ORIGINAL

FOURTH FIVE-YEAR REVIEW REPORT FOR DIXIE CAVERNS COUNTY LANDFILL SUPERFUND SITE ROANOKE COUNTY, VIRGINIA

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Prepared by

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SEP 20 2017

Date

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LIST OF ABBREVIATIONS & ACRONYMS

BTAG	EPA Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FCOR	Final Close-Out Report
FYR	Five-Year Review
HQ	Hazard Quotient
HTMR	High Temperature Metals Recovery
IC	Institutional Control
IEUBK	Integrated Exposure Uptake Biokinetic
mg/kg	Milligram Per Kilogram
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RAP	Response Action Plan
RCRA	Resources Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
µg/dL	Microgram per Deciliter
UU/UE	Unlimited Use and 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 (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Dixie Caverns County Landfill 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 two operable units (OUs), both of which are addressed in this FYR. OU1 addresses the fly ash pile. OU2 addresses all other areas of the Site, including the sludge disposal area and the drum disposal area.

EPA remedial project manager (RPM) Ron Davis led the FYR site inspection. Participants included EPA Biological Technical Assistance Group (BTAG) biologist Matthew Taynor, Virginia Department of Environmental Quality (VDEQ) project manager Angela McGarvey, Tarek Moneir and David Henderson from Roanoke County, Lawrence Hoffman from operation and maintenance (O&M) contractor CHA Consulting, and Amanda Goyne and Lynette Vanderpool from EPA FYR contractor Skeo. The review began on 10/25/2016.

Site Background

The Site is located in a rural area of Roanoke County, Virginia (see Figure C-1 in Appendix C) at 6231 Twine Hollow Road. About 900 people live within 1 mile of the Site and about 4,000 people live within 3 miles. The Site lies on a relatively steep ridge between two valleys and is surrounded by heavily forested mountains.

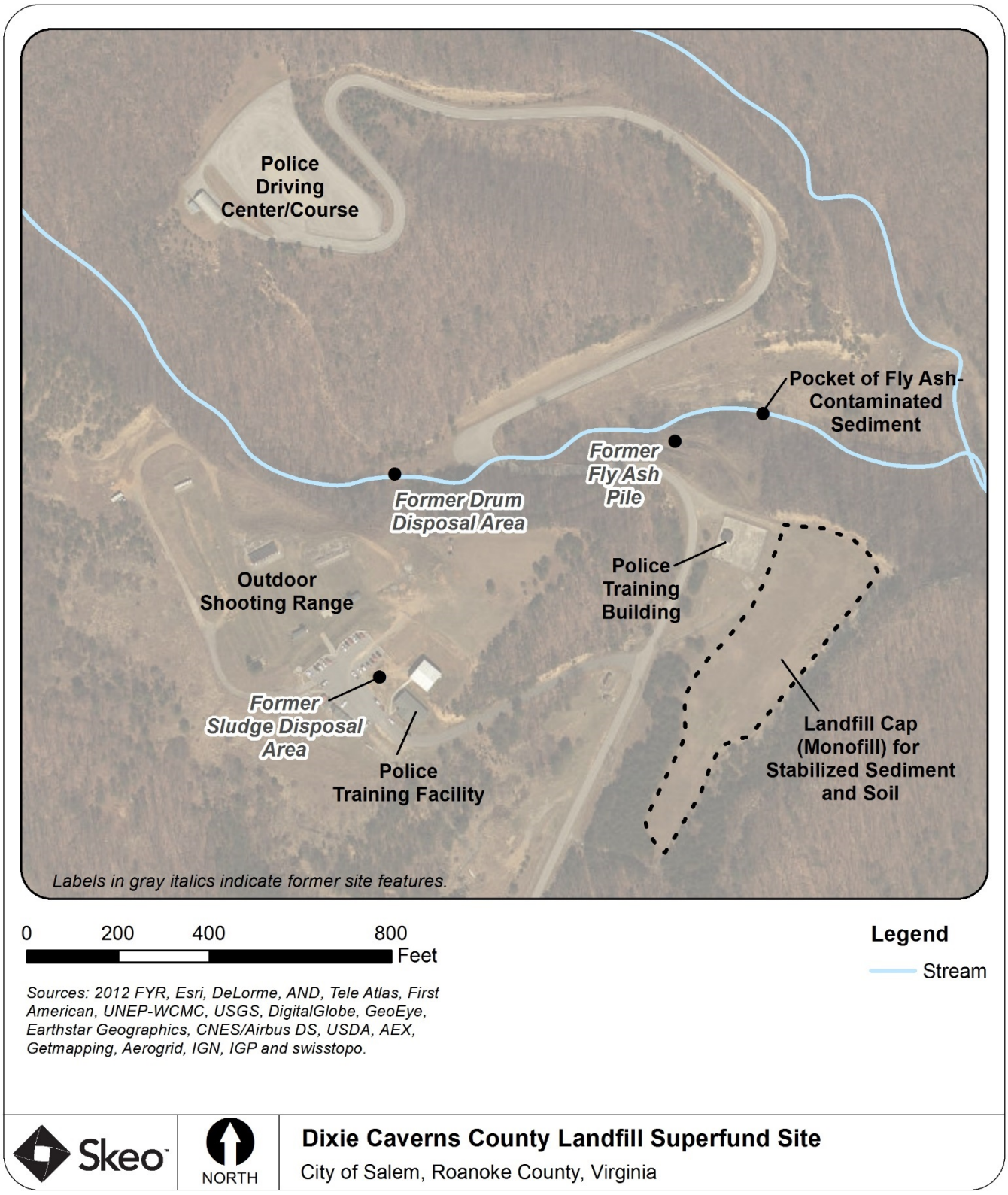
Roanoke County began disposing of municipal and industrial waste at the Site in 1965. After several unsuccessful attempts to obtain a permit for the municipal landfill, disposal ceased in 1976. The municipal landfill is now closed. The closed municipal landfill, including the toe drain located at the bottom edge of the landfill, was not part of the Superfund activities. Therefore, the closed municipal landfill was not evaluated in this FYR (see Figure C-1 in Appendix C).

Disposal of unknown quantities of industrial refuse, scrap metal, fly ash, sludge and other industrial wastes took place around the main 39-acre municipal landfill. Waste disposal outside of the municipal landfill included disposal of an unknown quantity of liquid and sludge waste in a sludge disposal area and about 300 drums of chemical waste in a drum disposal area. About 9,000 cubic yards of electric arc furnace fly ash were also dumped from the road onto a hillside in the northern portion of the Site. These former waste disposal operations contaminated sediment and soil.

The Superfund site includes several distinct areas located outside the main municipal landfill: the former sludge disposal area, the former drum disposal area, the former fly ash pile, and a capped landfill for stabilized sediment and soil that was created as part of the Superfund remedy, which is also known as the monofill (see Figure 1). Streams on the northern portion of the Site received runoff from the fly ash pile (this area is referred to as the northern discharge area). These streams discharge to the Roanoke River, located 2 miles southeast of the Site.

Roanoke County currently owns the site property. In the early 2000s, the Roanoke County Police Department constructed a training facility and training buildings, an outdoor shooting range, and a police driving course at the Site. The Site has a lock and is gated along the access road. Appendix A provides a list of references consulted as part of this FYR. Appendix B presents a chronological list of important events at the Site.

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.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Dixie Caverns County Landfill		
EPA ID: VAD980552095		
Region: 3	**State:** VA	**City/County:** Salem /Roanoke
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Ron Davis, Lisa Denmark, with additional support provided by Skeo		
Author affiliation: EPA Region 3		
Review period: 10/25/2016 – 9/21/2017		
Date of site inspection: 11/30/2016		
Type of review: Statutory		
Review number: 4		
Triggering action date: 9/21/2012		
Due date *(five years after triggering action date)*: 9/21/2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Between 1971 and 1973, Roanoke County and the Commonwealth of Virginia conducted various investigations of the waste disposal activities to determine whether the County could obtain a permit to operate the site area as a solid waste disposal facility. After several unsuccessful attempts to obtain a permit, Roanoke County ceased operation of the municipal landfill in July 1976. Following landfill closure, areas covered with tires, drums, sludge and fly ash as well as solid waste disposal areas were identified. In June 1983, EPA completed a preliminary assessment of the Site. It identified several disposal areas outside of the closed municipal landfill, including a discarded drum area, a sludge pit and a large fly ash pile, which contained elevated levels of metals.

