FIFTH FIVE-YEAR REVIEW REPORT FOR C&R BATTERY CO., INC. SUPERFUND SITE CHESTERFIELD COUNTY, VA

SEPTEMBER 2018

Prepared by

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SEP 6 2018

Date

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LIST OF ABBREVIATIONS AND ACRONYMS

AET	Apparent Effects Threshold
ARAR	Applicable or Relevant and Appropriate Requirement
BG	Background
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
HQ	Hazard Quotient
IC	Institutional Control
MCL	Maximum Contaminant Level
µg/dL	Micrograms per Deciliter
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MW	Monitoring Well
NA	Not Applicable
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PbB	Blood Lead Level
PCOR	Preliminary Close-Out Report
PEC	Probable Effects Concentration
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
UAO	Unilateral Administrative Order
UU/UE	Unlimited Use and Unrestricted Exposure
VADEQ	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 (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the Fifth FYR for the C&R Battery Co., Inc. Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous 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), which is addressed in this FYR. OU1 addresses contaminated soils, sediments and surface water. Groundwater was also evaluated under OU1 and was determined not to require remedial action.

EPA remedial project manager Debra Rossi (RPM) led the FYR. Participants included EPA community involvement coordinator Darriel Swatts, Angela McGarvey from the Virginia Department of Environmental Quality (VADEQ), potentially responsible party (PRP) representative Randy Moore from Verizon, and Amanda Goyne and Brice Robertson from Skeo (EPA FYR support contractor). The PRP was notified of the initiation of the FYR. The review began on December 4, 2017.

Site Background

The 11-acre Site is in Chesterfield County, about six miles southeast of Richmond, Virginia (Figure C-1). From 1973 to 1985, the C&R Battery Company (C&R Battery) operated a battery breaker on a portion of the Site to separate and recover lead from discarded automobile and truck batteries. During operations, C&R Battery drained battery acid into on-site ponds and lagoons; battery casings were shredded and stockpiled on site. These actions contaminated site soils, sediments and surface water.

Much of the Site is currently not in use. A heating and cooling company (Capitol Oil) operates on the southeast part of the Site. An ice distributing company (Valley Ice) uses a small, central part of the Site to store trucks (Valley Ice area). Current site features include various paved areas, Capitol Oil's office building and propane tanks, the Valley Ice area, and a fenced, unused lot overgrown with vegetation. The Site is in a primarily commercial and industrial area. The Site is bounded to the north by the James River, to the east and west by industrial businesses, and to the south by Bellwood Road, and commercial and industrial businesses.

Lithology under the Site consists of a surficial clay and silt layer ranging from 20 to 60 feet in thickness. Below this is an extensive sand and gravel deposit. Groundwater is about 41 to 46 feet below ground surface. Groundwater flow direction within the sand and gravel aquifer is northwest. The closest surface water body is the James River, located about 650 feet north of the Site. The Site is within the drainage basin of the James River, which is part of the Great Chesapeake system. A drainage ditch runs through the east-central part of the Site and flows into the James River.

Appendix A lists documents reviewed during this FYR. Appendix B provides a chronology of site events.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: C&R Battery Co., Inc.		
EPA ID: VAD049957913		
Region: 3	**State:** VA	**City/County:** Richmond / Chesterfield
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the Site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Debra Rossi with additional support provided by Skeo		
Author affiliation: EPA Region 3		
Review period: 12/4/2017 - 9/30/2018		
Date of site inspection: 12/12/2017		
Type of review: Statutory		
Review number: 5		
Triggering action date: 9/30/2013		
Due date *(five years after triggering action date)*: 9/30/2018		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In the late 1970s, the Virginia State Water Control Board detected elevated levels of lead in site soil, surface water and groundwater. In 1983, the Virginia Occupational Safety and Health Administration (OSHA) inspected the C&R Battery facility during operation. Air monitoring found lead concentrations well above the OSHA standard and employees had elevated blood lead levels. Previous investigations had found elevated lead levels and low pH in site soils and surface water near the Site. EPA placed the Site on the National Priorities List (NPL) in July 1987.

EPA conducted the Site's remedial investigation/feasibility study (RI/FS) from August 1988 to January 1990. The RI/FS found surface soils contaminated with lead, antimony, arsenic, cadmium, nickel, silver and zinc, with the greatest concentrations of contaminants in the south-central portion of the Site. Lead was the contaminant with the highest concentrations in surface soils. The RI/FS indicated that subsurface soils were contaminated with lead in some areas, generally also in the south-central part of the Site. Significant lead contamination was generally restricted to the upper 8 feet of soil, although some borings showed elevated lead concentrations to a depth of 15 feet or more. Sampling indicated site groundwater was contaminated with iron, manganese, cadmium and zinc.

No inorganics were detected in groundwater above National Primary Drinking Water Standards, but some inorganics were above National Secondary Drinking Water Standards and Virginia groundwater standards. Surface water sampling indicated that intermittent surface water in the drainage ditch was contaminated with site-related metals, which exceeded acute and chronic toxicity values. The RI indicated that sediment contamination was localized in the drainage ditch.

As part of the RI/FS, EPA completed human health and ecological risk assessments. The human health risk assessment found three primary pathways of potential concern: inhalation of dust from surface soils, dermal contact with or ingestion of contaminated soil, and leaching of contaminants from soils into groundwater and subsequent ingestion of contaminated groundwater. The ecological risk assessment found very little vegetation on site and concluded that bioaccumulation was not a viable pathway because lead does not bioaccumulate in the edible portions of plants. Aquatic life was not observed in the drainage ditch, but the drainage ditch is a potential pathway for transport of soluble metals to the James River. Bioassay data from sediment elutriate tests indicated toxic effects on the organisms tested in the James River.

Response Actions

In response to potential public health concerns, EPA conducted a removal action at the Site in the summer of 1986. Actions included removing acidic liquid from on-site lagoons, raising the liquid's pH, and discharging the neutralized liquid into ditches on site; removing lagoon sludge, blending it with hydrated lime and returning sludge to the lagoon; mixing lime into the upper 2 feet of site soils; consolidating shredded battery casings, soil and debris found east of the drainage ditch into debris piles on site; installing riprap channels and dams and grading the drainage ditch; and installing a fence inside the tree line.

EPA issued the Site's Record of Decision (ROD) in March 1990. The remedial action objectives (RAOs) for soil and sediment at the Site are to:

- Prevent exposure to soil with lead concentrations greater than 1,000 milligrams per kilogram (mg/kg) or concentrations of the other contaminants of concern (COCs) above their respective action levels.
- Prevent migration of COCs from soil to groundwater that would cause lead concentrations in groundwater to exceed the 0.05 milligrams per liter (mg/L) maximum contaminant level (MCL)[1] or concentrations of the other COCs in groundwater to exceed their respective MCLs.
- Prevent exposure of ecological receptors to drainage ditch sediments containing lead at concentrations that exceed 450 mg/kg or the other COCs at concentrations that exceed their respective action levels.

