FOURTH FIVE-YEAR REVIEW REPORT FOR SAUNDERS SUPPLY CO. SUPERFUND SITE CITY OF SUFFOLK, VIRGINIA

DECEMBER 2019

Prepared by

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Date

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LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CCA	Copper, Chromium and Arsenic
CDD	Chlorinated Dibenzo-p-dioxins
CDF	Chlorinated Dibenzofurans
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
DUP	Duplicate
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GAC	Granular Activated Carbon
HQ	Hazard Quotient
IC	Institutional Control
J	Estimated Result
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PCOR	Preliminary Close-Out Report
PCP	Pentachlorophenol
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
RAO	Remedial Action Objective
RfD	Reference Dose
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
RV	Recreational Vehicle
RW	Recovery Well
SW	Surface Water
TCDD	Tetrachlorodibenzo-p-dioxin
USACE	United States Army Corps of Engineers
UU/UE	Unlimited Use/Unrestricted Exposure
VDEQ	Virginia Department of Environmental Quality

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR Reports such as this one. In addition, FYR Reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (40 Code of Federal Regulations Section 300.430(f)(4)(ii)) and considering EPA policy.

This is the fourth FYR for the Saunders Supply Co. Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR, dated December 29, 2014 (2014 FYR). The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The Site consists of one operable unit (OU). The sitewide OU addresses the groundwater and soil remedies.

EPA's remedial project manager (RPM) for the Site, Lisa Denmark led the FYR assisted by EPA RPM Dan Taylor. An additional EPA participant included EPA's community involvement coordinator (CIC), Meg Keegan. Staff from the Virginia Department of Environmental Quality (VDEQ) and state operation and maintenance (O&M) contractor also participated in the review. Skeo provided EPA contractor support for this FYR. The review began on March 21, 2019.

Site Background

The Site is located in Chuckatuck, city of Suffolk, in a mixed residential and commercial area (Figure 1). It includes the Saunders Supply Company property (Saunders Site property), a portion of the adjacent property and associated groundwater contamination. Current Site features on the Saunders property include the Saunders Supply Company wholesale lumber yard, a recreational vehicle (RV) storage business, and an active groundwater treatment system. Current Site features on the adjacent property include a commercial business, a small (non-remedy-related) surface water treatment system that provides irrigation water, and monitoring and recovery wells. Figure 1 shows current Site features.

Between 1964 and 1991, on-site operations included the use of pentachlorophenol (PCP) and later, copper, chromium and arsenic solution (CCA) to treat lumber. The treatment process included drying treated wood on pallets and a concrete drip pad and discharging of process wastes into a wastewater pond and an unlined pond, referred to as the former earthen separation pond. As a training exercise, the local fire department sometimes burned the crust-like residue that formed on the surface of the former earthen separation pond. Additional Site activities included the application of waste PCP sludge on roads and around the lumber storage areas to control dust and weeds, and the periodic incineration of PCP sludge in a conical burn pit. Drainage from the facility also contaminated a storm sewer and associated catch basins along Route 32 (Godwin Boulevard). These former source areas can be seen in Figure 2. Facility operations contaminated groundwater with PCP and metals. Operations also contaminated soil and sediment with PCP, metals and dioxin/furans.

Features and land uses surrounding the Site include a residence, commercial property, and Godwin's Millpond to the north, a gasoline station, residential subdivision and the retail division of Saunders Supply Company to the south, commercial establishments and residences to the east, and a wooded area and intermittent stream to the west (Figure 1). The intermittent stream discharges to Godwin's Millpond. Godwin's Millpond was historically used as a municipal drinking water source; however, has been on stand-by status since the end of 2015. The Site and surrounding properties are connected to the public water supply. There is an irrigation well on the adjacent commercial property that is no longer in use.

Groundwater contamination at the Site is present in the following two aquifers:

- Columbia aquifer (shallow zone): uppermost unit of fine-to-medium-grained sand, extends to a depth of

about 12 feet across most of the Site. The aquifer is underlain by a discontinuous transition zone of fine-grained, green-gray clay, about 2 to 7 feet thick.

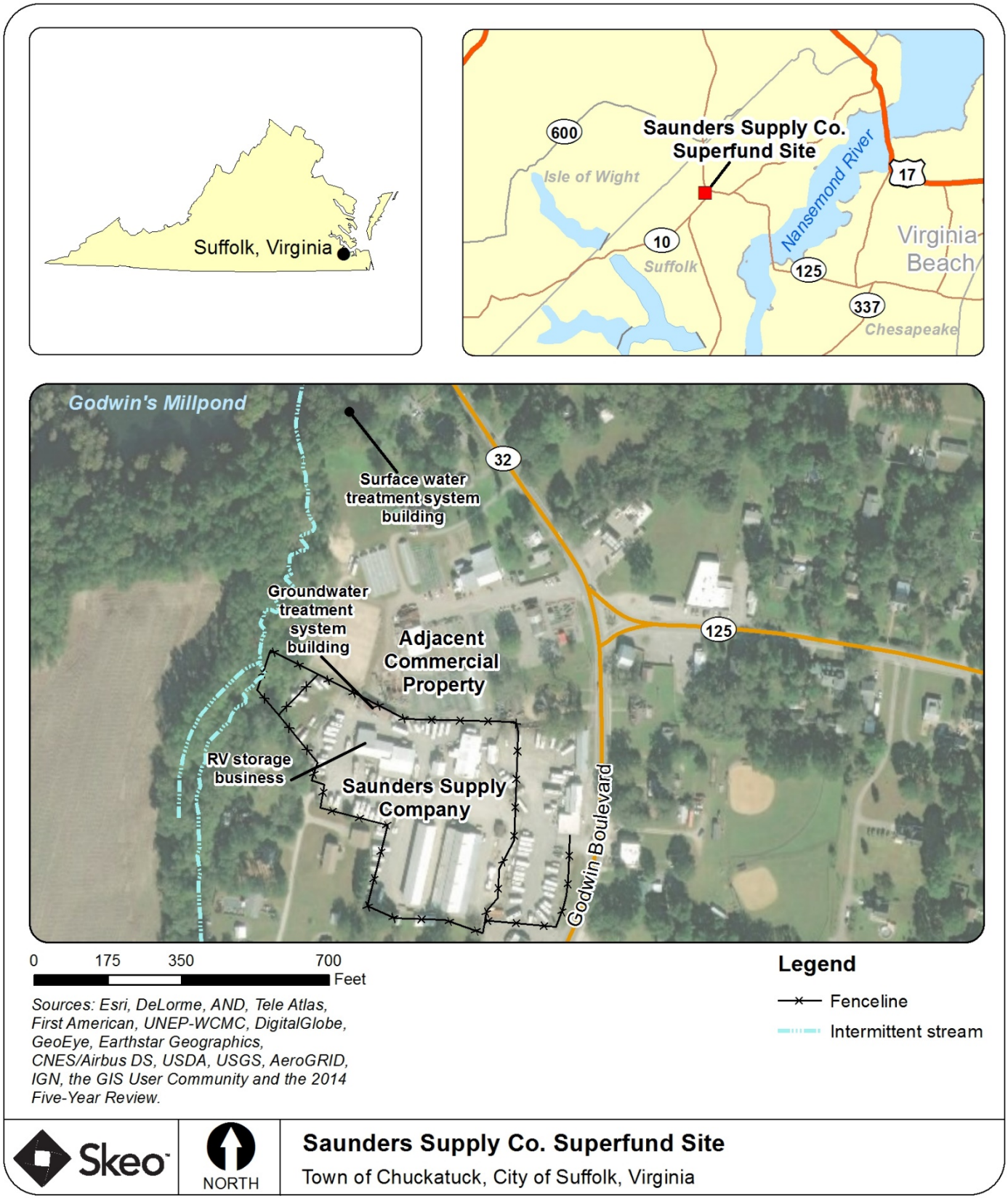
- Upper Yorktown Confining Unit (deep zone): thick gray silt and sandy silt unit, about 55 feet thick.

Groundwater within both aquifers at the Site generally flows to the north, with a slight westerly component; groundwater seeps are also present on the eastern bank of the intermittent stream. Appendix A provides a list of references used for this FYR. Appendix B provides a chronology of major Site events.

FIVE-YEAR REVIEW SUMMARY FORM

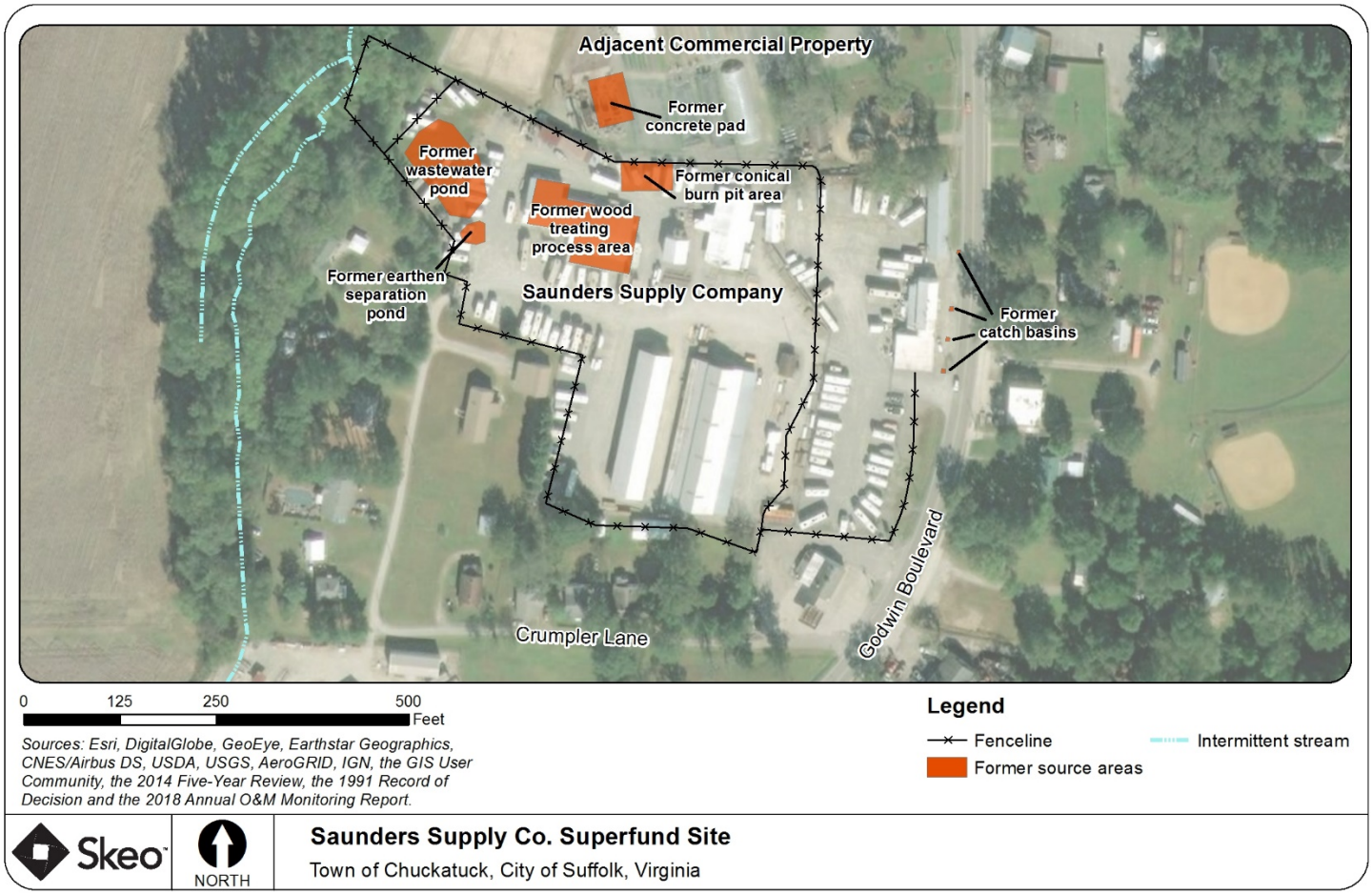
SITE IDENTIFICATION		
Site Name: Saunders Supply Co.		
EPA ID: VAD003117389		
Region: 3	**State:** VA	**City/County:** Chuckatuck / Suffolk
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the Site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Lisa Denmark, with additional support provided by Skeo		
Author affiliation: EPA Region 3		
Review period: 3/21/2019 – 12/29/2019		
Date of Site inspection: 3/21/2019		
Type of review: Statutory		
Review number: 4		
Triggering action date: 12/29/2014		
Due date *(five years after triggering action date)*: 12/29/2019		

Figure 1: Vicinity Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 2: Former Source Area Map



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II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1981, a neighbor filed a complaint with the Virginia Department of Health regarding what appeared to be wood-treating wastewater sludge in post holes dug on the adjacent property. In response to the complaint, the Virginia Department of Health, Solid Waste Management Division and the Virginia State Water Control Board investigated the Site in the early 1980s. Based on investigation findings, the state required that the Saunders Supply Company install monitoring wells, excavate contaminated soil around the conical burn pit area and install a recovery well. The company installed monitoring wells in 1982, excavated soil within a 15-foot radius of the conical burn pit, to a depth of about 8 feet, and disposed of the excavated soil off-site in 1984. The company installed a recovery well in the excavated pit and used the recovered water as process water for the CCA treatment of lumber. EPA inspections of the Site in November 1984 and August 1985 found dioxin and furans in soil around the burn pit and confirmed the presence of site-related groundwater contamination. EPA placed the Site on the Superfund program's National Priorities List (NPL) in October 1989. Saunders Supply Company was financially unable to cover the cost of site-related investigations or cleanup. EPA took the lead at the Site and completed a remedial investigation and feasibility study (RI/FS) in May 1991.

The baseline risk assessment, performed as part of the RI, identified unacceptable risks associated with Site soil for on-site workers and future residents, primarily via ingestion. The RI identified arsenic and dioxin/furans in soil as the primary risk drivers for on-site workers and arsenic, dioxin/furans and PCP in soil under a future residential land use scenario. It also determined that PCP in Site groundwater, within the Columbia and Yorktown

aquifers, poses unacceptable risks to human health, primarily through ingestion, under a future residential land use scenario.

The ecological risk assessment, performed as part of the RI, found evidence indicating the potential for adverse ecological impacts in sediments of Godwin's Millpond and the adjacent intermittent streams. However, spatial distribution of contaminants of concern (COCs) did not provide evidence that the impacts were Site related.