Based on initial investigations, EPA proposed the Site for listing on the Superfund program's National Priorities List (NPL) on January 22, 1987. In January 1988 and April 1989, EPA sent special notice letters to potentially responsible parties (PRPs), offering them the opportunity to perform the remedial investigation and feasibility study (RI/FS) for the Site. When the PRPs declined to perform the work in July 1989, EPA initiated the RI/FS to

determine the full nature and extent of contamination at the Site. EPA finalized the Site's listing on the NPL on October 4, 1989.

The Site's 1991 RI/FS found evidence of fly ash migration away from a large fly ash pile. The RI/FS also identified elevated levels of metals in surface water and sediments of streams receiving runoff from the 9,000 cubic yards of fly ash dumped onto a hillside in the northern portion of the Site. EPA identified an imminent threat to human health and the environment from the release of hazardous substances at the Site. Table 1 summarizes site contaminants of concern (COCs) by media.

Table 1: Site COCs, by Media

COCs	Media
Lead, cadmium, zinc	Fly ash
Lead, cadmium, zinc	Sediment
Lead, cadmium, zinc	Soil

Response Actions

As a result of initial investigations, Roanoke County signed a Consent Agreement and Order with EPA in September 1987 to conduct removal actions at the three disposal areas. Removal actions for the discarded drum area included removal of construction debris, tires and about 300 drums. Drums were inspected, removed and prepared for off-site disposal. Tires were collected, cleaned and buried on-site. Removal actions for the sludge pit consisted of the removal and off-site disposal of about 500 cubic yards of sludge and contaminated soil, post-excavation sampling, backfilling and grading with clean fill, and revegetation of the area for erosion control. The County completed removal activities at the drum disposal area and the sludge disposal area in 1989.

EPA approved the County's plan to treat the fly ash on site using a proprietary stabilization process and place the treated waste on site. However, questions concerning the regulatory status of the waste delayed implementation of the work plan. EPA recommended suspension of further removal activity pertaining to the fly ash because of uncertainty as to whether the County's plan would meet federal and state requirements.

OU1

On September 30, 1991, EPA issued a Record of Decision (ROD) for OU1 to address about 9,000 cubic yards of Resource Conservation and Recovery Act (RCRA)-classified K061 (fly ash) waste at the Site. Remedial action objectives (RAOs) for OU1 were not specified in the 1991 ROD. The remedy selected in the 1991 ROD required:

- Excavation of about 9,000 cubic yards of fly ash material at the Site.
- Transportation of about 9,000 cubic yards of fly ash material off site for treatment using the High Temperature Metals Recovery (HTMR) process.
- Treatment of the fly ash at an EPA-approved HTMR facility to achieve the treatment standards for K061 waste specified in 56 Federal Register 41164-41178.
- Implementation of dust controls and erosion and sedimentation controls during fly ash excavation.

All visible fly ash was removed and disposed of off site.

OU2

When EPA issued the 1991 ROD for OU1, the Agency designated all areas of the Site, aside from the fly ash pile, as OU2. Because of the high levels of lead, cadmium and zinc found in stream sediments during the RI/FS, EPA evaluated the need for an expedited response. EPA subsequently determined that an imminent threat to public health, welfare and/or the environment existed due to the actual release of hazardous substances from the former

fly ash pile into sediment and soil in the vicinity of and directly beneath the former fly ash pile at the Site. As a result, EPA and the PRPs entered into an Administrative Order by Consent for Removal Action on August 28, 1992.

The RAO for the removal action was to attain acceptable levels of lead, cadmium and zinc from sediments and soils. EPA did not specify numeric cleanup goals for cadmium or zinc; the levels were based on a risk assessment that considered the exposure level and toxicity of those pollutants.

The removal action for OU2 required the following actions:

- Identify the extent of contamination exceeding ecological risk-based levels in two streams at the Site and in soils in the vicinity of and directly beneath the K061 (fly ash) waste pile.
- Eliminate the effect of contamination on aquatic and vegetative species located in and around the two streams.
- Remove, treat and/or dispose of contaminated soils in the vicinity of and directly beneath the K061 waste pile.

The removal action also required that the PRPs develop and implement a Response Action Plan (RAP). The 1993 RAP included cleanup levels for total lead in sediments of two streams in the northern discharge area and in soil under the K061 waste pile. The cleanup level for the stream sediments was selected based on dermal contact and incidental ingestion by a child playing in the stream. The 500 milligram per kilogram (mg/kg) cleanup goal was based on residential direct contact. Table 2 summarizes the RAP cleanup goal for sediment. EPA selected a cleanup level of 1,000 mg/kg for soil under the K061 waste pile. This cleanup goal was selected based on the likely future land use as non-residential. Table 3 summarizes the RAP cleanup goal for soil under the K061 waste pile.

Table 2: Sediment COC Cleanup Goals

Sediment COC	1993 RAP Cleanup Goal (mg/kg)
Lead	500

Table 3: Soil COC Cleanup Goals

Soil COC	1993 RAP Cleanup Goal (mg/kg)
Lead	1,000

EPA issued a ROD for OU2 on September 28, 1992. EPA selected "No Further Action" as the remedy for OU2 because previous and ongoing removal actions would address all risks posed by the Site. The ROD documents the removal action for OU2 as appropriate to remove, treat and/or dispose of contaminated sediment in the northern drainage area and in soils near and directly beneath the K061 (fly ash) waste pile.

In 2012, EPA issued an Explanation of Significant Differences (ESD). The ESD defines appropriate restrictions and institutional controls to prohibit any activities on the County-owned property making up the Site that would in any manner disturb or interfere with the environmental remedial systems.

Status of Implementation

The PRPs entered into a Consent Decree with EPA in 1993, agreeing to implement the remedy for the fly ash pile selected in the OU1 ROD. Construction of the OU1 remedy began on August 15, 1994. EPA Concurrence Notices on November 15, 1995, and January 30, 1996, documented completion of the cleanup at OU1 and achievement of the performance standards required in the ROD.

Implementation of the RAP for OU2 took place from 1993 to 1997. The work took place in five stages. The first stage included sampling and analysis of stream sediment and use of the results to form remedial strategies. The second stage included removal of contaminated soil and sediment. Subsequent sampling confirmed the success of the removal. The third stage included on-site stabilization of contaminated sediment and soil. The fourth stage included a geological and hydrogeological investigation of the Site to determine its suitability for landfill construction, design and construction of the on-site landfill (the monofill), disposal of stabilized sediment and soil in the on-site monofill, and monofill capping, revegetating and closure. The monofill was designed as a RCRA subtitle C compliant landfill and included a leachate collection system to collect any potential leachate produced by the stabilized sediment and soil. The PRP submitted a report certifying the successful cleanup of soil in OU2 in 1995 demonstrated by full compliance of approved workplans, which included confirmation sampling. Cleanup and stabilization of contaminated sediment in OU2 continued until 1997. The final stage included cleanup of access, roadway and production areas.

EPA selected "No Further Action" as the remedy for OU2 because previous and ongoing removal actions would address all risks posed by the Site. EPA conducted a final inspection of the OU2 cleanup on July 31, 1997.

The only waste remaining at the Site is contained in the monofill area in "concrete-like" stabilized blocks and in an approximately five-cubic-yard pocket of fly ash-contaminated sediments. This area of remaining fly ash-contaminated sediments is in the northern discharge area of the Site at the bottom of the hillside where fly ash was disposed of (see Figure 1). Excavation of the pocket of fly ash-contaminated sediments did not take place due to its inaccessible location in the south bank of the large sediment pond. The pocket is buried under 7 feet of clay and a large culvert protects the area from erosion by the stream. EPA approved abandonment of this pocket of fly ash-contaminated sediments after demonstrations showed the practicality of long-term entombment.

On September 25, 1997, EPA issued the Site's Final Close-Out Report (FCOR), which documented the completion of remedy construction activities at both OUs. EPA deleted the Site from the NPL on September 28, 2001.