The remedy selected in the 1990 ROD included:

- Clean closure of the former acid pond according to Resource Conservation and Recovery Act (RCRA) closure requirements, including excavation of soil containing lead above the 220 mg/kg background concentration.
- Excavation of surface and subsurface soil containing lead above the 1,000 mg/kg action level beyond the perimeter of the former acid pond.
- Excavation of debris piles.
- Excavation of drainage ditch sediments containing lead above the 450 mg/kg action level.
- Stabilization of the excavated soil, sediment and debris using a cement/pozzolan-based or other similar stabilization process that provides equivalent protection.
- Disposal of the stabilized material in an approved industrial or sanitary landfill.
- Backfilling of all excavated areas with clean soil.
- Revegetation of the Site following placement of a layer of topsoil (approximately 6 inches) above all backfilled areas and areas with lead levels exceeding 220 mg/kg (background).
- Removal, treatment and disposal of on-site nickel/cadmium batteries in an approved RCRA facility.

[1] The federal MCL for lead in drinking water is currently 0.015 mg/L.

- Environmental monitoring during remedy implementation to ensure protection of the environment, particularly potential receptors in the James River.
- Removal and off-site treatment of any contaminated surface water in the drainage ditch.
- Groundwater monitoring at least until completion of the first FYR required under Section 121(c) of CERCLA, 42 U.S.C. Section 9621 (c).
- Appropriate site use restrictions for future use scenarios to ensure protection of public health and the environment.

Table 1 presents the remedial action levels for contaminated site media established in the 1990 ROD.

Table 1: Soil and Sediment Remedial Action Levels

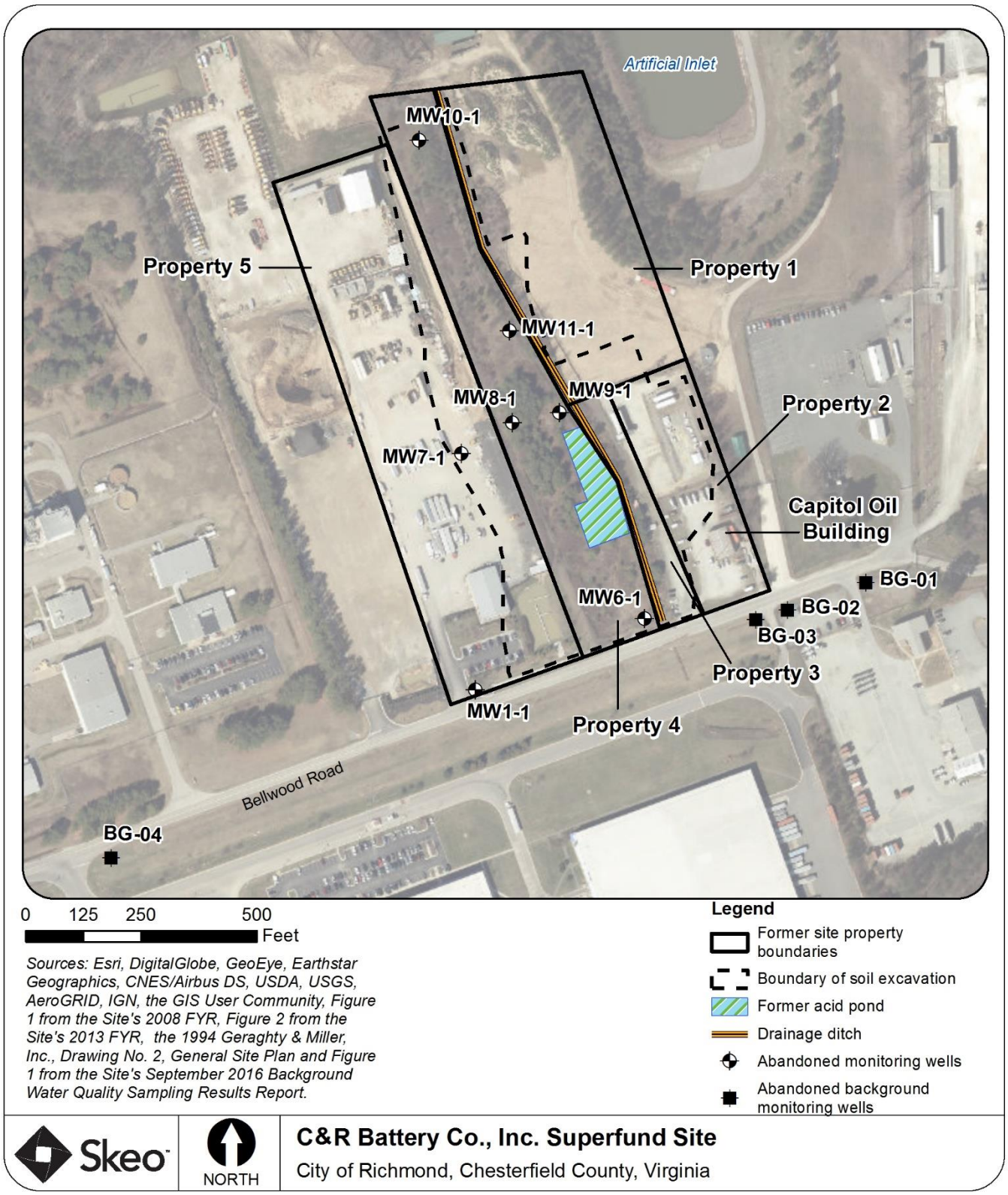
Contaminant of Concern (COC)	Surface Soil (mg/kg)	Sediment (mg/kg)
Antimony	77.4[a]	NA
Arsenic	10[a]	57
Cadmium	84[a]	5
Lead	1,000	450
Nickel	600[a]	NA
Notes: [a] Based on a 1 x 10^{-6} cancer risk level. NA = not applicable (levels already within acceptable risk range)		

Status of Implementation

The U.S. Army Corps of Engineers (USACE), on behalf of EPA, completed the remedial design for the Site in 1992. A field investigation and treatability study completed by Woodward-Clyde in 1991 on behalf of USACE guided the remedial design. Based on its field investigation, Woodward-Clyde concluded that lead was present in soil at concentrations exceeding the 1000 mg/kg action level primarily within two to four feet of fill material overlying the natural alluvium at the Site, and that the alluvium presented a barrier to the downward migration of lead into the natural soil and groundwater. Following completion of the remedial design, EPA issued a Unilateral Administrative Order (UAO) to PRPs in March 1992 to implement the selected remedial action. UAO Respondent Chesapeake and Potomac Telephone of Virginia, Inc. (C&P Telephone)[2] submitted a final remedial action work plan for EPA approval in December 1992 and conducted on-site remedial action activities from November 1992 through September 1993. C&P Telephone implemented the remedy generally in accordance with the remedial design and the remedial action work plan. However, with EPA approval, soil with lead concentrations exceeding the action level was left in place beneath and immediately adjacent to structures, including an office building and tank farm, on the portion of the Site occupied by Capitol Oil Company. At all other areas of the Site, lead-contaminated soil was excavated to a maximum depth of 5 feet. The Site achieved construction completion when EPA signed the Site's Preliminary Close-Out Report (PCOR) in September 1993. The PRP performed groundwater monitoring at the Site from 1993 to 2016. Site monitoring wells were decommissioned in 2017 with EPA approval. Site use restrictions (institutional controls) are not yet in place at the Site; EPA and VADEQ are working to finalize the Site use restrictions in coordination with the Site property owners. The Institutional Control Review section of this FYR Report provides details. Figure 1 shows relevant site features.