Response Actions

EPA selected the Site remedy in a 1991 Record of Decision (ROD), 1996 ROD Amendment, and 2019 Explanation of Significant Differences (ESD). While the decision documents do not specifically define remedial action objectives (RAOs), the documents state that the remedy will protect human health and the environment by accomplishing the following actions:

- Eliminate direct contact with contaminated surface and subsurface soil, storm-sewer sediment and K001 sediment.[1]
- Reduce contaminant levels in the concrete pads.
- Eliminate direct contact with water in the wastewater pond.
- Reduce contaminant levels in the existing concrete storm sewer.
- Prevent off-site migration of contaminated groundwater.
- Eliminate exposure to contaminated ground water through long-term groundwater monitoring and institutional controls.

In the ROD, EPA selected low-temperature thermal desorption (LTTD) treatment of the excavated soil and the storm sewer sediments. The selected remedy also included dechlorination treatment of the wastewater pond sediments and transporting all treated soil and sediments off-site for disposal.

During the remedial design phase, additional soil sampling showed the total amount of soil requiring treatment decreased from an estimated 25,000 tons to 18,000 tons. Since the cost of mobilizing and demobilizing the LTTD equipment was a fixed cost that would be prorated over the entire amount of treated soil and sediments, the decrease in volume caused an increase in cost per ton of soil treated. Therefore, the cost of treating the soil and sediment at an off-site incinerator was comparable in cost to the on-site LTTD treatment remedy selected in the ROD. Additionally, off-site incineration was considered more effective in the short term.

On September 27, 1996, EPA issued a ROD Amendment changing the soil and sediment remedy from on-site LTTD to off-site incineration and disposal. In addition, the 1991 ROD did not require active groundwater cleanup. During remedial design of the original remedy, groundwater sampling confirmed the migration of PCP-contaminated groundwater toward Godwin's Millpond, which is used as a drinking water supply reservoir. In response, EPA conducted a removal action to construct a groundwater extraction and treatment system to stop the migration of site-related groundwater toward the pond. Construction of the groundwater extraction and treatment system was still underway when the 1996 ROD Amendment was finalized.

The final remedy, as modified by the 1996 ROD Amendment includes the following components:

- Excavation and off-site incineration and disposal of K001 sediment from the wastewater pond and the former earthen separation pond.
- Excavation and off-site incineration and disposal of Site soil and sediment from the storm sewer.
- Removal of the top inch of the stained areas of the concrete pad, solidification and off-site disposal of the removed material, and removal and on-site disposal of the concrete pad in the area requiring soil excavation.

[1] K001 is the hazardous waste classification for bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or PCP.

- Cleaning of debris and sediment from the existing 8-inch concrete storm sewer and lining of the sewer with a high-density polyethylene pipe.
- Operation and maintenance of the groundwater collection and treatment system.
- Groundwater monitoring for PCP, arsenic and chromium for 30 years to ascertain that the remedy is protective of human health and the environment.
- Removal and plugging of pre-existing wells screened across the clay layer between the Columbia and Yorktown aquifers to prevent migration of contaminated groundwater into the deeper Yorktown aquifer.
- Implementation of institutional controls to restrict access to contaminated groundwater under the Site and prevent movement of the PCP off-site.

The Contaminants of Concern for all media evaluated and identified in the ROD for the Site included:

- Arsenic- soil and groundwater COC.
- Chromium (hexavalent and total)- soil and groundwater COC.
- Copper- soil COC.
- Dioxin- soil COC.
- PCP- soil and groundwater COC.

The 1991 ROD established a risk-based cleanup level for PCP in soil (1.46 ppm) and based the groundwater cleanup goal for PCP (1 µg/L) on the then proposed and now current maximum contaminant level (MCL). This cleanup goal was established for groundwater, however, as described in the 1996 ROD, EPA used its response authority to construct a system to prevent further migration of contaminated groundwater. Since the source of contamination would be removed through the actions required under the 1996 ROD, it was originally anticipated the treatment system would operate for less than 10 years.

Cleanup levels for arsenic and chromium were not established in the 1991 ROD; however, for the purposes of evaluating groundwater monitoring data, concentrations are compared to current MCLs (arsenic 10 µg/L and chromium 100 µg/L).

EPA issued an ESD on June 28, 2019 to require institutional controls for certain affected properties at the Site. This ESD is described in additional detail in the Institutional Control Review section of this FYR Report, below.

Status of Implementation

The groundwater extraction and treatment system became operational in April 1998 and includes four recovery wells (RW-1, RW-2, RW-4 and RW-5) screened in the Columbia aquifer and installed along, what was believed to be, the approximate longitudinal axis of the groundwater plume.[2] The system relays extracted groundwater to the on-site treatment building (locations of wells and the treatment building are shown in Figure 4). The treatment system includes a reaction tank and blower (to oxidize and precipitate iron and other heavy metals), a settling tank, bag filter system, granulated activated carbon (GAC) units and an effluent tank. The system discharges treated groundwater to the city sewer along Godwin Boulevard. Groundwater is routinely monitored for PCP, arsenic and chromium, as required by the 1991 ROD. The O&M and Data Review sections of this FYR Report include additional information regarding recent groundwater monitoring.

In March 1999, EPA contractor DESCO, Inc. began construction of the soil remedy. The United States Army Corps of Engineers (USACE) provided remedy construction oversight for EPA. The remedial contractor excavated contaminated sediment from the former wastewater pond and former earthen separation pond, and about 28,000 tons of contaminated soil from across the Site. Following excavation, the contractor disposed of the materials off-site, backfilled the areas with clean soil and then covered the areas with crushed stone. Cleanup also included scarification of the concrete drip pad to remove staining from the CCA solution, demolition and on-site

[2] Former recovery well, RW-3, caved in and was abandoned by EPA in January 2010. In January 2010, EPA installed well RW-5 in an effort to increase the recovery of PCP near the former wood treating process area on the Saunders Supply Company property.

disposal of the remaining portions of the drip pad in the area of the former wastewater pond (as fill), backfilling of the area, and cleaning of the catch basins and storm sewer along Godwin Boulevard. EPA decided the storm sewer did not need to be relined because it was more physically sound than initially thought; EPA documented the change of that remedial component in a memorandum in the Site's administrative file. While not required by the remedy, cleanup also included demolition and off-site disposal of several Site structures and features from the former wood-treating operation, and construction of a stormwater management system.

EPA documented the completion of remedy construction in the Site's December 1999 Preliminary Close-Out Report (PCOR). The PCOR states that EPA, VDEQ and the USACE determined that the remedy was constructed in accordance with the 1991 ROD and 1996 ROD Amendment. On July 2009 EPA transferred Site O&M responsibility of the groundwater treatment system to VDEQ.

2016 Optimization Review

In August 2016, EPA completed an Optimization Review for the Site. The primary focus of the optimization review was the groundwater remedy and potential sources of continued groundwater contamination. The review identified several data gaps regarding Site characterization and remedial strategy. Table 1 summarizes those data gaps.

Table 1: Site Characterization Data Gaps Identified by the 2016 Optimization Review Report

Data Gap	Implications
Unknown distribution and mass of PCP in source area	Source area contaminant mass may act as a long-term continuing source to downgradient areas.
Extent of contamination	The extent of contamination in the downgradient and cross-gradient areas west of the recovery wells is not well understood and may not be effectively captured and removed by the existing groundwater extraction and treatment system.
The interaction of the groundwater and surface water among the aquifers and the intermittent stream and Godwin's Millpond is not well understood.	Potential exists for groundwater discharge from Columbia and upper Yorktown to the intermittent stream and Godwin's Millpond.

The goal of the groundwater remedy selected by the 1996 ROD Amendment was to prevent further migration of site-related groundwater contamination; the groundwater extraction and treatment system was not designed to effectively reduce contaminant mass concentrations in the subsurface. The source area soil and sediment cleanups were expected to remove the source of groundwater contamination. Groundwater monitoring data suggest that residual source area contamination likely remains in place in the subsurface (see the Data Review section of this FYR Report for additional information). While the current groundwater treatment system meets required discharge criteria, the overall remedy has not succeeded in reducing groundwater contaminant concentrations or attaining groundwater cleanup levels. Therefore, the optimization review team agreed that a revised remedial strategy is needed that focuses on additional delineation of the nature and extent of Site related contaminants, contaminant mass removal and aquifer restoration. The Optimization Review Report included the following recommendations to help characterize the Site for remedy refinement:

- Delineate the current extent of potential source and groundwater contamination at the source area.
- Delineate the current extent of contamination in groundwater in the western portion of the downgradient plume area for both the Columbia aquifer and the Yorktown Confining Unit to better understand the extent of contamination and the nature of contaminant transport between the Columba aquifer and the upper Yorktown Confining Unit.
- Better characterize the groundwater-to-surface-water (intermittent stream and Godwin's Millpond) interactions.
- Confirm that the Site's original RAOs are consistent with current Site conditions.
- Perform a sequenced approach to improve the effectiveness of the current remedy and consider other treatment technologies to enhance the mass removal.

- Improve extraction well pumping rates to increase plume capture and maximize contaminant mass removal.
- Take steps prescribed in the report to improve the treatment system capacity.
- Update remedy performance monitoring by updating the O&M Manual, including concentration contour plots for PCP, arsenic and chromium for the shallow and deep intervals of the aquifer in the annual O&M and monitoring reports, and by collection of quarterly effluent samples after the second GAC canister to ensure that the treated effluent meets required discharge limits.
- Develop completion criteria for each remedy component.

VDEQ and EPA are in the process of evaluating the need for implementation of all the Optimization Review Report recommendations. However, after completion of the Optimization Review Report, the:" Scope of Work Saunders Supply Company Superfund Site Chuckatuck, Virginia Final – December 2017", (Scope of Work of December 2017) was prepared by EPA HQ's contractors and provides detailed plans for implementation of the characterization optimization recommendations. EPA is currently in the process of delineating the extent of potential source contamination and extent of groundwater contamination in the western portion of the downgradient plume area. The information gathered through execution of these portions of the Scope of Work of December 2017 will be used to evaluate the need for any potential future remedy modifications. This work is scheduled to begin December of 2019.

Institutional Control (IC) Review

The September 1991 ROD requires implementation of ICs to restrict access to contaminated groundwater beneath the Site and to restrict off-site extraction of groundwater to prevent off-site migration of groundwater contamination. A 2004 Title Notice, filed by the Saunders Supply Company and maintained at the city of Suffolk's Clerk's Office, meets the ROD's IC requirements for the Saunders property (a copy of the notice is included in Appendix C). The Title Notice grants EPA access to the Saunders property to perform site-related activities and prohibits the extraction and use of groundwater from the Columbia and Yorktown aquifers. The Title Notice also includes language to ensure that the access agreement and groundwater use restrictions will remain in place, regardless of future changes in property ownership.

Access to contaminated groundwater related to the Site has also been restricted with regard to the adjacent commercial property and residence (location E and D of Figure 3). The adjacent commercial property and residence is connected to the public water supply, and EPA has notified the property owner that groundwater is not to be used for drinking water. EPA previously built the property owner a small water-treatment plant so they could treat and use surface water from Godwin's Millpond for irrigation. As part of this FYR, EPA confirmed with the property owner that the system remains operational and provides irrigation water for the ongoing nursery business.

To prevent installation of any new wells on the adjacent commercial property and residence, and the properties located between the adjacent commercial property and Saunders property (location F and G of Figure 3), EPA has implemented an informational and notification control. The control informed the Suffolk Department of Health of the need to restrict access to contaminated groundwater, and further obtained the cooperation of the Health Department, which has placed a notice in its files to notify EPA if anyone applies for a permit to construct a well on the affected properties. During this FYR, the Suffolk Department of Health confirmed that the note is still in place. In 2018, VDEQ performed a well search and confirmed no visual indications of the irrigation well on the adjacent commercial property and residence were observed on the surface.

To address contact with soil containing elevated dioxin, EPA issued an ESD on June 28, 2019 implementing ICs on the Site and adjacent properties. The ICs are addressed by information controls through fact sheets, web page information, and/or letters to affected property owners. EPA will coordinate with local planning officials, zoning officials, stakeholders, and local residents to limit contact with soil containing elevated dioxin and to prevent potential future residential exposure to dioxin contamination. EPA created an internal record that will document communication with these entities and will be evaluated on a routine basis to ensure implementation of the IC. Local officials will provide updates to the EPA if the areas of concern are proposed to change from industrial to

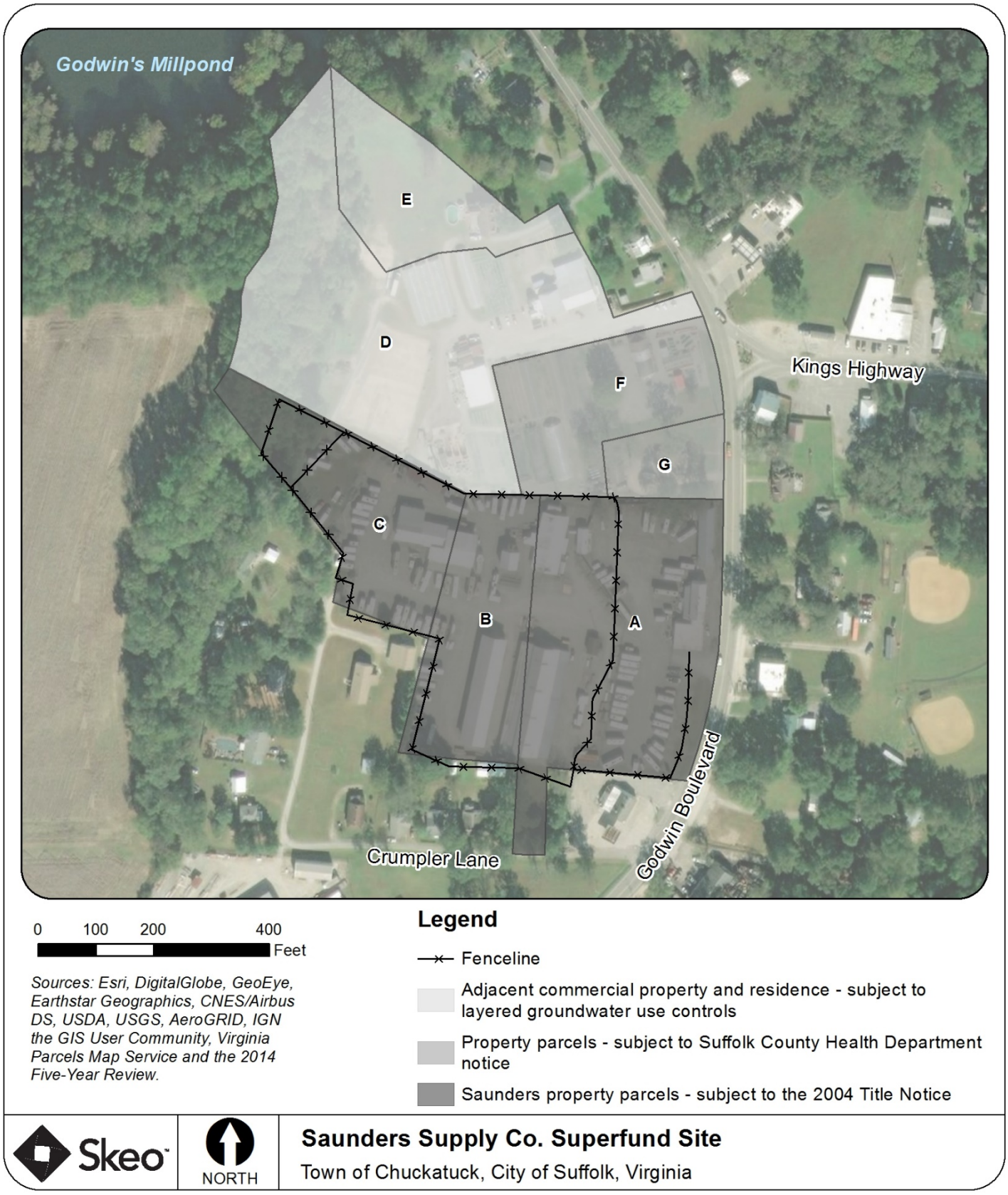
residential use. See the Progress Since Previous Review and Data Review and Technical Assessment section of this FYR Report for additional information regarding the ESD and dioxin and soil data.