The parcel where the Site is located is zoned "Agricultural/Rural Preserve w/ Special Use." The special-use aspect of the zoning relates to Roanoke County's special use permit to allow police training activities on the parcel. As documented in the 2012 ESD, Roanoke County implemented an institutional control to restrict activities at the Site. The County recorded Ordinance 091112-5 for the County-owned parcel that includes the Site on October 16, 2012. The Ordinance defines prohibited activities at both the Site and the County-owned parcel, as a whole.

Prohibited activities defined in the Ordinance that protect the components of the Superfund remedy include:

- Digging and/or construction at the monofill where the stabilized sediments and soils are located.
- Disturbance of the leachate collection system and leachate collection tanks.
- Any use of leachate generated at the property including, without limitation, any activities that could cause exposure to contaminants in the leachate via ingestion, vapor inhalation or dermal contact.[1]

Prohibited activities defined in the Ordinance that protect the closed 39-acre municipal landfill, which is not part of the Site, include:

- Digging in or disturbance of the landfill cap, tampering with hardware or equipment associated with the gas vents, monitoring wells, leachate collection and conveyance systems or the security fencing.
- Digging in or disturbance of the landfill cap including, without limitation, any activities that could result in contact with contaminants in the soils at the property through ingestion, inhalation or dermal contact.

[1] Also applies to the municipal landfill leachate collection system.

- Disturbance of groundwater monitoring wells, and installation of drinking water wells.

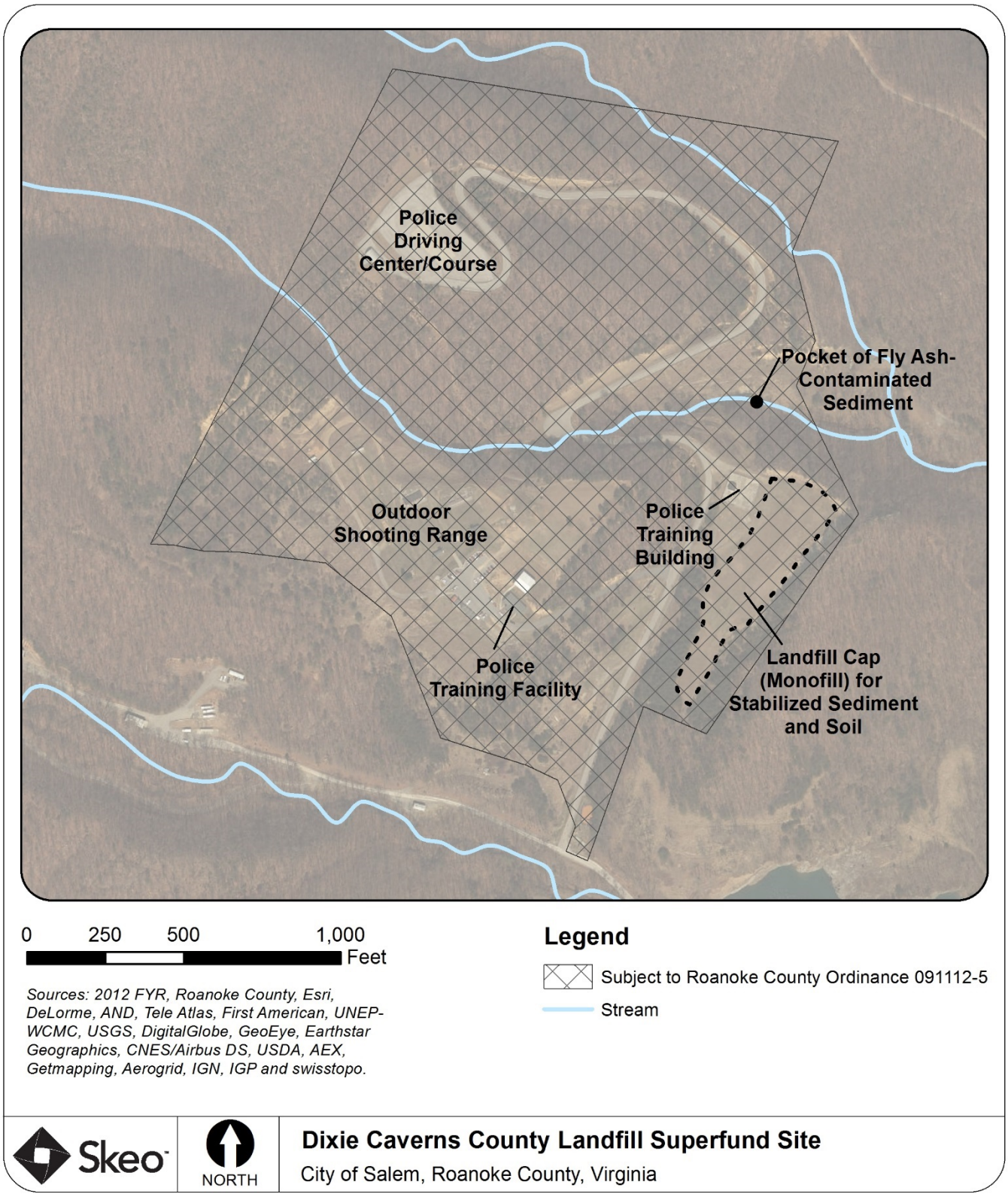
The ordinance specifically permits the owner of the parcel to use the parcel for a firing range, police driving course, other related training facilities and any other lawful uses, so long as these uses do not disturb or interfere with the environmental remedial systems. See Table 4 for a summary of the implemented institutional control. Roanoke County confirmed that the parcel is connected to the public water supply and there are no private wells on site. Appendix H provides a copy of the Ordinance. Figure 2 shows the parcel subject to the Ordinance.

Table 4: Summary of 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 and Date
Groundwater, soil, sediment, leachate[a]	Yes	Yes	063.00-01-14.00-0000	Prohibit any activities on the property that would disturb or interfere with the environmental remedial systems at the property; prohibit digging in or disturbance of the landfill cap and the capped landfill area where stabilized blocks of contamination sediment and soil are located (i.e., the monofill), as well as any activities that could result in contact with contaminants in the soils at the property through ingestion, inhalation or dermal contact; protect the hardware and equipment associated with the landfill cap including gas vents, monitoring wells, leachate collection and conveyance systems and tanks, and security fencing; prohibit any use of leachate generated at the property; prohibit disturbance of groundwater monitoring wells; and prohibit installation of drinking water wells.[b]	Roanoke County Ordinance 091112-5, October 2012

[a] Groundwater and leachate related to the closed municipal landfill, which was not the focus of Superfund activities, are also covered by the IC.
[b] Landfill components mentioned here, including gas vents, monitoring wells, leachate collection and conveyance systems and tanks, and security fencing, and groundwater monitoring wells, are related to the closed municipal landfill and are not part of the Superfund remedy.

Figure 2: 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 & Maintenance

The OU1 ROD did not include any long-term O&M activities or requirements. The Post-Closure Care Plan for the monofill containing stabilized sediment and soil from OU2 was developed to provide methods and schedules for these O&M activities. The Post-Closure Care Plan requires regular inspections to monitor the condition of the closed monofill and identify maintenance needs.

The FCOR indicated the need for a yearly inspection of the approximately five-cubic-yard pocket of fly ash-contaminated sediments for five years after closure to ensure erosion did not begin to affect the area. If inspections indicate the integrity of the pocket is threatened, repairs should be made to ensure the contaminated sediments continue to remain entombed. The FCOR indicated that the sediment control structures adjacent to the pocket, including the piping and drop inlet, should be inspected regularly to verify they are free of debris. An interview with a County official indicated that currently the area of the pocket of fly ash is not being inspected.

The O&M contractor for the County submitted the Post-Closure Inspection reports on a quarterly basis over the past five years. O&M activities have included inspections of the monofill's vegetative cover, the area surrounding the monofill and the monofill's leachate collection system. Inspections identified various bare areas of the vegetative cover or areas where vegetation was thin. Periodic reseeding of these areas took place. Reseeded areas show vegetative growth. The first quarter inspection in 2013 found evidence of ponding and stormwater runoff erosion on the monofill, as well as depressed ruts from mowing equipment. The O&M contractor recommended that mowing of the monofill take place during dry conditions. By the second quarter of 2013, the ponding and erosion was no longer evident on the monofill. In June 2013, installation of warning signs around the perimeter of the monofill took place to restrict access to the vegetative cover. Periodically, inspections observed debris, including tires, scrap wood and piping in areas adjacent to the monofill area or in drainage ditches. The County subsequently removed the debris. In 2014, inspections found a tree growing on the east side of the monofill. The County removed the tree by the inspection in the third quarter of 2015.