[2] C&P was succeeded by Verizon, the current PRP.

Figure 1: 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.

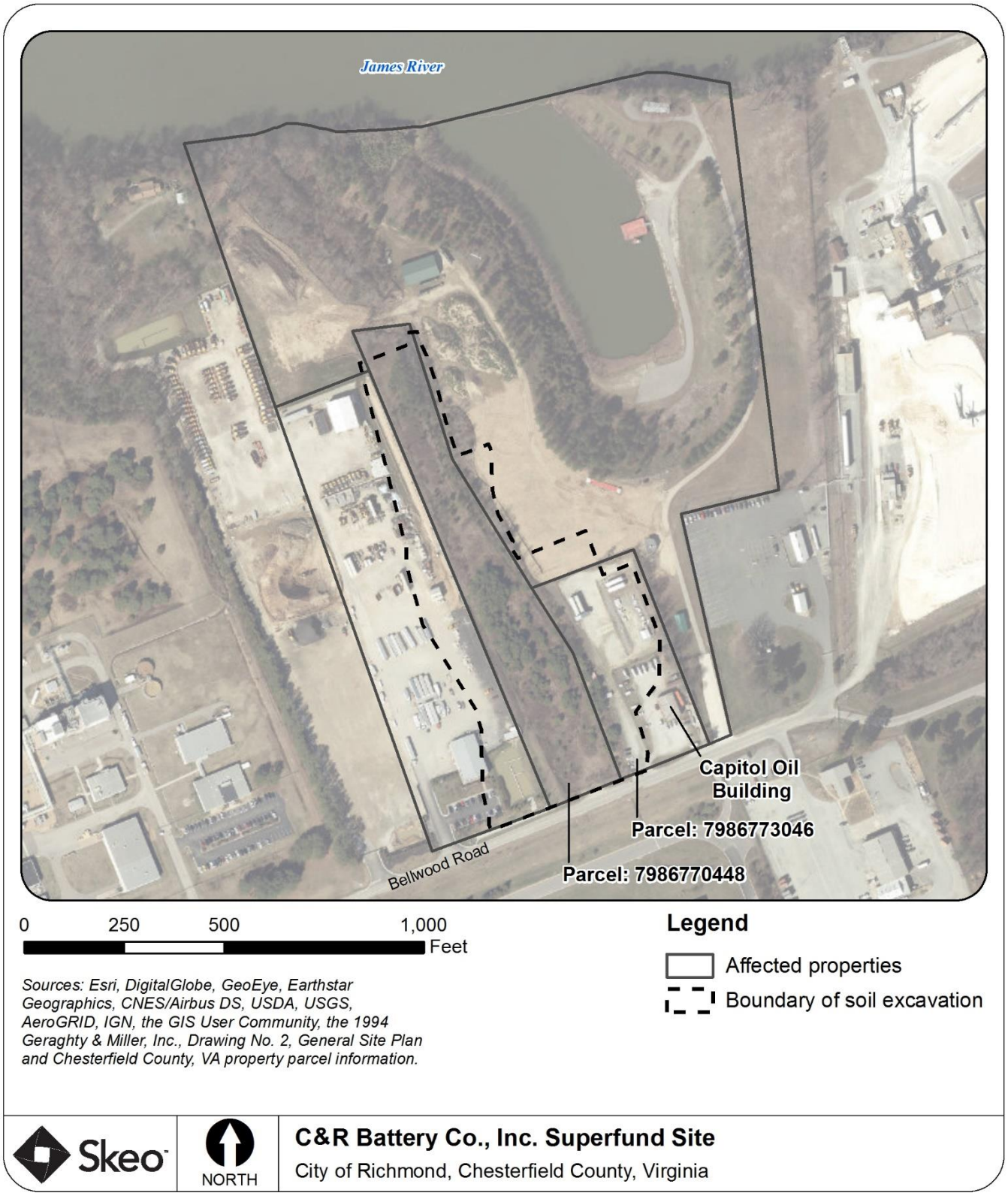
Institutional Control (IC) Review

The 1990 ROD called for site use restrictions to ensure protection of public health and the environment. Site use restrictions have not been implemented at the Site as of this FYR. EPA and VADEQ are negotiating with property owners to implement restrictions that would limit future site use to commercial/industrial uses, prevent potential exposure of on-site workers and ecological receptors to subsurface soil with lead levels that could pose a threat to human health or the environment, and ensure that any soil excavated at the Site is characterized and managed in accordance with state and federal law. Currently, all site properties are in commercial/industrial use. Table 2 summarizes planned institutional controls at the Site. Figure 2 shows the two parcels that EPA and VADEQ are evaluating for institutional controls. Since the signing of the ROD in 1990, the parcel boundaries for some affected site properties have changed. These updated parcel boundaries are reflected in Figure 2.

Table 2: Summary of Planned 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 Objectives	Title of IC Instrument Planned and Date
Soils	Yes	Yes	To be determined (see Question B summary for details)	Ensure protection of human health and the environment. Restrict future site uses to commercial/ industrial uses and restrict excavation.	Environmental Covenant (planned)

Figure 2: Institutional Controls 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)

There are currently no O&M activities at the Site. In July 2017, the PRP plugged and abandoned 10 groundwater monitoring wells. These included six on-site groundwater monitoring wells (MW 6-1, MW 7-1, MW 8-1, MW 9-1, MW 10-1 and MW 11-1) and four background monitoring wells near the Site (BG-01, BG-02, BG-03, BG-04). Figure 1 shows the locations of these wells. MW 1-1 was previously plugged and abandoned.

