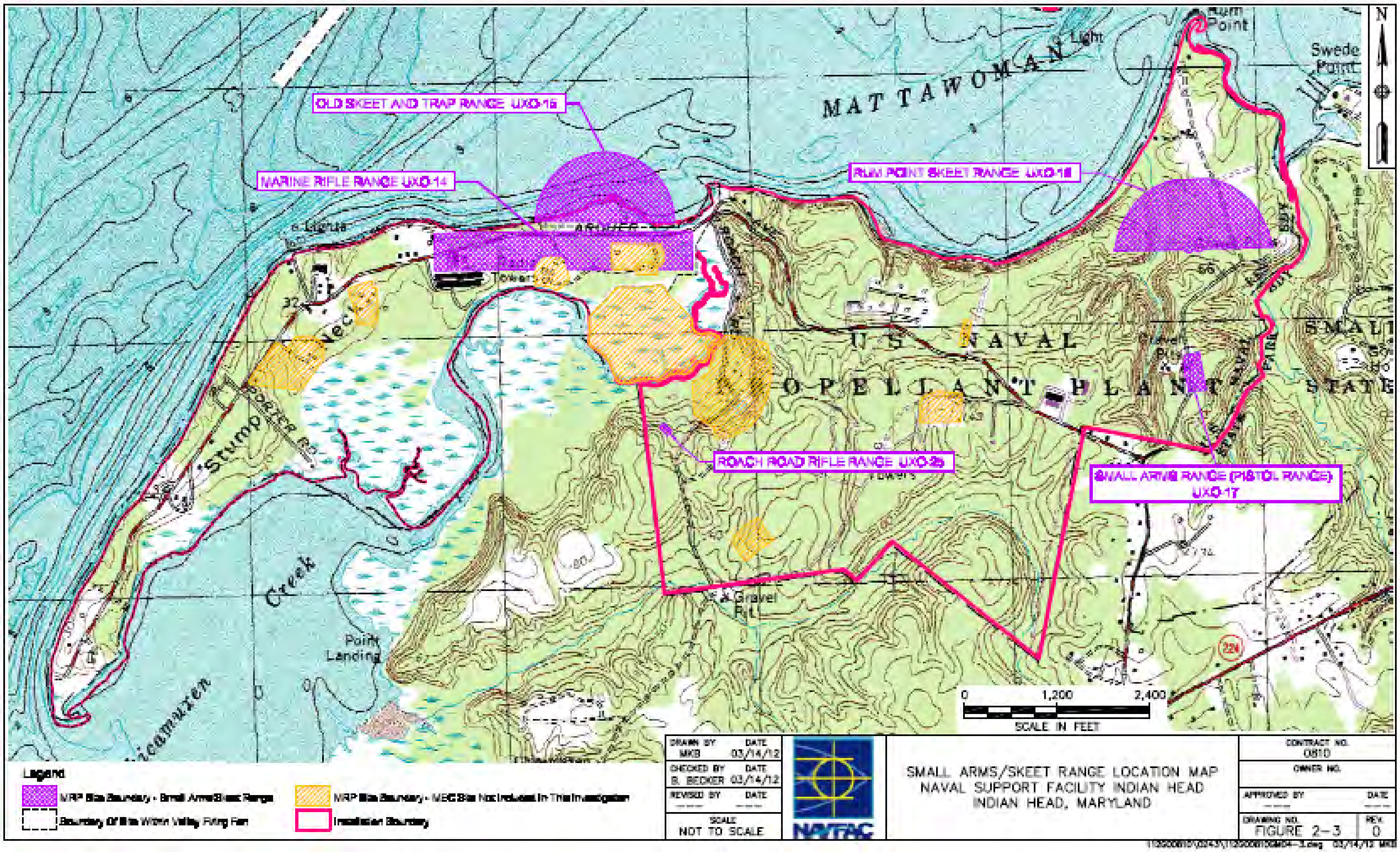
Questions ?

STUMP NECK SMALL ARMS/SKEET RANGE REMOVAL ACTION UPDATE

Presented By
Joseph Rail
Naval Facilities Engineering Command (NAVFAC)
Washington

10/18/18

Small Arms/Skeet Range Locations



Site Background

UXO 14- Marine Rifle Range- 30.4 acres, used from 1911 to 1918 for rifle training, includes multiple firing lines, two target berms, and hillside impact area.

UXO 15- Old Skeet and Trap Range- 29.3 acres, used from 1967 to 1991 for small arms recreational activity, includes two firing points and associated impact area.

UXO 16- Rum Point Skeet Range- 33.5 acres, used from 1991 to 2001 for small arms (shotgun) recreational activity, includes two firing pads and associated shot fall areas.

UXO 17- Small Arms (Pistol) Range- 2 acres, used from mid-1980s to 1991 for small arms training, includes three firing lines, a target area, and hillside impact area.

UXO 25- Roach Road Rifle Range- 0.3 acres, used from 1967 to 1986 for small arms (rifle and pistol) training, included eight firing stands, six targets, and impact area.

Contaminants of Concern

Site	Subarea	COC[1]	
		Surface Soil	Subsurface Soil
MRR - UXO 14	Hillside Impact Area	Lead	Lead
OSTR - UXO 15	Firing Points/Target Area	PAHs	--
	NW Shot Fall Area	Lead	--
	NE Shot Fall Area	Lead	--
RPSR - UXO 16	Firing Points/Target Area	PAHs	--
SAPR - UXO 17	Firing Line Area	Nitroglycerin	--
	Target Area	Lead[2]	--
RRRR - UXO 25	Target Area	Lead	--

[1] COCs include contaminants that are present at concentrations that pose unacceptable risks to potential human health and ecological receptors. Contaminants discussed in the text as ecological COPCs are not included on this list of COCs, but are addressed in Section 3.4 and Appendix E. Addressing human health risk in soil at the site(s) also will address ecological risks.

[2] Due to the visible evidence of soil sloughing from the face of the backstop berm in the UXO 17 Target Area, "surface soil" was considered to be soil from 0 to 4 feet bgs along the base of the berm.