Operation of the leachate collection system for the monofill and monitoring for leachate from the monofill are ongoing. No leachate was produced by the monofill during the past five years so no sampling or analysis of leachate has taken place.

The quarterly inspection reports from the County's O&M contractor do not indicate that sediment control structures, including the piping and drop inlet adjacent to the pocket of fly ash-contaminated sediments, have been inspected during the last five years. EPA should determine if inspections of the sediment control structures are taking place and whether ongoing periodic inspections of the pocket of fly ash-contaminated sediments should be conducted to evaluate potential erosion impacts.

III. PROGRESS SINCE THE PREVIOUS REVIEW

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

Table 5: Protectiveness Determinations/Statements from the 2012 FYR

Protectiveness Determination	Protectiveness Statement
Short-term Protective	The remedy is considered protective of human health and the environment in the short term, as the landfill containing waste is complete, the cap remains intact and in good condition, and the landfill is functioning properly. Institutional controls have been implemented at the Site, and an Explanation of Significant Differences (ESD), which identifies the restrictions, is being prepared. A general ecological assessment of the Site is needed to determine whether the remedy is protective in the long term.

Table 6: Status of Recommendations from the 2012 FYR

OU*	Issue	Recommendation	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Quarterly inspections of the Site should continue and reports should be sent directly to EPA.	Continue inspections.	Completed	Quarterly site inspections of the monofill continue to take place as part of O&M activities, and the reports are provided to EPA.	12/7/2012
1	There is a bare patch of ground near the monofill cap.	Reestablish vegetation within the bare patch and properly slope the area to allow proper water drainage.	Completed	Reseeding and placement of straw over reseeded areas took place periodically over the last five years. The November 2016 FYR site inspection confirmed reestablishment of the vegetation and proper drainage.	11/30/2016
1	A general ecological health assessment of the Site should be performed.	Have a member of the BTAG be present during the next site inspection.	Ongoing	BTAG biologist Matthew Taynor participated in the November 2016 FYR site inspection. See Section IV for more information on the site inspection. A BTAG representative was present during the site inspection, completing the recommendation. However, no ecological health assessment has been completed.	11/30/2016
* The 2012 FYR indicated issues and recommendations for OU1. However, these issues and recommendations deal with the remedial components of OU2.					

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available in the Salem Register in June 2017. It announced the start of the FYR period for the Site. Appendix E provides a copy of the notice. The results of the review and the report will be made available at the Site's information repository, Roanoke County Public Library (Glenvar Branch), located at 3917 Daugherty Road in Salem, Virginia.

During the FYR process, an interview with Roanoke County was conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** This interview is summarized below. Appendix I includes the interview form. There are no homes near the Site. Therefore, no interviews with residents were done.

David Henderson, the Roanoke County Engineer, is aware of the former environmental issues and cleanup at the Site and feels well informed regarding site activities and remedial progress. He reported no problems with unexpected or unusual activities at the Site; at one point, the police left some equipment on the monofill, but once Mr. Henderson communicated the issue to the police, it was resolved. Mr. Henderson is not aware of any changes to state laws or local regulations that could affect the protectiveness of the remedy. He is not aware of any

changes to projected land use at the Site. Mr. Henderson does not think it is necessary to contact the surrounding neighbors to inform them about site activities; he thinks they prefer to be left alone. Mr. Henderson asked if long-term inspections will ever be stopped or reduced. He stated that having inspections helps the County know the Site still exists; because the Site is not very active, he expressed that it could be forgotten if inspections did not happen.

Data Review

Operation of the leachate collection system and monitoring for leachate at the monofill are ongoing. No leachate has been produced by the monofill containing stabilized sediment and soil from OU2. Because the monofill has not produced leachate, no monitoring data have been collected from the system for review.

Site Inspection

The site inspection took place on 11/30/2016. In attendance were EPA RPM Ron Davis, biologist Matthew Taynor from the BTAG, Angela McGarvey from VDEQ, Tarek Moneir and David Henderson from Roanoke County, Lawrence Hoffman from O&M contractor CHA Consulting, and Amanda Goyne and Lynette Vanderpool from EPA FYR contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. Appendix D provides the completed site inspection checklist. Appendix F provides photographs from the FYR site inspection.

Site inspection participants met at the front gate of the County-owned parcel, parts of which are now a police training facility, at the end of Twine Hollow Road in Salem, Virginia. Participants discussed the history of the Site, current site status, monitoring and inspection activities, and reuse of the Site. Police training activities were taking place on several areas of the Site during the site inspection. Participants walked from the front gate up the hill to the leachate collection system. Lawrence Hoffman from O&M contractor CHA Consulting explained the design of the leachate collection system. He stated that the collection tank was empty and that no leachate has been collected. The process for quarterly monitoring of leachate was also discussed. Participants then walked around the monofill area of the Site, observing the warning signs posted around the perimeter of the monofill as well as the condition of the vegetative cover. Previous maintenance work done to address bare patches on the monofill was discussed. No bare patches and no indications of problems with the monofill or the vegetative cover were found.

Participants also walked down to the stream area, located on the northern portion of the Site, where excavation of fly ash, soil and sediment took place. Participants observed the approximate location of the five-cubic-yard pocket of fly ash-contaminated sediments, as well as a pool of green standing water in the stream bed. The area of the entombed fly ash-contaminated sediments remained well stabilized. The condition of the stream, the pool of standing water and the surrounding area were discussed.

The information repository at Roanoke County Public Library (Glenvar Branch) contained site documents, including the digital and hard copies of the administrative records for initial removal activities, OU1 and OU2, the 2001 deletion docket, and the 2001 FYR Report. EPA will update the repository after the completion of this FYR.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

Based on a review of site documents and the results of the site inspection, the remedy for OU1 is functioning as intended. About 9,000 cubic yards of fly ash material was excavated and treated off site using the HTMR process.

The remedy for OU2 generally functions as intended. The remedy was implemented through a removal action to attain acceptable levels of lead, cadmium and zinc in sediments and soils. The removal action required eliminating the effect of contamination on aquatic and vegetative species in and around the two streams next to the K061 (fly ash) waste pile. However, the cleanup goal for sediment was based on residential direct contact and the cleanup goal for soil was based on a non-residential future land use standard. The portions of the document "Implementation of a Response Action Plan to Remove, Stabilize, and Dispose of Soils and Sediment at Dixie Caverns Landfill" dated September 4, 1997, were not available for review during this FYR. It is unclear what contaminant concentrations were left in sediment and soil and whether the removal activities remain protective of ecological receptors. EPA should determine if this document addresses the protectiveness of the removal activities for ecological receptors. Changes in the risk assessment process since the removal activities should also be considered.

Implementation of the RAP, including the excavation, stabilization and placement of stabilized sediment and soil in the monofill, reduces human direct contact with contamination. Stabilization of contaminated sediment and soil is functioning as intended, as no leachate has been produced or collected from the landfill's leachate collection system. Quarterly inspections of the monofill have found that the vegetative cover is functioning as intended. The County's O&M contractor notifies the County if there is erosion or bare patches on the vegetative cover; the County reseeds the areas as necessary. There may be an opportunity to reduce the frequency of inspections of the monofill and monitoring of the leachate collection system as the vegetative cover is functioning as intended and no leachate is being produced.

The parcel where the Site is located is zoned "Agricultural/Rural Preserve w/ Special Use." The special-use aspect of the zoning relates to Roanoke County's special use permit to allow police training activities on the parcel. As required by the 2012 ESD, the County implemented an institutional control to restrict activities at the County-owned parcel that includes the Site. The County recorded the Ordinance on October 16, 2012. It prohibits any activities without limitation that would disturb or interfere with environmental remedial systems. Because of the Site's current use as a police training area, fencing, gates and signs restrict access to the County-owned parcel. Additionally, signs are posted around the perimeter of the monofill to prohibit disturbance of the cap.