III. PROGRESS SINCE THE PREVIOUS REVIEW

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

Table 3: Protectiveness Determinations/Statements from the 2013 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	The assessment of this five-year review found the remedy is protective in the short term because, as a result of the cleanup, no one is currently exposed to contamination that poses or could pose a risk. However, in the long term the remedy is not protective because (1) no mechanism exists to prevent future exposure to acidic groundwater; and (2) the site use restrictions called for in the ROD to ensure the protection of human health and the environment have not been implemented. Site use restrictions will be implemented to keep groundwater at the Site from being used for drinking water. A groundwater remedy may be needed address the persistent acidic (low pH) groundwater found in several monitoring wells.

Table 4: Status of Recommendations from the 2013 FYR Report

OU #	Issue	Recommendation	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Site use restrictions have not been implemented.	Site use restrictions will be implemented to prevent exposure to groundwater.	Ongoing	Site use restrictions have not yet been implemented. Institutional controls are needed to prevent exposure to contaminated soil as explained in Table 2. Groundwater use restrictions are not required as explained in Section IV of this FYR Report	Not Applicable
1	Acidic (low pH) groundwater is still present in several monitoring wells.	EPA will review Verizon's background groundwater quality data and determine if further study is warranted.	Completed	Verizon installed four new background monitoring wells and collected additional groundwater samples for pH measurements at background and on-site monitoring locations. EPA found no significant difference in groundwater pH between the background and on-site monitoring locations. EPA approved discontinuation of the groundwater monitoring program.	4/26/2017

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was posted in the Chesterfield Times Dispatch newspaper on July 4, 2018 (Appendix D). It stated that the FYR was underway and invited the public to submit any comments to EPA. The results of the review and the report will be made available at the Site's information repository, Chesterfield County Public Library – Central Library, located at 9501 Lori Road in Chesterfield, Virginia – and online at: https://www.epa.gov/superfund/search-superfund-five-year-reviews.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** Those interviewed included state project manager Angela McGarvey of VADEQ, one of the current site property owners, the Environmental Manager for Chesterfield County, and nearby residents. The interviews are summarized below. Appendix E contains completed interview forms.

Ms. McGarvey commented that she believes that the remedy was successfully implemented and the only outstanding requirement is to implement institutional controls. She further commented that the Site is ready for reuse and future efforts should be made to speed up the closure process. The site property owners of parcel 7986773046 have not had any problems with unusual or unexpected activities at the Site. They noted that they lease 1.5 acres of their property to Valley Ice for storing trucks. Mr. Howard commented that he is not aware of any changes in local laws or projected land uses that would affect the Site. Most residents were not aware of the former environmental issues and cleanup activities at the Site and would like to be kept better informed by EPA. See Appendix E for additional responses.

Data Review

Groundwater

The 2013 FYR Report recommended the development of an appropriate background data set to assess whether the low pH of site groundwater was a result of natural conditions or related to past site activities. For previous evaluations, Verizon used pH data for groundwater samples collected from Defense Supply Center Richmond (DSCR) monitoring wells as a background data set and found that pH levels were similar in groundwater samples collected from DSCR wells and site monitoring wells. However, EPA had concerns about whether the groundwater samples collected from the DSCR wells were representative of background conditions. In August 2015, in accordance with an EPA approved work plan, Verizon constructed four new monitoring wells upgradient of the Site along Bellwood Road to obtain background groundwater quality data. Verizon monitored groundwater pH at the new background wells and the six on-site groundwater monitoring wells in September 2015 and February 2016.

In April 2016, EPA performed a statistical evaluation of the groundwater pH data for three groups of monitoring wells: DSCR wells, newly installed site background wells and site monitoring wells. Based on box plots comparing pH levels among the groups and a one-way analysis of variance, EPA concluded that there was no significant difference between background pH conditions and pH conditions in groundwater at the Site. Verizon conducted additional pH monitoring through September 2016 which corroborated EPA's conclusion. Based on these findings, EPA approved discontinuation of the groundwater monitoring program in April 2017. Figure 1 shows the location of Site monitoring wells and background monitoring wells.

Site Inspection

The site inspection took place on December 12, 2017. In attendance were EPA RPM Debra Rossi, Angela McGarvey from VADEQ, Randy Moore from Verizon, the site property owners of parcel 7986770448, and Amanda Goyne and Brice Robertson from Skeo (EPA FYR support contractor). The purpose of the inspection was to assess the protectiveness of the remedy. The site inspection checklist and photographs are included in Appendix F and Appendix G, respectively.

Participants met at the entrance gate to the fenced, unused part of the Site (parcel 7986770448). The fencing was in good condition and the entrance was locked. Participants walked around the unused part of the Site and noticed 10 empty drums. Mr. Moore said he would have them removed soon. The unused portion of the Site was overgrown with vegetation. Site property owners of parcel 7986770448 expressed interest in reusing the area. Next, participants toured parcel 7986773046. The property is still being used to house and store the Capitol Oil office and associated business operations. The paved area on the western portion of the property was recently leased and is being used by Valley Ice to store trucks. The recently graded and paved area north of parcel 7986773046 is currently not in use. Ms. Rossi stated that there still may be contamination under parcel 7986773046 and other areas of the Site where excavation took place, as soil was excavated to a maximum depth of 5 feet.

Participants discussed the need to get institutional controls in place to limit future site uses to commercial/ industrial and to restrict excavation activities. Site property owners present during the site visit said that they are willing to help put these institutional controls in place. The Site's designated site repository, the Central Library branch of the Chesterfield County Public Library system, was closed during the FYR period and reopened on July 30, 2018.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

Yes, the site inspection and review of documents, applicable or relevant and appropriate requirements (ARARs) and risk assumptions indicate that the Site's remedy is functioning as intended by site decision documents. The remedial action has eliminated exposure of human and ecological receptors to contaminated soil and sediment and prevented migration of contaminants from soil into groundwater, satisfying the RAOs specified in the ROD. The Site achieved construction completion status in September 1993. Institutional controls, when in place, will ensure the long-term protectiveness of the remedy.

The 2013 FYR Report recommended background pH monitoring to determine if acidic conditions in site groundwater is a result of natural conditions or site activities. Evaluation of these data found no significant differences in pH levels between the background and site groundwater data sets. In July 2017, Verizon plugged and abandoned the six on-site groundwater monitoring wells and the four off-site background monitoring wells. There are no prescribed O&M activities at the Site. The 1990 ROD called for site use restrictions to ensure protection of human health and the environment. EPA and VADEQ are currently in discussions with site property owners to implement institutional controls to limit future site uses to commercial/industrial and restrict excavation of subsurface soils without appropriate oversight and precautions.

During this FYR, EPA evaluated a discrepancy between soil sampling results in the RI Report and ROD, which show lead levels exceeding the 1,000 mg/kg action level at 6 to 8 feet below ground surface prior to the remedial action, and the sampling results in the pre-design investigation, which concluded that elevated lead levels were limited to the upper 2 to 4 feet of soil and fill material overlying the natural alluvial soils. As documented in the 1994 Remedial Action Report, the maximum excavation depth during remedial action was about 5 feet. EPA's evaluation found that the record is inconclusive in explaining this discrepancy, although the weight of the evidence suggests a high probability of residual lead concentrations above the 1,000 mg/kg action level in subsurface soils in the vicinity of the former acid pond area and in several other areas where excavations took place. The memorandum noted that additional sampling might be considered to confirm the presence or absence of remaining soil contamination above the 1,000 mg/kg action level (EPA, 2018). Restricting the disturbance of subsurface soil (soil deeper than 6 to 12 inches below the existing grade) would eliminate the potential for exposure to residual lead concentrations.

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:

The RAOs, cleanup levels and exposure assumptions remain valid, and while some of the toxicity data and EPA current guidance concerning lead contamination have changed, the changes do not affect the protectiveness of the remedy. The RAOs identified in the 1990 ROD are still valid and there are no new site conditions that could impact their validity. The remedial action level of 1,000 mg/kg for lead-contaminated surface soils was in accordance with EPA's guidance at the time of remedy selection. EPA's current guidance for soil lead levels at industrial/commercial sites is 800 mg/kg, which is more stringent than the Site's 1,000 mg/kg action level. However, EPA's most recent Adult Lead Methodology (June 2017, Table H-1) concluded that the projected soil concentration that results in no more than a 5 percent probability that fetal blood-lead exceeds 5 micrograms per deciliter (µg/dL) is 1,050 mg/kg. Based on this, EPA has concluded that the 1,000 mg/kg action level is acceptable for the Site for commercial/industrial uses.

Remedial actions also included placement of topsoil (approximately 6 inches) followed by revegetation over areas with lead levels between 220 mg/kg (background) and 1,000 mg/kg. Action levels for the other contaminants in surface soils were developed using a 1×10^{-6} risk scenario. As part of this FYR, EPA completed a composite worker (industrial/commercial) regional screening level (RSL) evaluation for these other action levels. The evaluation demonstrated that all surface soil action levels remain valid for commercial/industrial use (Table H-2). Appendix H provides a detailed toxicity review. In addition, the ROD action levels for sediment established for the drainage ditch were reviewed and compared against EPA's probable effect concentrations (PECs) for freshwater sediment and contamination concentrations left in place following remediation. The review indicated that the ROD action levels for sediment remain valid (Appendix H).

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
OU(s) without Issues/Recommendations Identified in the FYR:
None.

Issues and Recommendations Identified in the FYR:

OU(s):	Issue Category: Institutional Controls
	Issue: The RI/ROD and post-ROD documentation differ in characterization of the vertical extent of lead-contaminated soil. There are no institutional controls in place to restrict land use, including future excavation at the Site.

	Recommendation: Implement institutional controls that limit land use to industrial/commercial uses. Require site owners to obtain EPA approval before excavating or disturbing soils in affected areas of the Site and properly characterize any excavated soil.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State/PRP/property owner	EPA/State	3/29/2019

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy currently protects human health and the environment because the cleanup excavated and disposed of contaminated surface soils and sediments above action levels and there are no complete exposure pathways to remaining subsurface contaminated soils. For the remedy to be protective in the long term, implement institutional controls that limit land use to commercial/industrial uses and require site owners take appropriate precautions for excavation and handling of excavated soils in affected Site areas.

VIII. NEXT REVIEW

The next FYR Report for the C&R Battery Co., Inc. Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Background Water Quality Sampling Results, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by Arcadis for EPA Region 3. November 15, 2016.

Evaluation of the pH Background and Monitoring Well Data, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by Lockheed Martin for EPA Region 3. April 13, 2016.

Final Feasibility Study Report, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by NUS Corporation for EPA Region 3. January 1990.

Final Remedial Investigation Report, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by NUS Corporation for EPA Region 3. January 1990.

Fourth Five-Year Review Report, C & R Battery Co., Inc. Superfund Site, Richmond, VA. EPA Region 3. September 30, 2013.

Memorandum for the Document Review and Assessment of Current Site Conditions, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by Battelle for EPA Region 3. April 24, 2018.

Preliminary Close-Out Report, C & R Battery Co., Inc. Superfund Site, Richmond, VA. EPA Region 3. September 1993.

Record of Decision, C & R Battery Co., Inc. Superfund Site, Richmond, VA. EPA Region 3. March 30, 1990.

Remedial Action Report, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by Geraghty & Miller for EPA Region 3. May 1994.

Remedial Action Work Plan, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by Geraghty & Miller, Inc. for C&P Telephone Company of Virginia, Inc. December 1992.

Third Five-Year Review Report, C & R Battery Co., Inc. Superfund Site, Richmond, VA. EPA Region 3. September 22, 2008.

Treatability Study and Site Characterization Report, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by Woodward-Clyde for the U.S. Department of the Army Corp of Engineers, Omaha District. September 1991.

Well Decommissioning Memo, C & R Battery Co., Inc. Superfund Site, Richmond, VA. Prepared by Arcadis for EPA Region 3. July 21, 2017.

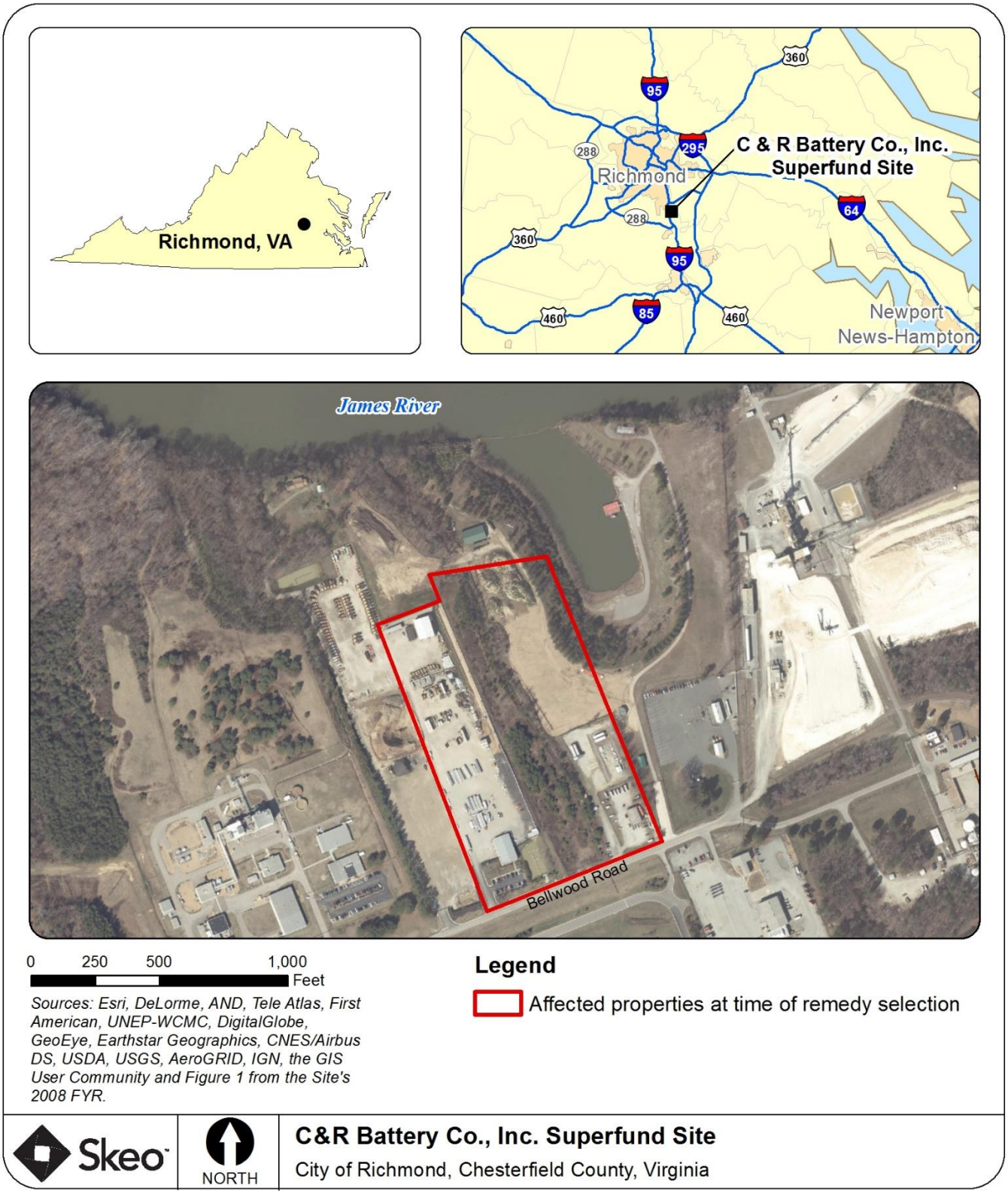
APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
C&R Battery operated a battery breaking and recycling operation on site	1973 – 1985
The Virginia State Water Control Board began monitoring the Site and detected elevated lead in site soil, surface water and groundwater	Late 1970s
Virginia OSHA inspected the Site and found elevated levels of lead in air and in employees' blood	1983
EPA conducted a removal action	Summer 1986
EPA placed the Site on the NPL	July 22, 1987
EPA began the Site's RI/FS	August 1988
EPA completed the Site's RI/FS	January 1990
EPA issued the ROD for the Site	March 30, 1990
EPA began the Site's remedial design	September 27, 1990
EPA completed the Site's remedial design and issued a UAO to the PRPs to implement the selected remedial action	March 27, 1992
C&P Telephone PRPs began the Site's selected remedial action	November 1992
C&P Telephone completed the Site's remedial action	September 23, 1993
EPA issued the Site's PCOR	September 28, 1993
EPA signed the Site's first FYR Report	July 29, 1998
EPA signed the Site's second FYR Report	September 30, 2003
EPA signed the Site's third FYR Report	September 30, 2008
EPA signed the Site's fourth FYR Report	September 30, 2013
Verizon constructed four off-site background monitoring wells	August 2015
Verizon conducted pH sampling of background and on-site monitoring wells	2015 and 2016
EPA performed statistical evaluation of pH sampling data and found no statistical difference in pH levels between background and on-site wells; EPA concurred that the groundwater monitoring program could be discontinued	April 2016
Verizon plugged and abandoned 10 groundwater monitoring wells (four background wells and six on-site monitoring wells)	July 2017

APPENDIX C – SITE MAPS

Figure C-1: Site 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.

APPENDIX D – PRESS NOTICE

Paid Advertisement Paid Advertisement

EPA REVIEWS CLEANUP

C&R Battery Superfund Site

The U.S. Environmental Agency is reviewing the cleanup that was conducted at the C&R Battery Co., Inc. Superfund Site located in Chesterfield County. EPA inspects sites regularly to ensure that cleanups conducted remain protective of public health and the environment. EPA's previous review of the site in 2013 determined that the remedy was working as designed and remained protective, and that placing restrictions on land and groundwater use would ensure protectiveness over the long term. Findings from the current review that is being conducted will be available September 2018.

For questions or to provide site-related information for the review:

Contact: Cathleen Kennedy, *Community Involvement Coordinator*
Phone: 215-814-2746
Email: kennedy.cathleen@epa.gov

To access detailed site information including the Review Report once finalized: https://www.epa.gov/superfund/crbattery

Protecting public health and the environment

APPENDIX E – INTERVIEW FORMS

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Angela McGarvey **Affiliation:** VADEQ
Subject Contact Information: Angela.mcgarvey@deq.virginia.gov, (804) 698-4084
Time: 2:00 pm **Date:** 4/12/2018
Interview Location: NA

Interview Format (circle one): In Person Phone Mail Other: Email

Interview Category: State Agency

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

   It appears that the remedy was successfully implemented and the only outstanding requirement is to implement institutional controls through a Uniform Environmental Covenant Act (UECA). The site is ready for reuse and future efforts should be made to speed up the closure process to allow the owner to reuse and manage the site institutional controls.

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

   The remedy is performing as planned. During the 2018 5-year site visit, it was clarified that soil under buildings and within an above ground storage tank farm were not removed as part of the remedy and thus will require institutional controls moving forward to closure.

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

   No. The site is in an industrial area.

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.

   During a site visits in 2015, the owner of the property asked if he could reuse the property. DEQ referred him to EPA for an official response.

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

   No.

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

   The 1990 ROD required site use restrictions to be implemented and are currently under development by EPA, DEQ, Verizon, and the owner.

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

   Part of the subject property has a "For Lease" sign.

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

   EPA should work closely with DEQ and the owner of the property in order to complete and successfully implement the UECA.

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

   Yes.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Debra Rossi **Affiliation:** EPA
Subject Name: Partial Site Property Owner **Affiliation:** Partial Site Property Owner
Subject Contact Information:
Time: **Date:** 12/12/2017
Interview Location: On site

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Site Property Owners

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

   Yes.

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

   Not applicable.

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

   Not applicable.

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

   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   Not applicable.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   Yes. The well supplies water for the bathroom. Bathroom wastewater discharges to septic tank. Diamond Springs supplies bottled drinking water.

7. Do you anticipate any changes to land use at the 1306 Bellwood Road property? For what type of use was the 1.5-acre area leased?

   Property is leased to Valley Ice/Holtzman Corp.

8. a. When were the gas tanks removed?

In the mid-1990s.

12. b. Are current tanks filled with propane?

Yes.

12. c. How was the containment structure for the gas tanks constructed?

It was made from gravel and dirt.

12. d. Was soil beneath the gas tanks removed or altered after the tanks were removed?

No.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Jeff Howard **Affiliation:** Chesterfield County General Services – Environmental Manager

Subject Contact Information:
Time: **Date:**
Interview Location:

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Local Government

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

   Yes.

2. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

   We visited the Site in 2008. Since then, we haven't been there and haven't heard any complaints. As long as there's no issues, I think the Internet is best. EPA is doing a good job on their website.

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

   No.

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

   I am not aware of any changes that would affect the Site.

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

   I am not aware of any changes in projected land use at the Site.

6. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   I do not know. In the reports, it would be good to have a list of people who were contacted during the FYR period.

7. Do you have any comments, suggestions or recommendations regarding the project?

   No.

8. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

   Yes.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Resident 1 **Affiliation:** Nearby resident
Subject Contact Information: NA
Time: **Date:**
Interview Location: Resident's home

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

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

   Yes. I don't know about the cleanup issues, but know about the site history.

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

   Everything has been handled as far as cleanup goes. I'm glad that the cleanup took place.

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

   I don't know of any.

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

   Not that I'm aware of.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   Not that I'm aware of. Flyers and email can work. Older people would want flyers or mailouts most likely.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   I do. I use it for the shower and other household needs. I buy bottled water for cooking and drinking.

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

   No, I just would like to be informed of any hazards.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Resident 2 **Affiliation:** Nearby resident
Subject Contact Information: NA
Time: **Date:**
Interview Location: Resident's home

Interview Format (circle one): In Person Phone Mail Other:

Interview Category: Residents

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

   No.

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

   I don't know anything about it, but people in this area are dying of cancer.

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

   Many people in this area have died of cancer. It could be because of the Site.

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

   I saw the fire company nearby the other day, it seemed like a response activity.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   I don't know. I've been here seven years and you're the first person I've seen. Put flyers on the doors.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   Yes. I use it for showering and other household needs. We use bottled water for drinking and cooking.

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

   I don't know anything about the Site.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Resident 3 **Affiliation:** Nearby resident
Subject Contact Information: NA
Time: **Date:**
Interview Location: Resident's home

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

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

   No.

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

   No.

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

   No.

4. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   As far as I know, they have. Door-to-door outreach would be best.

5. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   I have a private well. I use the water for everything – drinking, cooking, bathing.

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

   No.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Resident 4 **Affiliation:** Nearby resident
Subject Contact Information: NA
Time: **Date:**
Interview Location:

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

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

   No.

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

   It's fine.

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

   No.

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

   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   No. Door-to-door and flyers would be good.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   Yes. We use it for cooking and bathing.

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

   No.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Resident 5 **Affiliation:** Nearby resident
Subject Contact Information: NA
Time: **Date:**
Interview Location:

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

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

   No, I wasn't aware. I bought this house 10 years ago and nobody ever told me.

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

   I don't know exactly where it is. My friend lives in the area and he has cancer.

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

   The industry in the area may affect people in the community.

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

   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   No. EPA could list the hazards and inform the community better.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   I'm on a private well and the drinking water is a big concern for me. I use the well for everyday uses – drinking, showering, cooking.

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

   My recommendation would be to alert people of the hazards of living so close to a Superfund site.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Resident 6 **Affiliation:** Nearby resident
Subject Contact Information: NA
Time: **Date:**
Interview Location:

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

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

   I know of it, but not much about it. I know there was a battery place near here that was leaking and they came and checked our wells, but that's about it.

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

   They did it okay.

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

   Everyone has just been worried about their wells, but more concerned about the dump nearby.

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

   I don't know of anything.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   No. By mail would be best.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   Yes. We use it for everything, but we have three filters on it.

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

   No.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: C&R Battery Co., Inc. **EPA ID No.:** VAD049957913

Interviewer Name: Darriel Swatts **Affiliation:** EPA
Subject Name: Resident 7 **Affiliation:** Nearby resident
Subject Contact Information: NA
Time: **Date:**
Interview Location:

Interview Format (circle one): (In Person) Phone Mail Other:

Interview Category: Residents

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

   No.

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

   I've never heard of it before.

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

   We go down to the river and there's a lot of trash there.

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

   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   No. Door-to-door would be best.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   Yes. We use it for everything.

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

   No.

C&R Battery Co., Inc. Superfund Site Five-Year Review Interview Form

Site Name: **C&R Battery Co., Inc.** **EPA ID No.:** **VAD049957913**

Interviewer Name: **Darriel Swatts** **Affiliation:** **EPA**
Subject Name: **Resident 8** **Affiliation:** **Nearby Resident**
Subject Contact Information: **NA**
Time: **Date:**
Interview Location:

Interview Format (circle one): **In Person** **Phone** **Mail** **Other:**

Interview Category: **Residents**

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

   No.

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

   Pretty good.

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

   Positive effect, since these are cleanup actions.

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

   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   I don't think so. They could make a social media page and could also have a commercial.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   Yes, we have four wells. They are used for irrigation systems, the work barn, the guest house and are used for everything. But they are double-filtered.

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

   Keep things clean.

APPENDIX F – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: C&R Battery Co., Inc.	**Date of Inspection:** 12/12/2017
Location and Region: Richmond, VA, Region 3	**EPA ID: VAD049957913**
Agency, Office or Company Leading the Five-Year Review: EPA	**Weather/Temperature:** 40s and sunny

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 of soils and sediments above cleanup levels, stabilization and off-site disposal, removal and off-site treatment and disposal of contaminated surface water, closure of the former acid pond area, and backfilling of all excavated areas with 6 inches of top soil.

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

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

2. **O&M Staff** _____ (Name) | _____ (Title) | _____ (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 EPA
   Contact Debra Rossi (Name) | Remedial Project Manager (Title) | _____ (Date) | 215-814-3228 (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency VADEQ
   Contact Angela McGarvey (Name) | Project Manager (Title) | 04/12/2018 (Date) | 804-698-4084 (Phone No.)
   Problems/suggestions ☐ Report attached: _____

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

   Agency _____
   Contact _____ (Name) | _____ (Title) | _____ (Date) | _____ (Phone No.)

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: _____

Partial site owners.

Nearby residents.

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: _____

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: _____

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: _____

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: _____

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

Remarks: _____

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

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

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

Describe costs and reasons: _____

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

A. Fencing

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

Remarks: Site fencing appeared to be in good condition.

B. Other Access Restrictions

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

Remarks: Signage not in place for the unused, fenced portion of the Site.

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: _____

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: Institutional controls need to be put in place restricting site uses to commercial/industrial uses and restricting excavation activities without contaminant characterization.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☐ N/A

Remarks: Valley Ice has begun leasing a portion of the Site for storing trucks.

3. **Land Use Changes Off Site** ☐ N/A

Remarks: A construction machinery company began operating west of the Site.

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

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 remedy was designed to prevent exposure to contaminated soils and sediments and prevent migration of lead and other contaminants into groundwater above MCLs. The remedy is currently functioning as designed. Contaminated soil and sediments have been excavated to a depth of about 5 feet, the former acid pond area has been removed, and contaminated surface water was treated and disposed of at an off-site facility. Institutional controls have not been implemented. They are needed to restrict site uses to commercial/industrial uses and to prevent excavation activities without contaminant characterization.
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. Currently, there are no prescribed O&M activities at the Site.
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. None identified.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. None identified.

Site Inspection Participants

- Debra Rossi, EPA Region 3
- Angela McGarvey, VADEQ
- Randy Moore, Verizon
- Site owners (parcel 7986770448)
- Amanda Goyne, Skeo
- Brice Robertson, Skeo

APPENDIX G – SITE INSPECTION PHOTOS

Gated and locked entrance to fenced site property (parcel 7986770448)

Empty drums on site

View of fenced site property (parcel 7986770448), looking north

Overgrown drainage ditch area

Looking north on parcels 7986770448 and 7986773046

Parcel 7986773046 and the Capitol Oil office building, looking north

Looking south on parcel 7986773046 and the Capitol Oil office building

Tank storage area on parcel 7986773046

Area leased by Valley Ice for storing trucks

Graded area north of parcel 7986773046

Business operating on parcel 7976777951, immediately west of 7986770448

APPENDIX H – TOXICITY REVIEW

The remedial action level of 1,000 mg/kg for lead-contaminated surface soils was in accordance with EPA's guidance at the time of remedy selection. EPA's current guidance for industrial/commercial use is 800 mg/kg, which is more stringent than the Site's 1,000 mg/kg action level. However, a screening of EPA's most recent Adult Lead Methodology (Table H-1) concluded that the projected soil concentration that results in no more than a 5 percent probability that fetal blood-lead exceeds 5 µg/dL for the Site is 1,050 mg/kg. Based on this evaluation, the ROD cleanup goal remains valid.

Table H-1: Adult Lead Methodology (June 2017)[a]

Variable	Description of Variable	Units	GSDi and PbB_0 from Analysis of NHANES 2009-2014
$PbB_{fetal, 0.95}$	Target PbB in fetus (e.g., 2-8 µg/dL)	µg/dL	5
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	µg/dL	0.6
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/year	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/year	365
PRG in Soil for no more than 5% probability that fetal PbB exceeds target PbB		**mg/kg**	**1,050**

Notes:

a. Based on EPA's Update to the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters, Office of Land and Emergency Management, May 2017: https://semspub.epa.gov/work/HQ/196766.pdf.

PbB = blood lead level

µg/dL = micrograms per deciliter

The 1990 ROD selected surface soil action levels (except lead) based on risk assessment modeling using a 10^{-6} risk scenario. Table H-2 evaluates the current validity of these actions levels using 2017 EPA Composite Worker RSLs; the RSLs incorporate current toxicity values and standard default exposure factors. Composite Worker RSLs are used because the anticipated future use of the Site is industrial/commercial use.

The evaluation demonstrates that all surface soil action levels remain valid for commercial/industrial use. Concentrations are within EPA's risk management range of 1×10^{-6} to 1×10^{-4} and below EPA's benchmark of 1 for noncarcinogens.

Table H-2: Review of Surface Soil Action Levels – Human Health Direct Contact

COC	Surface Soil Action Level[a] (mg/kg)	Composite Worker RSL[b] (mg/kg)		Risk[c]	HQ[d] (Hazard Quotient)
		Cancer-Based RSL (10^{-6} Risk)	Non-Cancer RSL (HQ = 1.0)		
Antimony	77.4	--	470	NA	0.16
Arsenic	10	3	480	3.3×10^{-6}	0.02
Cadmium	84	9,300	980	9.0×10^{-9}	0.09
Nickel	600	64,000	22,000	9.4×10^{-9}	0.03

Notes:
a. Surface soil action level listed in Table 1 in the 1990 ROD.
b. EPA's composite worker RSLs, dated November 2017, available at https://semspub.epa.gov/work/HQ/197033.pdf (accessed 3/23/18).
c. Cancer risk calculated using the following equation, based on the fact that RSLs are derived based on 1×10^{-6} risk: cancer risk = (remedial goal ÷ cancer-based RSL) × 10^{-6}.
d. Noncancer HQ calculated using the following equation: HQ = (remedial goal ÷ noncancer RSL).
NA = not applicable
-- = EPA has not finalized a carcinogenic or noncarcinogenic toxicity value for this compound.

The drainage ditch on the eastern side of the Site contains water after rain events. According to the 1990 FS Report, lead and other metals were detected in ditch sediment at a pool of standing water while sediment samples collected in the James River were free of contamination. However, EPA developed sediment remedial action levels for arsenic, cadmium and lead due to the drainage ditch being a potential pathway for transport of soluble metals to the James River. In addition, results of sediment elutriate bioassays during the RI indicated toxicity that correlated to elevated levels of trace metals, particularly of lead, in the drainage ditch. According to the 1992 Remedial Design Report, remediation of drainage ditch sediments was based on lead concentrations exceeding the cleanup goal of 450 mg/kg because lead was present at concentrations orders of magnitude higher than the other COCs. Thus, remediation of lead would also remediate the other metals detected less frequently and less widespread.

The ROD established sediment action levels based on apparent effects threshold (AET) values for Puget Sound, which is an estuary and not freshwater. The AETs are given as a range and the ROD chose the most conservative value (the lower end of the range) as action levels. Since the ROD, ecological benchmarks similar to AET values but established for a freshwater system have been published. One of these values is a probable effects concentration (PEC), which is often used by EPA as a performance objective for sediment remediation. A comparison of the Site's sediment action levels and the respective PECs for each COC indicates that the PECs are slightly more stringent for arsenic, nearly the same for cadmium and more stringent for lead (Table H-3). However, the ROD action levels remain valid because remediation focused on lead and the confirmation results for sediments remaining in place ranged from 13 mg/kg to 69 mg/kg, with an average lead concentration of 48 mg/kg; these concentrations are below the ROD action level and current PEC for lead. The reduction of lead is expected to have reduced the concentrations of arsenic and cadmium.

Table H-3: Review of Sediment Action Levels – EPA Region 3 Screening Levels and Current Freshwater Sediment PECs

COC	Sediment Action Level (mg/kg)	PEC Sediment Values[a] (mg/kg) (Freshwater)
Arsenic	57	33
Cadmium	5	4.98
Lead	450	128

Notes:
a. PEC Sediment Values: https://response.restoration.noaa.gov/sites/default/files/SQuiRTs.pdf.