BRANDYWINE DEFENSE REUTILIZATION AND MARKETING OFFICE

Joint Base Andrews
Prince George's County, Maryland

FACT SHEET: JANUARY 2020
UPDATE ON ENVIRONMENTAL RESTORATION ACTIVITIES AT BRANDYWINE

This fact sheet provides an overview of remedial action activities at the Brandywine Defense Reutilization and Marketing Office (DRMO) site, Prince George's County, Maryland.

Introduction

Past Department of Defense (DoD) activities used the Brandywine DRMO site for storage from 1943 to 1987. Unfortunately, spills, leaks, and storage practices common to that era resulted in the release of solvents and fuels into the environment. Those releases resulted in the Brandywine DRMO being listed on the National Priorities List in 1999. A Federal Facilities Agreement was negotiated for the subsequent work to be conducted at Brandywine between the DoD and U.S. Environmental Protection Agency (USEPA), effective 2011.

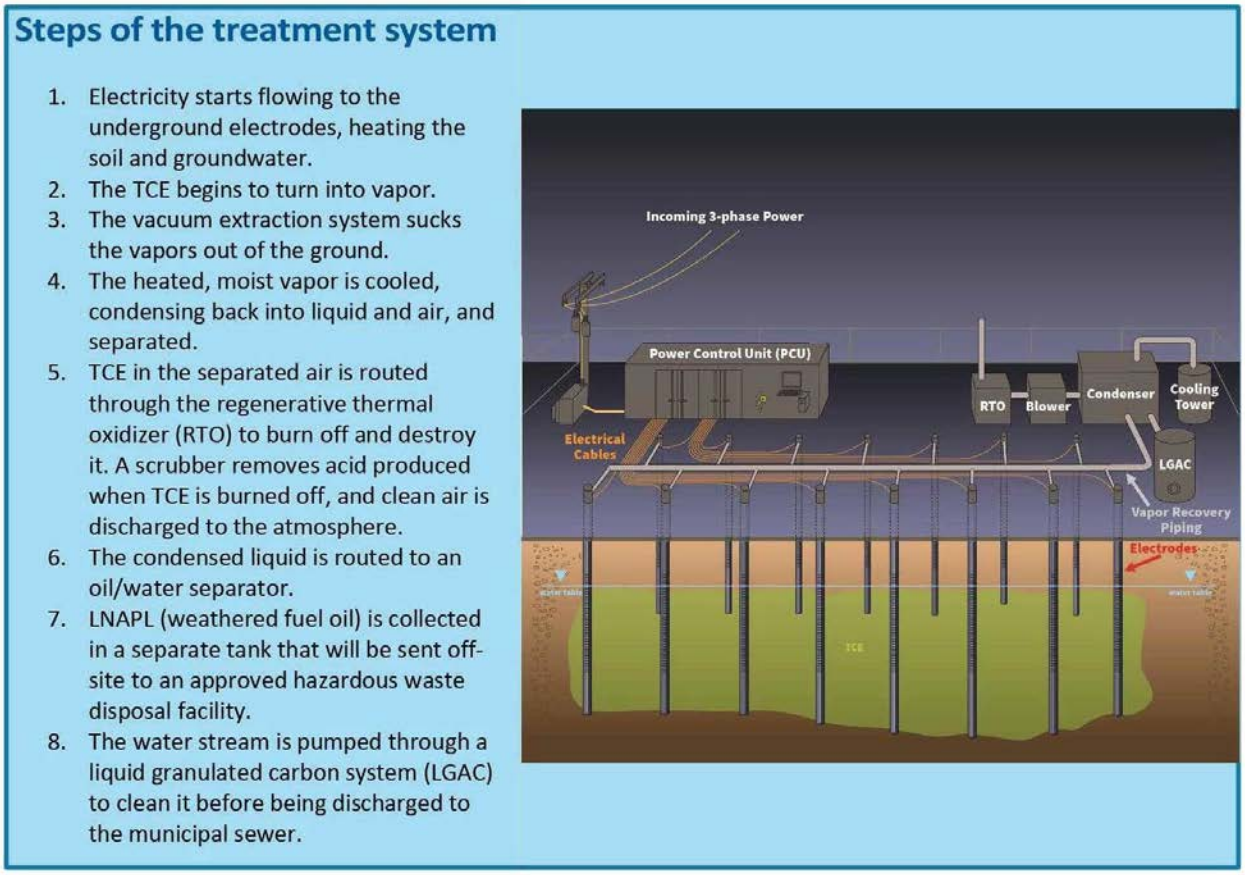
Previous environmental investigations discovered that trichloroethylene (TCE), a type of volatile organic compound (VOC) or solvent, had leaked into the subsurface; and polychlorinated biphenyls (PCBs) had leaked into the soil. The Air Force has completed numerous studies and response actions to address historic releases at the Brandywine site, dating back to 1985. An interim remedial action for groundwater began in 2006 using groundwater extraction and treatment and injections of material to promote contaminant degradation cleaned up the 20-acre chlorinated solvent plume, limiting the area of contamination to the source area in clays below the northwest corner of the site, extending beneath CSX railroad tracks and Cherry Tree Crossing Road.