About five cubic yards of fly ash-contaminated sediments were left in place at the Site due to its inaccessible location in a stream bank, buried under 7 feet of clay. Quarterly inspection reports from the County's O&M contractor do not discuss inspections of this area and this area is not discussed in the Post-Closure Care Plan for the Site. EPA should determine whether inspections are occurring and, if so, whether they should continue. Participants observed this area during the November 2016 site inspection and found the area remained well stabilized.

During the November 2016 site inspection, a pool of green standing water was observed in the stream bed in the area of the fly ash, sediment and soil excavations. It is unclear whether this discoloration is caused by contamination in the surface water. During this FYR, the BTAG suggested collection of surface water and sediment samples from this area to test for metals.

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 exposure assumptions for OU1 remain valid. There were no cleanup levels for the fly ash pile as all the waste was removed and disposed of off site. RAOs were not specified in the 1991 OU1 ROD.

The exposure assumptions and RAOs used at the time of the remedy selection for OU2 are still valid. However, no RAO was specified for ecological receptors. It is unclear whether the removal activities remain protective of

ecological receptors and EPA should determine the protectiveness of the removal activities for ecological receptors. The exposure scenarios for sediment and soils were for child recreator and non-residential use, respectively, and remain valid. The RAO for the removal action was to attain acceptable levels of lead, cadmium and zinc in sediments and soils. EPA did not specify cleanup goals for cadmium or zinc. The levels for cleanup for these constituents were to be based on a hazard quotient of 1. The sediment lead cleanup goal was based on residential direct contact. Using EPA's current regional screening level (RSL) for lead in residential soil, the sediment cleanup goal is less stringent than the residential lead RSL (Table G-1 in Appendix G). The lead cleanup goal for soil was based on non-residential use. The industrial lead RSL is more stringent than the soil cleanup goal (Table G-2 in Appendix G). Therefore, the cleanup goals for sediment and soil should be reevaluated to ensure future protectiveness. The remedy remains protective in the short term because the area of the Site potentially impacted by remaining contaminated soil and sediment is not being used, and no exposure is occurring. In addition, the Site has restricted access with a locked gate on the access road and regular on-site police presence due to training operations.

In August 2004, EPA issued new dermal guidance, RAGS E, Supplemental Guidance for Dermal Risk Assessment, which recommends a soil-to-skin adherence factor of 0.2 milligram per centimeter for a child resident. In addition, the Integrated Exposure Uptake Biokinetic (IEUBK) Model changed the default parameters for rate of soil ingestion, background concentration in air and background dietary exposure to lead, and extended the age for analysis to seven years. EPA also issued the Exposure Factors Handbook, which recommends varying inhalation rates based on age and sex.[2] However, these changes have not resulted in any changes to the RAOs and cleanup criteria.

EPA is reevaluating its residential soil lead policy. EPA is strongly considering revising the current target blood-lead level in young children from 10 µg/dL to a more protective value. The range being considered is 2 to 8 µg/dL, with a likely point value of 5 µg/dL. Assuming 5 µg/dL is selected as the target blood-lead level for young children, the corresponding soil screening concentration for lead under a residential exposure scenario would be 200 ppm, on average. This modification could change the soil lead level that triggers an action at Superfund sites, as well as the recommended remediation goal; however, the residential soil excavation and backfilling actions taken at the Site, along with active institutional controls, have eliminated the soil exposure pathway and therefore would remain protective.

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:
OU1

Issues and Recommendations Identified in the FYR:

[2] EPA first published the Exposures Factors Handbook in 1989, updated it in 1997 and most recently updated it in 2011.

OU: 2	Issue Category: Operations and Maintenance			
	Issue: The Post-Closure Care Plan does not discuss whether inspections of the sediment control structures, including the piping and drop inlet adjacent to the pocket of fly ash-contaminated sediments are required.			
	Recommendation: Require ongoing periodic inspections of the pocket of fly ash-contaminated sediments to evaluate potential erosion impacts.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/21/2018

OU: 2	Issue Category: Remedy Performance			
	Issue: The cleanup levels for lead in sediment and soil selected at the time of the remedy are less stringent than current screening levels.			
	Recommendation: Reevaluate lead cleanup standards for sediment and soil.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	9/21/2018

OU: 2	Issue Category: Changed Site Conditions			
	Issue: During the FYR site inspection, a pool of green standing water was observed in the stream bed in the area of the fly ash, sediment and soil excavations.			
	Recommendation: Collect surface water and sediment samples to determine if discoloration is due to site-related contamination.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	1/15/2018

OU: 2	Issue Category: Remedy Performance			
	Issue: It is unclear if the removal activities were and still are protective of ecological receptors.			
	Recommendation: Evaluate the need to conduct a Screening Level Ecological Risk Assessment to determine if the remedy is protective of ecological receptors. This should include determining how or if ecologically-protective cleanup levels were developed for the removal actions and whether the removal activities were and still are protective of ecological receptors, taking into consideration changes in the risk assessment process since removal activities occurred.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	9/21/2018

OTHER FINDINGS

In addition, the following were identified during the FYR. They may improve community involvement, but do not affect current and/or future protectiveness:

- The information repository at the Roanoke County Public Library (Glenvar Branch) contained site documents for initial removal activities, OU1 and OU2, the 2001 deletion docket, and the 2001 FYR. EPA will update the repository after the completion of this FYR.
- Ordinance 091112-5, which restricts activities at the Site, is not included in the Roanoke County GIS property report. The property report should be updated to include this ordinance.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: 1	*Protectiveness Determination:* Protective
Protectiveness Statement: The OU1 remedy is protective of human health and the environment because the fly ash material was excavated and treated off site using the HTMR process.	

Protectiveness Statement(s)	
Operable Unit: 2	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The OU2 remedy is currently protective of human health and the environment because there are no current completed exposure pathways. Contaminated sediment and soil were excavated, stabilized and placed in the on-site monofill. Stabilization of contaminated sediment and soil is functioning as intended as no leachate has been produced or collected from the landfill's leachate collection system. Quarterly inspections of the monofill have found that the vegetative cover is functioning as intended. Land use controls are in place, ensuring that no activities take place at the Site that could disturb the remedial systems in place. For the remedy to remain protective over the long term, the following recommendations need to be implemented: 1) Require ongoing periodic inspections of the pocket of fly ash-contaminated sediments to evaluate potential erosion impacts. 2) Reevaluate lead cleanup goals for sediment and soil. 3) Collect surface water and sediment samples to determine whether discoloration is due to site-related contamination. 4) Evaluate how or if ecologically-protective cleanup levels were developed for the removal actions and whether the removal activities were and still are protective of ecological receptors, taking into consideration changes in the risk assessment process since removal activities.	

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: Because the remedial action at OU2 is short-term protective, the site remedy is considered short-term protective. For the remedy to remain protective over the long term, the actions listed above in the OU2 protectiveness statement need to be taken.

VIII. NEXT REVIEW

The next FYR Report for the Dixie Caverns County Landfill Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Appendix VI Dixie Caverns Monofill for Stabilized Sediment Post-Closure Care Plan, Implementation of a Response Action Plan to Remove, Stabilize, and Dispose of Soils and Sediment at Dixie Caverns Landfill. September 4, 1997.

Dixie Caverns On-site Landfill for Stabilized Soils and Sediment, Base Grades and Erosion & Sediment Control Plan. Olver Incorporated. July 21, 1995.

EPA Superfund Record of Decision: Dixie Caverns County Landfill OU1, September 30, 1991.

EPA Superfund Record of Decision: Dixie Caverns County Landfill OU2, September 28, 1992.

Explanation of Significant Differences for the Dixie Caverns County Landfill Superfund Site. December 20, 2012.

Five-Year Review Report for Dixie Caverns County Landfill Superfund Site, Roanoke County, VA. July 23, 2001.

Quarterly Post-Closure Inspection Reports for the Dixie Caverns Monofill for Stabilized Soil and Sediment. CHA Consulting Inc. March 2012 – November 2016.

Remedial Investigation Report for Dixie Caverns Landfill Site. Tetra Tech, Inc. January 1992.

Response Action Plan for Remediation of Surface Streams B and E at Dixie Caverns Landfill, Roanoke, Virginia. Volumes 1 and 2. Olver Incorporated Consulting Engineers and Environmental Laboratories. February 11, 1993.

Second Five-Year Review Report for Dixie Caverns County Landfill Superfund Site, Roanoke County, VA. September 24, 2007.

Superfund Final Close-Out Report, Dixie Caverns County Landfill Superfund Site, Roanoke County, Virginia. September 25, 1997.

Third Five-Year Review Report for Dixie Caverns County Landfill Superfund Site, Roanoke County, VA. September 21, 2012.

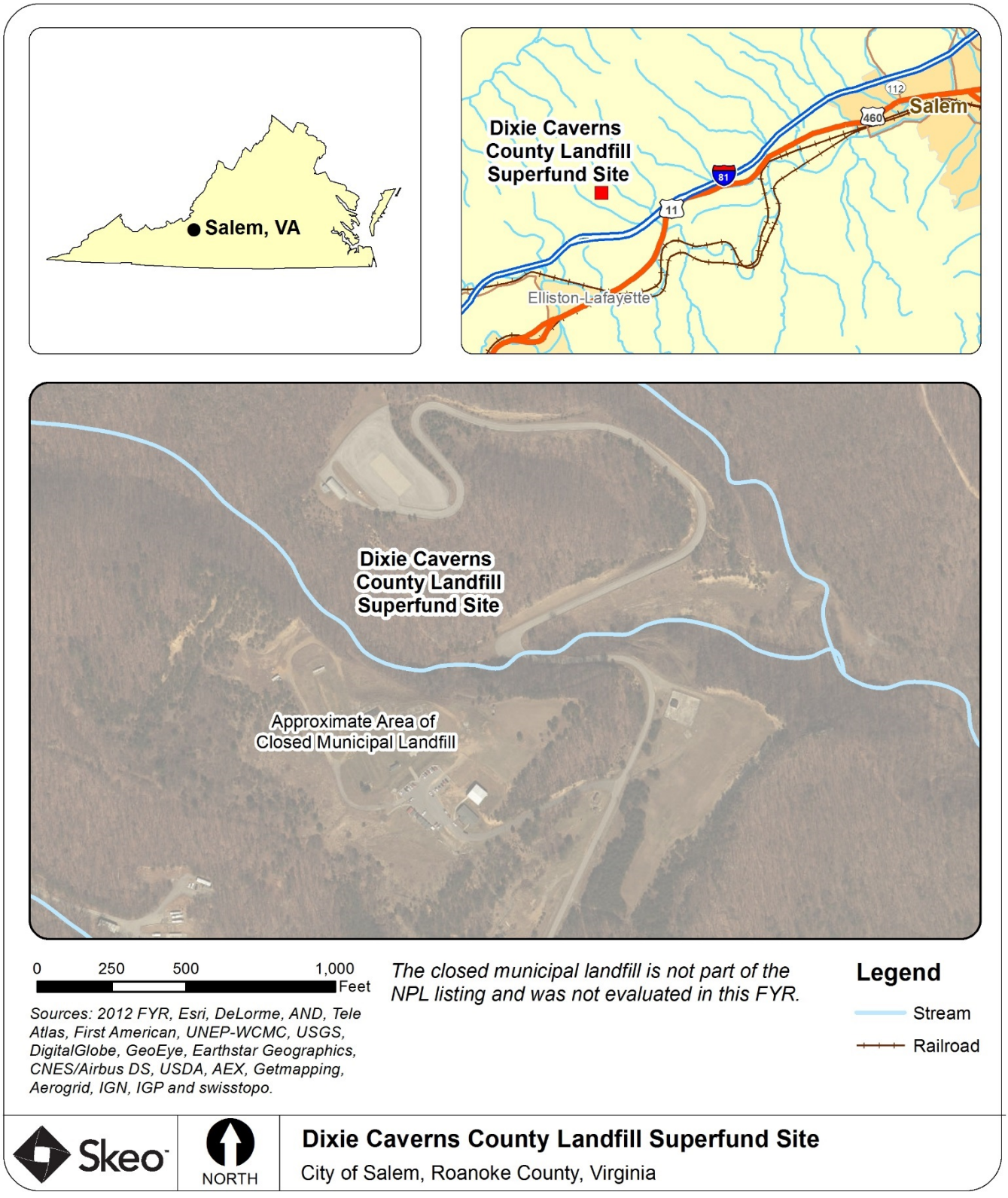
APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
Municipal and industrial wastes first disposed of at the Site (operated by Roanoke County)	1965
Roanoke County notified by Commonwealth of Virginia that landfill operations must be phased out by July 1, 1973	1972
The landfill ceased operations after several unsuccessful attempts to obtain a permit	July 1976
EPA completed the Site's preliminary assessment	June 1983
EPA proposed the Site for listing on the NPL	January 22, 1987
EPA began the removal action for the sludge disposal area and the drum disposal area	September 1987
EPA completed the removal action for the sludge disposal area and the drum disposal area	1989
EPA initiated the Site's RI/FS	July 1989
EPA listed the Site on the NPL	October 4, 1989
EPA issued the ROD for OU1	September 30, 1991
EPA completed the RI and identified a need for an expedited response for OU2	January 1992
EPA and the PRPs entered into an Administrative Order by Consent for a removal action for OU2	August 28, 1992
EPA issued the ROD for OU2	September 28, 1992
Implementation of the RAP for OU2 began	1993
Roanoke County, Roanoke Electricity Steel and EPA entered into a Consent Decree to implement the OU1 remedy	June 1993
PRPs began construction of the remedy for OU1	August 15, 1994
PRPs completed construction of the remedy for OU1	January 30, 1996
RAP for OU2 concluded	July 31, 1997
EPA signed the Site's FCOR	September 25, 1997
EPA signed the Site's first FYR Report	July 23, 2001
EPA deleted the Site from the NPL	September 28, 2001
EPA signed the Site's second FYR Report	September 24, 2007
EPA signed the Site's third FYR Report	September 21, 2012
Roanoke County recorded an institutional control for the Site	October 16, 2012
EPA issued an ESD updating the site remedy	December 20, 2012

APPENDIX C – SITE MAP

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 – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Dixie Caverns County Landfill	**Date of Inspection:** 11/30/2016
Location and Region: Salem, VIRGINIA 3	**EPA ID: VAD980552095**
Agency, Office or Company Leading the Five-Year Review: EPA	**Weather/Temperature:** 60s, Cloudy

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other: Leachate collection system for monofill
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

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** _____ (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 Roanoke County
Contact David Henderson (Name) | County Engineer (Title) | 08/29/2017 (Date) | 540-772-2083 (Phone No.)
Problems/suggestions ☐ Report attached: see Appendix I

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

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

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: _____

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 post-closure care plan for the monofill for stabilized sediment is included as Appendix VI of the report "Implementation of a Response Action Plan to Remove, Stabilize, and Dispose of Soils and Sediment at Dixie Caverns Landfill".

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: N/A

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

A. Fencing

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

Remarks: _____

B. Other Access Restrictions

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

Remarks: Access restriction signs posted at entrance to County-owned parcel; additional signs posted surrounding monofill to prohibit disturbance of the cap.

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): In-person, visual inspection

Frequency: Quarterly

Responsible party/agency: CHA Consulting Inc. (contractor for County)

Contact	Lawrence Hoffman	Vice President	11/30/2016	540-552-5548
	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 required by the 2012 ESD for the Site were implemented by the County in 2012.

D. General

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

Remarks: _____

2. **Land Use Changes On Site** ☒ N/A

Remarks: The Site continues to be used as the location of a police training facility.

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

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident

Lengths: _____ Widths: _____ Depths: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident

Area extent: _____ Depth: _____

Remarks: _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established

☒ No signs of stress ☐ Trees/shrubs (indicate size and locations on a diagram)

Remarks: The vegetative cover is in adequate condition and is reseeded as needed if bare spots are identified.

6. **Alternative Cover** (e.g., armored rock, concrete) ☒ N/A

Remarks: _____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident

Area extent: _____ Height: _____

Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident

☐ Wet areas ☐ Location shown on site map Area extent: _____

☐ Ponding ☐ Location shown on site map Area extent: _____

☐ Seeps ☐ Location shown on site map Area extent: _____

☐ Soft subgrade ☐ Location shown on site map Area extent: _____

Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map

☒ No evidence of slope instability

Area extent: _____

Remarks: _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ No evidence of settlement

Area extent: _____ Depth: _____

Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation

Material type:_____ Area extent: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion

Area extent: _____ Depth: _____

Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting

Area extent: _____ Depth: _____

Remarks: _____

5. **Obstructions** Type: _____ ☐ No obstructions

☐ Location shown on site map Area extent: _____

Size: _____

Remarks: _____

6. **Excessive Vegetative Growth** Type: _____

☐ No evidence of excessive growth

☐ Vegetation in channels does not obstruct flow

☐ Location shown on site map Area extent: _____

Remarks: _____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive

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

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Gas Monitoring Probes**

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

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)

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

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

4. **Extraction Wells Leachate**

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

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☐ Siltation not evident

Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

☐ Erosion not evident

Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A

Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☐ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☐ Functioning ☐ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: _____

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

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

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection 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: _____

C. Treatment System ☐ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon absorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ 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: _____

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.

A leachate collection system is in place to collect leachate from the on-site monofill. The system is in adequate condition. There has not been any flow of leachate, so flow measurements have not been taken. However, monitoring reports are submitted quarterly and include temperature and pH measurements from the vault that is part of the leachate collection system.

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, excavation and treatment of fly ash, stabilization of contaminated soil and sediment, landfilling of stabilized soil and sediment in the on-site monofill, and implementation of institutional controls, has been effective.

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.

The Post-Closure Care Plan for the monofill containing stabilized sediment and soil from OU2 was developed to provide methods and schedules for these O&M activities. The Post-Closure Care Plan requires regular inspections to monitor the condition of the closed monofill and identify maintenance needs. Inspection of the monofill is conducted regularly and issues related to the vegetative cover, such as bare patches, are addressed in a timely manner. The monofill is not producing leachate but monitoring of the system is conducted regularly. Quarterly inspection reports do not indicate whether sediment control structures, including the piping and drop inlet, adjacent to the pocket of fly ash-contaminated sediments are inspected regularly. EPA should determine if inspections of the sediment control structures are taking place and whether ongoing periodic inspections of the pocket of fly ash-contaminated sediments should be conducted to evaluate potential erosion impacts.

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.

_____

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

There may be an opportunity to reduce the frequency of inspections of the landfill and monitoring of the leachate collection system.

APPENDIX E – PRESS NOTICE

EPA REVIEWS CLEANUP

Dixie Caverns County Landfill

The U.S. Environmental Protection Agency (EPA) is conducting a Five-Year Review of the Saegertown Industrial Area Superfund Site located in Crawford County. EPA inspects sites regularly to ensure that cleanups conducted remain protective of public health and the environment. EPA's last review of the site in 2012 determined that the remedy continues to be protective of human health and the environment in the long-term. **Findings from this review will be available September 2017.**

To access the review, or to provide site-related information:
Contact: Larry Johnson, *Community Involvement Coordinator*
Phone: 215-814-3239
Email: Johnson.larry-c@epa.gov

To access detailed site and contact information:
https://www.epa.gov/superfund/dixiecaverns

Protecting human health and the environment

APPENDIX F – SITE INSPECTION PHOTOS

Site entrance

Inactive leachate collection tank, municipal water supply pump house and leachate vault

Looking into leachate vault

Road to Roanoke County Firearms Range

Looking northeast from entrance road to monofill drainage features

Sign on capped monofill

Looking north from eastern side of monofill to police training building

Looking south on monofill

Looking north on monofill

Looking west from monofill to police training building

Looking east toward area of five-cubic-yard pocket of fly ash-contaminated sediments that was not excavated due to its inaccessible location in the south bank of a large sediment pond

Looking east to pool of green standing water in the stream bed in the area of the fly ash, sediment and soil excavations

Close-up of pool of green standing water in the stream bed in the area of the fly ash, sediment and soil excavations

Fly ash removal area (area without large trees on the right)

Police training facility activity

Police training facility activity

APPENDIX G – SCREENING LEVEL RISK REVIEW

In the 1993 RAP, EPA selected cleanup levels for total lead in sediments of two streams and in underlying soils. The cleanup level for the stream sediments was selected based on dermal contact and incidental ingestion by a child playing in the stream. EPA selected 500 mg/kg as the cleanup goal, based on residential direct contact. The current RSL for residential soil is 400 mg/kg. This RSL for lead is based on the blood-lead model and is more stringent than the cleanup goal (Table G-1). However, the residential RSL is likely overly conservative since the area is not residential. The exposure scenario is recreational with shorter exposure durations. The cleanup goal for sediment should be reevaluated to ensure it is still protective.

Table G-1: Review of Sediment Cleanup Goals

COC	1993 RAP Cleanup Goal (mg/kg)	EPA Residential RSL[a] (mg/kg)		Residential Risk Level	
		1 x 10^{-6} Risk	HQ = 1	Cancer Risk[b]	Noncancer HQ[c]
Lead	500	400		NA[d]	

Notes:

a. Current RSLs, dated May 2016, are available at http://www.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 03/08/2017).

b. 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 = (remedial goal ÷ cancer RSL) × 10^{-6}.

c. The noncancer HQ (hazard quotient) was calculated using the following equation:
HQ = (remedial goal ÷ noncancer RSL).

d. RSL is based on a blood-lead model. It is not based on carcinogenic or noncarcinogenic effects.

HQ = hazard quotient

NA = carcinogenic target risk not identified for this contaminant

EPA selected a cleanup level of 1,000 mg/kg for the underlying soils. This cleanup goal was selected based on the likely future land use as non-residential. The industrial RSL for lead is 800 mg/kg, which is more stringent than the cleanup goal for soil (Table G-2). The cleanup goal for soil should be reevaluated to ensure it remains protective.

Table G-2: Review of Soil Cleanup Goals

COC	1993 RAP Cleanup Goal (mg/kg)	EPA Industrial RSL[a] (mg/kg)		Industrial Risk Level	
		1 x 10^{-6} Risk	HQ = 1	Cancer Risk[b]	Noncancer HQ[c]
Lead	1,000	800		NA	

Notes:

a. Current RSLs, dated May 2016, are available at http://www.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 03/08/2017).

b. 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 = (remedial goal ÷ cancer RSL) × 10^{-6}.

c. The noncancer HQ was calculated using the following equation:
HQ = (remedial goal ÷ noncancer RSL).

d. RSL is based on a blood-lead model. It is not based on carcinogenic or noncarcinogenic effects.

NA = carcinogenic target risk not identified for this contaminant

APPENDIX H – INSTITUTIONAL CONTROL

20121958 Co.Atty./9

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AT A REGULAR MEETING OF THE BOARD OF SUPERVISORS OF ROANOKE COUNTY, VIRGINIA, HELD AT THE ROANOKE COUNTY ADMINISTRATION CENTER ON TUESDAY, SEPTEMBER 11, 2012

ORDINANCE 091112-5 AMENDING CHAPTER 2 "ADMINISTRATION" OF THE ROANOKE COUNTY CODE BY THE ADDITION OF ARTICLE VII "CLOSED LANDFILL, INSTITUTIONAL CONTROLS", AND PROHIBITING CERTAIN ACTIVITIES FOR THE PURPOSE OF PROTECTING THE INTEGRITY OF THE REMEDIAL MEASURES AT THE DIXIE CAVERNS LANDFILL SUPERFUND SITE

WHEREAS, the first reading of this ordinance is scheduled for August 28, 2012, and the second reading and public hearing is scheduled for September 11, 2012.

BE IT ORDAINED AND ENACTED by the Board of Supervisors of Roanoke County, Virginia as follows:

Section 1. Chapter 2 "Administration" is amended by the addition of a new Article VII "Closed Landfill, Institutional Controls" as follows:

§2-150. Background and Legislative Intent

A. Roanoke County operated the Dixie Caverns County Landfill as a disposal site for municipal refuse, solvents and fly ash from 1965 to 1976. From 1967 to 1975 electric arc furnace air emission control dust (fly ash) from Roanoke Electric Steel Corporation was disposed at this site. When this landfill was closed in 1976 it was not capped. The site lies on a relatively steep ridge complex between two steep valleys, each of which contains an intermittent stream. The property consists of approximately 74.9 acres, 39 acres of which were used for the landfill, located at Dixie Caverns in Roanoke County, Virginia, together with undeveloped land, and is identified as Tax Parcel Number 063.00-01-14.00-0000 (hereinafter referred to as "Dixie Caverns Landfill").

Four areas at this landfill required remediation: a drum disposal area, the solvent contaminated sludge pit, the fly ash disposal area and a stream area. In 1987 Roanoke County entered into a Consent Agreement and Order with the Environmental Protection Agency (EPA) to clean up this site. A removal action was performed in 1988 to dispose of the drums and the contaminated sludge from the sludge pit.

Dixie Caverns Landfill became a Superfund Site when it was listed on the National Priorities List in October 1989.

The Site was the focus of two Removal Actions and two Records of Decision (RODs). The only waste remaining at the Site is contained in a landfill area of the Site specifically constructed for it, as "concrete-like" stabilized blocks, and in a small pocket of fly ash-contaminated sediments, securely entombed deep in an inaccessible stream bank.

This site was delisted from the National Priorities List in September 2001.

§ 2-151. Definitions.

Unless the context clearly indicates otherwise, the meaning of the following terms and phases used in this Ordinance shall be as follows:

A. "Property" shall mean the real property located within the property identified as the Dixie Caverns Landfill, as more specifically described as Tax Map Parcel Number 063.00-01-14.00-0000.

B. "Owner" shall mean the Person, custodian, guardian, trustee, caretaker, executor administrator in whose name the deed for the Property, or any portion thereof, is titled.

C. "Person" shall mean any individual, partnership, company, corporation, association, corporate political body, joint ownership or any other entity.

§ 2-152. Prohibition.

It shall be unlawful for any Owner, lessor, lessee or occupier of the Property, or any other Person to engage in any activities on the Property that would in any manner disturb or interfere with the environmental remedial systems at the Property, including, without limitation, the landfill cap, gas vents, monitoring wells, leachate collection and conveyance system, and security measures, such as fencing, that prevent access to the Property. The prohibited activities include, but are not limited to the following:

A. Digging in or disturbance of the landfill cap, tampering with hardware or equipment associated with the gas vents, monitoring wells, leachate collection and conveyance systems or the security fencing.

B. Any use of leachate generated at the Property including, without limitation, any activities that could cause exposure to contaminants in the leachate via ingestion, vapor inhalation or dermal contact.

C. Digging in or disturbance of the landfill cap including, without limitation, any activities that could result in contact with contaminants in the soils at the Property through ingestion, inhalation or dermal contact.

D. No digging and/or construction at the Monofill where the stabilized sediments and soils are located.

E. Ground water monitoring wells should not be disturbed, and no drinking water wells should be installed.

F. The leachate collection system and leachate collection tanks should not be disturbed.

§ 2-153. Permitted Uses.

The Owner is permitted to use the Property for its firing range, driving range, other related training facilities and any other lawful uses, so long as these uses do not disturb or interfere with the environmental remedial systems at the Property or as otherwise prohibited by Section 2-152.

§ 2-154. Enforcement - Violations and Penalties.

A. In addition to any other remedy available under law or in equity, any Person convicted of a violation of this Article shall be subject to a criminal fine in an amount not to exceed $1,000.00 per day per violation or suffer imprisonment for a period of not more than 30 days, or both, together with costs of prosecution. Each 24-hour period during which a violation continues shall constitute a separate offense. Enforcement of this Ordinance shall be brought by action filed in the General District Court or Circuit Court for the County of Roanoke. The County Attorney may assume the prosecution with the consent of the Commonwealth's Attorney All fines and penalties collected for violation of this Ordinance shall be paid over to the County General Fund. Nothing in this section shall prohibit the County from enforcing the provisions of this Ordinance by any other remedy available at law or in equity. The remedies provided herein shall be cumulative and concurrent and shall be in addition to any other remedies available to the township at law or in equity.

Section 2 - Severability. In the event that any section, sentence, clause, phrase or word of this Ordinance shall be declared illegal, invalid or unconstitutional by any court of competent jurisdiction, such declaration shall not prevent, preclude or otherwise foreclose enforcement of any of the remaining portions of this Ordinance.

Section 3 - Repealer. All Ordinances or parts of Ordinances inconsistent herewith or in conflict with any of the specific terms enacted hereby, to the extent of said inconsistencies or conflicts, are hereby specifically repealed.

Section 4 - Effective Date. This Ordinance shall become effective from and after the date of its adoption.

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On motion of Supervisor Flora to adopt the ordinance, and carried by the following roll call and recorded vote:

AYES: Supervisors Moore, Altizer, Elswick, Flora

NAYS: None

ABSENT: Supervisor Church

A COPY TESTE:

Deborah C. Jacks
Clerk to the Board of Supervisors

cc: Paul Mahoney, County Attorney

I hereby certify that the foregoing is a true and correct copy of Ordinance 091112-5 adopted by the Roanoke County Board of Supervisors by a unanimous recorded vote on Tuesday, September 11, 2012.

Deborah C. Jacks
Clerk to the Board of Supervisors

See attached Exhibit A
Deed To Roanoke County
(DB 799 Pg 31)

PG 0272 '12 OCT 16 1435

Exhibit A

1662

THIS DEED, made this the [illegible] day of January, 1966, by and between E. C. HILL and THELMA H. HILL, his wife, parties of the first part, and THE BOARD OF SUPERVISORS OF ROANOKE COUNTY, VIRGINIA, party of the second part.

W I T N E S S E T H :

THAT FOR AND IN CONSIDERATION of the sum of SEVENTY-ONE HUNDRED ($7100.00) DOLLARS cash in hand paid by the party of the second part unto the parties of the first part, the receipt of which is hereby acknowledged, the parties of the first part do hereby BARGAIN and SELL and GRANT and CONVEY with COVENANTS OF GENERAL WARRANTY OF TITLE unto The Board of Supervisors of Roanoke County, Virginia, party of the second part, all that certain tract or parcel of land situate Northwest of Dixie Caverns in the Salem Magisterial District, Roanoke County, Virginia, and more particularly described as follows, to-wit:

> BEGINNING at a point in the center of the road on the line of the Tread Corporation, said beginning point being N. 39 degs. E. 384 feet from a thirty inch, white oak, a corner between Tread Corporation and E. C. Hill; thence leaving said beginning point and with the division line between Tread Corporation and the property herein conveyed the following courses and distances: N. 38 degs. E. 96 feet to a five inch gum; N. 19 degs. W. 161 feet, N. 60 degs. 30' W. 169 feet, N. 73 degs. W. 212 feet, N. 15 degs. 30' W. 214 feet, N. 14 degs. 30' W. 192 feet, N. 45 degs. 30' W. 258 feet, N. 74 degs. W. 200 feet, N. 88 degs. 30' W. 195 feet, N. 74 degs. W. 155 feet to a point on the line of the Garnand tract; thence with same N. 32 degs. E. 1,568 feet, more or less, to a point; thence continuing with the Garnand tract S. 78 degs. E. 1,485 feet to a point; thence with a new line through the Hill property S. 26 degs. 30' W. 2,235 feet, more or less; thence S. 35 degs. W. 100 feet to a thirty inch culvert in the center line of the road; thence with the center line of the said road N. 64 degs. W. 53 feet to the place of BEGINNING and containing sixty acres, more or less, and being in accordance with a plat attached hereto, dated November 26, 1965, made by Paul B. Matthews, County Engineer; and
>
> Being the northeastern part of a 100.42 acre tract conveyed to E. C. Hill by deed from Nannie A. Hill and F. E. Hill, her husband, of record in the Clerk's Office of the Circuit Court of Roanoke County, Virginia, in Deed Book 298, page 492.

[illegible]
Attorney at Law
Salem, Virginia

BOOK 793 PAGE 32

PG 0373 '12 OCT 30 1435

Also [illegible] for [illegible] sixty [illegible] Route [illegible] which said [illegible] running with the remaining E. C. Hill lands.

TO HAVE AND TO HOLD unto The Board of Supervisors of Roanoke County, Virginia, party of the second part, its successors and assigns forever in fee simple.

The parties of the first part covenant that they have the right to convey the said property unto the party of the second part in fee simple; that the said party of the second part shall have quiet and peaceable possession of said real estate free from all encumbrances; that they have done no act to encumber the same; and that they will execute such other and further assurances of title to the said real estate as may be requisite and necessary.

Witness the following signatures and seals:

E. C. Hill (SEAL)
E. C. Hill

Flora M. