

RESTORATION ADVISORY BOARD MEETING NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP), CALVERTON CALVERTON COMMUNITY CENTER, CALVERTON, NEW YORK THURSDAY, NOVMEBER 15, 2016

The forty-fifth meeting of the Restoration Advisory Board (RAB) was held at the Calverton Community Center. Meeting attendees included representatives from the Navy (Joseph McCloud), New York State Departments of Environmental Conservation (NYSDEC) (Henry Wilkie) and Health (NYSDOH) (Steven Karpinski), Suffolk County Department of Health Services (SCDHS) (Doug Feldman, Andrew Rapiejko), Town of Riverhead (Drew Dillingham), RAB Community Members (Lou Cork, Steven Shapiro (representing the Wading River Civic Organization), Vincent Racaniello), the public (Andrew Freleng), Arcadis (Paul Martorano), Resolution Consultants (Robert Forstner, Michael Zobel), Tetra Tech (David Brayack), and KOMAN Government Solutions (Jen Good). The sign-in sheet is included as Attachment 1.

WELCOME AND AGENDA REVIEW

The Navy representative, Mr. Joseph McCloud, welcomed everyone to the RAB meeting and introduced the meeting agenda. The agenda for the meeting is included as Attachment 2. The Navy presentations are included in Attachment 3.

DISTRIBUTION AND APPROVAL OF MINUTES

Mr. McCloud asked whether the RAB members received the RAB meeting minutes from the April 2016 meeting, and if there were questions or comments on the minutes. Mr. Vincent Racaniello asked that future meeting minutes be distributed earlier than one month prior to the next meeting, and Mr. Steven Shapiro asked that an acronym list be included; there were no comments specific to the contents of the prior meeting, and the minutes for the April 2016 RAB meeting were approved.

COMMUNITY UPDATE

Mr. Racaniello inquired about the presence of 1,4-dioxane; Mr. Robert Forstner (Resolution Consultants) responded, noting that it was included as part of the overall summary of 2015 sampling results at the prior meeting. The 2015 sampling program included a screening component to evaluate concentrations of 1,4-dioxane at six locations where 1,4-dioxane would be considered likely to be present, based on other factor (primarily, historic concentrations of trichloroethane [TCA]); one detection of approximately 2 μ g/L noted.

TECHNICAL PROGRESS – GENERAL OVERVIEW OF INSTALLATION RESTORATION SITES

Mr. McCloud then introduced the technical portion of the meeting, which consisted of presentations on the current activities at Sites 2, 6A/10, 7 and the Southern Area. Prior to the beginning of the individual technical presentations, in regard to a general summary of activities at Site 7, Mr. McCloud noted that

free product was recently observed during the course of routine monitoring. Mr. Racaniello asked if there had been any notable changes in groundwater that preceded this observation, and when free product had last been observed. Mr. Forstner noted that regionally, groundwater has subsided about three to four feet over the last four years. Mr. David Brayack (Tetra Tech) indicated that free product was last observed around 1995; it was believed that the product was trapped below the concrete slab that served as the foundation for the former underground storage tanks (USTs), and there were two or three wells noted as requiring cleanup at that time. Mr. Andrew Rapiejko (SCDHS) asked about the slab's position relative to groundwater; Mr. Brayack responded, noting that groundwater is at about 18 feet or more below grade, the slab is at about 15 feet below grade, and that degradation of product beneath the slab by the air sparge/soil vapor extraction (AS/SVE) system that previously operated at the site may have been prevented if the slab blocked air flow. With the subsidence in the water table, product may be coming out of the smear zone and forming a layer on top of the groundwater.

SITE 2 GEOPHYSICAL INVESTIGATION UPDATE

Mr. Brayack then presented an update regarding the munitions response and path forward at Site 2, starting with a summary history of the site. The presentation is included in Attachment 3. Site 2 is located on property that remains under Navy ownership, and was an active Fire Training Area from the 1950s until 1996. As a result, soil and groundwater have been impacted by petroleum, chlorinated solvents, and other chemicals. In addition, potential residual munitions and explosives of concern (MEC), which likely originated at the cannon test area, are present at Site 2.

Remedial activities on the site included initial investigations and evaluations from 1986 through 2011, removal of contaminated soil from two spills in 1987, the operation of a groundwater recovery/oil-water separation system, from 1987 through 1996, removal of a 1,000 gallon tank in 1996, operation of an AS/SVE system from 1995 through 2000, and removal of shallow petroleum-contaminated soils in 2008-2009. MEC response actions have included a program to excavate, screen and backfill the top 18 inches of soil on 6.9 acres of the site from 2012 to 2014, and an additional program to expand the margins of this area by 1.8 acres in 2015. Various drums containing oil, Freon, paint wastes and tar-like material were removed from the site over the course of the MEC response actions. In 2012, a Supplemental Resource Recovery and Conservation Act (RCRA) Facility Investigation (RFI) was conducted, to reevaluate soil and groundwater quality following the interim remedial actions completed before 2008. The RFI concluded xylenes were present in subsurface soils, and two plumes of volatile organic compounds (VOCs) existed; trichloroethene (TCE) was the primary contaminant in the westernmost plume, and xylene was the primary contaminants in the eastern plume.

Following the RFI, a Feasibility Study/Corrective Measures Study (FS/CMS) was conducted to evaluate potential remedial options. The various alternatives evaluated to address soil and groundwater contamination included no action, land use controls (LUCs) and monitoring, treatment of additional source

areas, a biological barrier for the western (TCE) plume, biosparging of residual petroleum-contaminated soil, air sparging at the property line, or some combination of these options. Alternatives evaluated to address potential residual MEC included surface clearing, stabilization and LUCs, or excavation, screening and reuse of potential MEC-impacted soil.

Regarding a figure showing the location of the various areas of interest and property boundaries at Site 2, Mr. Rapiejko inquired about the property line denoting continued Navy ownership of land, the overlap of potential remedial areas beyond this line, and the Navy's ability to implement remedies on land no longer owned by the Navy. Mr. Brayack confirmed that some of the area potentially requiring remediation is no longer owned by the Navy, but that the Navy has retained (as part of the transfer agreements) the ability to enter and work on those lands for purposes of remediation. Mr. McCloud elaborated, noting that the "quit claim" deed requires the Navy to remediate contamination that was the result of NWIRP facility operations, even on the lands no longer owned by the Navy.

Mr. Rapiejko noted that Alternative 6, as an example, includes LUCs and inquired as to whether the Navy would be able to enforce LUCs on the town-owned property, and if the Navy would be responsible for maintenance. Mr. McCloud responded, noting that the Navy does have authority to place and enforce LUCs on all property formerly part of the NWIRP and would be responsible for any maintenance, including maintenance of any LUCs or other remedial actions constructed on land that has been or may subsequently be transferred to the town. Mr. Brayack elaborated further, noting that this is already the case at other locations, such as the Metro Energy facility. He also noted that the capping alternative would be compatible with the town's planned designation of this area as open space. Mr. Racaniello asked if the town would accept the land with restrictions; Mr. Brayack noted that the town could choose to refuse to accept any proposed restrictions; in that case, the Navy has other options regarding how to dispose of the land.

An inquiry as to the manner of the potential MEC at the site was made. Mr. Brayack noted that the MEC is believed to have originated in the cannon test area, and there is no reason to suspect high explosives are present. Mr. McCloud added that only four suspect (potentially live) rounds were found during the course of all remedial actions, and that these were blown up on site.

The path forward for Site 2 was tentatively expected to include release of a Proposed Plan in early 2017, an associated public meeting (likely in January or February), and issuance of a Record of Decision (ROD) for Interim Action and completion of the remedial design in 2017. Construction would then begin in either 2017 or 2018. It was noted that the ROD is being considered interim because of the detection of perfluorinated compounds (PFCs) on-site, and it is assumed that a longer-term response to address the presence of PFCs will be required.

Mr. Rapiejko inquired as to potential treatment options for PFCs; is, for example, air sparging an option? Mr. Brayack responded, indicating that PFCs cannot be stripped by sparging. Mr. Rapiejko suggested it

may be more prudent to defer action until a response to the PFC issue can be identified, due to concerns that whatever option selected to address the VOC contamination issues could potentially create a larger problem in dealing with PFCs. Mr. Brayack noted that it is not yet known what the remedial options for the PFC contamination might be at this site, and delaying to address all issued in a single ROD means that the ROD may be delayed until 2020 or 2021, and that the MEC exposure would continue to remain an issue throughout any such delay. He noted that it may, however, be possible to implement a capping alternative to address the MEC exposure while selecting something other than sparging for the VOC exposure.

TECHNICAL PROGRESS – 2015 GROUNDWATER INVESTIGATION

Mr. Forstner provided a presentation on the results of the perfluoroalkyl substances (PFAS) sampling that was conducted as part of the annual basewide sampling event in 2016. The presentation is included in Attachment 3. PFAS are "emerging contaminants" that were used in many products since the 1950s because of excellent stain- and water-repellent properties. However, they are long-lasting and now globally distributed in the environment. In May 2016, the United States Environmental Protection Agency (EPA) issued lifetime health advisories for two PFAS compounds (perfluorooctane sulfonate [PFOS] and perfluorooctanoic acid [PFOA]) that were historically closely associated with aqueous film forming foam (AFFF) that recommended limiting exposure via drinking water to 0.07 µg/L or less for either compound, or the two of them combined.

Generally, AFFF was used at fire training exercises from the 1950s through the mid-1990s, and a records search was underway to evaluate AFFF use at NWIRP Calverton. It is known that AFFF was used in building fire suppression systems at NWIRP Calverton, and at least some of these buildings' systems were tested by a "full dump" that released large quantities of foam. In addition, there were at least five crashes on the installation related to site operations between 1956 and 1983, and AFFF may be been used in response to any of these events. Mr. Rapiejko asked if there were also any crashes off-installation, south of the Peconic River. Mr. McCloud responding, indicating there were at least two such crashes documented (one in 1954, and another in 1970).

As part of the annual basewide sampling event conducted in September 2016, groundwater samples for PFOS/PFOA analyses were collected from seven Site 2 sampling locations (five on-property, two off-property) and four Site 6A/Southern Area locations (two at Site 6A, two in the Southern Area). In addition, a drinking water sample was collected from a residence connected to a residential drinking water well downgradient of Site 2 (in the vicinity of the two Site 2 off-property wells that were analyzed for PFOS/PFOA). PFOS and/or PFOA were detected at all eleven locations, and the EPA health advisory was exceeded at seven of these locations. PFOS was detected in the residential sample, at about 10 percent of the health advisory level; PFOA was not detected in this sample.