Table 2 summarizes the Site's ICs. Figure 3 shows the current status of the Site's groundwater ICs.

Table 2: Summary of Planned and/or Implemented Institutional Controls (ICs)

Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented
Groundwater	Yes	Yes	A, B and C (Saunders property)	Restrict access to contaminated groundwater beneath the Site.	August 2004 Title Notice
			D and E (adjacent property)	Restrict access to contaminated groundwater beneath the Site. Restrict off-site extraction of groundwater to prevent off-site migration of site-related groundwater contamination.	Suffolk Department of Health note to property file prevents installation of new wells.
			F and G	Restrict off-site extraction of groundwater to prevent off-site migration of site-related groundwater contamination.	Suffolk Department of Health note to property file prevents installation of new wells.
Soil	Yes	Yes	Sitewide	Limit potential future residential exposure to dioxin contamination in soil that exceeds a HI above 1 at the Site.	Informational controls such as fact sheets, web page information, and/or letters to affected property owners and coordination with local planning officials, zoning officials.

Figure 3: Groundwater Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Systems Operations/Operation and Maintenance (O&M)

In July 2009, EPA transferred O&M of the groundwater treatment system to VDEQ. During this FYR period, VDEQ performed O&M activities in accordance with the Site's 2003 O&M Manual and 2010 Sampling and Analysis Plan. Treatment system O&M activities include weekly maintenance checks, a comprehensive monthly inspection and unscheduled maintenance, as needed. Pump maintenance is the primary maintenance activity at the Site. Iron-scale buildup and fouling of the impellers periodically clog the extraction pumps and reduce the flow rate. Maintenance and inspections are documented in checklists, which are included in annual O&M reports.

The O&M contractor also performs semi-annual groundwater and surface water monitoring; see the Data Review section of this FYR Report for additional information. In response to one of the 2016 Optimization Review Report recommendations, VDEQ updated the Site's Sampling and Analysis Plan and O&M Plan in January and March 2019, respectively. O&M activities after these dates will be performed in accordance with the updated 2019 plans. The most recent April 2019 sampling activities followed the updated 2019 Sampling and Analysis Plan.

The O&M contractor also collects quarterly samples from the treatment system influent and effluent to assess the effectiveness of the treatment system. The Data Review section of this FYR Report provides additional information regarding system sampling results.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the 2014 FYR Report as well as the recommendations from the 2014 FYR Report and the status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2014 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	The remedy for the Site is protective of human health and the environment in the short term. Exposure pathways that could result in unacceptable risks are being controlled. All threats at the Site associated with ingestion or dermal contact with contaminated soil and sediment have been addressed through excavation and off-site treatment and disposal. In addition, there are no exposures to the contaminated groundwater because everyone in the vicinity of the Site is connected to the city of Suffolk public water supply and the groundwater extraction system has prevented contamination from reaching either MW-19D or Godwin's Millpond. ICs have been implemented to prevent future exposure to, or ingestion of, contaminated groundwater on the Saunders property while long-term groundwater remediation is ongoing. Institutional controls for the adjacent property are being met through the Suffolk Department of Health. Long-term protectiveness will be achieved when cleanup goals are met.

Table 4: Status of Recommendations from the 2014 FYR Report

Issue	Recommendation	Current Status	Current Implementation Status Description	Completion Date (if applicable)
EPA released the final non-cancer dioxin reassessment, publishing a non-cancer toxicity value, or reference dose (RfD), for 2,3,7,8-TCDD in EPA's Integrated Risk Information System (IRIS). The properties adjoining the Site were never sampled for dioxin.	EPA will evaluate the need to perform limited sampling for TCDD in surface soil outside the perimeter of previously excavated areas.	Completed	In 2016, EPA contracted TechLaw to collect and analyze surface soil samples for dioxin/furans – the samples were collected from locations at and surrounding the Site. The sampling effort adequately addressed this 2014 FYR recommendation; however, the sampling effort found dioxin/furans in surface soil. See the Data Review and Technical Assessment sections of this FYR Report for additional information regarding the 2016 dioxin soil data.	11/30/2016
Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) have been identified as a newly identified groundwater contaminant by EPA. One potential source for PFOA/PFOS is firefighting, especially when using foam. At this Site, PCP sludge was occasionally burned as a fire-fighting exercise. However, EPA does not have any information that foam was used to extinguish the fires.	EPA will determine whether firefighting foam was used in the firefighting exercises. If foam was used or it cannot be determined whether foam was used, EPA will sample the groundwater for PFOA and PFOS.	Completed	In December 2016, VDEQ Site manager William Lindsay, conducted a phone interview with the property owner of the adjacent property regarding historic firefighting activities at the Saunders Site property. The property owner has a decades-long familiarity with the Site and began service as a volunteer with the local fire department in 1972. He is familiar with the firefighting training exercises previously conducted at the Site. He indicated that the purpose of the training exercises was to instruct firefighters how to use water to extinguish fires, and that firefighting foam was not used during the training exercises. VDEQ submitted this information to EPA in a memorandum dated 12/13/2016.	12/13/2016

Explanation of Significant Difference

In 2016, based on a recommendation of the 2014 FYR, EPA contracted TechLaw to collect and analyze surface soil samples for dioxin/furans from the Site and adjacent properties. Analytical results obtained for detected concentrations of 2,3,7,8- tetrachlorodibenzo-p-dioxin (TCDD) in the soil samples were all below the industrial regional screening levels (RSLs). EPA's toxicologist then evaluated the Toxicity Equivalency using the sum of dioxin congeners to determine the Hazard Index (HI). Results identified limited areas where the HI exceeds 1, indicating a potential non-cancer health risk if the area of concern is used as a residential property; however, the areas of concern are currently used for industrial purposes. On June 28, 2019 EPA issued an Explanation of Significant Difference (ESD) requiring ICs on the Site and adjacent properties to prevent residential use of the affected areas.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice stating that the FYR was underway and inviting the public to submit any comments to EPA was made available by a newspaper posting in *the Suffolk News Herald* on 9/13/2019 (Appendix D). The results of the review and the report will be made available at the Suffolk Public Library and Suffolk Public Library Chuckatuck Branch located at 443 West Washington Street and 5881 Godwin Boulevard respectively.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** The interviews are summarized below. Sample questions from the interviews can be found in Appendix E.

Interview responses indicated mixed impressions of the cleanup activities, with all respondents commenting on the duration of the cleanup. Both VDEQ and the O&M contractor noted that the remedy was currently functioning as designed, but there may be opportunities to optimize and/or expedite the cleanup in the future. One resident expressed concern about the efficiency of the remedy in place, while another resident expressed concern about the overall cost of the cleanup. No residents were concerned about vandalism or trespass at the Site and residents felt well-informed about ongoing activities at the Site but noted residents in rental properties may not be as aware of these activities. Residents expressed that email or mailed Site updates continues to be the best way to communicate with local community members.

Data Review

During this FYR period, VDEQ O&M contractor performed semi-annual groundwater and surface water sampling, and quarterly treatment system monitoring. The sampling was in accordance with the Site's 2010 Sampling and Analysis Plan and the updated 2019 Sampling and Analysis Plan. The Sampling and Analysis Plan was updated January 30, 2019 and the sampling event that occurred after this date and sampling moving forward will follow the updated Sampling and Analysis Plan. The purpose of the sampling is to assess the effectiveness of the groundwater treatment system and monitor plume extent. The O&M contractor provides sampling results to EPA in annual O&M and monitoring reports. Since the 2014 FYR, surface soil sampling for dioxin/furans was also performed by a contractor for EPA in 2016. This FYR data review summarizes and evaluates information included in the Site's 2018 and 2019 Annual O&M and Monitoring Report (which includes historic data) and the 2016 Incremental Soil Sampling Trip Report.

Groundwater

Semi-annual groundwater monitoring includes collection of samples from the Site's four active recovery wells (RW-1, RW-2, RW-4 and RW-5) and 11 monitoring wells (Figure 4). Well identifiers that end with "S" indicate a shallow, Columbia aquifer well. Well identifiers that end with "D" indicate a deep, Yorktown aquifer well. However, the 2016 Optimization Review Report indicates that several well screens, including MW-8D and MW-12D, appear to intersect both the Columbia and Yorktown aquifers. The Optimization Review Report recommended abandoning wells that intersect both hydrostratigraphic units and possibly replacing them with wells with shorter well screens in discrete units because the groundwater samples collected from these wells likely originate from the most permeable flow zones in the Columbia aquifer and may not reflect the conditions in the Yorktown Confining Unit.

All groundwater samples are analyzed for PCP, arsenic and chromium. Although the 1991 ROD only established a cleanup level for PCP, concentrations for all three groundwater COCs are compared to their respective MCLs to evaluate the performance of the groundwater extraction and treatment system. Samples from RW-5 are also analyzed for polycyclic aromatic hydrocarbons (PAHs). Samples from MW-7S are analyzed for the following inorganic constituents: antimony, barium, cobalt, copper, cyanide, lead, manganese, nickel, selenium and zinc. To evaluate groundwater flow patterns at the Site, the O&M contractor also collects water-level measurements from Site wells. Since the 2014 FYR, groundwater contours for both the shallow zone (Columbia aquifer) and deep zone (Yorktown aquifer) indicate a hydraulic gradient to the north-northwest across the Site, with cones of depression surrounding recovery wells RW-1, RW-4 and, sometimes, RW-2 in the shallow zone. The Site's 2016 Optimization Review Report states that RW-5 consistently accounts for the greatest pumping volume of the recovery wells. Installation of piezometers in July 2019 has confirmed a cone of depression around RW-5. Figures F-1 and F-2 in Appendix F show April 2019 groundwater elevation contours for both the shallow and deep zones.

In 2006, groundwater samples were analyzed for hexavalent chromium at the MW-7S/8D and MW-9S/10D well clusters. Total chromium and hexavalent chromium were positively detected in the two shallow well samples. The total chromium/hexavalent chromium ratios for MW-7S and MW-9S were 128/127 µg/L and 257/286 µg/L, respectively. The results indicated the chromium in groundwater to be completely hexavalent chromium. These findings will be further analyzed during the December 2019 Site work that will be completed as part of execution

of the Scope of Work of 2017; implementing select recommendations from the Site's 2016 Optimization Review Report.

Between April 2014 and April 2019, COCs were not typically detected at the farthest downgradient wells – MW-19D, MW-23D, MW-22S and RW-4 (Figure 4). When detected, COC concentrations at those locations were below MCLs. Results from those wells indicate that the groundwater extraction system is effectively preventing site-related groundwater contamination from reaching Godwin's Millpond. Deep zone well MW-19D is the farthest downgradient well – there is no shallow monitoring well at that location. The Site's 2016 Optimization Review Report recommended installation of a shallow monitoring well near MW-19D to better characterize groundwater quality at the downgradient discharge location near Godwin's Millpond.

Except for well MW-20S, PCP concentrations at all other wells exceeded the 1 microgram per liter (µg/L) MCL at least once between April 2014 and April 2019. Table 5 below shows PCP concentrations for all wells that had at least one PCP MCL exceedance since April 2014. Figure 4 indicates the well locations.

Table 5: PCP Concentrations at Select Wells, April 2014 to April 2019

Sampling Date	Well IDs and Results (µg/L) PCP MCL = 1 µg/L									
	MW-7S	**MW-8D**	**MW-9S**	**MW-10D**	**MW-11S**	**MW-12D**	**MW-21D**	**RW-1**	**RW-2**	**RW-5**
4/2014	1.47	1.33	<0.0784	2.45	<0.0785	1.82	0.736	7.33	<0.0765	150 (85.2 DUP)
10/2014	36.8	1.58	11.9	0.349	0.141J	16.8	1.23	11.2	10.6	50.3 (67.1 DUP)
4/2015	0.719	0.616	2.05	<0.102	<0.105	1.84	0.295	7.05	9.80	425 (396 DUP)
10/2015	42.2	1.06	12.3	0.0905J	<0.105	16.8	<0.0998	7.54	4.11	184 (210 DUP)
4/2016	26.9	0.559	0.139 J	6.13	<0.0993	12.1	0.219	7.32	0.129	103 (126 DUP)
10/2016	60.3	0.589	10.5	<0.0999	1.46	1.83	<0.103	3.98	7.48	26.5 (45.7 DUP)
4/2017	0.545	0.430	<0.107	2.35	3.1	1.01	<0.106	14.9	0.44	48.5 (34.9 DUP)
10/2017	0.689	2.67	12.8	<0.101	1.57	8.75	0.134	4.75	3.57	200 (197 DUP)
4/2018	0.527	0.495	2.47	0.177	0.183	1.92	0.143	2.92	2.43	78.1
10/2018	1.17	.578	<0.105	2.30	<0.105	33.8	<0.104	3.54	---------	173 (139 DUP)
4/2019	.676	.336	<0.0541	0.594	0.0543J	6.16	0.0536J	2.68	3.27	98.2 (104 DUP)

Notes:
Results above are from Table 4 in the Site's July 2019 Annual O&M and Monitoring Report.
DUP = duplicate result
J = estimated result
Shaded results indicate an MCL exceedance.