Remedial Action Update

The Final Record of Decision (ROD) was signed by the Air Force and USEPA in March 2018. The Maryland Department of Environment (MDE) provided state concurrence. The final remedy is consistent with the Proposed Plan, namely no further action for site soils and electrical resistance heating (ERH) to treat the groundwater contaminant source area. HydroGeoLogic, Inc. (HGL) and its thermal remediation partner TRS Group, Inc. (TRS) designed and implemented the ERH remedy at the site. ERH will treat the primary contaminants of concern (COCs) at the site, TCE, TCE breakdown products (cis-1,2-Dichloroethene [cis-1,2-DCE)] and vinyl chloride [VC]), as well as lower levels of 1,4-dichlorobenezene (1,4-DCB). The USEPA accepted the remedial design and will continue to provide oversight, along with the US Army Corps of Engineers (USACE) and the Air Force. A public meeting was held on May 15, 2018 after ROD signature and Remedial Design / Remedial Action Work Plan approval to brief the public on the final remedy. In January 2019, a ceremony was held with the public to recognize that construction of the ERH system was nearly complete and operations were soon to commence.

ERH Treatment System Design and Construction

ERH is a technology that heats the ground to extract and treat hazardous substances as illustrated in the diagram below. Electricity runs through electrodes, and the natural resistance of the subsurface results in heating the soil and groundwater, which will vaporize the contaminants. The vapors are captured and removed through vapor recovery wells. Contaminated vapor is then treated above ground before being discharged to the air.



Construction of the ERH system began in May 2018. The ERH system design employed two electrode designs (sheet pile and bored electrode pairs). Sheet pile electrodes were installed at 58 locations within the treatment area during July 2018. Sheet pile electrodes were installed at electrode locations without an overhead clearance restriction and at locations within Cherry Tree Crossing Road. Roadway closure was limited to one lane during daytime hours, and vehicle traffic within the active work zone was controlled by flag persons that directed traffic along the open lane.

To protect equipment and materials, as well as maintain public safety during system construction and operation, a combination of temporary and permanent fence was employed. The permanent fence design implemented 6-foot tall, vinyl-clad, chain-linked fence near the electrode field to mitigate any voltage potential along the critical runs of fence near the electrodes. Standard galvanized temporary fence was employed to provide security where voltage potential was not a

hazard. The combined temporary and permanent fence surrounded the ERH equipment compound and treatment area where electrode cables and vapor recovery piping existed above grade. Privacy screens were installed to the fence to limit interference of the security systems with motion from vehicle traffic.

The ERH system design employed two security system to provide site security during operations. The security system used a combination of infrared sensors and motion activated cameras. The infrared sensors were programed to terminate power delivery to the electrodes when tripped by an object or person that enters the area of coverage. The motion activated cameras record any activity within their field of view and send out a video to TRS staff for review. Both systems were monitored by an independent security provider, 24 hours a day and 7 days a week, when armed. Additionally, a remote access camera mounted on a pole in the east treatment area provided 360 viewing of both equipment compounds.

During construction of the system, CSX provided protection and construction oversight for electrodes and infrastructure installed on CSX property. CSX also required the ERH system to incorporate real time monitoring of the two rail lines that transect the site. An optical monitoring system using a laser to measure movement of mirror survey prisms mounted the steel rail of the tracks was installed on April 3, 2019. Full-scale continuous operation of the ERH system commenced on April 5, 2019.

Remedial Action Objectives

Remedial action objectives (RAOs) specific to the ERH portion of the remedy are as follows:

- Reduce concentrations of volatile organic compounds (VOCs) (TCE, cis-1,2-DCE, and VC) in the source area (clays underlying the site at depth) such that contaminant concentrations in the Brandywine Formation groundwater are reduced to levels below promulgated USEPA Maximum Contaminant Levels (MCLs) for drinking water.
- Reduce concentrations of 1,4-DCB, 2-methylnaphthalene, and naphthalene in smear zone soils (soils at the water table interface, approximately 10-feet below ground surface) in the northwest corner of the DRMO yard such that COC concentrations in the Brandywine Formation groundwater are reduced to levels below MCLs and risk-based levels for constituents without an MCL.

Groundwater cleanup criteria are presented in Table 1 (below).

Table 1.
Groundwater COC Cleanup Criteria

Analyte	Concentration (µg/L)
TCE	5 (MCL)
cis-1,2-DCE	70 (MCL)
Vinyl Chloride	2 (MCL)
Naphthalene	1.7 (Risk-based, Drinking Water))
2-Methylnapthelene	36 (Risk-based, Drinking Water)
1,4-DCB	75 (MCL)

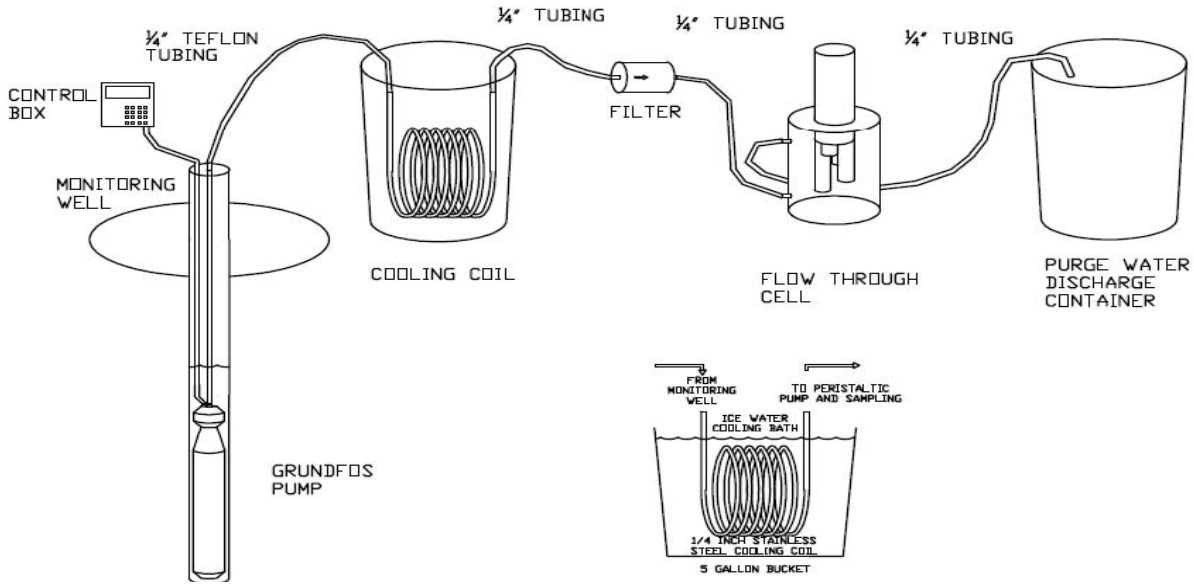
Achievement of risk-based cleanup criteria for contaminants without MCLs, naphthalene and 2-methylnaphthalene, will take longer because of their lower volatility. Land Use Controls (LUCs) will continue to ensure that people are not exposed to contaminants in the groundwater until cleanup criteria are achieved.

ERH Treatment System Operation

Two rounds of groundwater samples were collected from nine stainless steel wells installed within the ERH footprint on November 1, 2018 and December 13, 2018, prior to ERH system startup and operation, to serve as a baseline for comparison.

During ERH system operations, operational parameters, including power application throughout the treatment volume, subsurface temperatures at 17 monitoring points, subsurface vacuum, condensate production, vapor recovery flows/pressures, and estimates of contaminant concentrations in the recovered subsurface vapors were routinely measured. This data was used to assess the efficiency of the ERH system and optimize system performance. HGL collected all vapor and water samples for compliance monitoring.

Groundwater samples were collected from nine monitoring wells within the ERH footprint during the ERH treatment to assess progress towards RAOs. Groundwater temperatures during ERH treatment are anticipated to maintain an average of approximately 160 degrees Fahrenheit. As shown in the diagram below, an ice bath is used to cool the groundwater prior to sample collection, eliminating the negative impact of elevated temperatures on groundwater chemistry and contaminant concentrations, and allowing for the safe handling of highly elevated water temperatures.



The first round of "hot" groundwater sampling during operations was performed on June 4, 2019, when the average temperature in the subsurface was approximately 95 degrees Celsius. The June 4 results reflected non-aqueous phase liquid (NAPL) dissolution and removal at some locations in the treatment area. After 63 days of operations, on June 11, 2019, the average temperature site

wide reached 100 degrees Celsius. Peak mass removal concentrations throughout the site was observed within ten days after achieving 100 degrees Celsius. On August 9, 2019 the mass removal concentrations began to plateau, 60 days after reaching 100 degrees Celsius site wide, and remained so with as the system operated at boiling temperatures for over 138 days. Confirmation groundwater sampling continued on a routine basis (two to three weeks apart) depending on operational parameters throughout the period. Groundwater samples were subsequently collected from all nine wells on July 9, 2019 and August 7, 2019. During the August 7 event, MCLs were achieved at the first location within the treatment volume. ERH operations continued, focusing on areas that had not yet achieved MCLs. An average temperature of 106.3 degrees Celsius was maintained by the ERH system for at least 4 months. Sampling continued approximately every two to three weeks for the next three months until contaminants in groundwater achieved MCLs. During the first week of November, the Air Force, USACE, HGL, TRS, USEPA, MDE, and Prince Georges County Health Department met via teleconference. During the meeting, groundwater, subsurface temperature, and contaminant mass recovery data were presented to support shutdown of the ERH system. Following that meeting, ERH power application ceased with EPA and MDE written concurrence that multiple lines of evidence supported that the RAOs of the ROD had been met.

In summary, after seven months of operation, the ERH system was successful in eliminating the ongoing VOC source of groundwater contamination beneath the northwest corner of the DRMO property, CSX Railroad tracks, and Cherry Tree Crossing Road, and reducing VOC concentrations in groundwater to concentrations at or near MCLs. The aboveground ERH system components are being removed from the site and subsurface components are being removed or abandoned in place per property owner requirements.

Ongoing Activities

Post-remedial action groundwater sampling began in December 2019 and will occur quarterly for the first year, semiannually for the following 2 years, then annually for 1 year. Monitoring after ERH treatment will include monitoring TCE, PCE, cis-1,2-DCE, VC, 1,4-DCB, naphthalene, 2-methylnaphthalene, iron, and manganese in monitoring wells. Monitoring is included for the entire plume, including distal portions of the plume addressed during the interim remedy that have not yet met cleanup goals for iron and manganese. The monitoring well network will be optimized and continually evaluated with respect to frequency, location, and analytes based upon progress towards achievement of cleanup criteria. Attainment of cleanup criteria will be evaluated per EPA Guidance. Performance monitoring evaluations will be provided in performance groundwater sampling reports.

Groundwater use is not permitted in the vicinity of the Brandywine DRMO site because Maryland regulations forbid the installation of individual water supply systems when a community water supply system is available (COMAR § 26.03.01.05.A.). Public water is supplied to the area by the WSSC. Land use controls have also been implemented to restrict the use of, or limit access to, real property to prevent exposure to contaminants above permissible levels. The intent of using these controls is to protect human health by limiting the activities that may occur at the site to prevent exposure to COCs and to protect the remedy. LUCs will remain in place as long as the

concentrations of COCs are above the cleanup criteria. The LUC boundary may be adjusted over time as new data are analyzed.

Public Outreach

Joint Base Andrews Environmental Restoration Program (JBA ERP) continues to actively engage the Brandywine community and is committed to maintaining an open dialogue. Representatives of the JBA ERP have attended multiple public meetings and distributed over a dozen fact sheets; and were featured in 2 newspaper articles and an EPA video. The Final ROD and all supporting documents are available for review at the Prince George's County Library System, Oxon Hill Branch, 6200 Oxon Hill Road, Oxon Hill, Maryland (301-839-2400). A public information session was held on May 15, 2018 after ROD signature and RD RAWP approval at the Old Volunteer Fire Department of Brandywine, 14201 Brandywine Road, Brandywine, Maryland to provide an update on and answer questions related to environmental restoration activities at the Brandywine site. In January 2019, a ceremony was held at the Old Volunteer Fire Department of Brandywine with the public to recognize that construction of the ERH system was nearly complete. This fact sheet documents successful implementation of the ERH system and achievement of RAOs set forth in the final ROD.

For questions or concerns about restoration activities at the site, please contact any of the following points-of-contact below.

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