The Navy's path forward regarding PFAS includes additional sampling at the residence to monitor changes in PFAS concentrations, and the evaluation of possible longer-term solutions in accordance with data as it is collected. Mr. Rapiejko noted that the county owns the residential water well that was sampled, and that although the PFAS levels were below the health advisory, the county may have further input regarding this well. Mr. Rapiejko also asked if there has been any thought to impacts on biota. Mr. Forstner responded, noting that as an emerging contaminant, the science in regards to PFAS and their impacts to various receptors is evolving very quickly and that, at the current time, there are no accepted standards for evaluation of impacts to biota due to PFAS. Data will continue to be collected and reevaluated as the science evolves. Mr. Steven Karpinski (NYSDOH) indicated that the state is currently working towards establishing standards to protect biota.

Mr. Rapiejko further inquired about the Fence Line Treatment System (FLTS), and whether PFAS might be reaching the Peconic River. Mr. Brayack noted that, as an air stripping technology, the FLTS would not address PFAS; Mr. McCloud indicated that surface water sampling for PFAS could be considered for implementation in the upcoming fiscal year. In regards to an inquiry as to whether the Navy would consider setting its' own clean-up target for PFAS, Mr. McCloud indicated that it would depend on completion of a Risk Assessment. Mr. Rapiejko then asked what the mechanism would be for triggering additional investigation if a maximum contaminant level (MCL) is established for any of the emerging contaminants. Mr. Brayack noted that this is something that would generally be covered as part of a Five Year Review.

TECHNICAL PROGRESS -SITE 7 REMEDIAL ACTION UPDATE

Ms. Jen Good (KOMAN Government Solutions) provided an update on the status of Site 7 (the former Fuel Depot). The presentation is included in Attachment 3. A summary of the site history was provided first, noting that an AS/SVE system started operation on a pilot scale in 2005 and at full scale in 2006, and was operated seasonally (April to December) through November 2013. Modifications were made over time to improve performance, but the system reached the end of its functional life, with a major blower overhaul required to continue operation. The system was shut down in November 2013 and routine monitoring began according to the "Performance and Shutdown Evaluation" plan.

A summary of the historic tank areas, the layout of injection, monitoring and extraction wells, and system performance was then shown, including a figure depicting the extent of the contaminant plume shrinking over time. Routine sampling activities conducted since system shutdown (including quarterly sampling of seven wells) were then summarized, and contaminant trends were shown. It was noted that four downgradient sentinel wells were added to the network beginning in September 2015, and that groundwater sampling was done on a quarterly basis through December 2015 and on a semi-annual basis beginning March 2016. In addition, in support of a potential in-situ chemical oxidation (ISCO) pilot project, additional water quality parameters were evaluated in March 2016 to aid in design. Groundwater

monitoring data was then summarized, including trend charts showing concentrations over time of the contaminants of concern at the seven locations included in the routine monitoring program.

Regarding recent activities, Ms. Good noted that free product was observed in MW-17S during the semiannual groundwater sampling event in October 2016. Resolution Consultants collected a sample of the product for fingerprint analysis, which identified it as degraded jet fuel. Product was subsequently also observed at MW-19S, and the free product layer has been stable at about 1 foot in thickness since. Product recovery via hand bailing was begun as a passive remedial effort in the short term. Mr. Rapiejko asked about the frequency of bailing; Ms. Good noted that the wells are being gauged and bailed roughly three times per week.

Mr. Forstner then discussed the path forward for Site 7, indicating that the planed ISCO pilot to address residual contamination was being deferred in order to investigate the extent of free product, and evaluate potential short- and long-term responses to address the presence of free product. A direct-push technology (DPT) rig would be used to investigate in-situ conditions at locations in between wells where the free product is being observed, particularly to investigate whether the buried foundation slab for the former storage tanks may be a contributing factor to the appearance of the free product. Field work was planned for later 2016, with a potential report evaluating site conditions in early 2017. Gauging and bailing recoverable product would continue as an interim response. Mr. Rapiejko inquired as to the scope of the DPT program. Mr. Forstner responded, indicating that it would be up to 8 locations, and that it would be implemented as part of the upcoming Site 6A investigation and would be addressed in an addendum to the Work Plan for that work.

TECHNICAL PROGRESS - FENCE-LINE TREATMENT SYSTEM UPDATE

Ms. Good then provided an update on the operation of the FLTS. The presentation is included in Attachment 3. The FLTS was constructed pursuant to a ROD for Site 6A/10B (also known as Operable Unit 3 [OU3]) that was completed in May 2012. The selected remedy calls for LUCs and a system to extract, treat and infiltrate groundwater in order to achieve the remedial goal of containing the spread of a plume of VOCs leaving the site in groundwater.

The FLTS system employs two extraction wells, air stripping equipment, and two infiltration galleries in order to control the VOC plume. Construction started in October 2012 and was completed in October 2013, and system start-up occurred on October 8, 2013. In order to address declining productivity, extraction well EW-2, which was installed as part of the original FLTS, was taken off-line and replacement well EW-3 was brought on-line in February 2016.

Operating statistics and sampling data were then presented, covering a 36-month period from system startup through October 2016. System uptime and flow rates were lower in the first four months due to issues associated with system startup; following the initial shakeout period, average influent flowrates

exceeded 78 gallons per minute (gpm) over the next year. The system operated at a reduced rate beginning in March 2015, initially due to a seasonally-elevated groundwater table and subsequently due to reduced output from extraction well EW-2.

Influent contaminant concentration trends were then presented. Generally, a downward trend has been observed since the system began operation. Based on the influent data, it is estimated that the system is currently removing less than a tenth of a pound of VOCs on a monthly basis, and the cumulative removal through October 2016 was estimated at 49.92 pounds. Target VOC concentrations have decreased to below 5 μ g/L. In order to evaluate the presence of VOCs other than those included in the site ROD, analysis of influent for the full list of VOCs began in May 2016; perchloroethylene (PCE) concentrations have ranged as high as 8.9 μ g/L. Mr. Rapiejko asked if the full list of VOCs has been analyzed for influent samples previously; Ms. Good responded, indicating that previously only the reduced list of site-related compounds was analyzed.

Regarding EW-3 and its' impact on system operation, it was noted that after the new well went online in late February 2016, the average influent flowrate increased to 94.5 gpm in March 2016. Since then, the system has been operated at a rate closer to 80 gpm due to a reduced ability of the infiltration galleries to accept flow. A letter work plan to perform chemical redevelopment of the infiltration galleries was submitted in July 2016 and subsequently approved in September, and work was scheduled to begin in November 2016. Performance of the infiltration galleries will continue to be evaluated, and extension of the galleries eastward is possible.

The FLTS maintains continued compliance with all discharge goals, including effluent levels less than the relevant NYSDOH MCLs, and VOC removal efficiency is in excess of 99 percent. Although several Fence Line Area wells continue to indicate VOC concentrations in excess of 50 µg/L influent VOC concentrations are nearing or are occasionally below MCLs, and as a result, system shutdown criteria will be evaluated on an ongoing basis as more data becomes available.

Mr. Forstner then presented results from the most recent sampling event, in spring 2016. Part of the spring 2016 event was the routine semiannual sampling that is conducted in the Peconic River area and included sampling at four surface water stations and four in-river piezometers. No exceedances of Remedial Design (RD) benchmarks were observed, and data was generally consistent with prior data in the Peconic River Area.

In addition, sampling of 12 wells and piezometers in the Fence Line Area was conducted to monitor insitu conditions near the FLTS extraction wells. Results from the Spring sampling event were generally consistent with prior data, and is suggestive of narrow VOC plume (and in particular, 1,1-dichloroethane [DCA]) that continues to flow through the Fence Line Area, though it's lateral position does shift (as evidenced by changes in DCA concentrations at SA-PZ139 and SA-MW127I between September 2015 and May 2016, for example). Mr. Rapiejko asked if SA-MW127I is in the capture zone for the FLTS; Mr.

Forstner responded, indicating that it is near the edge of the capture zone. Mr. Brayack continued, noting that the elevated DCA result (220 µg/L) at SA-MW127I in May 2016 is concerning, because it may indicate that something is getting by the FLTS. Mr. Forstner added an observation that SA-MW127I is roughly six months' travel time beyond extraction well EW-3, so the May results may have been indicative of DCA that passed through the EW-2/EW-3 area prior to EW-3 going on-line and data from samples collected in September will be more informative in evaluating ongoing transport through the Fence Line Area. Mr. Brayack further noted that there is an extraction well in the vicinity of SA-MW127I that was used for pump tests during design of the FLTS, and that well could potentially be tied in to the FLTS if the plume has shifted east and more hydraulic control in this area is needed.

Mr. Rapiejko also asked if the presence of PCE in the Fence Line Area was a new observation. Mr. Brayack noted that it has been observed previously, usually outside of the DCA plume, but that it is still within the FLTS capture zone. It will continue to be monitored, and the FLTS is effective in treating PCE. At this time, the only issue that would trigger any further consideration as to the nature and source of the PCE would be if the presence of PCE, specifically, was the only thing preventing shutdown of the FLTS. In that event, the Navy may consider tracking down the source of the PCE to determine if it is Navy-related (thought to be unlikely), or if it is from a non-Navy source.

Mr. Forstner then provided a look forward at upcoming work in Site 6A and the Southern Area. Five additional monitoring wells are planned in the Southern Area, on the Peconic River Sportsman's Club property, in order to address a data gap between the existing SA-MW132 and SA-PZ123 clusters and provide better definition of the DCA plume along the northern shore of Donahue Pond. In addition, an investigation of the Site 6A Source Area is planned to evaluate recent elevated VOC concentrations at FC-MW02SR1 and FC-MW03SR1. These wells are located in the historic source area that was previously excavated and treated with oxidant. The primary purpose of this investigation is to determine if the source of the recently-observed VOCs is upwelling from below historic excavation, or if there is an upgradient source now contributing to VOCs in this area. In addition, this program will investigate whether the VOCs currently observed in the historic source area are exiting the area. Both the Site 6A and Southern Area work are described in a combined Work Plan that has been submitted to NYSDEC for review.

GENERAL DISCUSSION AND CLOSING REMARKS

Following completion of the formal presentations, an opportunity for further discussion of the progress at the site in general was offered, but there were no further questions posed. Mr. McCloud thanked the attendees for their participation. The next RAB meeting was planned for spring 2017, with a final date and location to be confirmed. The meeting was then adjourned.

LIST OF ACRONYMS AND ABBREVIATIONS

AFFF Aqueous Film Forming Foam
AS/SVE Air Sparge/Soil Vapor Extraction

bgs Below Ground Surface

BTEX Benzene, Toluene, Ethylbenzene, Xylene

DCA 1,1-Dichloroethane
DPT Direct-Push Technology

EPA Environmental Protection Agency

ER Environmental Restoration

EW Extraction Well

FLTS Fence Line Treatment System

FS/CMS Feasibility Study/Corrective Measures Study

gpm Gallons per Minute

ISCO In-Situ Chemical Oxidation

LUC Land Use Control

MCL Maximum Contaminant Level

MEC Munitions and Explosives of Concern

MW Monitoring Well

NTCRA Non-Time Critical Removal Action

NWIRP Naval Weapons Industrial Reserve Plant

NYSDEC New York State Department of Environmental Conservation

NYSDOH New York State Department of Health

OU Operable Unit

PAH Polynuclear Aromatic Hydrocarbon

PCB Polychlorinated biphenyl

PCE Perchloroethylene (Tetrachloroethylene)

PFAS Perfluoroalkyl Substance
PFC Perfluorinated Compound
PFOA Perfluorooctanoic acid
PFOS Perfluorooctane sulfonate

PRSC Peconic River Sportsman's Club RAB Restoration Advisory Board

RCRA Resource Conservation and Recovery Act

RD Remedial Design

RFI RCRA Facility Investigation

ROD Record of Decision

SCDHS Suffolk County Department of Health Services

TCE Trichloroethene µg/L Micrograms per Liter

UST Underground Storage Tank
VOC Volatile Organic Compound

ATTACHMENT 1 NOVEMBER 15, 2016 RAB MEETING SIGN-IN SHEET

45th RAB Meeting for NWIRP Calverton November 15, 2016 Sign-in List

Name (Print)	Address and/or email if interested in being on mailing list	Affiliation	How did you hear about the meeting?
JOSEPH MICLIOND			
HENRY WILKE			
Robert Forstner			
David Bragock			
Sevel aprisc	4		
Lan Conf			
Mike Zobel	-		
Steve Shapino	-		
Andy Freheng	-		
Parl Martarano	-		
Vincent Round			
DOUG FELSHAN	-		
Drew Dillinghan	Ł		
Jen Good	-		

ATTACHMENT 2 NOVEMBER 15, 2016 RAB MEETING AGENDA

Agenda

Restoration Advisory Board Naval Weapons Industrial Reserve Plant Calverton

November 15, 2016
Calverton Community Center, Calverton NY 7:00 p.m.

Welcome and Agenda Review

Joseph McCloud, NAVFAC Mid-Atlantic

Distribution of Minutes

All Members

Community Update

Vincent Racaniello, RAB Co-chair

Technical Progress

General Overview of ER Sites

Joseph McCloud, NAVFAC Mid-Atlantic

Site 2 Feasibility Study Update

David Brayack, Tetra Tech

Perfluoroalkyl Substances Sampling Update

Robert Forstner PE, Resolution Consultants

Site 7 Remedial Action Update

Jen Good PG, KOMAN Government Solutions

Fence Line Treatment System Update

Jen Good PG, KOMAN Government Solutions

Closing Remarks

Joseph McCloud, NAVFAC Mid-Atlantic

Presenters will be available after the program for questions.

ATTACHMENT 3

NAVY PRESENTATIONS - NOVEMBER 15, 2016 RAB MEETING



RESTORATION ADVISORY BOARD MEETING

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP) CALVERTON, NEW YORK

November 15, 2016

General Overview of ER Sites



• Sitewide

2016 sampling events completed in May and September

Site 2

- Feasibility Study under way
- PFAS sampling completed in September 2016

Site 6A/10B/Southern Area

- Fence-line system construction completed and online October 2013
- Replacement extraction well installed and online as of March 2016
- Operable Unit 3 (OU3) Record of Decision (ROD) and Remedial Design completed

Site 7

- AS/SVE system shutdown after 2013 operating season; monitoring ongoing
- Pilot study for supplemental action underway



SITE 2 (FIRE TRAINING AREA) FEASIBILITY STUDY

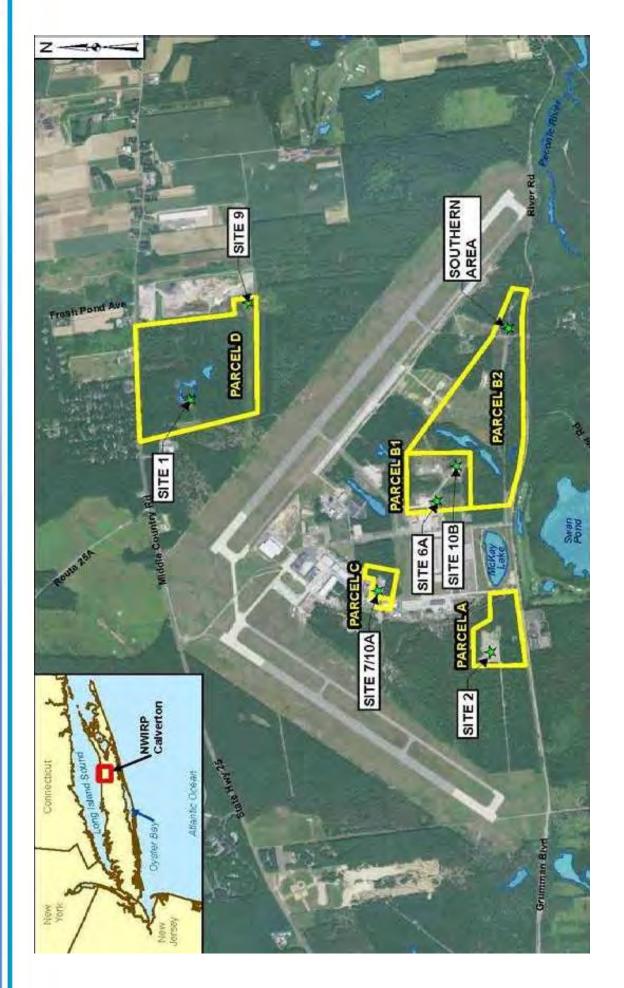
November 2016 Restoration Advisory Board

NWIRP CALVERTON, NEW YORK

November 15, 2016



Site Location



Site 2 - History



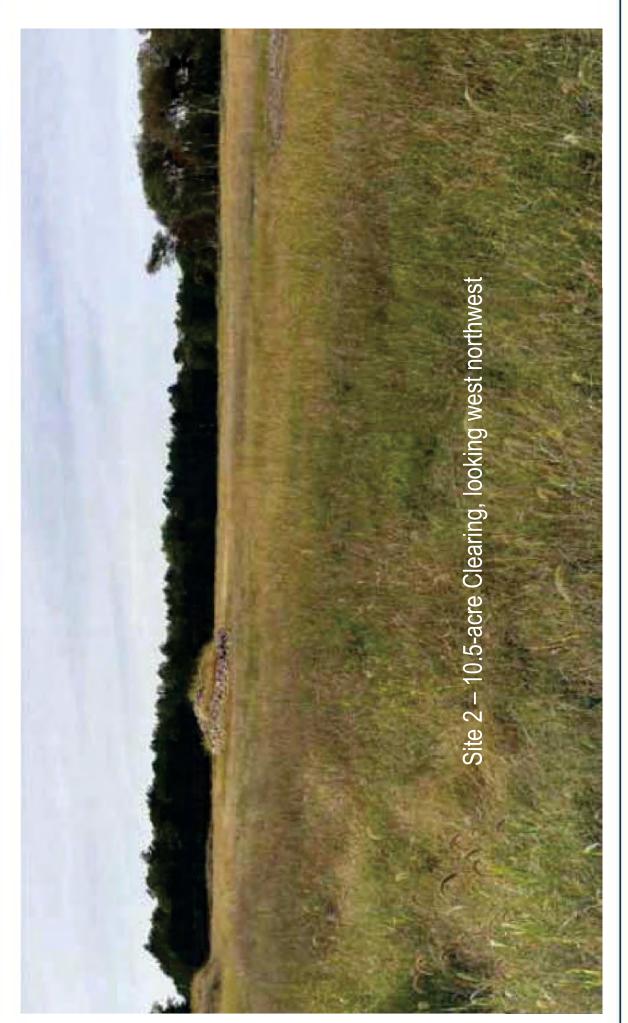
- acres retained by the Navy to continue Site 2 is located on the remaining 211 **Environmental Restoration Program** activities
- Training Area from the 1950's until 1996 Site 2 was used as an active Fire
- As a result of fire training activities, soil and groundwater at the site have been impacted by petroleum, chlorinated solvents, and other chemicals
- present and likely originated at another location at the NWIRP (cannon test Explosives of Concern (MEC) are Potential Residual Munitions and



Former Site Layout and Initial Response Actions (Pre-2008)

Site 2 – Current Conditions (Sept 2016)





Site 2 – Response Activities (1986 to 2009)



Remedial Site Activities

- 1986 2011: Initial investigations and evaluations
- 1987: Contaminated soil removal from 1982 and 1983 waste oil spills
- 1987 1996: Groundwater recovery/oil-water separation system recovered approximately 325 gallons of petroleum product
- 1,000 gallon tank was removed from the Site in 1996
- 1995 2000 Air Sparge/Soil Vapor Extraction (AS/SVE) operation
- 54 pounds of chlorinated volatile organic compounds (VOCs) removed from the Site
- Up to 63,000 pounds of organics may have been destroyed via bio-degradation
- 2008/2009: Non Time Critical Removal Action (NTCRA) for shallow petroleumcontaminated soil
- AS/SVE system and concrete burn ring removed from the Site
- 10,860 tons of petroleum-contaminated soil excavated and disposed off-site
- 546 tons of surficial coal were excavated and disposed off-site
- Several crushed drums (contents, non-hazardous) were encountered and disposed off-site

Site 2 – Response Activities (2012 to 2015)



Remedial Site Activities

2012 - 2014: Removal and MEC response activities:

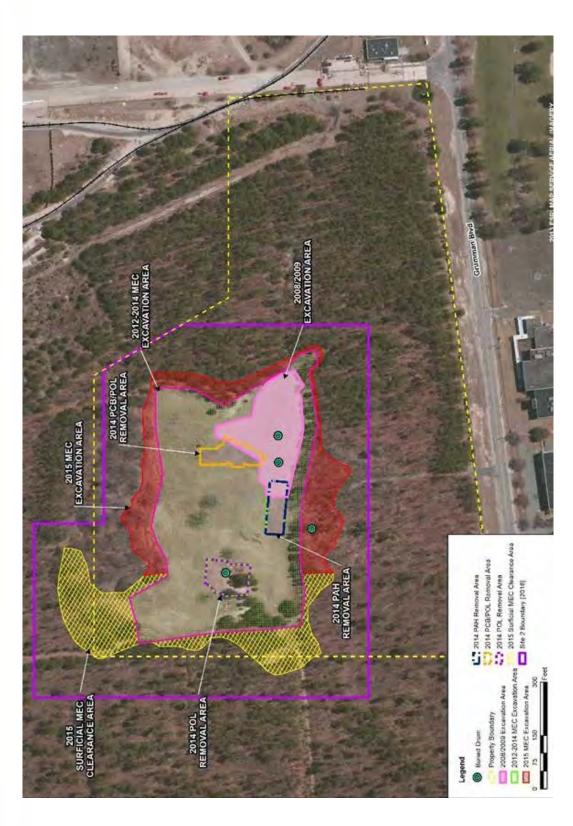
- Mechanical soil excavation, screening, and backfill of 6.9 acres to a minimum of 18 inches below ground surface (bgs)
- Approximately 19,200 MEC-related items (primarily 20 millimeter projectiles/fragments) were recovered, destroyed or disposed off-site
- Excavation of polynuclear aromatic hydrocarbon (PAH)- and polychlorinated biphenyl (PCB)impacted soils identified during the 2008/2009 NTCRA and MEC-impacted soil excavation/screening
- During excavation activities, several crushed drums containing oil, Freon, and paint wastes were encountered and disposed off-site

2015 MEC response activities (additional 3.6 acres):

- Mechanical soil excavation, MEC screening, and backfill of 1.8 acres to a minimum of 18 inches bgs
- Surface clearing for MEC conducted on 1.8 acres
- During excavation several crushed drums containing tar-like material were encountered and disposed off-site ī



Site 2 – Response Activities (2012 to 2015)



Soil and MEC Removal Actions

Site 2 – Supplemental Resource Conservation and Recovery Act Facility Investigation (RFI)



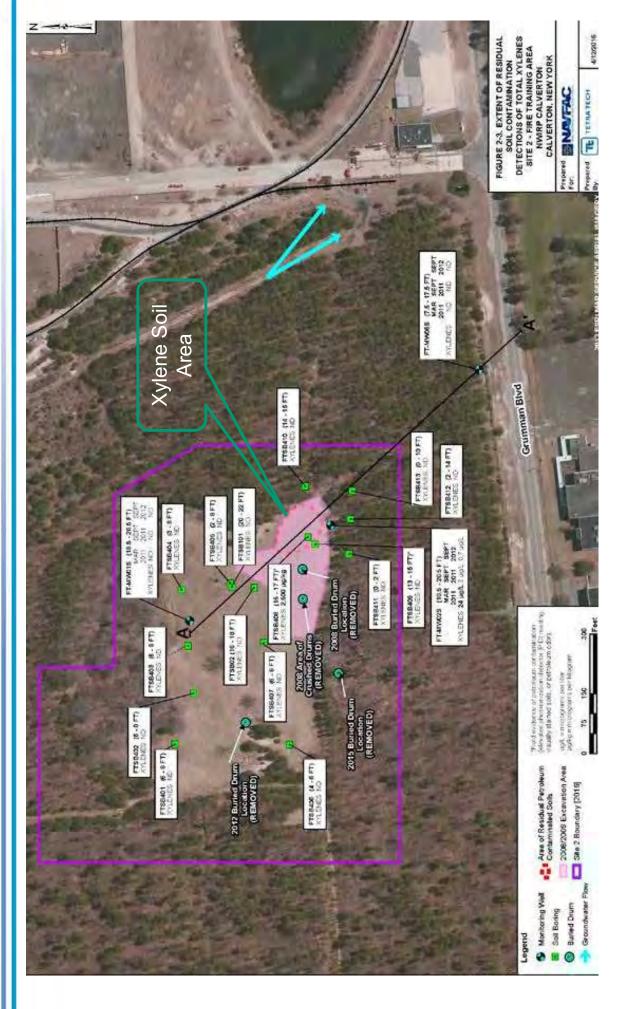
- In 2012 a Supplemental RFI was conducted at the Site
- implementation of on-site interim remedial actions completed before 2008 The purpose of the investigation was to re-evaluate soil and groundwater quality at the Site and areas downgradient of Navy property, since

Media and chemicals:

- Soil: Xylenes in subsurface soil (deep localized hot spot area)
- Groundwater: Two VOC-contaminated groundwater plumes appear to exist
- Trichloroethene (TCE) and xylene are the primary contaminants in the groundwater ī

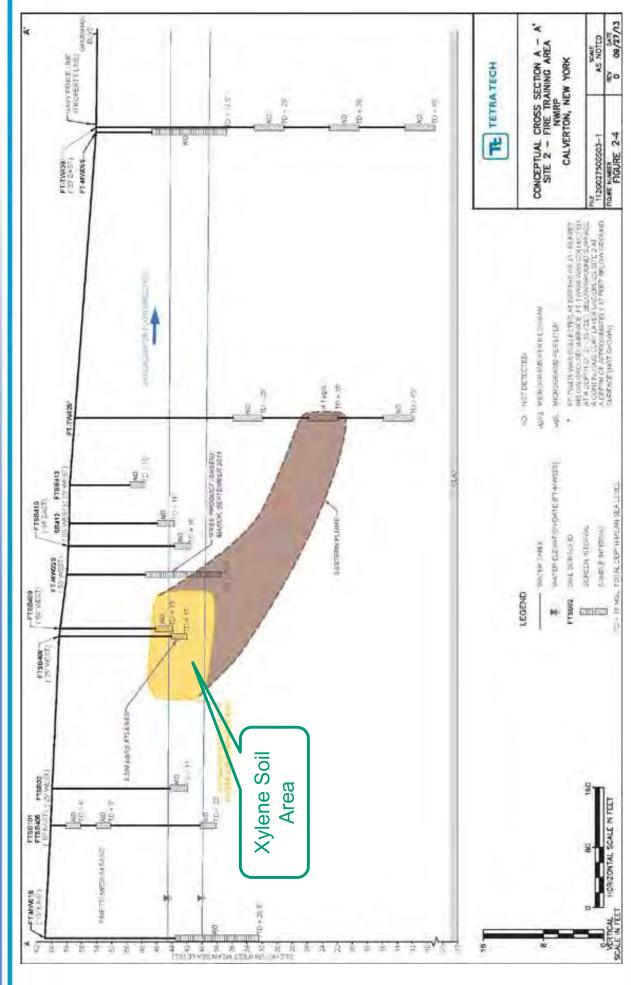
Site 2 – Supplemental RCRA Facility Investigation - Soil





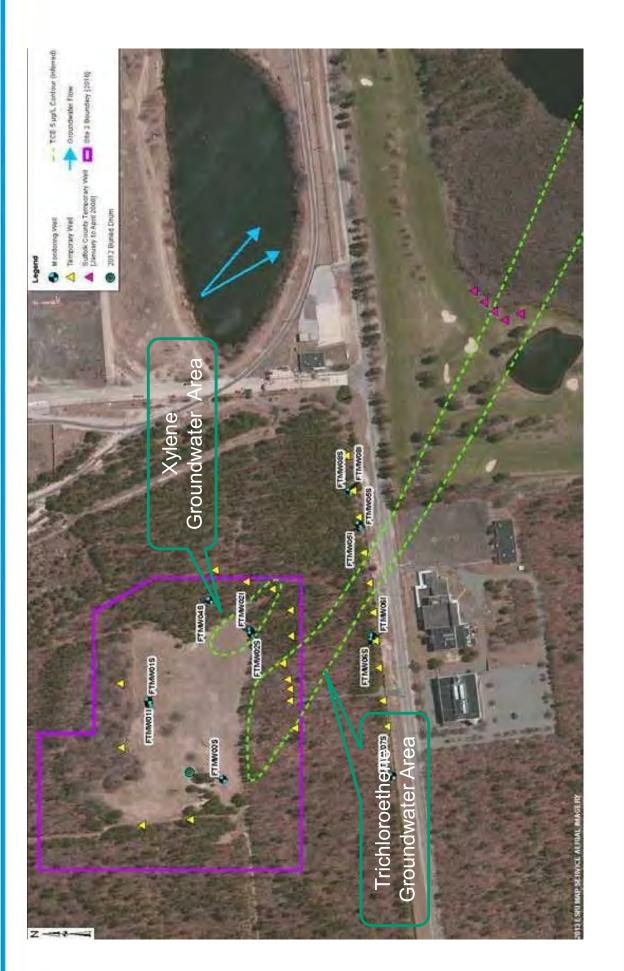
Site 2 – Supplemental RCRA Facility Investigation - Soil





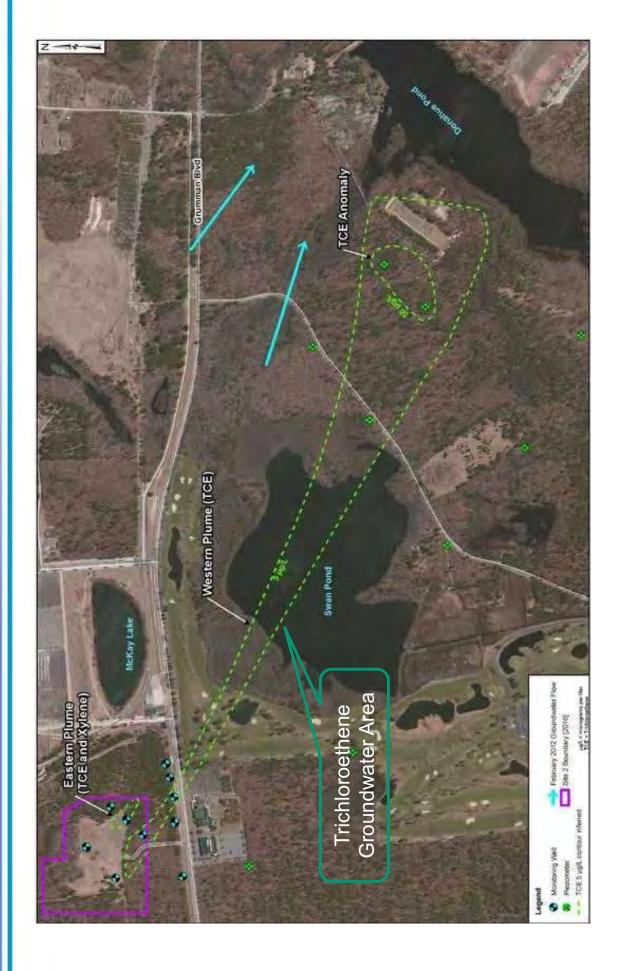
Facility Investigation - Groundwater Site 2 -Supplemental RCRA





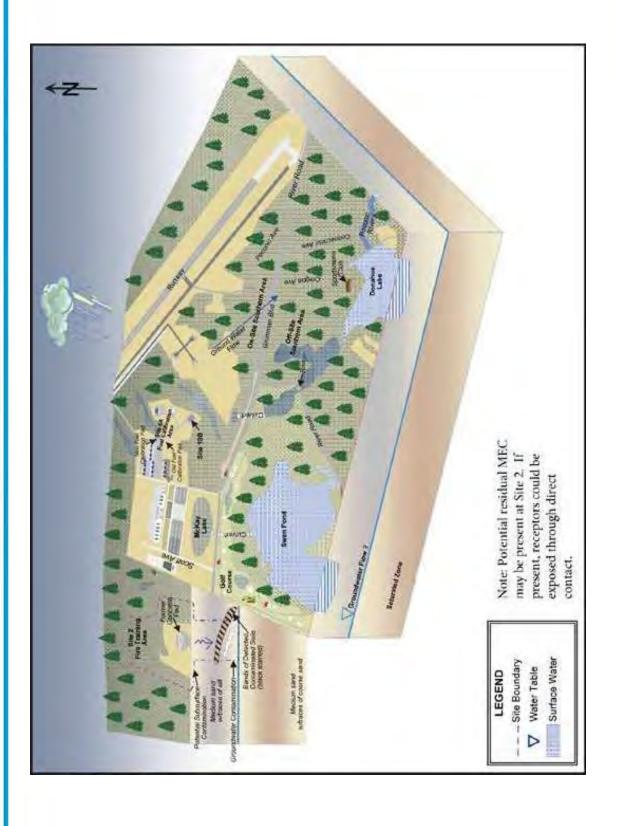
Facility Investigation - Groundwater Site 2 – Supplemental RCRA





Site 2 – Conceptual Site Model





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Corrective Measure Study (FS/CMS) Site 2 – Feasibility Study/



Soil and Groundwater Alternatives (1 to 5):

- Alternative 1 No Action
- Alternative 2A Land Use Controls (LUCs) and Monitoring
- Alternative 2B LUCs, Monitoring, and Treatment of Additional Source Areas
- Alternative 3 LUCs, Monitoring, Treatment of Addition Source Areas, and Biological Barrier for the Western (TCE) Plume
- Alternative 4A LUCs, Monitoring, Treatment of Additional Source Areas, and Biosparging of Residual Petroleum Contaminated Soil
- Alternative 4B LUCs, Monitoring, Treatment of Additional Source Areas, Biosparging of Residual Petroleum Contaminated Soil, and Air Sparging at the Property Line
- Alternative 5 LUCs, Monitoring, Treatment of Additional Source Areas, Excavation and Offsite Disposal of Residual Petroleum-Contaminated Soil and Excavation, and Air Sparging at the Property Line

Site 2 – FS/CMS



Potential Residual MEC Alternatives (6 and 7)

- Alternative 6 Surface Clearing of Potential Residual MEC, Stabilization, and LUCs
- Alternative 7 Excavation and Screening of Potential Residual MEC and Reuse of Soil



Site 2 – Path Forward



2017 Proposed Plan (45-day public comment period)

Public Meeting in Jan/Feb 2017 (to be announced)

2017 ROD for an Interim Action

2017 Design

2017/2018 Start Construction



2016 PERFLUOROALKYL SUBSTANCES SAMPLING

November 2016 Restoration Advisory Board

NWIRP CALVERTON, NEW YORK

November 15, 2016



Perfluoroalkyl Substances (PFAS) Sampling



- PFAS are classified as "emerging" contaminants no Safe Drinking Water Act standards or routine water quality testing requirements
- Man-made compounds that break down slowly
- Useful for home & industrial purposes, but long lasting in the environment
- Used since the 1950s in many products because of stain- and water-repellent properties
- Fire-fighting foam (AFFF)
- Stains, paints, and grease
- Fabric for upholstered furniture and carpets
- Nonstick cookware
- Floor wax
- Food packaging (e.g., lining of microwave popcorn bags, fast food wrappers)
- Globally distributed in the environment, detected in blood of humans and wildlife

PFAS Sampling



EPA Office of Water Lifetime Health Advisory Levels, Issued May 2016

- 0.07 µg/L for perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), individually or their sum
- These are not regulatory standards
- Health-based concentrations above which EPA recommends action be taken to reduce exposure

Navy Strategy to Manage and Address PFAS

- Protectively identifying locations where PFOA/PFOS may have migrated to off installation drinking water sources
- Where EPA lifetime health advisory levels have been exceeded, the Navy has provided alternative drinking water
- Conducting installation-wide assessments to identify all potential PFOA and PFOS release sites and will prioritize future site investigations and remediation based on potential risk to drinking water sources



Site 2 Former Fire Training Area

- Fire training exercises conducted from the 1950s to the mid-1990s
- AFFF used in some fire training exercises; records search underway to evaluate AFFF

Fire Suppression Systems in Calverton Buildings

- Buildings constructed prior to 1980 did not have AFFF fire suppression systems
- Buildings constructed after 1982 had AFFF systems tested by closed means (i.e. the AFFF water mixture was collected in a tank)
- Building 168 (New Aircraft Paint Hangar ca. 1980) and Building 318 (Rehab Existing Paint Hangar – ca. 1981) had fire suppression systems utilizing AFFF
- Located adjacent to an immediately upgradient of the Fuel Calibration Area (Site 6A)
- These systems were tested by a full dump of AFFF and water inside the structures



Crash Sites

- Interviews conducted as part of 1997 Baseline Environmental Survey identified five crashes at NWIRP Calverton throughout its operational history
- Earliest in 1956, most recent in 1983
- Two in the Southeast Buffer on approach to runway 32-14
- Two on runway 32-14
- One in the Northeast Pond Dumping Area
- Records search underway to evaluate AFFF use in emergency response



Sampling conducted September 2016

- One residential well (serves River Road houses south of Swan Lake)
- PFOS detected at ~10% of health advisory, PFOA not detected
- Seven Site 2 Samples (5 on-property, 2 off-property)
- PFOS and/or PFOA detected in all 5 on-property samples; 3 exceeded health advisory
- PFOS or PFOA detected in both off-property samples; PFOS exceeded health advisory at FT-
- Four Site 6A/Southern Area Locations (2 Source Area, 2 Fence Line Area)
- PFOS and PFOA detected in both Site 6A samples; 1 exceeded health advisory
- PFOS and PFOA detected in both Fence Line Area samples; both exceeded health advisory

No drinking water wells are currently known to be impacted above EPA Health Advisory levels



Path Forward

- Conduct additional groundwater sampling
- Perform drinking water monitoring at one property to check for PFAS concentration changes
- Continue to monitor and respond as appropriate to changes in health-based levels
- Evaluate and implement possible long term solutions

For additional information, please visit:

http://www.secnav.navy.mil/eie/pages/pfc-pfas.aspx

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SITE 7 – FUEL DEPOT AIR SPARGING/SOIL VAPOR **EXTRACTION SYSTEM UPDATE**

November 2016 Restoration Advisory Board

NWIRP CALVERTON, NEW YORK

November 15, 2016



Outline of Presentation

Introduction

System Performance / Background Information

Decommissioning of full-scale AS/SVE system

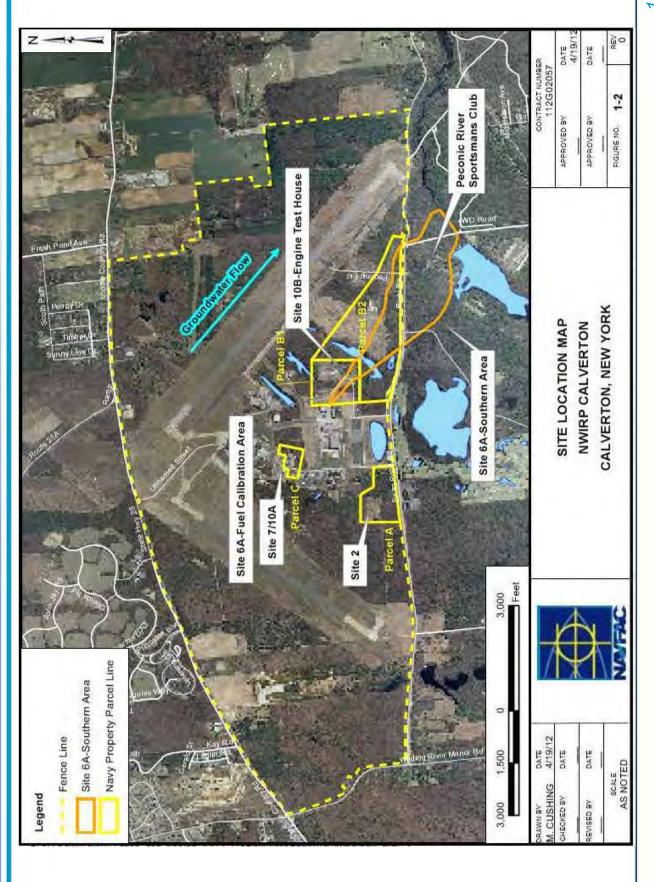
Recent Activities

- Groundwater Sampling / Monitoring

Summary and Path Forward



Introduction



Introduction



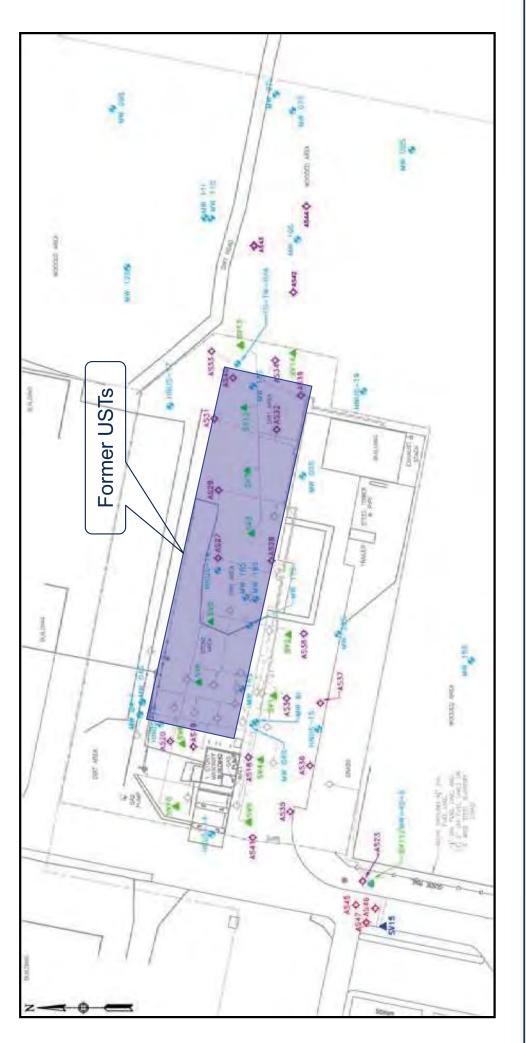
- AS/SVE system started operation in 2005 (pilot) / 2006 (full scale)
- Operated seasonally (April to December)
- Three modifications were made to the system to improve performance
- System reached end of its functional life November 2013
- System was shut down in November 2013 and monitoring began per the Performance and Shutdown Evaluation document (Nov 2013)



Introduction



Injection, Extraction, and Monitoring Wells



System Performance

1992/1995, 2009, and 2011 to 2013 Plume Boundaries



Decommissioning of Full-Scale AS/SVE System



- Contractor mobilized August 10, 2015
- Piping removed and wells decommissioned during first week
- Fabric structure repurposed for a museum
- All other material decontaminated and recycled or disposed

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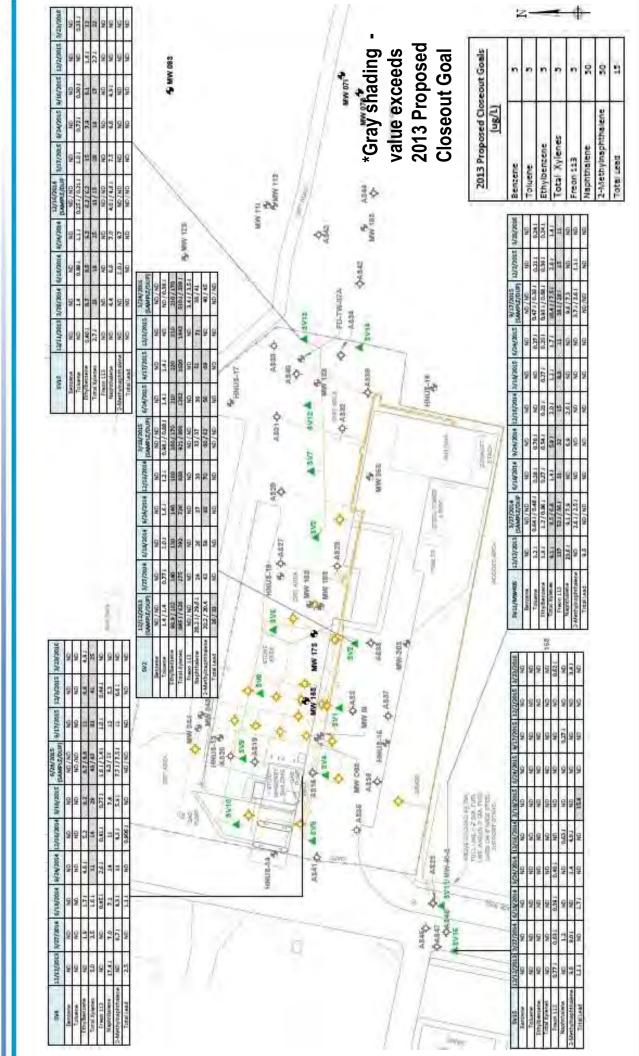
Recent Activities



Seasonal groundwater sampling post system shut-down

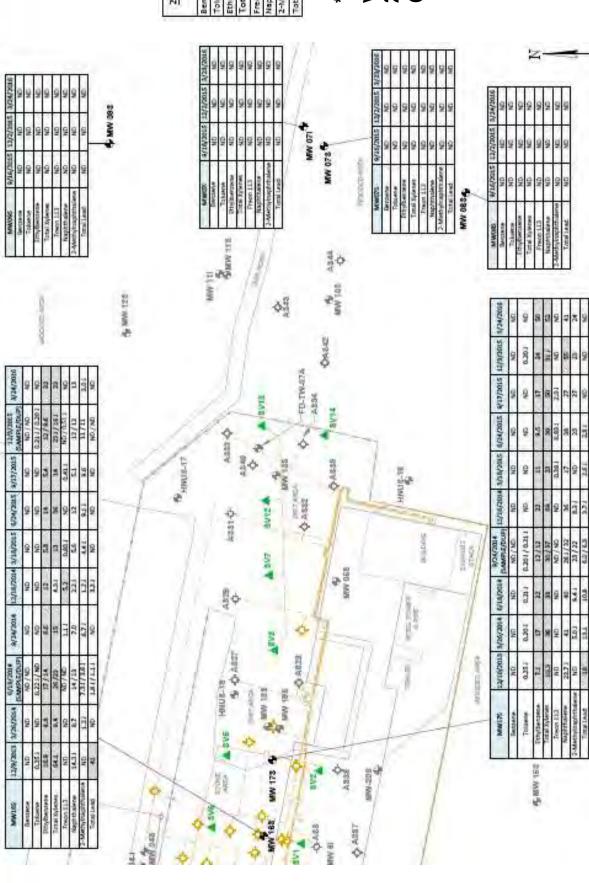
- First round conducted in December 2013 system down for one month prior to sample
- Samples analyzed for select VOCs (BTEX, Freon, Naphthalene), 2-methylnaphthalene, and lead
- Quarterly sampling of 7 wells (SV-2, SV-4, SV-11, SV-13, SV-15, MW-16S, MW-17S) which previously had exceedances of 2003 ROD Remediation Goals
- March, June, September, December 2014 and 2015
- Beginning September 2015, four downgradient sentry wells added to monitoring well network MW-07S, MW-07I, MW-08S, MW-09S
- In 2016, sampling frequency reduced to semi-annual (March, October)
- Additional parameters collected for evaluation for potential injection





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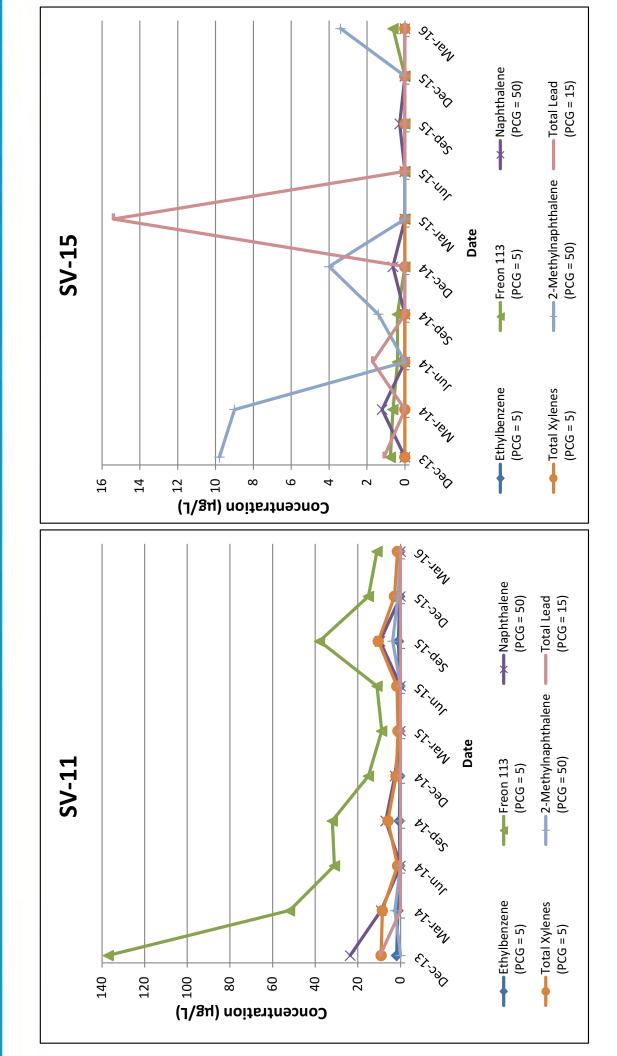
2013 Proposed Close [ug/l]	court Go
Benzene	n
Toluene	n
Ethylbentene	n
Total Xylenes	n
Freon 113	n
Naphthalene	20
2-Methylnsphithslene	8
Total Lead	27

2013 Proposed *Gray shading value exceeds **Closeout Goal**

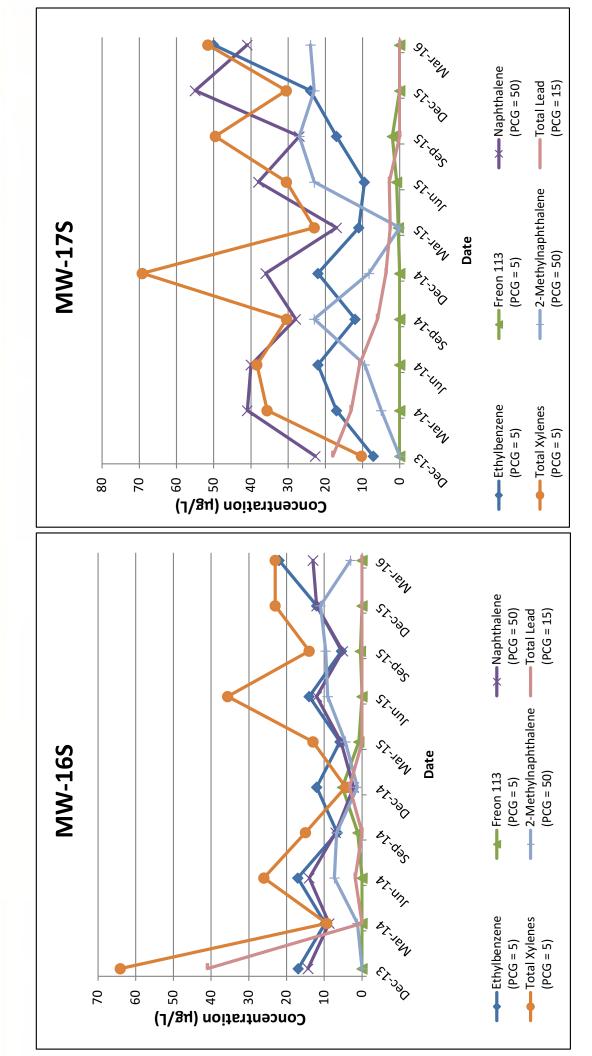
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Quarterly/Semi-Annual Groundwater Sampling

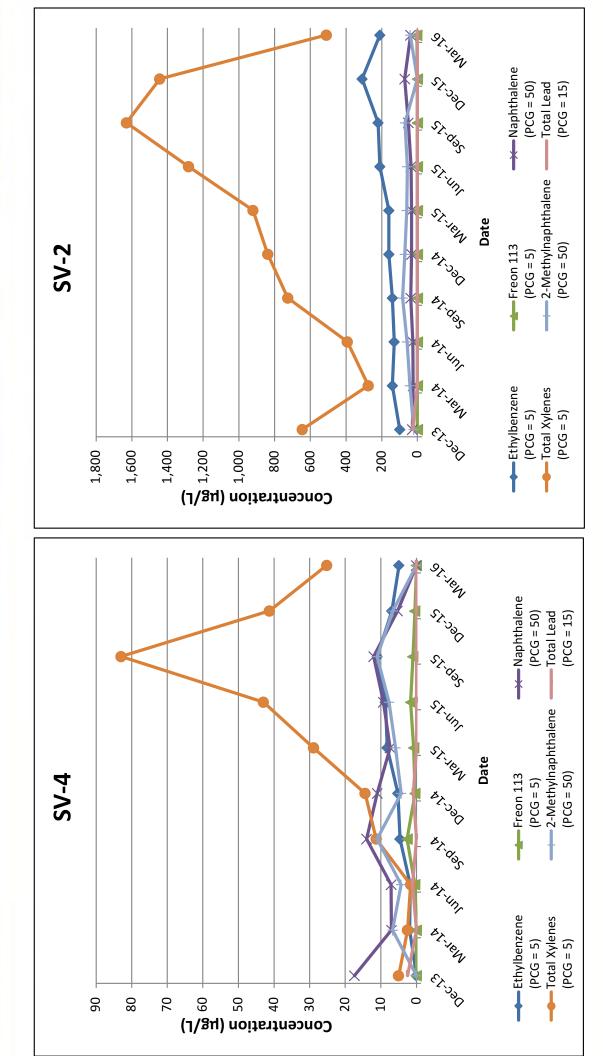






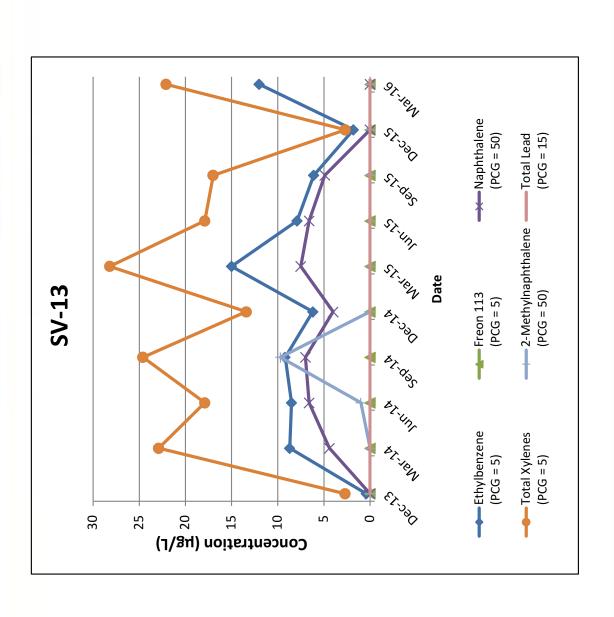






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Recent Activities – October 2016



Semi-annual groundwater monitoring event performed in October 2016

- Free product observed in MW-17S no groundwater samples collected from this well
- Performed additional site gauging, collected a sample of product for analysis
- Fingerprint analysis confirms product is degraded jet fuel

Continued gauging MW-17S and surrounding monitoring wells/SVE wells several times per week

- Product also observed at MW-19S
- Product layer stable at about 1 foot thick at both locations

Product recovery via hand bailing begun, to continue as part of gauging

11/15/2016

Summary and Path Forward



Defer plan for in-site chemical oxidation (ISCO) Pilot Study to investigate extent of free product

Use a direct-push technology (DPT) rig to investigate in-situ conditions

Floating product in wells generally not the true thickness of product in soil

Buried foundations for tanks may be obstacle

Planned for December 2016

Evaluate and report on potential short- and long-term responses

Planned for January/February 2017

Continue gauging and bailing recoverable product as an interim response



GROUNDWATER EXTRACTION TREATMENT SYSTEM SITE 6A - SOUTHERN AREA FENCE LINE

November 2016 Restoration Advisory Board

NWIRP CALVERTON, NEW YORK

November 15, 2016

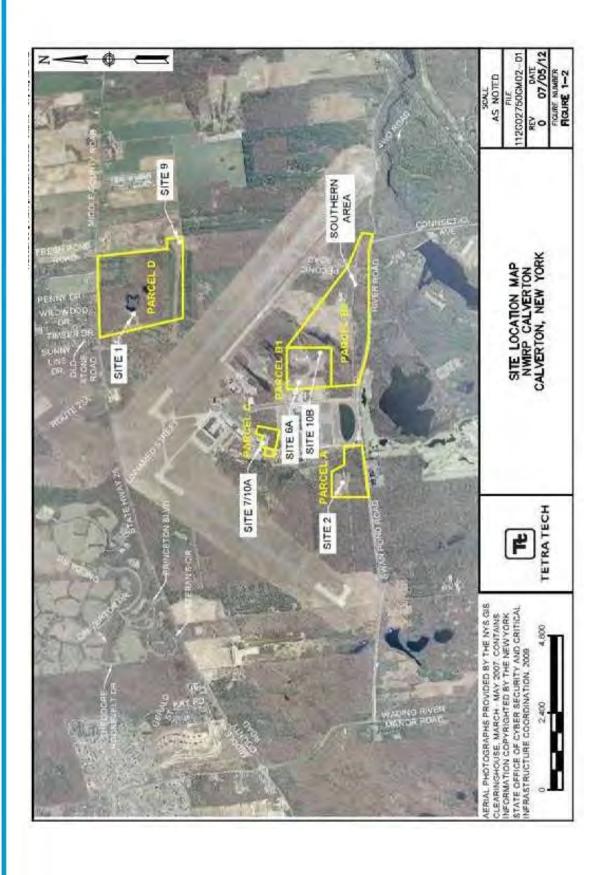


Presentation Agenda

- Introduction
- System Overview
- System Operation
- System Performance / Recent Activities
- System Performance Summary / Future Activities



Site Layout



11/15/2016

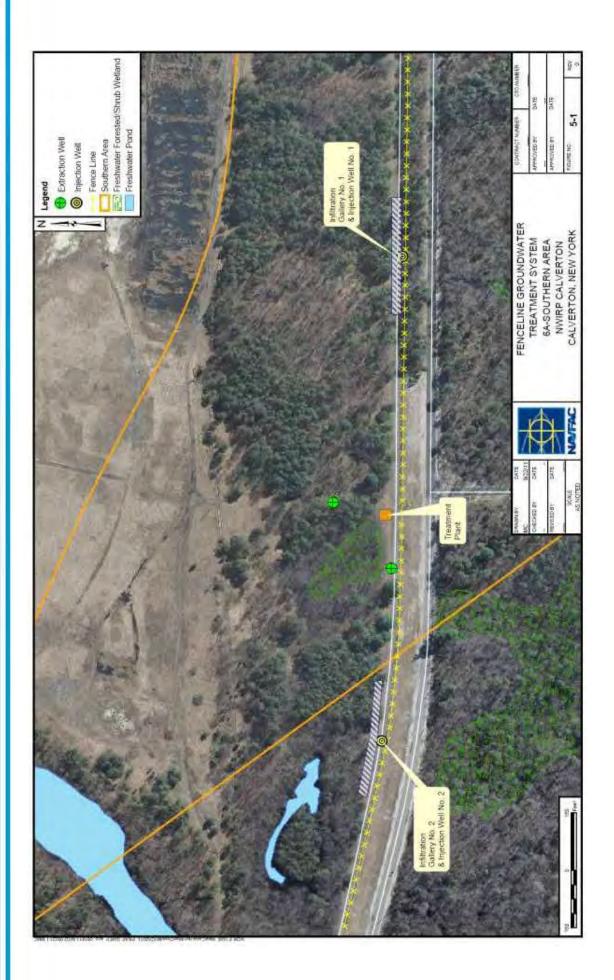
Fence Line Treatment System Overview



- ROD in May 2012
- Selected remedy for Fence Line Area LUCs and monitoring with extraction, treatment, and infiltration
- Remedial Design for Fence Line Treatment System (FLTS) in May 2012
- Fence Line Treatment System overview:
- Two extraction wells, up to 100 gallons per minute
- VOCs removed via air stripping
- Treated groundwater re-injected through infiltration galleries, meeting MCLs
- Construction began in October 2012
- System start-up occurred 8 October 2013
- EW-2 taken off-line and replacement well EW-3 brought on-line in February

Fence Line Treatment System Overview





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Fence Line Treatment System Overview



Treatment Plant Building





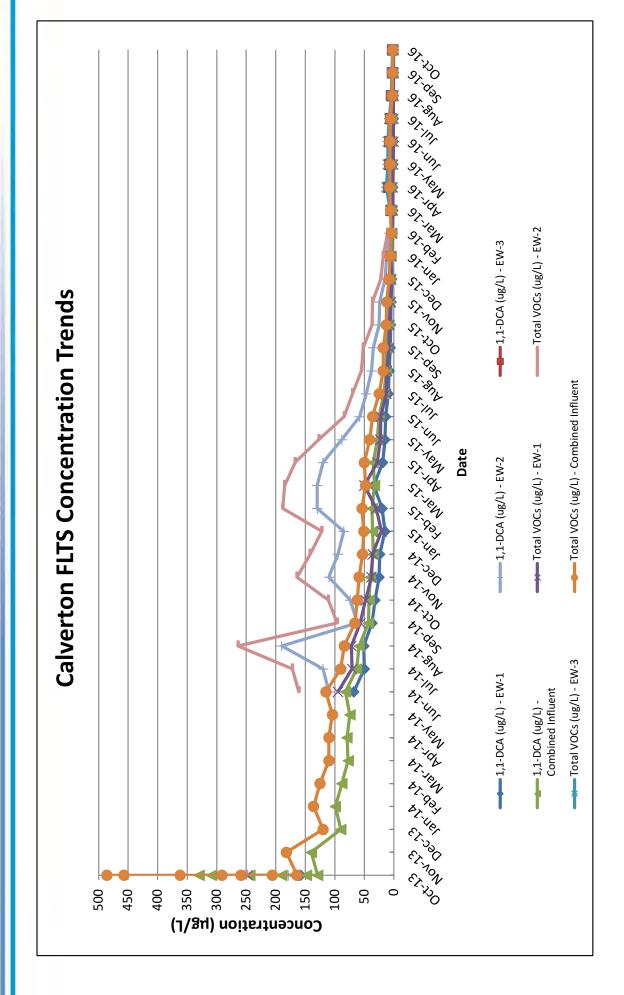
System Components

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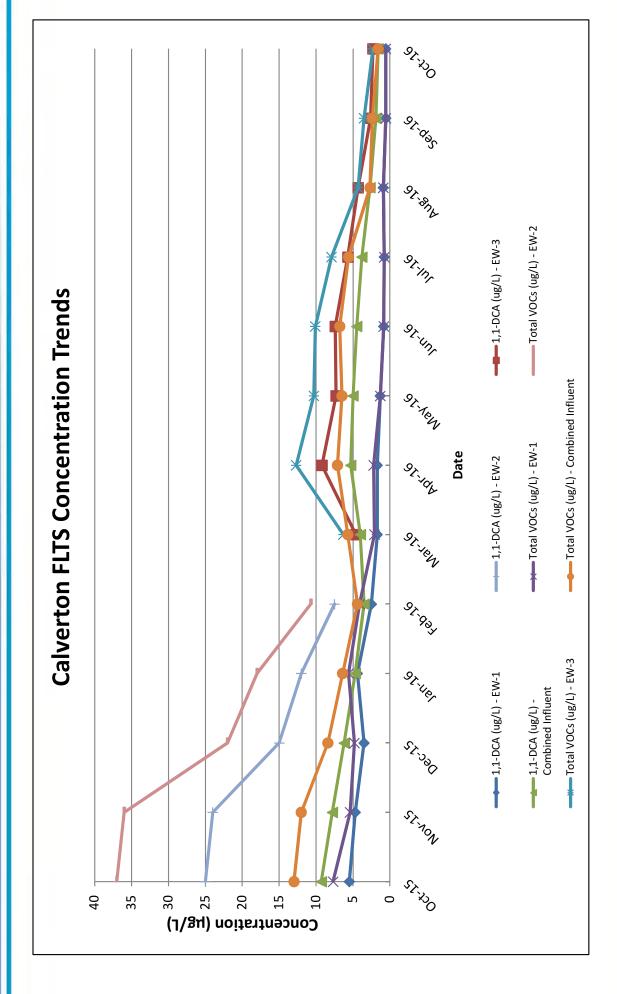


	FLOW DATA	DATA			FLOW DATA	DATA	
Date	Total Monthly Flow (gal)	Total Cumulative Flow (gal)	Average Influent Flowrate (gpm)	Date	Total Monthly Flow (gal)	Total Cumulative Flow (gal)	Average Influent Flowrate (gpm)
Oct-13*	2,976,601	2,976,601	89.9	Apr-15	3,152,581	58,108,301	76.1
Nov-13	2,288,925	5,265,526	78.2	May-15	3,020,310	61,128,611	77.2
Dec-13	1,715,264	6,980,790	61.5	June-15	2,700,213	63,828,824	73.1
Jan-14	2,358,016	9,338,806	77.0	July-15	3,167,585	66,996,409	71.1
Feb-14	3,814,953	13,153,759	96.2	Aug-15	2,660,132	69,656,541	64.5
Mar-14	3,794,639	16,948,398	91.3	Sept-15	2,849,371	72,505,912	9.89
Apr-14	3,683,505	20,631,903	91.0	Oct-15	2,725,555	75,231,467	65.1
May-14	3,658,145	24,290,048	87.9	Nov-15	2,506,673	77,738,140	68.8
June-14	3,149,276	27,439,324	85.0	Dec-15	2,642,380	80,380,520	67.5
1111/2-14	3 113 492	30 552 816	79.4	Jan-16	2,160,582	82,541,102	8.69
) Clip 14	0,110,402	33,552,819	1.7	Feb-16	2,832,957	85,374,059	73.4
Aug-14	5,115,492	33,000,300	01.7	Mar-16	3,931,870	89,305,929	94.5
Sept-14	1,949,358	35,615,666	/8.8	Apr-16	2,960,041	92,265,970	76.4
Oct-14	3,744,800	39,360,466	87.0	May-16	2,761,171	95,027,141	8.07
Nov-14	2,325,171	41,685,637	88.4	June-16	3,418,214	98,445,355	79.5
Dec-14	3,791,812	45,477,450	91.0	July-16	3,372,265	101,817,620	9.6/
Jan-15	3,711,714	49,189,164	87.1	Aug-16	3,336,255	105,153,875	79.5
Feb-15	3,331,398	52,520,562	87.0	Sept-16	2,481,681	107,635,556	71.8
Mar-15	2,435,158	54,955,720	77.3	Oct-16	3,011,578	110,647,134	76.8













al	Cumulative VOC	Mass Removal (Ib)	4.04	7.50	9.20	11.86	15.81	19.26	22.61	25.77	28.77	31.09	33.44	34.50	36.44	37.58	39.22	40.81	42.30	43.28
Target VOC Mass Removal	Monthly VOC Mass	Removal (Ib)	4.04	3.46	1.70	2.66	3.95	3.45	3.35	3.16	3.00	2.32	2.35	1.06	1.94	1.14	1.64	1.59	1.49	0.98
Tar		Date	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	June-14	July-14	Aug-14	Sept-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15

Та	Target VOC Mass Removal	al
	Monthly VOC Mass	Cumulative VOC
Date	Removal	Mass Removal
	(Ib)	(Ib)
Apr-15	1.31	44.59
May-15	1.02	45.61
June-15	0.81	46.42
July-15	0.67	47.09
Aug-15	0.41	47.50
Sept-15	0.43	47.93
Oct-15	0.30	48.23
Nov-15	0.25	48.48
Dec-15	0.18	48.66
Jan-16	0.12	48.78
Feb-16	0.10	48.88
Mar-16	0.19	49.07
Apr-16	0.18	49.25
May-16	0.15	49.40
June-16	0.19	49.59
July-16	0.16	49.75
Aug-16	0.08	49.83
Sept-16	0.05	49.88
Oct-16	0.04	49.92

Fence Line Treatment System Performance Recent Activities



- Replacement well EW-3 brought on-line in February 2016
- Overall decreasing trends observed in influent concentrations and flow rates
- Target VOC concentrations in combined influent have recently decreased below 5 µg/L (since August 2016)
- Began analyzing for full-list VOCs in May 2016
- ranged from 8.9 µg/L in May 2016 to 4.5 J µg/L in October 2016 Perchloroethylene (PCE) concentrations in combined influent



EW-3 Wellhead

11/15/2016

Fence Line Treatment System Performance Recent Activities



Flow rates increased immediately after bringing well EW-3 on-line

Flow rates have since decreased due to reduced ability of infiltration galleries to accept flow

- Letter work plan to perform chemical redevelopment of infiltration galleries submitted in July 2016

Approval received in August / September; Work scheduled to begin November 2016

Continued evaluation and possible extension of galleries to the east if necessary

Fence Line Treatment System Performance Summary / Future Activities



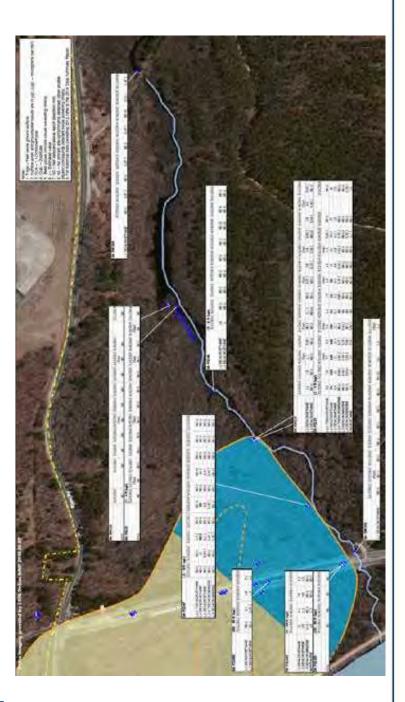
- Continued compliance with all discharge goals
- Continued VOC removal efficiencies of >99%
- Influent analytical results nearing or below maximum contaminant levels (MCLs)
- Concentrations in several Area monitoring wells remain above 50 µg/L
- Continue evaluating groundwater concentrations in Area / shut-down criteria
- Recent sampling of Area wells performed in Fall 2016
- Continue evaluating infiltration gallery capacity and perform system modifications if needed
- Continue to perform monthly compliance sampling and submit monthly compliance reports

Spring 2016 Sampling



Semi-Annual Peconic River Area Sampling

- Routine part of the basewide monitoring program
- Four surface water samples
 - Four in-river piezometers
- No exceedances of benchmarks; surface water & piezometer data generally consistent with prior data



Spring 2016 Sampling



Fence-Line Area Monitoring

- Added to monitor in-situ conditions in vicinity of extraction wells
- Included 12 wells & piezometers that are part of the routine basewide monitoring program
- MCL exceedances consistent with prior data (1,1-dichloroethane [DCA] in particular), suggestive of a narrow plume still flowing through the Fence Line Area



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Look Forward – Site 6A/Southern Area



Data gap between SA-MW132 and SA-PZ123 clusters to be addressed

- 5 additional wells on PRSC property
- Provide better definition of plume along northern shore of Donahue Pond
- Awaiting Work Plan approval and PRSC access agreement

Site 6A Source Investigation

- Driven by recent VOC concentrations at FC-MW02SR1 and FC-MW03SR1
- Will attempt to:
- Determine if source is upwelling from below excavation, or from upgradient
- Determine if there is a plume existing the source area to the east
- Awaiting Work Plan approval



Questions?