Dissolved chromium is routinely detected at wells MW-10D, MW-9S, MW-8D and MW-7S, with the highest concentrations observed at MW-7S. However, the dissolved chromium did not exceed its MCL of 100 µg/L at any wells between April 2014 and April 2019. In April 2018, total chromium concentrations at wells MW-7S (151 µg/L), MW-10D (228 µg/L) and RW-2 (255 µg/L) exceeded the MCL of 100 µg/L. Total chromium concentrations at those same wells were below the MCL in all other sampling events since 2014, indicating that the MCL exceedances observed in April 2018 may not have been representative of typical concentrations at those locations. As indicated above, the groundwater sample results from 2006 indicated chromium in groundwater to be completely hexavalent chromium, which has a lower RSL than total chromium. The work planned to begin December 2019 will further analyze this.

Arsenic is routinely detected at several wells, at concentrations below the MCL of 10 µg/L. Dissolved arsenic concentrations at wells MW-8D and MW-7S consistently exceed the arsenic MCL (Table 7). In October 2017 and April 2018, total arsenic concentrations exceeded the arsenic MCL at least once at wells MW-7S, MW-8D, MW-10D and MW-21D (Table 8).[3]

[3]. The total arsenic MCL exceedances observed in 2017, 2018 and 2019 are likely consistent with prior year total metals results.

Table 7: Dissolved Arsenic Concentrations at Select Wells, April 2014 to April 2019

Sampling Date	Well IDs and Results (µg/L) Arsenic MCL = 10 µg/L	
	MW-7S	MW-8D
4/2014	1,540	944
10/2014	2,120	861
4/2015	1,440	1,140
10/2015	1,980	945
4/2016	1,760	1,270
10/2016	2,450	981
4/2017	2,330	1,370
10/2017	2,620	969
4/2018	1,730	778
10/2018	2,410	928
4/2019	1,560	968

Notes:
Results above are from Table 4 in the Site's July 2019 Annual O&M and Monitoring Report.
Shaded results indicate an MCL exceedance.

Table 8: Total Arsenic Concentrations at Select Wells, October 2017-April 2019

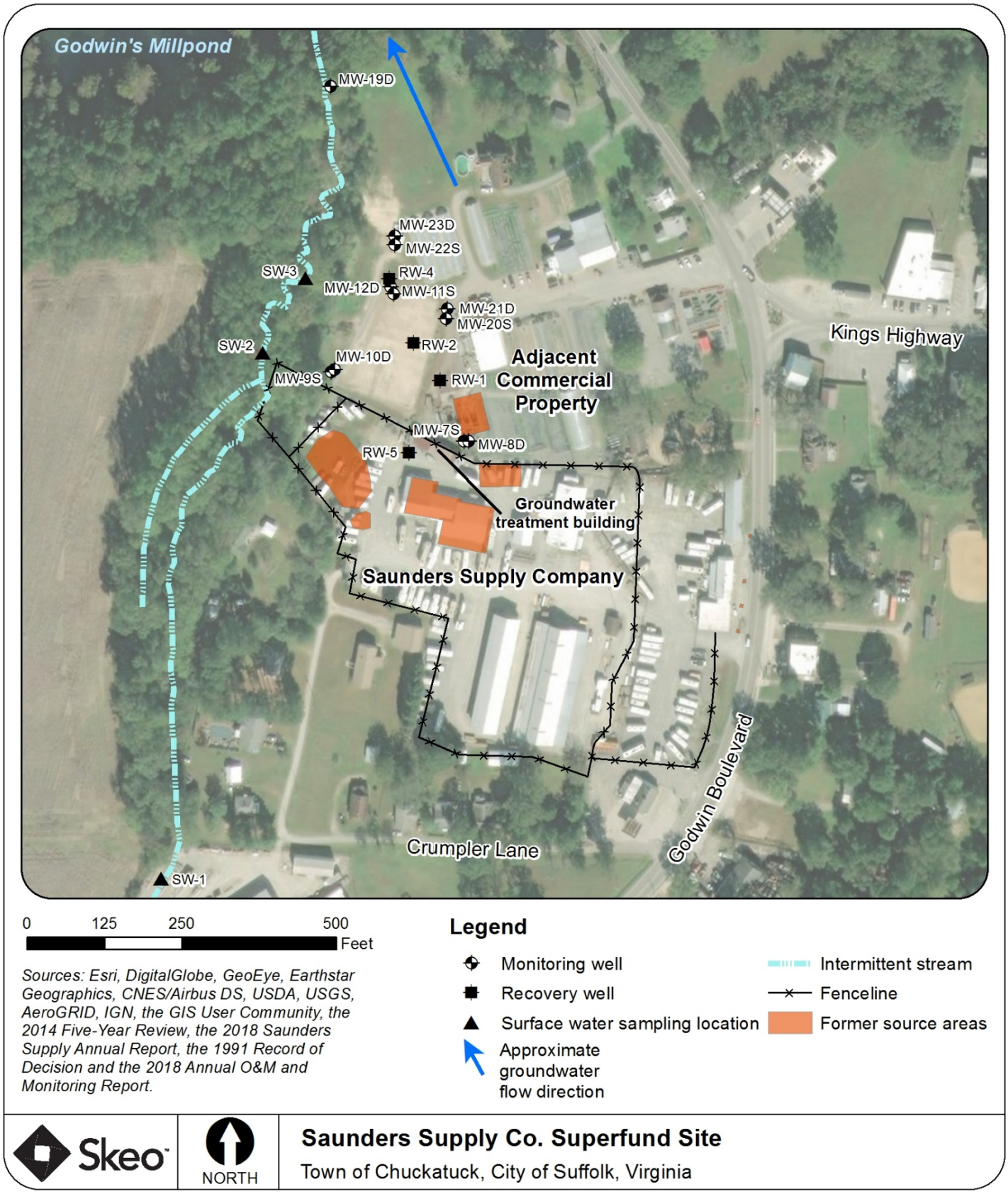
Sampling Date	Well IDs and Results (µg/L) Arsenic MCL = 10 µg/L				
	MW-7S	MW-8D	MW-10D	MW-21D	RW-1
10/2017	2,620	1,090	< 1.0	26.3	6.36
4/2018	1,830	812	51.0	28.0	6.11
10/2018	2,420	895	<1.0	37.2	22.8
4/2019	1,530	926	<1.0	29.7	13.6

Notes:
Results above are from Tables 2 and 3 in the Site's September 2018 Annual O&M and Monitoring Report and Tables 2 and 3 in the Site's July 2019 Annual O&M and Monitoring Report.
Shaded results indicate an MCL exceedance.

Of the additional inorganic constituents analyzed for in well MW-7S in 2017, 2018 and 2019, while several were detected, only antimony exceeded its MCL of 6 µg/L. Recent MW-7 antimony results include 26.0 µg/L in October 2017, 19.5 µg/L in April 2018, 31.4 µg/L in October 2018 and 19.9 µg/L in April 2019. From October 2017 to April 2019 sampling, PAHs were detected in RW-5 (benzo (k) fluoranthene at 0.119 µg/L during the October 2018 sampling event; below the MCL of 0.2 µg/L). No other PAHs were detected in RW-5.

Since 2014, in general, COC concentrations have fluctuated, with no clear trends observed. The highest groundwater COC concentrations are typically observed at and near wells RW-5 (PCP), MW-7S (PCP, arsenic and chromium) and MW-8D (arsenic). Those wells are located nearest to the former wood-treatment area and other former source areas (Figure 4). The lack of an overall decrease in COC concentrations over time and the locations of the persistently high COC concentrations indicate the likely presence of residual source area contamination.

Figure 4: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Groundwater Treatment System Monitoring

The O&M contractor collects quarterly samples from the treatment system influent and effluent (after the first set of GAC filter vessels) to confirm that discharge limits are being met, determine removal efficiencies and evaluate overall system performance. The 2003 O&M Plan established the MCLs for PCP (1 µg/L), arsenic (10 µg/L) and chromium (100 µg/L) as the system discharge limits. Between December 2014 and April 2019, this FYR period, all treated groundwater samples met discharge limits. Annual O&M and Monitoring Report determined that the treatment system is efficiently removing PCP, arsenic and chromium across the system.

The Site's 2018 & 2019 Annual O&M and Monitoring Report noted that the treatment system recovered minimal contaminant mass from the subsurface (0.154 pounds of PCP, 0.0083 pounds of arsenic, and 0.0215 pounds of chromium) from July 2017 through June 2019. From July 2017 to June 2019, 389,098 gallons of groundwater was recovered and processed. According to the Site's 2016 Optimization Review Report, the treatment system removed a total of 1.213 pounds of PCP, 0.0207 pounds of arsenic and 0.0144 pounds of chromium between 2012 and 2015.

Surface Water

While not required by the 1991 ROD, in March 2017, the O&M contractor started collecting semi-annual surface water (SW) samples from three locations (SW-1, SW-2 and SW-3) along the intermittent stream that borders the Site to the west (Figure 4). Samples are analyzed for PCP, total and dissolved arsenic and chromium, and results are compared to MCLs and Virginia Water Quality Standards for the protection of human health in surface water. The Virginia Water Quality Standards for monitored compounds are 0.3 µg/L (PCP), 10 µg/L (arsenic) and 100 µg/L (chromium). Since surface water sampling began, PCP and total and dissolved arsenic and chromium have been detected at all three surface water sampling locations; however, prior to October 2018, none of the results exceeded MCLs. At SW-2, total arsenic exceeded the MCL and Virginia Water Quality Standard in October 2018 with a result of 14.8 µg/L. At SW-3, total arsenic exceeded the MCL and Virginia Water Quality Standard in April 2019 with a result of 10.9 µg/L. PCP has not exceeded the MCL since surface water sampling began, however exceeded the Virginia Water Quality Standard at SW-1 March 2017 and October 2017 (0.364 µg/L and 0.504 µg/L respectively). These recent exceedances of the total arsenic MCL and Virginia Water Quality Standards in surface water indicate that site-related groundwater contamination could potentially be discharging to surface water at concentrations that could pose unacceptable risks to receptors, however the results are sporadic and the execution of the Scope of Work of December 2017 will further analyze these exceedances. Table F-1 in Appendix F includes surface water monitoring results from the Site's 2019 Annual O&M and Monitoring Report (which includes data from 2017-2019). Surface water monitoring will continue.

Soil – Dioxins/Furans

In February 2012, EPA released the final human health non-cancer dioxin reassessment publishing an oral non-cancer toxicity value, or reference dose, of $7x10^{-10}$ mg/kg-day for TCDD in EPA's Integrated Risk Information System. The dioxin reference dose was approved for immediate use at Superfund sites to ensure protection of human health. Properties adjacent to the Saunders Site Property had never been sampled for dioxin. In 2016, in order to evaluate Site soil in light of EPA's dioxin reassessment, and as part of the effort to better characterize Site contamination, EPA contracted TechLaw to collect and analyze surface soil samples for chlorinated dibenzo-p-dioxins/chlorinated dibenzofurans (CDD/CDF). The samples were collected from the Site and adjacent properties. The primary objective of the sampling event was to evaluate surface soil to determine if CDD/CDF contamination exists at concentrations exceeding EPA RSLs for industrial and/or residential soil, depending on the sample location.

The contractor submitted results to EPA in a November 2016 Incremental Soil Sampling Trip Report. Analytical results obtained for 2,3,7,8-TCDD in soil samples collected during this sampling event were screened using both industrial and residential RSL's. The screening results recommended review of the full analytical results for further risk assessment. Cancer and non-cancer HI risks were evaluated in 2017 assuming both residential and industrial use. Results identified a limited area on an adjacent property where the HI exceeds 1, indicating a potential non-cancer health risk if the area of concern is used as a residential property; however, these areas of concern are currently used as industrial. On June 28, 2019 EPA issued an ESD requiring ICs on the Site and adjacent properties to prevent residential use of the affected areas.

Site Inspection

The Site inspection took place on March 21, 2019. Participants included the EPA RPM and CIC. VDEQ, the State O&M contractor and Skeo (EPA contractor support) also participated in the Site inspection. The purpose of the inspection was to assess the protectiveness of the remedy. The Site inspection checklist is included in Appendix G. Site inspection photographs are included in Appendix H.

The inspection began on the Saunders property with a tour of the groundwater treatment system building. All treatment system components were clearly labeled and appeared to be in good condition. Copies of the Site's Health and Safety Plan and O&M Manual are maintained in the building. Participants observed well RW-5, located next to the treatment system building. The well sump had about two inches of water. During heavy rainfall, water sometimes pools in the sump but drains quickly. The RW-5 pump and riser pipe were replaced in April 2019, shortly after the Site inspection. Participants also observed business operations at the Saunders property, which include wood storage and RV storage. There are no current Site features associated with the former soil cleanup areas. All soil cleanup areas are now covered with fill and gravel. The Saunders property is surrounded by a fence and secured with locking gates when the businesses are not in operation.

Participants toured the adjacent commercial property and observed recovery and monitoring wells as well as greenhouses used by the plant nursery that operates there. All wells appeared to be in good condition. Some monitoring wells were unlocked; however, they are located on closely monitored properties in active use. The likelihood of someone coming on to the adjacent property and tampering with the unlocked wells is low. Water was observed flowing in the unnamed intermittent stream that runs along the western side of the Site. Site inspection participants observed Godwin's Millpond, which is north and downgradient of the Site. Participants then walked south of the Site to observe the northernmost, upgradient surface water sampling location along the intermittent stream. Two inactive groundwater monitoring wells, MW-1S and MW-2D, were observed inside the fence of the adjacent (off-site) Saunders Supply Company retail and sales business. State and EPA staff discussed the need to evaluate whether the two wells were needed or could be properly abandoned.

During the Site inspection, EPA staff performed FYR interviews with some Site property owners, as summarized above. Skeo staff visited the Site's local information repository, located at the Suffolk Public Library at 443 West Washington Street in Suffolk and found the repository was incomplete. EPA staff also visited the Suffolk Public Library Chuckatuck Branch at 5881 Godwin Boulevard. EPA coordinated with both branches to establish completed repositories in both locations. EPA will make the final FYR report available to the public through the online Site Profile Page and in both local repositories.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes, the remedial components are functioning as intended by the decision documents. However, the goal of the groundwater remedy selected by the 1996 ROD Amendment was to prevent further migration of site-related groundwater contamination and the groundwater extraction and treatment system was not designed to achieve groundwater cleanup levels throughout the groundwater contamination plume at the Site.

Removal of contaminated soil and sediment at the original source areas, and backfilling and covering of those areas with gravel, helped eliminate the potential for direct contact with those media in source area surface soil. Cleanup of the storm sewer and concrete pad cleanup met the RAOs of reducing contaminant levels in those areas. Backfilling of the excavated source areas with clean fill and gravel met the RAO of eliminating direct contact with contaminated soil and sediment at those areas.

The ROD Amendment describes the intention for the groundwater extraction and treatment system was to prevent further migration of the contamination toward Godwin Millpond. EPA used its emergency response authority to construct a system to collect and treat groundwater. EPA proposed in the ROD Amendment to continue O&M of this system. COCs were not typically detected at the farthest downgradient wells during this FYR period. When detected, COC concentrations were below MCLs.

The source area soil and sediment cleanups were expected to remove the source of groundwater contamination. EPA initially anticipated that operation of the groundwater extraction and treatment system would be required for less than 10 years. However, the ROD Amendment called for operation of the treatment system until groundwater cleanup goals are achieved. According to the 2016 Optimization Review Report, while the current groundwater treatment system meets required discharge criteria and is effectively preventing site-related groundwater contamination from reaching Godwin's Millpond, the remedy has not succeeded in reducing groundwater contaminant concentrations or reaching groundwater cleanup levels. Groundwater data collected since the 2014 FYR confirm the Optimization Review Report findings; since 2014, in general, COC concentrations in groundwater have fluctuated, with no clear trends observed. The lack of an overall decrease in COC concentrations over time, and the locations of the persistently high COC concentrations indicate the presence of residual source area contamination. In light of this information, additional remedial investigation work is planned for December of 2019 to further delineate the Site and likely residual source area. The results of the investigation will be evaluated to determine if a modification to the groundwater remedy is necessary to achieve groundwater cleanup levels throughout the groundwater contamination plume.

Although groundwater contamination remains on-site, the area is connected to the municipal water supply and no one is using contaminated groundwater. ICs prevent the use and extraction of groundwater on the Saunders property and layered groundwater use controls prevent the use and extraction of groundwater on the adjacent commercial property and residence and the adjacent property (property parcels D, E, F and G of Figure 3).

Overall, the Site appeared well-maintained during the FYR Site inspection. During this FYR period, O&M activities were performed and documented routinely, as required by the Site's 2003 O&M Plan. Moving forward, O&M will be performed in accordance with the 2019 O&M Plan.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Question B Summary:

Most of the exposure assumptions and RAOs used at the time of remedy selection remain valid. While groundwater contamination remains on-site, no one is using groundwater in the impacted area and institutional controls restrict the use of groundwater beneath the Site. Groundwater data indicate that the plume has not migrated to Godwin's Millpond at concentrations that could potentially pose risks to receptors. However, as indicated above, RAO of the groundwater remedy selected by the 1996 ROD Amendment was to prevent further migration of site-related groundwater contamination and the groundwater extraction and treatment system was not designed to achieve groundwater cleanup levels throughout the groundwater contamination plume at the Site.

While the RI identified unacceptable risks associated with dioxin in Site soil, the ROD did not establish a cleanup goal for the constituent. To determine whether dioxin contamination exists in surface soil at areas not addressed by the original soil cleanup, EPA performed additional dioxin sampling at the Site in 2016. Results identified a limited area where the HI exceeds 1, indicating a potential non-cancer health risk if the area of concern is used as a residential property; however, these areas of concern are currently used as industrial. On June 28, 2019 an ESD was signed that selected ICs on those limited properties where HI exceeds 1 as part of the remedy to limit potential future residential exposure to dioxin contamination in soil.

While the RI identified unacceptable risks associated with arsenic in Site soil, the ROD did not establish a cleanup level for the constituent. The persistently high concentrations of arsenic in Site groundwater near the former source areas indicates that the original soil remedy may not have adequately addressed the constituent. Post-

cleanup soil sampling data are not available to confirm residual arsenic concentrations in soil, following cleanup. The highest detected arsenic concentration found in surface soil during the RI was 266 mg/kg, near the former wood treating building. Using current RSLs, under a residential land use scenario, the maximum detected arsenic concentration corresponds to risk above EPA's carcinogenic risk range of 1 x 10^{-6} to 1 x 10^{-4} and above the target noncancer hazard quotient (HQ) of 1. Under an industrial land use scenario, the concentration corresponds to risk below EPA's carcinogenic risk range and below the target noncancer HQ of 1. The location of the maximum RI arsenic detection was on the Saunders Site property, which is in industrial use. Beginning in December 2019, additional investigations will be performed in accordance with the Scope of Work of December 2017 to evaluate if potential source material is present that is contributing to groundwater contamination.

The ROD established MCLs and Virginia Water Quality Standards as chemical-specific applicable or relevant and appropriate requirements (ARARs) for the discharge of treated groundwater to surface water. The Site's 2003 O&M Plan established the MCLs for PCP, arsenic and chromium as the treatment system discharge limits; MCLs of arsenic and chromium are equal to the current state surface water quality standards for both protection of human health and aquatic life (freshwater acute criteria). The Virginia Water Quality Standard for surface water for PCP is 0.3, more stringent than the MCL. The freshwater chronic surface water standard (for aquatic life) for chromium (74 µg/L) is lower than the chromium MCL (100 µg/L). However, the remedy remains protective for chromium in surface water because treated groundwater is discharged to the city sewer system. Surface water sampling results from 2017 also show that chromium in the intermittent stream adjacent to the Site is below both the acute and chronic state surface water standards for aquatic life. There have been no changes to the MCLs for PCP, arsenic and chromium since the 2003 O&M Plan; therefore, the treatment system discharge limits (1 µg/L for PCP, 10 µg/L for arsenic and 100 µg/L for chromium) remain protective. The ROD established the then-proposed PCP MCL of 1 µg/L as a criterion to-be-considered and as the PCP groundwater cleanup goal. The PCP MCL has not changed since 1991; therefore, the groundwater cleanup goal of 1 µg/L remains valid.

Prior to October 2018, none of the intermittent stream sampling results exceeded their MCLs. In October 2018 and April 2019 total arsenic exceeded the MCL and Virginia Water Quality Standard. PCP has never exceeded the MCL of the intermittent stream sampling results, however exceeded the Virginia Water Quality Standards for surface water during 2017. PCP has not exceeded this standard since 2017. The recent exceedances of arsenic MCL and Virginia Water Quality Standard in surface water indicate site-related groundwater contamination could potentially be discharging to the intermittent stream at concentrations that could pose unacceptable risks to receptors. The 2016 Optimization Review Report recommended defining the plume boundaries more clearly. Beginning in December 2019, additional investigations will be performed in accordance with the Scope of Work of December 2017 to better define the extent of the groundwater contamination plume.

To assess if the PCP soil cleanup goal remains protective of human health, it was compared to EPA's 2018 RSLs. As shown in Tables I-1 and I-2 in Appendix I, the soil cleanup goal for PCP of 1.46 milligrams per kilogram (mg/kg) remains valid because under both commercial/industrial and residential land use scenarios, it corresponds to risk below or within EPA's carcinogenic risk range of 1 x 10^{-6} to 1 x 10^{-4} and below the target noncancer HQ of 1. The Site's PCP soil cleanup goal was based on direct contact risk, not on protection of groundwater. The 1991 ROD stated that PCP concentrations that did not pose a direct contact risk would remain in soil and may result in PCP concentrations in groundwater above the 1 µg/L cleanup goal. The continued presence of elevated PCP concentrations in Site groundwater indicate that the soil cleanup goal may not be protective of groundwater. However, this currently does not impact protectiveness because exposure to groundwater is restricted through institutional controls. Beginning in December 2019, additional investigations will be performed in accordance with the Scope of Work of December 2017, to determine if modifications to the selected remedy are necessary to achieve groundwater cleanup levels throughout the groundwater contamination plume.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
Issues and Recommendations Identified in the FYR:

OU(s): OU1	Issue Category: Remedy Performance			
	Issue: Source material may be present at the Site contributing to groundwater contamination, the groundwater contamination plume may not be fully delineated, and the selected remedy may not be able to achieve groundwater cleanup levels throughout the groundwater contamination plume.			
	Recommendation: Complete additional investigations in accordance with the Scope of Work of December 2017 to determine if source material is present that is contributing to groundwater contamination, define the extent of groundwater contamination, and determine if modifications to the selected remedy are necessary to achieve groundwater cleanup levels throughout the groundwater contamination plume.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	12/29/2021

OTHER FINDINGS

Several additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- Sampling results during October 2018 and April 2019 exceeded MCLs and Virginia Water Quality Standards for total arsenic in the intermittent stream. This finding will be further evaluated during the execution of the Scope of Work of December 2017.
- Antimony has been detected in groundwater near the former source areas at concentrations that exceed the MCL of 6 µg/L This finding will be further evaluated during the execution of the Scope of Work of December 2017.
- Additional speciation of chromium to confirm if hexavalent chromium is a concern and being treated sufficiently.
- During the FYR Site inspection, participants observed two inactive groundwater monitoring wells, MW-1S and MW-2D, inside the fence of the adjacent (off-site) Saunders Supply Company retail and sales business. Evaluate whether the two wells are needed or could be properly abandoned.
- Ensure that all monitoring well lids are locked.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy at the Site currently protects human health and the environment in the short term because exposure to contaminated groundwater is prevented and appropriate institutional controls are in place. However, for the remedy to be protective in the long term; • Determine if source material is present that is contributing to groundwater contamination, • Define the extent of groundwater contamination, and • Determine if modifications to the selected remedy are necessary to achieve groundwater cleanup levels throughout the groundwater contamination plume.

VIII. GOVERNMENT PERFORMANCE AND RESULTS ACT MEASURES

As part of this FYR, the Government Performance and Results Act (GPRA) Measures have also been reviewed. The GPRA Measures and their status are provided as follows:

Environmental Indicators

Human Health: Current Human Health Exposure Controlled and Protective Remedy in Place (HEPR)

Groundwater Migration: Insufficient Data to Determine Contaminated Groundwater Control (GMID)

Site-Wide Ready for Anticipated Use (SWRAU)

The Site was considered to be SWRAU on September 27, 2011.

IX. NEXT REVIEW

The next FYR Report for the Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Annual Operation and Maintenance and Monitoring Report, July 2017 Through June 2018, Saunders Supply Company Superfund Site, Chuckatuck, Virginia. Prepared by Environmental Alliance, Inc. for VDEQ. September 2018.

Annual Operation and Maintenance and Monitoring Report, July 2018 Through June 2019, Saunders Supply Company Superfund Site, Chuckatuck, Virginia. Prepared by Environmental Alliance, Inc. for VDEQ. July 24, 2019.

Draft Hydrogeological Analysis Report, Saunders Supply Company Superfund Site, Chuckatuck, Virginia. Prepared by CDM for EPA Region 3.

Explanation of Significant Difference, Saunders Supply Company Superfund Site, Chuckatuck, Suffolk County, Virginia. EPA Region 3. June 2019.

Incremental Soil Sampling Trip Report, Saunders Supply Company Superfund Site, Chuckatuck, Suffolk County, Virginia. Prepared by TechLaw for EPA Region 3.

Optimization Review Report, Saunders Supply Company Superfund Site, Suffolk County, Virginia. Prepared by ICF International for EPA Region 3. August 2016.

Preliminary Close Out Report, Saunders Supply Company Superfund Site, Chuckatuck, Virginia. EPA Region 3. December 1999.

Preliminary Assessment of the Saunders Supply Company Virginia Site 121. Prepared by Bureau of Solid Waste Management, Virginia State Health Department for EPA Region 3. August 1984.

Record of Decision, Saunders Supply Company Superfund Site, Chuckatuck, Virginia. EPA Region 3. September 1991.

Record of Decision Amendment, Saunders Supply Company Superfund Site, Chuckatuck, Virginia. EPA Region 3. September 1996.

Remedial Investigation Report, Saunders Supply Company, Volumes I and II. Prepared by Ecology and Environment, Inc. for EPA Region 3. May 1991.

Saunders Supply Company Superfund Site Firefighting Foam Memo. VDEQ Office f Remediation Programs. December 2016.

Saunders Property Title Notice, Instrument #040016306. August 2004.

Scope of Work Saunders Supply Company Superfund Site, Chuckatuck, Virginia, Final- December 2017.

Third Five-Year Review Report for Saunders Supply Company Superfund Site, Chuckatuck, Virginia. EPA Region 3. December 2014.

APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
Wood-treating operations began on Site	1964
In response to a complaint by a neighbor, the Virginia Department of Health, Solid Waste Management Division and the Virginia State Water Control Board investigated the Site	Early 1980s
Operators used sludge generated by the wood-treating process to control dust and weeds on Site	1966-1981
Site operators occasionally used an on-site conical burner to incinerate wood-treating waste sludge	1969
Bureau of Solid Waste Management, Virginia State Health Department completed the Site's preliminary Site assessment	August 1984
EPA added the Site to the NPL	October 1989
EPA completed the Site's RI/FS	May 1991
Saunders Supply Company stopped on-site wood-treating activities	June 1991
EPA selected the Site's initial remedy in a ROD	September 1991
EPA started remedial design	July 1992
EPA completed initial remedial design and modified original remedy in a ROD Amendment	September 1996
Under removal authority, EPA began construction of Site's groundwater extraction and treatment system	January 1998
EPA completed construction of and began operating Site's groundwater extraction and treatment system	April 1998
On-site remedy construction began	March 1999
EPA, VDEQ and associated remedial contractors conducted pre-final Site inspection	November 1999
EPA completed remedy construction and signed Site's PCOR	December 1999
Saunders filed Title Notice with city of Suffolk to implement groundwater institutional controls for Saunders property	August 2004
EPA completed Site's first FYR Report	December 2004
EPA transferred Site O&M responsibility to VDEQ	July 2009
EPA completed Site's second FYR Report	December 2009
EPA completed Site's third FYR Report	December 2014
EPA completed Site's Optimization Review Report	August 2016
EPA contractor TechLaw completed Incremental Soil Sampling Trip Report (surface soil dioxin sampling report)	November 2016
EPA signed an Explanation of Significant Difference (ESD)	June 2019

APPENDIX C – 2004 SAUNDERS TITLE NOTICE

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Instrument Control Number

040016306

Commonwealth of Virginia
Land Record Instruments
Cover Sheet - Form A

2004 AUG 24 PM 1 19

[ILS VLR Cover Sheet Agent 1.0.66]

TAX EXEMPT / CORP

Date of Instrument: [8/24/2004]
Instrument Type: [NOT]

Number of Parcels [3]
Number of Pages [8]
City [x] County [ ] [City Of Suffolk]

(Box for Deed Stamp Only)

First and Second Grantors

Last Name	First Name	Middle Name or Initial	Suffix
[Saunders Supply Comp]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]

First and Second Grantees

Last Name	First Name	Middle Name or Initial	Suffix
[Saunders Supply Comp]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]

Grantee Address (Name) [Saunders Supply Company]
(Address 1) [P O Box 2278]
(Address 2) [ ]
(City, State, Zip) [Suffolk] [VA] [23432]

Consideration [0.00] Existing Debt [0.00] Assumption Balance [0.00]

Prior Instr. Recorded at: City [ ] County [ ] [ ] Percent. in this Juris. [100]
Book [ ] Page [ ] Instr. No [ ]
Parcel Identification No (PIN) [251237000]
Tax Map Num. (If different than PIN) [251237000]
Short Property Description [Saw-mill Lot]
[ ]
Current Property Address (Address 1) [Godwin Blvd.]
(Address 2) [ ]
(City, State, Zip) [Suffolk] [VA] [23432]

Instrument Prepared by [Saunders Supply Company]
Recording Paid for by [Pretlow & Pretlow PC]
Return Recording to (Name) [Pretlow & Pretlow PC]
(Address 1) [200 N Main St]
(Address 2) [ ]
(City, State, Zip) [Suffolk] [VA] [23434]
Customer Case ID [ ] [ ] [ ]

Cover Sheet Page # 1 of 2

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Instrument Control Number

Commonwealth of Virginia
Land Record Instruments
Continuation Cover Sheet
Form C

[ILS VLR Cover Sheet Agent 1.0.66]

TAX EXEMPT | GRANTOR | GRANTEE | CORP

Date of Instrument: [8/24/2004]
Instrument Type: [NOT]

Number of Parcels [3]
Number of Pages [8]

City [x] County [ ] [City Of Suffolk] (Box for Deed Stamp Only)

Grantors/Grantees/Parcel Continuation Form C

Last Name	First Name	Middle Name or Initial	Suffix
[ ]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]

Prior Instr. Recorded at: City [ ] County [ ] [ ] Percent. in this Juris. [100]
Book [ ] Page [ ] Instr. No [ ]
Parcel Identification No (PIN) [251238000]
Tax Map Num. (If different than PIN) [251238000]
Short Property Description [West side of county road]
[ ]
Current Property Address (Address 1) [Godwin Blvd.]
(Address 2) [ ]
(City, State, Zip) [Suffolk] [VA] [23432]

Prior Instr. Recorded at: City [ ] County [ ] [ ] Percent. in this Juris. [100]
Book [ ] Page [ ] Instr. No [ ]
Parcel Identification No (PIN) [251236000]
Tax Map Num. (If different than PIN) [251236000]
Short Property Description [1.8 acres]
[ ]
Current Property Address (Address 1) [Godwin Blvd.]
(Address 2) [ ]
(City, State, Zip) [Suffolk] [VA] [23432]

Cover Sheet Page # 2 of 2

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Title Notice

THIS TITLE NOTICE (this "Notice"), made and executed this 24th day of August, 2004, by Saunders Supply Company, a Virginia partnership (the "Owner"), provides as follows:

WHEREAS, the Owner is the fee simple owner of certain real property located in Chuckatuck, Virginia, as shown on Exhibit A attached hereto and made a part hereof (the "Property");

WHEREAS, the Property is part of a Superfund Site, known as Saunders Supply Company, Inc. Superfund Site (the "Site");

WHEREAS, the Environmental Protection Agency (the "EPA") selected a remedy for the Site on September 30, 1991, (the "ROD"), and said ROD having been amended September 27, 1996;

WHEREAS, the Owner and other potentially responsible parties have entered into a Consent Decree in the United States District Court for the Eastern District of Virginia (the "Consent Decree") requiring implementation of a part of the remedy, and pursuant to that Consent Decree are required to provide access and land use restrictions; and

WHEREAS, the Owner desires to provide access to the Property and subject the Property to the land use restrictions as hereinafter set forth for the benefit of the Property.

NOW, THEREFORE, the Owner hereby declares that the Property is and shall be held, transferred, sold, conveyed, occupied and used subject to the covenants, conditions and land use restrictions hereinafter set forth, such covenants, conditions, and land use restrictions to run with, bind and burden the Property.

Pursuant to the Consent Decree, Paragraph 26, Sections (a) and (b), the Owner shall:

a. provide the United States and its representatives, including the EPA and its contractors, with access at all reasonable times to the Site, or such other property, for the purpose of conducting any response activity related to the Site, including, but not limited to, the following activities:

   1. Monitoring, investigation, removal, remedial or other activities at the Site;

   2. Verifying any data or information submitted to the United States;

   3. Conducting investigations relating to contamination at or near the Site;

   4. Obtaining samples;

   5. Assessing the need for, planning or implementing additional response actions at or near the Site;

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6. Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by the Owner or its agents, consistent with Section XIII of the Consent Decree (Access to Information);

7. Assessing the Owner's compliance with the Consent Decree; and

8. Determining whether the Site or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to the Consent Decree;

b. Institutional Controls – commencing on the date of lodging of the Consent Decree, refrain from using the Site, or such other property addressed by the EPA's response actions, in any manner that would interfere with or adversely affect the implementation, integrity or protectiveness of the remedial measures or operation and maintenance at the Site. In addition, the Owner shall refrain from using the Site, or such other property addressed by the EPA's response actions, for any purpose which may reasonably be anticipated to interfere with, obstruct, or disturb the performance, support, or supervision of the remedial measures and operation and maintenance at the Site. Unless otherwise determined to be necessary by the EPA, such restrictions include, but are not limited to, the following:

1. Groundwater underlying the Property, including groundwater from either the Columbia Aquifer or the Yorktown Aquifer, shall not be extracted, consumed, exposed or utilized in any way, except for the limited purpose of pumping and treating the contaminated groundwater and monitoring groundwater contamination levels in accordance with plans approved by the EPA.

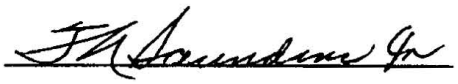
Pursuant to the Consent Decree, Paragraph 26, Section (c), in the event of a conveyance, assignment, or transfer of the Property, the Owner shall reserve an irrevocable and permanent easement granting to the Owner:

1. the right of access for the purposes of carrying out the obligations and restrictions of the Consent Decree; and

2. the right to carry out and enforce the obligations and restrictions set forth in the Consent Decree.

IN WITNESS WHEREOF, the Owner has caused this Notice to be executed in its name by its partners.

OWNER: **SAUNDERS SUPPLY COMPANY**

NAME: 

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Title: Partner

NAME: Parker Howell

Title: Partner

NAME: Samuel B. Howell

Title: Partner

City
~~COUNTY~~ OF Suffolk, to-wit:

The foregoing instrument was acknowledged before me this 24th day of Aug., 2004, by Samuel B. Howell T.A. Saunders, Jr., Parker Howell of Saunder Supply Co., a partnership, on behalf of the partnership.

My commission expires: May 31, 2008.

Betty W. Bernier
Notary Public

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EXHIBIT A

Description of Property

All that certain lot, piece or parcel of land lying, situate and being in the Village of Chuckatuck, Lower Chuckatuck District, Nansemond County, Virginia; and being bounded and described as follows:

> Commencing at an iron post at the Northwest corner of the property of W. G. Saunders, Jr., and known as the Saw-mill Lot; and thence running in a Westerly direction 210 feet to an iron post; thence in a Southerly direction parallel with the Western boundary of the Saw-mill Lot 458 feet, more or less, to an iron post on the Northern boundary of the property of Mitchell Bounds; thence in an Easterly direction 210 feet to another iron post at the corner of an eighteen (18) foot driveway to the said Saw-mill Lot; and thence in a Northerly direction along the Western boundary of said Saw-mill Lot 458 feet, more or less, to the point of beginning; and containing two (2) Acres, more or less, this conveyance, however, being in gross as a parcel and not by the acre, the acreage being in no wise guaranteed.

The land hereby conveyed is bounded on the East by the property of W. G. Saunders, Jr., known as the Saw-mill Lot; on the North and West by other lands of F. A. and Maggie M. Spady, and on the South by a driveway, the lands of Ray Howell, P. D. Howell, Jr., and Mitchell Bounds.

It being a part of the property which was conveyed unto F. A. Spady and Maggie M. Spady by deed from Matthew W. Crumpler, dated November 5, 1938, and duly of record in the Clerk's Office of the Circuit Court of Nansemond County, Virginia, in Deed Book 142, page 39.

All those certain lots, pieces or parcels of land, together with all buildings thereon and appurtenances thereunto belonging, lying, situate and being in the Village of Chuckatuck, Lower Chuckatuck Magisterial District, Nansemond County, Virginia, and being the same property conveyed unto W. G. Saunders, Jr., by B. W. Godwin and wife, by deed dated December 21, 1937, and duly recorded in the Clerk's Office of the Circuit Court of Nansemond County, Virginia, in Deed Book 140, at page 35, and described therein as follows:

(1) All that certain piece, parcel or lot of land conveyed unto B. W. Godwin by Matthew W. Crumpler by deed dated August 8, 1913, and duly recorded in the Clerk's Office of the Circuit Court of Nansemond County, Virginia, in Deed Book 76, page 168; and bounded and described in said deed as follows:

> "All that lot or parcel of land situated in Chuckatuck, Nansemond County, Virginia, on the West side of the county road from Chuckatuck to Suffolk and beginning at a stake on the West side of the said road at a point South of the residence of the said Matthew W. Crumpler and running thence Westwardly at right angles to the said road one hundred eighty-one and one-half (181-1/2) feet to a point,

thence running Southwardly parallel to the West side of the said county road one hundred and twenty (120) feet to a point, thence running Eastwardly at right angles to the said road one hundred eighty-one and one-half feet (181-1/2) to the West side of the said county road, and thence running Northwardly along the West side of the said county road one hundred and twenty (120) feet to the point of beginning, and containing one-half (1/2) acre, and being a part of that property that was conveyed to the said Matthew W. Crumpler by Lulie E. Pitt by deed dated the 29th day of August, 1899, and admitted to record on the same day and recorded in the Clerk's Office of the Circuit Court of Nansemond County, Virginia, in Deed Book 44, page 11."

(2) All that certain piece, parcel or lot of land conveyed unto B. W. Godwin by Matthew W. Crumpler by deed dated February 21, 1914, and recorded in said Clerk's Office in Deed Book 78, page 440; and bounded and described in said deed as follows:

"All that lot or parcel of land situated in Chuckatuck, Nansemond County, Virginia, on the West side of the County road from Chuckatuck to Suffolk, and beginning at a Hackberry or Skin and Bone tree on the West side of the road running in a Northwardly direction parallel with the County road (120) one hundred and twenty feet to the land of B. W. Godwin by deed on the 8th day of August, 1913, thence in a Westerly direction one hundred eighty-one and one-half feet (181-1/2), thence Southwardly one hundred and twenty feet (120) parallel with the County road to a stake, thence Eastwardly at right angle to the County Road one hundred eighty-one and one-half feet (181-1/2) ft.) to the said Hackberry or Skin and Bone tree to the point of beginning, and containing one-half acre (1/2), and being a part of that property that was conveyed to the said Matthew W. Crumpler by Lulie E. Pitt by deed dated the 29th day of August, 1899, and admitted to record on the same day, and recorded in the Clerk's Office of the Circuit Court of Nansemond County, Virginia, in Deed Book 44, page 11."

(3) All that certain piece, parcel or lot of land conveyed unto B. W. Godwin by Matthew W. Crumpler by deed dated November 5, 1917, and recorded in said Clerk's Office in Deed Book 88, page 283; and bounded and described in said deed as follows:

"All that lot of land situated in Chuckatuck, Nansemond County, Virginia, containing one and one-half (1-1/2) acres, more or less, and described as follows, lying on the West side of the County Road leading from Chuckatuck to Suffolk and beginning at the center of a ditch on the road even with a Skinning Bone tree, and is on the South side of the land owned by B. W. Godwin, formerly owned by M. W. Crumpler running in a Westward direction one hundred eighty one and one half feet (181-1/2 ft.) to a Stob dividing the lands of B. W.

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Godwin and M. W. Crumpler, thence in a Southwestwardly direction Three hundred and eighty four (384) feet towards the Northwest corner of the Public Hall reserving a Sixteen feet (16 ft.) outlet from the land of M. W. Crumpler to the County road, thence in a Southeastwardly direction one hundred and seventy (170) feet to the center of the ditch on the County road, thence down center of said ditch in a Northwardly direction four hundred and one (401) feet even with the Skinning bone tree, being the point of beginning, and being a part of that property that was conveyed to M. W. Crumpler by Lulie E. Pitt, by deed dated the 29th of August, 1899, and admitted to record on the same day and recorded in the Clerk's Office of the Circuit Court of Nansemond County, Virginia, in Deed Book 44, page 11."

(4) All that certain piece, parcel or lot of land conveyed unto B. W. Godwin by Mathew W. Crumpler by deed dated October 6, 1931, and duly recorded in said Clerk's Office in Deed Book 126, page 44; and bounded and described in said deed as follows:

"All that lot or parcel of land situated in Chuckatuck, Nansemond County, Virginia on the West side of the tract now owned by the said B. W. Godwin and which is being used as a Saw Mill and lumber yard. The above tract begins at the North West corner of the land now belonging to B. W. Godwin, running in a westerly direction seventy-five feet thence in a southerly direction six hundred and fourteen feet and thence in a easterly direction seventy-five feet joining the land of B. W. Godwin on the South West corner of the land which was conveyed by Mathew W. Crumpler to B. W. Godwin on the twenty-fourth day of February in the year one thousand nine hundred and fourteen, and containing about one and one quarter acres of land; and bring a part of that property that was conveyed to the said Mathew W. Crumpler by Lulie E. Pitt by deed dated the twenty-ninth day of August in the year eighteen hundred and ninety-nine and admitted to the record the same day; and recorded in the Clerk's Office of the Circuit Court of Nansemond County Virginia in deed book forty-four, page eleven."

All that certain lot, piece or parcel of land, together with all buildings thereon and appurtenances thereunto belonging, lying, situate and being in the Village of Chuckatuck, Lower Chuckatuck Magisterial District, Nansemond County, Virginia, and being the same property conveyed unto W. G. Saunders, Jr., T. A. Saunders, Jr., and P. D. Howell, Jr., Partners Trading as Saunders Supply Company, by F. A. Spady and Maggie M. Spady, by deed dated August 29, 1951, and duly of record in the aforesaid Clerk's Office in Deed Book 178, page 222, and described in said deed as follows:

"Commencing at an iron post at the Northwest corner of the property of W. G. Saunders, Jr., and known as the Saw-mill Lot; and thence running in a Westerly direction 210 feet to an iron post; thence in a

Southerly direction parallel with the Western boundary of the Saw-mill Lot 458 feet, more or less, to an iron post on the Northern boundary of the property of Mitchell Bounds; thence in an Easterly direction 210 feet to another iron post at the corner of an eighteen (18) foot driveway to the said Saw-mill Lot; and thence in a Northerly direction along the Western boundary of said Saw-mill Lot 458 feet, more or less, to the point of beginning; and containing two (2) Acres, more or less, this conveyance, however, being in gross as a parcel and not by the acre, the acreage being in no wise guaranteed.

"The land hereby conveyed is bounded on the East by the property of W. G. Saunders, Jr., known as the Saw-mill Lot; on the North and West by other lands of F. A. and Maggie M. Spady, and on the South by a driveway, the lands of Ray Howell, P. D. Howell, Jr., and Mitchell Bounds."

All that certain lot, piece or parcel of land, together with all appurtenances thereunto belonging, lying, situate and being in the Village of Chuckatuck, Lower Chuckatuck Magisterial District, Nansemond County, Virginia, and bounded and described as follows:

"Commencing at an iron pipe at the Northeast corner of the property of Mrs. John Kelley and on the line of other property of the Saunders Supply Company and running thence N. 61° 40' W. 158 feet along said Kelley property to the East side of a 30-foot right of way; thence N. 20° 10' E. 64 feet along said 30-foot right of way to a point; thence N. 69° 50' W. 30 feet around the Northern end of said right of way to a point; thence N. 20° 10' E. 32 feet to an iron pin; thence N. 29° 10' W. 221.5 feet along the land of Marshall Boyce to a stob; thence N. 28° 10' E. 96 feet along the run of a branch and the Buppert property to a stob; thence S. 54° 32' E. 355 feet along other lands of F. A. Spady and Maggie M. Spady to an iron pipe; thence S. 80° 00' E. 269 feet along other lands of F. A. Spady and Maggie M. Spady to an iron pipe in the property line of C. C. Johnson; thence S. 13° 15' E. 20 feet along the property of the said C. C. Johnson to a point in the property line of the Saunders Supply Company; thence N. 80° 00' W. 280 feet along other property of the Saunders Supply Company to an iron pipe; and thence S. 20° 32' W. 247 feet along other property of the Saunders Supply Company to the point of beginning, and containing 1.8 acres, more or less, according to a plat entitled: "Plat Showing Property of F. A. Spady, Being Conveyed To Saunders Supply Company, Chuckatuck District, Nansemond County, Virginia", made by Roy Brinkley, C.L.S., March 10, 1961, and a copy of said plat is hereto attached and made a part hereof."

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It being a part of the property which was conveyed unto the said F. A. Spady and Maggie M. Spady by Matthew W. Crumpler, by deed dated the 5th day of November, 1938, and duly of record in the Clerk's Office of the Circuit Court of Nansemond County, Virginia, in Deed Book 142, page 39.

INSTRUMENT #040016306
RECORDED IN THE CLERK'S OFFICE OF
SUFFOLK ON
AUGUST 24, 2004 AT 02:56PM
W. RANDOLPH CARTER, JR., CLERK
BY: _____ (DC)

APPENDIX D – PRESS NOTICE

EPA PUBLIC NOTICE

EPA REVIEWS CLEANUP
SAUNDERS SUPPLY CO. SUPERFUND SITE

The U.S. Environmental Protection Agency (EPA) is reviewing the cleanup that was conducted at the Saunders Supply Company Superfund Site located in Chuckatuck, Virginia. EPA inspects sites regularly to ensure that cleanups conducted protect public health and the environment. EPA's 2014 review of the site concluded that the cleanup was protective in the short-term. Findings from the current review will be available in December 2019.

To access detailed site information, including the review report once finalized, visit:
https://www.epa.gov/superfund/saunders

For questions or to provide site-related information for the review, contact:
Meg Keegan, EPA Community Involvement Coordinator
215-814-5494 or keegan.megan@epa.gov

APPENDIX E – INTERVIEW SAMPLE FORMS

SAUNDERS SUPPLY SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Saunders Supply Superfund Site	
EPA ID:	
Interviewer name:	**Interviewer affiliation:**
Subject name:	**Subject affiliation:**
Subject contact information:	
Interview date:	**Interview time:**
Interview location:	
Interview format (circle one): In Person Phone Mail Email Other:	
Interview category: Resident	

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

3. Were you involved with or had an opinion concerning how the cleanup was decided and implemented?

4. What have been the effects of this Site on the surrounding community, if any?

5. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

6. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.

7. Do you feel well informed about EPA's activities and progress? How can EPA best provide site-related information in the future?

8. What extent of community involvement do you wish to have during the future work at the site?

9. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

SAUNDERS SUPPLY SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Saunders Supply	
EPA ID:	
Interviewer name:	**Interviewer affiliation:**
Subject name:	**Subject affiliation:**
Subject contact information:	
Interview date:	**Interview time:**
Interview location:	
Interview format (circle one): In Person Phone Mail Email Other:	
Interview category: State Agency	

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

2. What is your assessment of the current performance of the remedy in place at the Site?

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

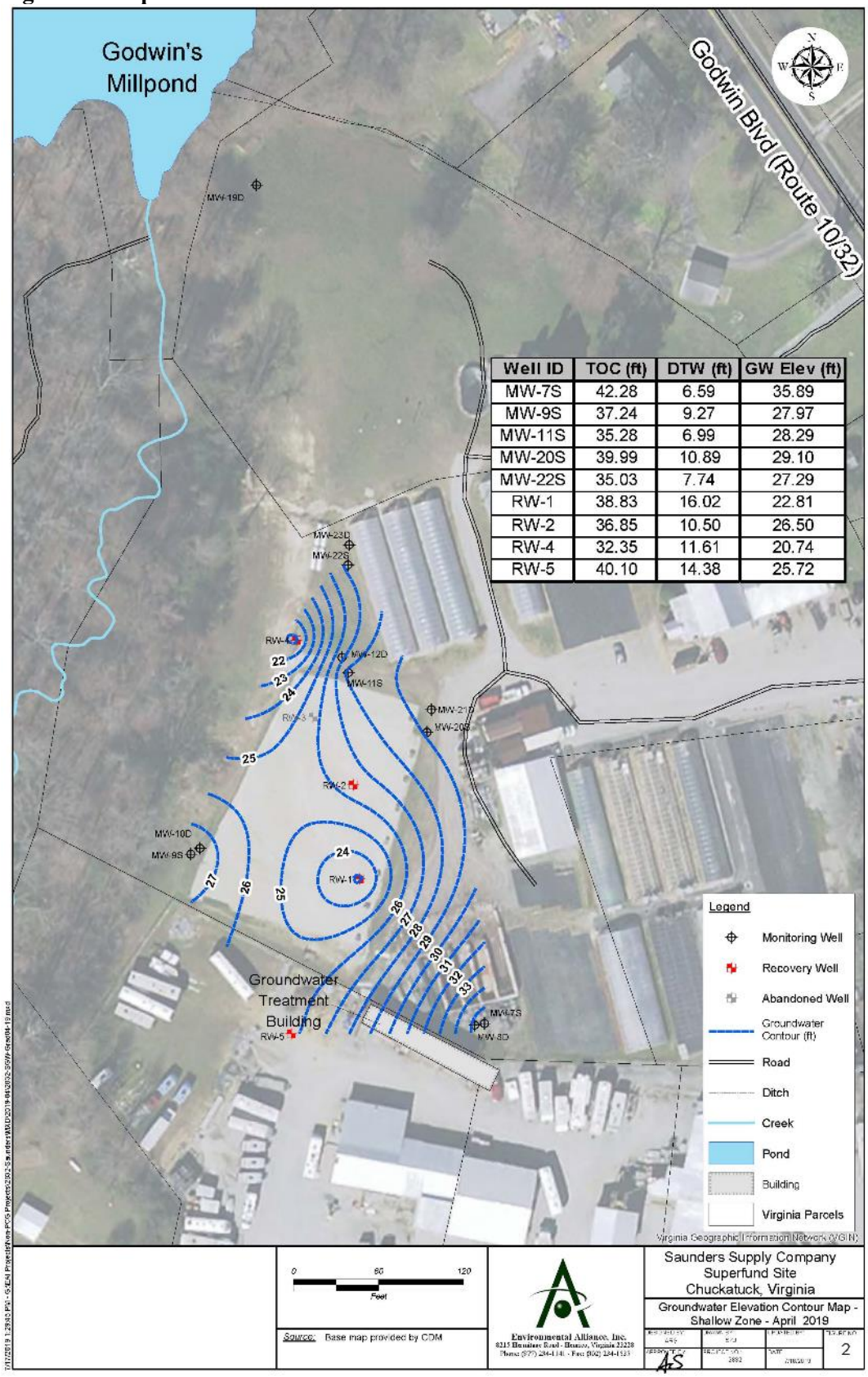
6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

7. Are you aware of any changes in projected land use(s) at the Site?

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

APPENDIX F – DATA REVIEW FIGURES AND INFORMATION

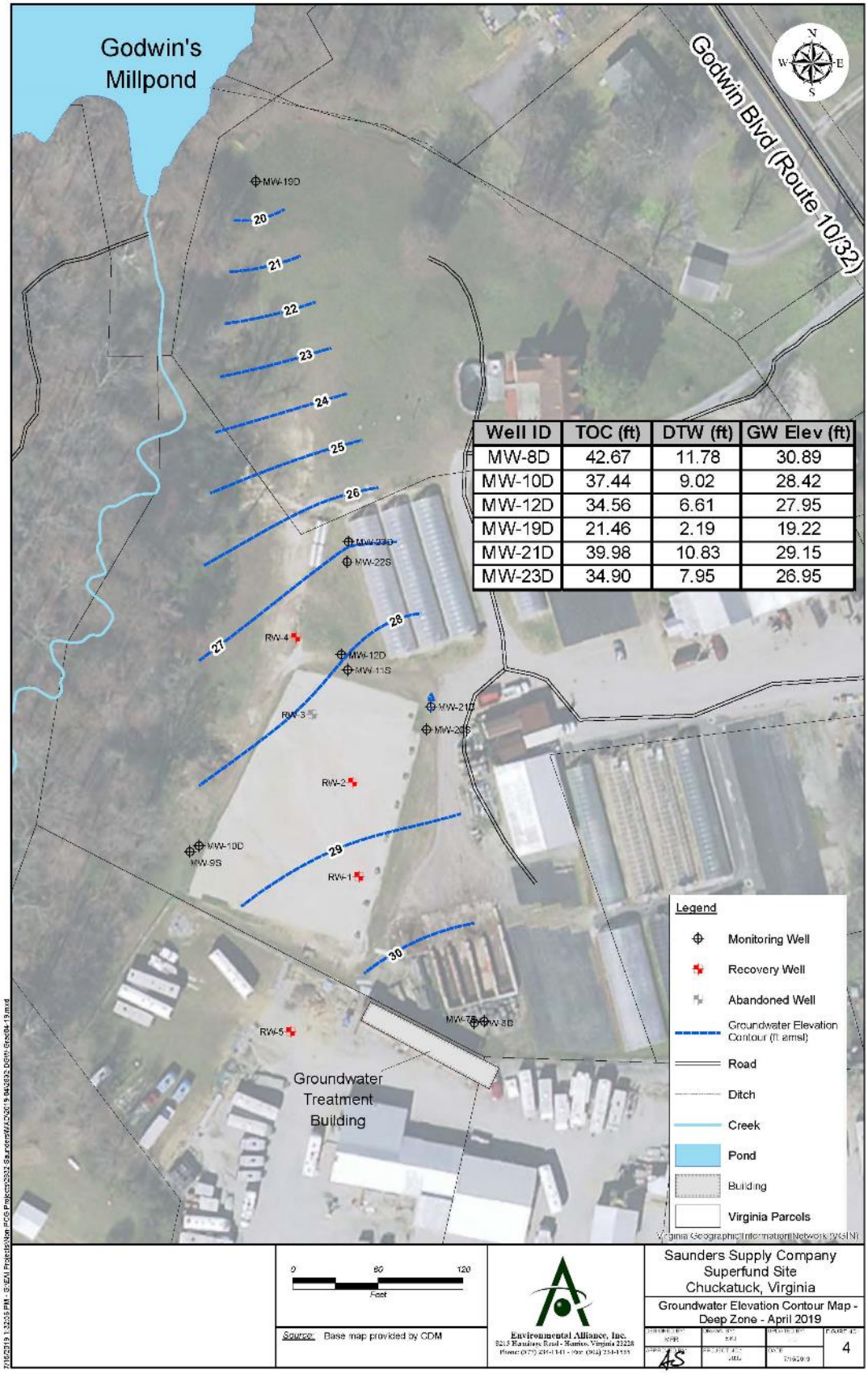
Figure F-1: April 2019 Groundwater Elevation Contours in the Shallow Zone



Well ID	TOC (ft)	DTW (ft)	GW Elev (ft)
MW-7S	42.28	6.59	35.89
MW-9S	37.24	9.27	27.97
MW-11S	35.28	6.99	28.29
MW-20S	39.99	10.89	29.10
MW-22S	35.03	7.74	27.29
RW-1	38.83	16.02	22.81
RW-2	36.85	10.50	26.50
RW-4	32.35	11.61	20.74
RW-5	40.10	14.38	25.72

Figure F-1 above is Figure 2 from the Site's 2019 Annual O&M and Monitoring Report.