Project Goals

In-Situ Treatment, Excavation, and Off-Site Disposal Includes:

- In-situ chemical treatment (via Maectite) to stabilize leachable lead
- Excavation of all lead-, PAH-, and nitroglycerin-contaminated soil and off-site disposal as nonhazardous waste
- Site prep, UXO escort, cultural resources escort, waste characterization, soil excavation, confirmation sampling, and site restoration
- Total excavation area of 154,487 ft^2 with a volume of 8,809 c.y. of contaminated soil removed
- 3,048 tons of hazardous lead-contaminated soil treated in-situ
- 13,081 tons of contaminated soil (3,810 tons lead-contaminated soil, 8,673 tons PAH-contaminated soil, and 598 tons nitroglycerin-contaminated soil) shipped off-site for disposal as non-hazardous waste

UXO 14-Marine Rifle Range

U.S. Navy

U.S. Navy

UXO 14-Marine Rifle Range

U.S. Navy

U.S. Navy

UXO 15-Old Skeet & Trap Range

U.S. Navy

U.S. Navy

UXO 16-Rum Point Skeet Range

U.S. Navy

UXO 17-Small Arms (Pistol) Range

U.S. Navy

U.S. Navy

UXO 25-Roach Road Rifle Range

U.S. Navy

Contacts and Questions

Points of Contact:

- **NAVFAC Washington:** Joseph Rail
- **NAVFAC Washington (Base RPM):** Andrew Louder

Questions ?

SITE 57 – BUILDING 292 TCE CONTAMINATION OPTIMIZATION UPDATE

Presented By
Andrew Louder-IR/MRP Manager
Naval Facilities Engineering Command (NAVFAC)
Washington

10/18/2018

Presentation Objectives

Objective:

- Discuss recent full-scale enhanced reductive dechlorination (ERD) injection pilot study activities conducted at the Site 57 source area
  - Background of Site 57
  - Fieldwork Conducted
  - Path Forward

Site 57 Location

Figure 2
Site Location Map
Naval Support Facility Indian Head
Indian Head, Maryland

MEADOWS
CONSULTING | MANAGEMENT | PLANNING

Site 57 Background – Site History

- Building 292 historical operations included using trichloroethene (TCE) for vapor degreasing and general cleaning from the mid-1960s until 1989.
- During the 1970s and 1980s, spent TCE was initially stored in a tank inside the building and was frequently transferred from the tank to drums stored outside via a pipe through the wall near the southern corner of the building. The drums were reportedly stored on a grass-surfaced area near the building and near a storm sewer manhole.
- It is suspected that the aforementioned operations resulted in soil and groundwater contamination.
- Building 292 is still active; however, TCE has not been used at the building since 1989.

Site 57 Background – Groundwater Plumes

- Previous investigations identified three distinct groundwater plumes:
  - Source area
  - Mid-plume area
  - Downgradient plume area

- Chemicals of concern (COCs) for Site 57 groundwater:
  - TCE
  - Cis-1,2-dichloroethene (DCE)
  - Trans-1,2-DCE
  - 1,1-DCE
  - Vinyl chloride (VC)
  - Diethyl ether

Site 57 Background – Selected Remedy

- Record of Decision (ROD) signed in 2007 presented the selected remedy for groundwater (Note: contaminated soil was removed in 2006 under a non-time critical removal action [NTCRA])
  - **Selected Remedy**:
    - In-situ bioremediation
      - Hydrogen-release compound (HRC) (electron donor) injection in source area plume to create anaerobic treatment zone suitable for reductive dechlorination of TCE and its degradation products cis-1,2-DCE and VC
      - Oxygen-release compound (ORC) (electron acceptor) injection in downgradient plume area to create aerobic treatment zone suitable for oxidative biodegradation of cis-1,2-DCE and VC
    - Monitored natural attenuation (MNA) for mid-plume area between source area and downgradient area plumes
    - Land use controls restricting the use of shallow groundwater as a potable water supply
    - Long-term monitoring (LTM) of shallow groundwater
    - Five-Year Reviews

Site 57 Background – Summary of Post-ROD Remedial Actions

- **November 2011**
  - Installed 12 permanent injection wells in the source area plume and initiated emulsified vegetable oil (EVO) injection
    - Halted during startup and could not be implemented due to “daylighting” of injectate into storm sewer
  - Successfully injected 600 pounds of ORC-Advanced substrate into six direct-push technology (DPT) boring locations in the downgradient plume area

- **April 2012**
  - Implemented A-SOX passive diffusion technology in source area plume
    - Limited success observed

Site 57 Background – Summary of Post-ROD Remedial Actions (continued)

- **April 2015 – September 2016**
  - Full-scale Proton Reduction Technology (PRT) pilot study implemented in source area plume
    - Prior to PRT system startup, used a slow-rate (60 ml/min on 2-hour on/off pump cycle with no back pressure) injection approach to deliver amendments into 12 existing source area plume injection wells without the "daylighting" that was observed when the injection was previously attempted under higher pressures and flowrates in 2011. Amendments included:
      - 220 gallons of potassium hydroxide (KOH) and 4,560 gallons of water
      - 110 gallons of 60% sodium lactate, 1,340 gallons of water, 50 pounds of diammonium phosphate (DAP) (nutrients), and 150 pounds of potassium bicarbonate ($KHCO_3$)
      - 12 liters of SDC-9 dechlorinating culture
    - Study concluded that:
      - As configured, the PRT system did not appear to generate sufficient hydrogen for effective treatment of chlorinated ethenes in the treatment area.
      - The injection of sodium lactate (electron donor) was clearly shown to be effective at promoting strongly reducing conditions and "jump starting" reductive dechlorination in the treatment area.