Figure F-2: April 2019 Groundwater Elevation Contours in the Deep Zone



Well ID	TOC (ft)	DTW (ft)	GW Elev (ft)
MW-8D	42.67	11.78	30.89
MW-10D	37.44	9.02	28.42
MW-12D	34.56	6.61	27.95
MW-19D	21.46	2.19	19.22
MW-21D	39.98	10.83	29.15
MW-23D	34.90	7.95	26.95

Figure F-2 above is Figure 4 from the Site's 2019 Annual O&M and Monitoring Report.

Table F-1: Surface Water Sampling Results, 2017-2019

Table 5
Surface Water Sampling Data
Saunders Supply Company Superfund Site
Chuckatuck, Virginia

Location ID	EPA	SW-1						SW-2					
Sample Date	MCLs	03/06/17	04/17/17	10/25/17	04/02/18	10/15/18	04/17/19	03/06/17	04/17/17	10/25/17	04/02/18	10/15/18	04/17/19
DISSOLVED METALS (µg/L) *E200.8*													
Arsenic	**10**	1.00 J	1.99 J	6.85	< 1.00	3.22 J	2.34 J	< 1.00	< 1.00	1.35 J	< 1.00	< 1.00	2.04 J
Chromium	**100**	< 1.00	< 1.00	3.89 J	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
TOTAL METALS (µg/L) *E200.8*													
Arsenic	**10**	1.76 J	7.10	2.88 J	2.07 J	4.46 J	4.93 J	< 1.00	2.19 J	< 1.00	< 1.00	**14.8**	1.93 J
Chromium	**100**	1.23 J	3.19 J	< 1.00	1.35 J	< 1.00	1.17 J	1.08 J	1.52 J	< 1.00	< 1.00	2.11 J	< 1.00
SVOCS (µg/L) *SW8270D SIM*													
Pentachlorophenol	**1**	0.364	0.234	0.504	0.230	0.284	0.185	0.104	< 0.105	< 0.101	< 0.108	< 0.126	0.0763 J

Location ID	EPA	SW-3					
Sample Date	MCLs	03/06/17	04/17/17	10/25/17	04/02/18	10/15/18	04/17/19
DISSOLVED METALS (µg/L) *E200.8*							
Arsenic	**10**	< 1.00	<1.00	< 1.00	< 1.00	1.23 J	2.11 J
Chromium	**100**	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
TOTAL METALS (µg/L) *E200.8*							
Arsenic	**10**	< 1.00	<1.00	< 1.00	< 1.00	3.40 J	**10.9**
Chromium	**100**	1.02 J	<1.00	< 1.00	< 1.00	< 1.00	7.46
SVOCS (µg/L) *SW8270D SIM*							
Pentachlorophenol	**1**	< 0.106	<0.109	< 0.102	< 0.108	< 1.26	0.265

Qualifiers:
J = estimated value

Notes:
µg/L = micrograms per liter
< = indicates analyte not detected at or above specified laboratory detection limit or practical quantitation limit
SVOC = Semivolatile Organic Compound
EPA-MCL = US Environmental Protection Agency Maximum Contaminant Level, May 2009.
Results formatted in **bold** are in exceedance of the EPA-MCL.
Dissolved Metals samples were lab filtered by REI Consultants, Inc. Labs

Table F-1 above is Table 5 from the Site's 2019 Annual O&M and Monitoring Report.

APPENDIX G – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Saunders Supply Co.	**Date of Inspection:** 3/21/2019
Location and Region: Chuckatuck, VA 3	**EPA ID: VAD003117389**
Agency, Office or Company Leading the Five-Year Review: EPA Region 3	**Weather/Temperature:** Overcast and 55 degrees.

Remedy Includes: (check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Excavation and off-site disposal of contaminated soil and sediment, and long-term groundwater monitoring.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** Aaron Siegel (Name) Project Geologist/Account Manager (Title) 3/21/2019 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☒ Report attached: _____

EPA interviewed one of the Site property owners during the FYR Site inspection. Interview responses are summarized in section IV of this FYR. Interview question forms are included in Appendix E.

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A

☒ Maintenance logs ☒ Readily available ☒ Up to date ☐ N/A

Remarks: The Site's O&M Manual is maintained inside the groundwater treatment system building and was observed during the FYR site inspection. O&M checklists are also routinely completed and maintained on-site. The Site's O&M Plan and Sampling and Analysis Plan were updated in 2019.

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A

☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A

Remarks: The Site's Health and Safety Plan is maintained inside the groundwater treatment system building and was observed during the FYR Site inspection.

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit ☐ Readily available ☐ Up to date ☒ N/A

☐ Effluent discharge ☐ Readily available ☐ Up to date ☒ N/A

☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☒ N/A

☐ Other permits: _____ ☐ Readily available ☐ Up to date ☒ N/A

Remarks: The Site's groundwater extraction and treatment system does not operate under any permits. Treatment system effluent must meet discharge limits established in the Site's 2019 O&M Plan.

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air ☐ Readily available ☐ Up to date ☒ N/A

☒ Water (effluent) ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Effluent from the groundwater treatment system is sampled routinely; results are submitted to EPA as required.

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: The state's O&M contractor Environmental Alliance visits the Site once a week. The groundwater treatment system building remains locked at all times when O&M personnel are not on-site. Access to the Saunders property is also secured by a tall fence and locking gates.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☒ Contractor for state

☐ PRP in-house ☐ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: O&M cost information is not available.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Site fences appeared to be in good condition. Gates remain secured with locks when Site businesses are not in operation.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☒ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☒ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: VDEQ and EPA

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☒ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: The ROD required ICs to restrict access to contaminated groundwater beneath the Site and to prevent off-site migration of contaminated groundwater. Specifically, the ROD called for deed restrictions on-site to prohibit groundwater use and restrictions of off-site groundwater extraction. A 2004 Title Notice meets the groundwater institutional control requirements for the Saunders Site property. EPA developed an alternative, layered approach for the adjacent property that achieves the same protection as official groundwater ICs. The residence is connected to the public water supply, so no one is using the groundwater for potable purposes. EPA previously built the adjacent property a small water treatment plant so they could treat and use surface water from Godwin's Millpond to the irrigate nursery plants. The Suffolk Department of Health has also placed a notice in its files to notify EPA if anyone applies for a

permit to construct a water well on the adjacent property. Additionally, the Suffolk Department of Health has placed a notice in its files to notify EPA if anyone applies for a permit on the properties located between the adjacent commercial property and Saunders property, along Godwin Boulevard

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident
   Remarks: No vandalism or trespassing has taken place on-site since the previous FYR.

2. **Land Use Changes On Site** ☒ N/A
   Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A
   Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A
   Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**
   ☒ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A
   Remarks:

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**
   ☒ Good condition ☐ Needs maintenance
   Remarks: _____

3. **Spare Parts and Equipment**
   ☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)
   ☒ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☒ Filters: Bag filters and carbon filters
   ☒ Additive (e.g., chelation agent, flocculent): A caustic solution is used to raise pH.
   ☐ Others: _____

☒ Good condition ☐ Needs maintenance

☒ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☒ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☒ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: Not all monitoring wells are locked. However, they are located on closely monitored properties that are in active use. The likelihood of someone coming on site and tampering with the unlocked wells is low.

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☐ Is of acceptable quality

2. **Monitoring Data Suggests:**

☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS	
A.	**Implementation of the Remedy**
	Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). The Site remedy, as established by the ROD and ROD Amendment, included extraction and treatment of contaminated groundwater, groundwater use restrictions, excavation and off-site treatment and disposal of contaminated soil and sediment, and long-term monitoring. Following excavation, soil cleanup areas were backfilled and covered with gravel. The municipal water supply is the source of potable water for the Site and properties. Institutional controls prohibit use of any groundwater at the Saunders property and prevent installation of new water wells on the adjacent property. Recent sampling discovered dioxin in surface soil at Site areas that were not addressed during the original cleanup. EPA issued an ESD to address dioxin at the Site. Groundwater and surface water monitoring data indicate that the Site's extraction system is effectively preventing off-site migration of contaminated groundwater. The remedy has not succeeded in reducing groundwater contaminant concentrations or reaching groundwater cleanup levels. The lack of an overall decrease in COC concentrations over time, and the locations of the persistently high COC concentrations near the former source areas, may indicate the presence of residual source area contamination.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. O&M seems to be adequate.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. This FYR and the Optimization Review Report identified several issues related to the performance of the original Site remedy. The optimization review team agreed that a revised remedial strategy that focuses on contaminant mass removal and aquifer restoration is needed.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. No opportunities for optimization were noted or identified during the FYR Site inspection.

APPENDIX H – SITE INSPECTION PHOTOS

Gate and fence at the main Site entrance

The groundwater treatment building

Blending and settling tanks in the treatment system building; extracted groundwater enters the system through the four lines shown on the left side of the above photo

System filtration units (blue bag filters and white carbon filters) on the right side of the above photo

Recovery well 5 (RW-5)

RW-4 is the farthest downgradient recovery well

Well MW-8D


Unnamed intermittent stream that flows along the western side of the Site, toward Godwin's Millpond

Godwin's Millpond (north and downgradient of the Site)

Greenhouse operations at the adjacent commerical property

View inside one of the greenhouses at the adjacent commercial property

Farthest upgradient surface water sampling location in the intermittent stream

Two inactive monitoring wells located north of the Site

Former location of the Site's wastewater pond

The former wood-treating process area

RVs parked at the former conical burn pit area

Office for the RV storage business that operates on-site

RVs parked on-site

Saunders Supply Company's lumber storage yard on-site

Wood storage at the Site

Treated effluent from the Site's groundwater treatment plant discharges to the local sewer system at this approximate location along Godwin Boulevard

Gate and fence at the rear entrance to the Saunders Site property

APPENDIX I – SCREENING-LEVEL RISK REVIEW

Soil Cleanup Goal Screening-Level Risk Assessment

The Site's soil cleanup goal for PCP was based on direct contact risk. To evaluate whether the PCP risk-based soil cleanup goal remains valid, this FYR compared it to EPA's current screening level for soil at commercial/industrial and residential areas. As shown in Tables I-1 and I-2, the soil cleanup goal remains valid, under both commercial/industrial and residential land use scenarios, because it corresponds to risk below or within EPA's carcinogenic risk range of 1 x 10^{-6} to 1 x 10^{-4} and below the target noncancer HQ of 1.

Table I-1: Screening-Level Soil Risk Evaluation – Commercial/Industrial

Soil COC	ROD Cleanup Goal (mg/kg)	Commercial/Industrial Worker RSL (mg/kg)[a]		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
PCP	1.46	4.0	2,800	3.7 X 10^{-7}	0.0005

Notes:
a. May 2019 EPA RSLs were used for this screening and are available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (accessed 5/28/2019).
b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk: cancer risk = (cleanup goal ÷ cancer-based RSL) × 10^{-6}.
c. The noncancer HQs were calculated using the following equation: HQ = cleanup goal ÷ noncancer-based RSL.

Table I-2: Screening-Level Soil Risk Evaluation – Residential

Soil COC	ROD Cleanup Goal (mg/kg)	Residential RSL (mg/kg)[a]		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
PCP	1.46	1.0	250	1.5 X 10^{-6}	0.006

Notes:
a. May 2019 EPA RSLs were used for this screening and are available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (accessed 5/28/2019).
b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk: cancer risk = (cleanup goal ÷ cancer-based RSL) × 10^{-6}.
c. The noncancer HQs were calculated using the following equation: HQ = cleanup goal ÷ noncancer-based RSL.

While the RI identified unacceptable risks associated with arsenic in Site soil, the ROD did not establish a cleanup goal for the constituent. The persistently high concentrations of arsenic in Site groundwater near the former source areas indicates that the original soil remedy may not have adequately addressed the constituent. Post-cleanup soil sampling data are not available to confirm residual arsenic concentrations in soil, following cleanup. In order to assess potential risk to human health posed by arsenic in source area surface soil, a screening-level risk assessment was performed by comparing the highest detected arsenic concentration found in surface soil during the RI to current RSLs. The highest detected arsenic concentration found in surface soil during the RI was 266 mg/kg, near the former wood treating building. Using current RSLs, under a residential land use scenario, the maximum arsenic concentration corresponds to risk above EPA's carcinogenic risk range of 1 x 10^{-6} to 1 x 10^{-4} and above the target noncancer HQ of 1 (Table I-3). Under an industrial land use scenario, the concentration corresponds to risk below EPA's carcinogenic risk range of 1 x 10^{-6} to 1 x 10^{-4} and below the target noncancer HQ of 1. The location of the maximum RI arsenic detection in surface soil was on the Saunders Site property, which is in industrial use; therefore, while the residual arsenic in source area subsurface soil may be acting as a continued source of groundwater contamination, the constituent is unlikely to pose unacceptable risks to Site workers. The screening-level risk assessment for arsenic is shown in Table I-3.

Table I-3: Screening-Level Soil Risk Evaluation: Arsenic

Soil COC	RI Maximum Detected Concentration (mg/kg)	RSL (mg/kg)[a]			Cancer Risk[b]	Noncancer HQ[c]
		Exposure Scenario	1 x 10^{-6} Risk	HQ=1.0		
Arsenic	266	Commercial/Industrial Worker	3.0	480	8.9 X 10^{-5}	0.6
		Residential	0.68	35	**3.9 X 10^{-4}**	**7.6**

Notes:

a. May 2019 EPA RSLs were used for this screening and are available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (accessed 5/28/2019).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk: cancer risk = (maximum detection ÷ cancer-based RSL) × 10^{-6}.

c. The noncancer HQs were calculated using the following equation: HQ = maximum detection ÷ noncancer-based RSL.

Bold values exceed EPA's acceptable risk range or noncancer HQ of 1.