Site 57 Full-Scale ERD Injection Pilot Study Rationale

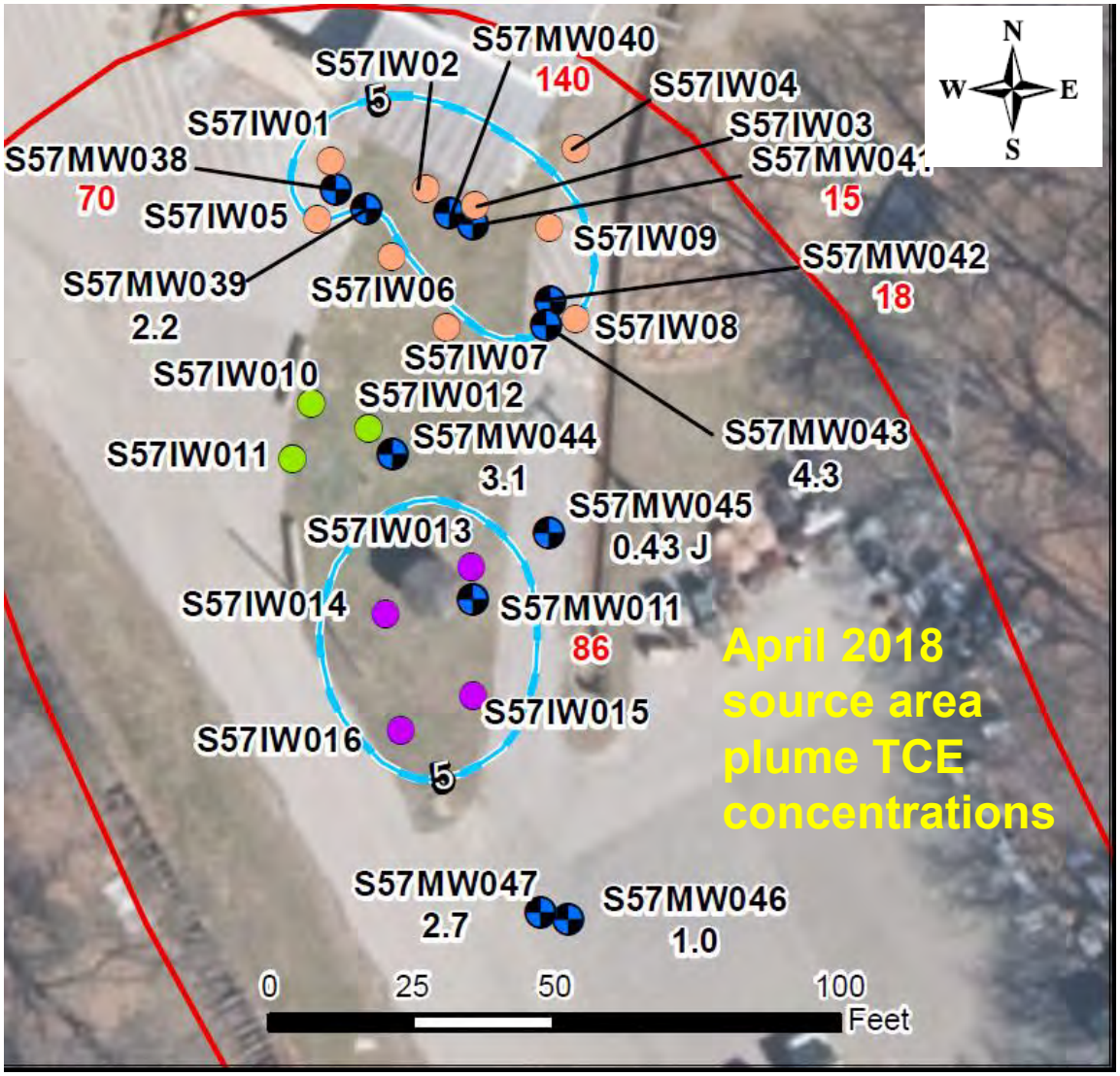
- Based on the success of the slow-rate injection of sodium lactate during the PRT pilot study, a full-scale ERD pilot study using the same slow-rate injection approach to distribute EVO to the source area plume via 16 permanent injection wells was implemented.

- *Total Injection Fieldwork Cost (Labor and Materials): ~$120K*

- Selected 60% SRS®-SD Small Droplet EVO (contains soybean oil, lactate, nutrients, and emulsifiers and preservatives) instead of sodium lactate since:
  - The volume of 60% SRS®-SD required to achieve the manufacturer's minimum recommended total organic carbon (TOC) loading of 500 mg/L was approximately half the volume of sodium lactate required, resulting in lower costs of substrate material and injection time.
  - During the PRT pilot study, the sodium lactate persisted for approximately 3 to 6 months; whereas 60% SRS®-SD generally releases bio-available hydrogen over a period of 3 to 5 years, thus enhancing the long-term anaerobic biodegradation of chlorinated ethenes in the treatment area.

Site 57 Full-Scale ERD Injection Pilot Study
Pre-Injection Fieldwork

- **April 2018**
  - Conducted baseline groundwater sampling prior to injection
- **July 2018**
  - Installed four new injection wells (screened from 7-23 feet bgs) in a TCE "hot spot" near S57MW011



Site 57 Full-Scale ERD Injection Pilot Study
Pre-Injection Fieldwork (continued)

- **July 2018**
  - Completed shallow trenching and installation of injection tubing from existing injection line manifold to four new injection wells
  - Constructed injection system including mix tank and slow-rate injection pump

Site 57 Full-Scale ERD Injection Pilot Study Injection Summary

- **July 24 – October 4, 2018**
  - Injected approximately 621 gallons of EVO, 5,591 gallons of dilution water, 150 pounds of sodium bicarbonate (buffer), and 16 pounds of sodium ascorbate (for lowering dissolved oxygen [DO] and chlorine neutralization) in the source area
  - Additional 1,930 gallons of flush water injected intermittently to minimize fouling
  - 10 liters of TSI DC *Dehalococcoides mccartyii* bioaugmentation culture added on August 15, 2018

Site 57 Full-Scale ERD Injection Pilot Study Injection Challenges/Corrective Actions

- **Challenge**: Two days after injection startup, visual evidence (gray cloudy water) of EVO was observed in water discharging from one of the storm sewer pipes in the catch basin located in the source area.
  - *Note: All components of the EVO used are biodegradable under both aerobic and anaerobic conditions. The primary adverse effect for EVO in a surface water body is that the DO could be consumed.*

- **Corrective Actions:**
  - Immediately shutdown injection system and permanently shut off three injection wells in close proximity to the storm sewer pipe in question. Following system restart, no visual evidence of EVO was observed in the storm sewer pipe.
  - DO concentrations of storm water were measured at a downgradient storm sewer access point periodically throughout the injection. DO concentrations consistently measured between 4 and 5 ppm over the course of the injection, indicating that the injection in the source area was not adversely impacting storm water flowing to Mattawoman Creek.

Site 57 Full-Scale ERD Injection Pilot Study Injection Challenges/Corrective Actions

- **Challenge**: Approximately halfway through the injection, mineralization of the EVO in the injection wells caused injection well fouling, which inhibited the flow of EVO into the formation.

- **Corrective Actions:**
  - Surged and flushed injection wells with clean water
  - Discontinued automated slow-rate (no pressure) injection
  - Injecting into one well at a time, used low-pressure injection method to deliver EVO to the subsurface at a flow rate of between 1 - 1.5 gallons per minute (gpm)
    - In instances where storm sewer or surface daylighting occurred, the injection was immediately ceased and injection was later restarted at a lower flow rate of 0.5 gpm.
      - If daylighting occurred again, injection of that well was permanently discontinued and the remaining injectate was distributed amongst wells that accepted the EVO at higher flowrates and with no daylighting.

Path Forward for Site 57 Groundwater Plumes

- One-month post-injection sampling event in November 2018 and periodic sampling events every six months thereafter
  - Purpose:
    - *Source Area Plume* - Evaluate EVO substrate distribution and monitor the performance of ERD
    - *Mid-Plume Area* - Evaluate the progress of and monitor the performance of MNA
    - *Downgradient plume area* - Monitor concentrations of VC (only COC currently above federal maximum contaminant level [MCL]) and natural attenuation parameters to support an evaluation to assess the applicability of MNA as a remedy for the downgradient plume area

Contacts and Questions

Points of Contact:

- **NAVFAC Washington PM:** Alex Scott
- **Indian Head PM:** Andrew Louder

Questions ?

IR Site 17- Disposed Metal Parts Along the Shoreline

Presented By
Andrew Louder-IR/MRP Manager
Naval Facilities Engineering Command (NAVFAC)
Washington

10/18/2018

Presentation Objectives

Objective:

- Update the results of the North Plume ESTCP Study
  - Background of IR 17
  - Results
  - Path Forward

IR Site 17

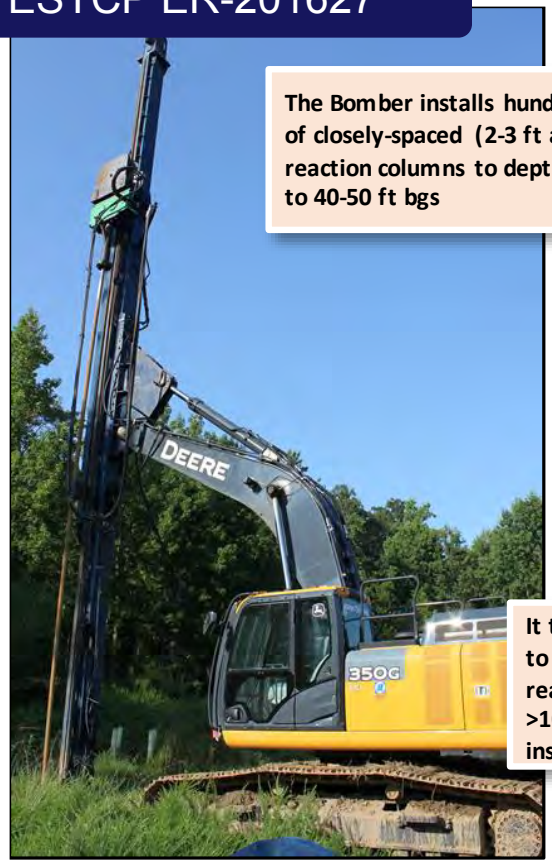
- Site 17 is a 1,000-foot stretch of shoreline along Mattawoman Creek where metal parts were discarded from the 1960s until the early 1980s. The discarded materials included rocket motor casings, shipping containers, empty drums, and various metal parts.. Based on a Remedial Investigation (RI) that was completed for this site (CH2M, 2004), two shallow groundwater plumes were identified: North Plume and South Plume. Each plume is defined by an area of attainment, which is the area where the site remediation goals were exceeded for the primary constituents of concern (COCs)—trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC).

IR Site 17-Site Map

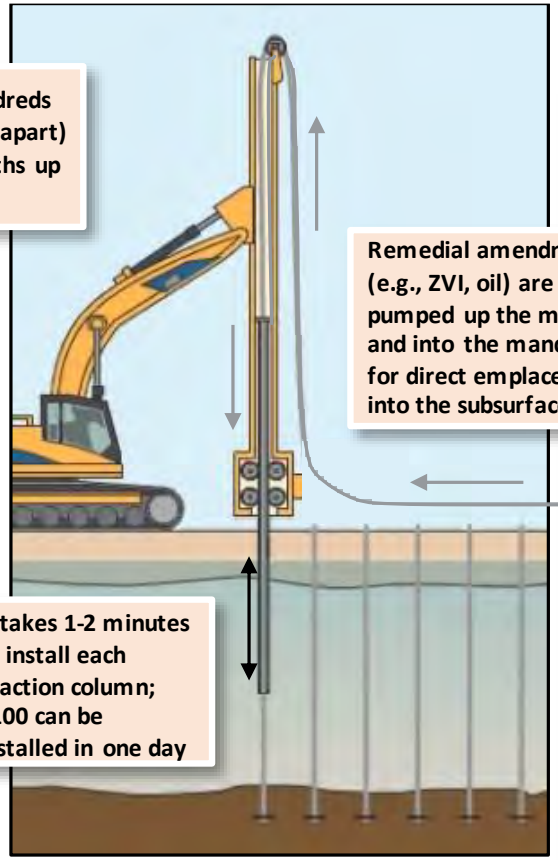
IR Site 17-North Plume

Objective: Demonstrate that the "Grout Bomber" technology can be repurposed to reduce remediation timeframes at Site 17 North Plume

ESTCP ER-201627

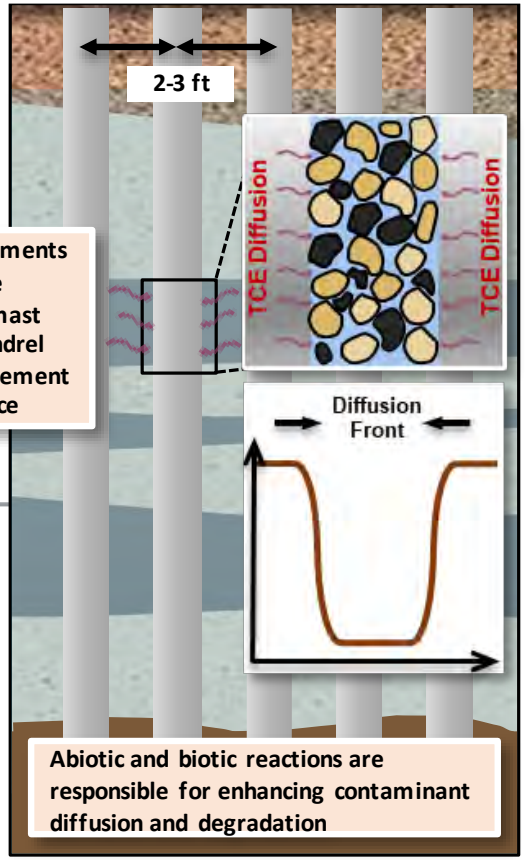


The Bomber installs hundreds of closely-spaced (2-3 ft apart) reaction columns to depths up to 40-50 ft bgs



Remedial amendments (e.g., ZVI, oil) are pumped up the mast and into the mandrel for direct emplacement into the subsurface

It takes 1-2 minutes to install each reaction column; >100 can be installed in one day



Abiotic and biotic reactions are responsible for enhancing contaminant diffusion and degradation

IR Site 17-North Plume

800 Reactions Columns (RCs) Installed in August 2017

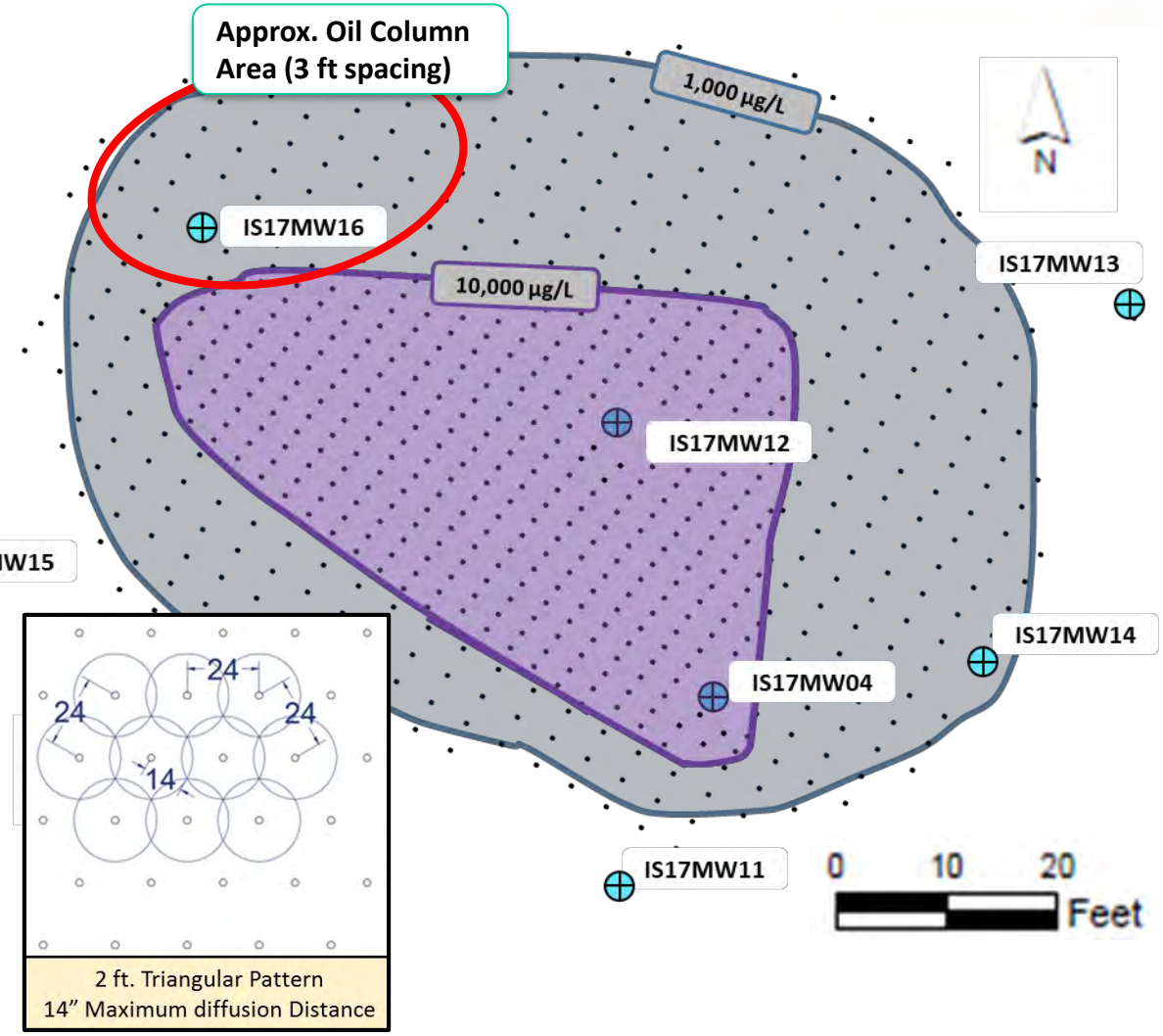
- **2-3 ft spacing**
- **depth of 30 ft bgs**

700 ZVI / sand RCs

- 40% ZVI / 60% sand
- Minor amounts of oil to improve pumpability

100 oil / sand RCs

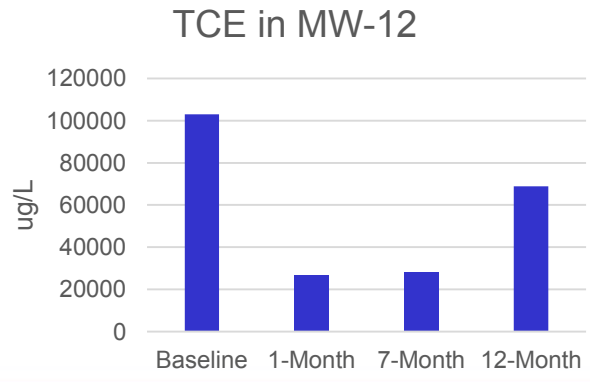
- 40% oil / 60% sand
- no ZVI added

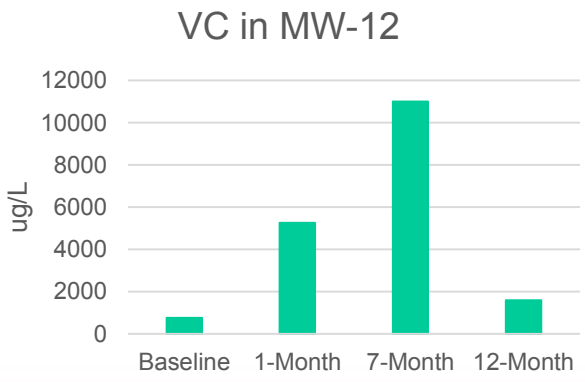


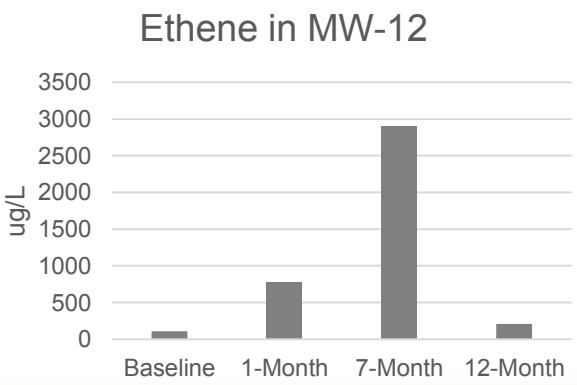
IR Site 17-North Plume Preliminary Results

- **4 sampling events since application.**
  - Baseline (July-August 2017, GSI), 1-month post install (September 2017, GSI), and ~7-months (February 2018, CH2M), and 12-months (August 2018, GSI)
- **Reductions in TCE concentrations and formation of daughter products (cis-DCE, vinyl chloride) in site wells since the baseline sampling (MW-04, MW-12, MW-14, and MW-16)**
  - Some rebound of TCE observed from prior (7-month) sampling (e.g. MW-14, MW-12)
  - Further monitoring needed (distribution of mass, seasonal change in groundwater flow, etc.)
- **Acetylene (reaction product of ZVI reaction) detected at MW-4 after 1 & 12 months**

TCE Destruction → **VC Formation and Destruction** → **Non-toxic End Product Formation**

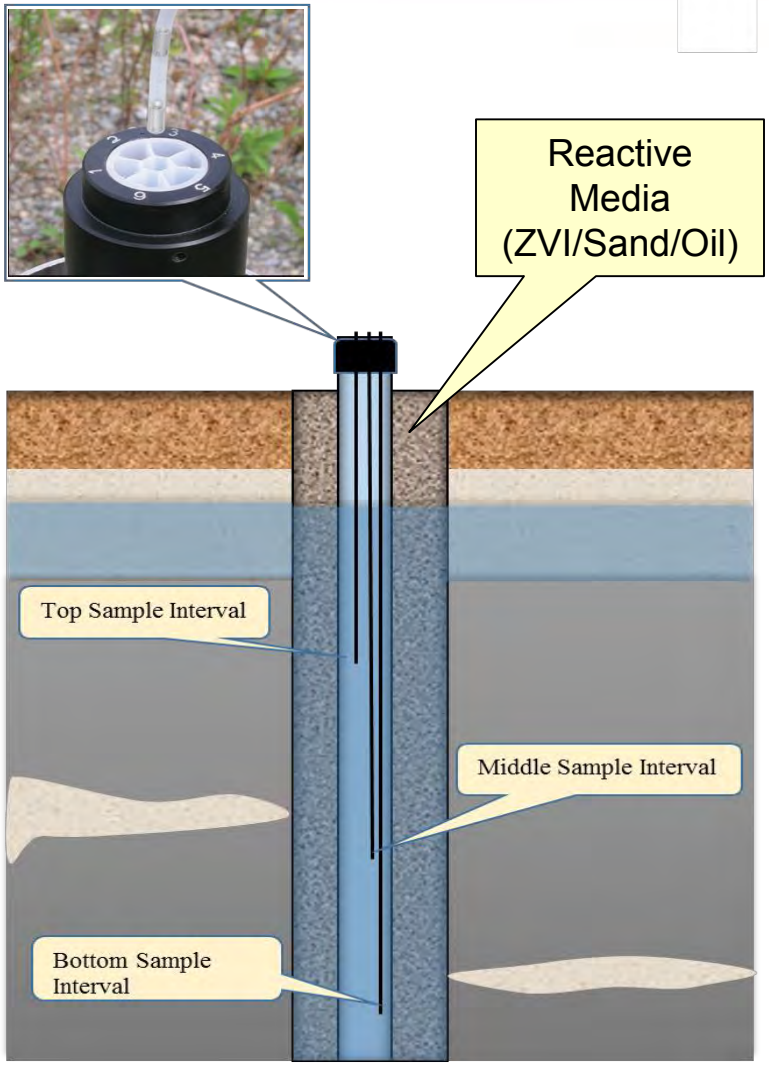






IR Site 17-North Plume Preliminary Results Cont'd

- **Continuous Multichannel Tubing (CMT) Wells**
- **Installed within the reaction column.**
  - **Better suited for identifying degradation.**
- **On average, concentrations in CMT wells are 2-3 orders of magnitude lower than their adjacent Monitoring Wells.**
  - **This means the reaction columns are working!**



IR Site 17-Conclusions

North Plume

- Although its early in the stages of performance monitoring, site wide trends, in general, appear to be moving in the right direction.
- Reaction columns are working as intended due to the data collected at the CMT wells in reference to the adjacent MW wells.
- Strong evidence of abiotic and biotic mechanisms
  - Decrease in TCE
  - Production of biotic daughter products
  - Production of acetylene (abiotic)
  - Increased microbial population

Contacts and Questions

Points of Contact:

- **NAVFAC Washington:** Joe Rail
- **NAVFAC Washington (Base RPM):** Andrew Louder

Questions ?

SWMU14 - PHOTOGRAPHIC LAB & X-RAY FACILITY, STUMP NECK ANNEX FEASIBILITY STUDY (FS) UPDATE

Presented By
Alex Scott, RPM
Naval Facilities Engineering Command (NAVFAC) Washington

10/18/2018

Presentation Objectives

Objective:

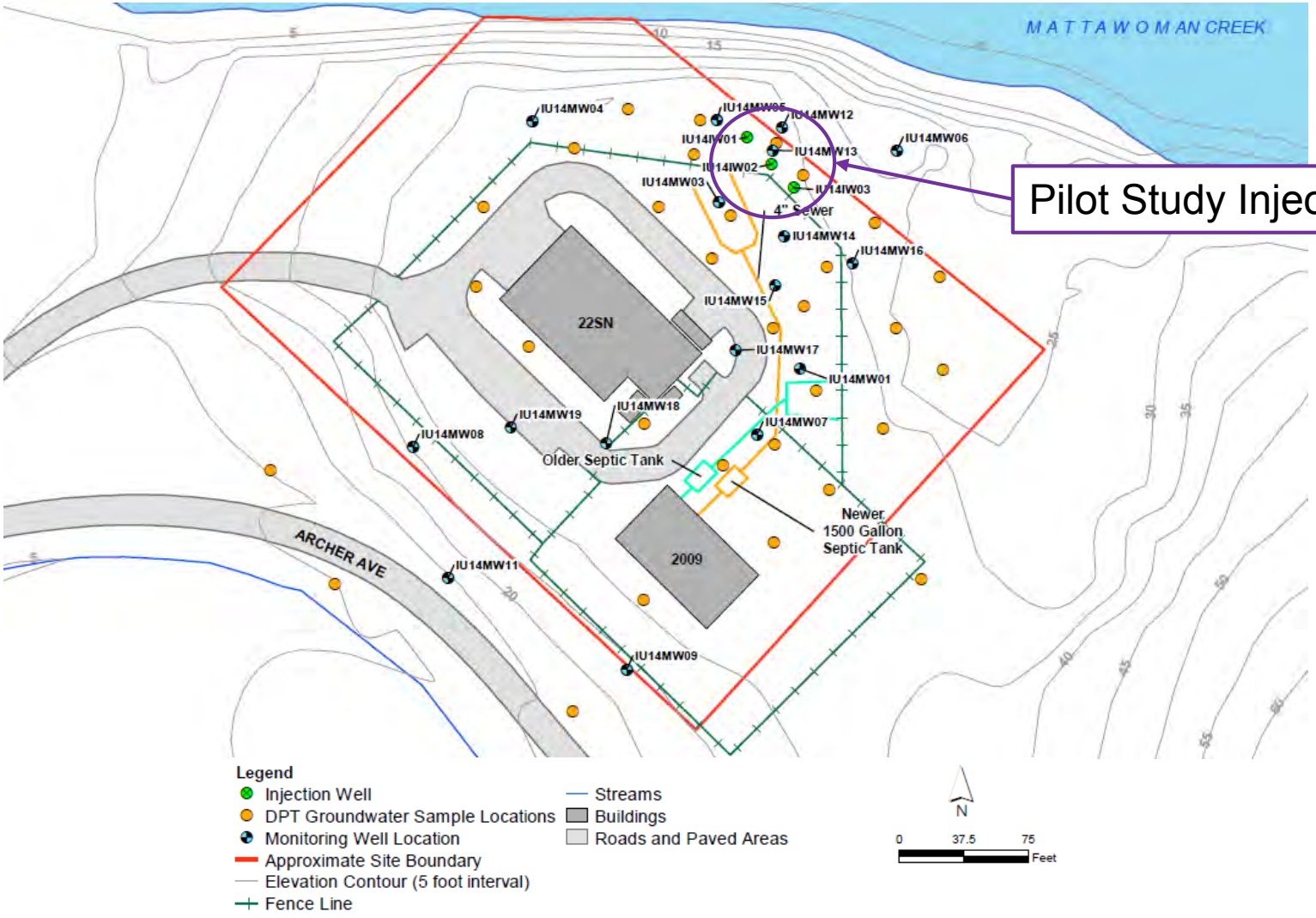
- Summarize the Feasibility Study (FS) Findings
  - Overview of Site History
  - Remedial Action Objectives (RAOs)
  - Considered Alternatives
  - Present a Summary of the Preferred Alternative
  - Next Steps

SWMU 14 Location

Site Location

- Stump Neck Annex off Archer Road.

SWMU 14 Site Layout



SWMU 14 Site History

Previous Investigations

- **2005 to 2008** – Site Screening Process (SSP) sampling to initially investigate and assess potential site contamination.
- **2010** – Site proceeded to an Remedial Investigation to sufficiently characterize contamination to determine the best remedial approach to clean up the site.
- **2014** – RI Finalized
  - Levels of cobalt in groundwater above human health screening levels; data was incorporated into the RI; subsurface soil not impacted
  - RI concluded that potentially unacceptable risk from cobalt exists in groundwater used as a potable water supply
- **2015 to 2017** – In-situ Bio-Geo-Chemical Precipitation of Cobalt (Co) remediation technology pilot test completed. *Refer to October 20, 2016 RAB for Pilot-Test Technology presentation.*
  - The success of the Pilot Study's treatment of the dissolved Co in groundwater provided a strong case for its inclusion as an Alternative in the detailed analysis of remedial alternatives in the FS.
- **2018** – FS completed
  - Original 2013 draft was halted until uncertainties regarding Co treatment in GW were resolved. These uncertainties included:
    - Distribution of Co in GW
    - Treatability of Co using the in-situ technology
    - Timeframe to achieve cleanup goals.

SWMU 14 Feasibility Study Intro

Feasibility Studies (refer to 40 CFR 300.430)

- The national goal of the remedy selection process is to select remedies that are protective of human health and the environment and that maintain protection over time.
- The primary objective of the FS is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected.
- Alternatives shall be developed that protect human health and the environment, and comply with ARARs (applicable or relevant and appropriate requirements). The remedy should address remedial action objectives (RAOs) specifying contaminants and media of concern, potential exposure pathways, and remediation goals. Alternatives are evaluated in the FS using the following criteria.
  - **(A)Threshold criteria.** Overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold requirements that each alternative must meet in order to be eligible for selection.
  - **(B)Primary balancing criteria.** The five primary balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.
  - **(C)Modifying criteria.** State and community acceptance are modifying criteria that shall be considered in remedy selection.

SWMU 14 Feasibility Study

RAOs:

- Prevent unacceptable risks to human receptors from exposure to cobalt in the shallow groundwater.
- Reduce concentration of cobalt to meet the remediation goal (17.7 µg/L Co, installation specific background level) in shallow groundwater to return the shallow groundwater to its beneficial use designation to the extent practicable.

The (3) Alternatives Analyzed:

1. **No Action** (always used for comparison, rarely acceptable)
2. **Land-Use Controls (LUCs), Long-Term Monitoring (LTM), and Natural Attenuation (NA):** No active remediation. Program would involve regular monitoring of the site's groundwater to ascertain if contaminant concentrations are attenuating, and that conditions remain protective of human health and the environment.
3. **In-Situ Chemical Precipitation, LUCs, LTM, and NA:** Apply the remediation technology from the pilot-test in full-scale at the site. Monitor contaminant and biogeochemical trends to ascertain that the remedy is performing as intended, and NA is occurring. Apply LUCs and implement an LTM program to monitor until remediation goals are achieved.

SWMU 14 Feasibility Study

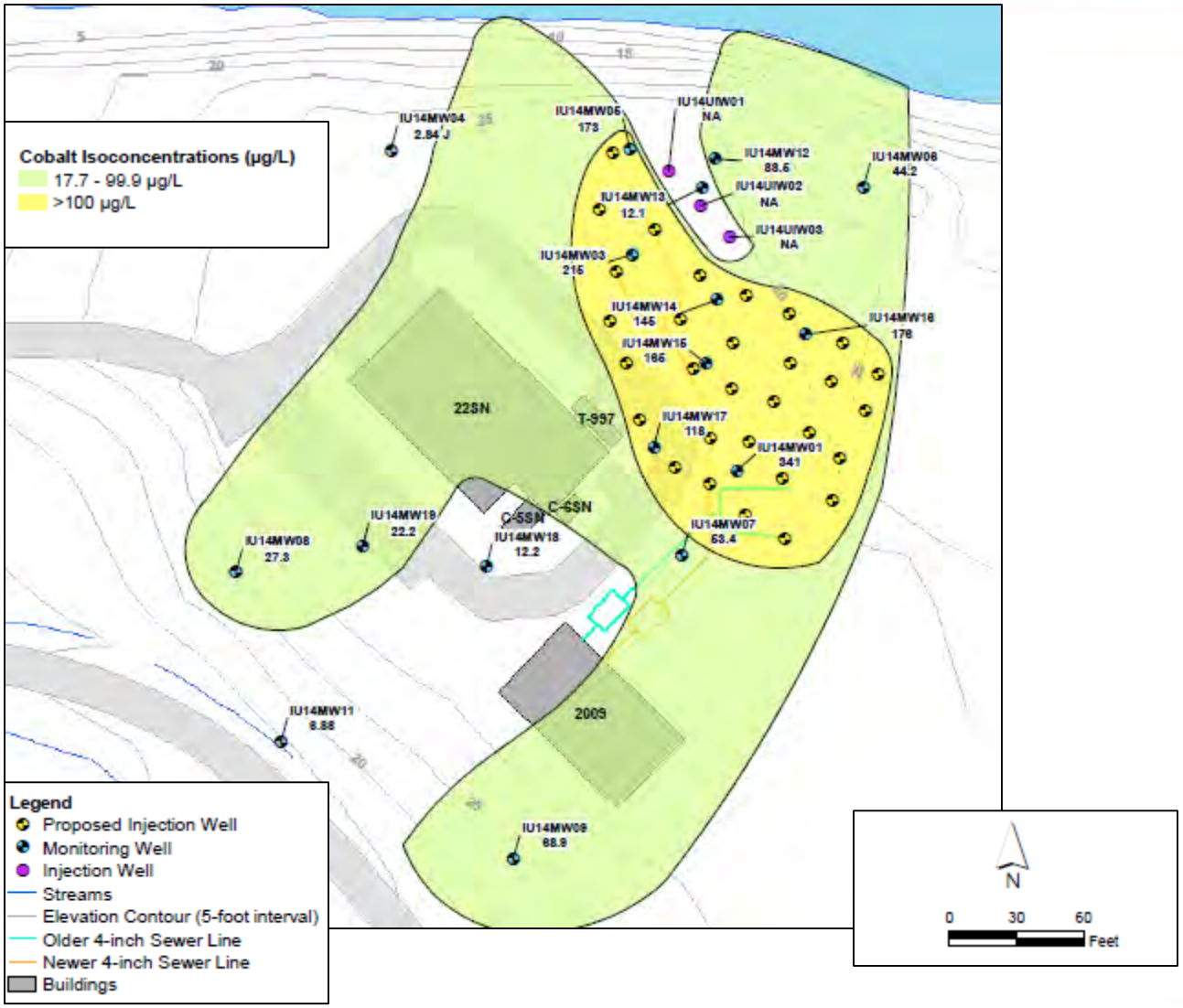
Alternatives Comparison:

1. **No Action, Lifetime Cost $0** – Does not provide any means and methods to provide protectiveness. Generally always an unacceptable alternative.
2. **LTM, LUCs, NA, Lifetime Cost $1,030,000** – While this alternative is likely to ensure protectiveness of human health and the environment, there is uncertainty if remediation goals can be achieved on the site without more active remediation.
3. **In-situ Chemical Precipitation, LTM, LUCs, NA, Lifetime Cost $1,310,000** – While capitol costs are more than alternative 2, the successful performance results from the pilot test are a more promising approach to addressing site contamination. There could be additional savings if the site achieves the remediation goals and site conditions are suitable for unrestricted use and unlimited exposure (UU/UE), appropriate for site closure.

Lifetime costs were calculated to a projected 21-year timeframe.

The FS presents further detailed analysis regarding the technologies and comparison.

SWMU 14 Alternative 3 Conceptual Site Layout



SWMU 14 FS Path Forward

The Navy prefers Alternative 3 as the site remedy (aka "preferred remedy").

- **It has the best balance of feasible implementation, overall cost/liability, and most likely to provide successful treatment of the cobalt contamination.**

This remedy will be formally presented to the public for comment in a Proposed Plan (PP) after finalization of the FS and concurrence from regulators.

- **For at least 30 days, the public is encouraged to provide comment on the PP. Comments will then be considered, addressed, and potentially modify the remedy to where a "Final Remedy" is memorialized in a Record of Decision (ROD) for the site.**

The public is encouraged to review the RI, FS, and PP, which will be available at local libraries and the public website:

http://go.usa.gov/DyQF

Contacts and Questions

Points of Contact:

- **NAVFAC Washington PM:** Alex Scott
- **Indian Head PM:** Andrew Louder

Questions ?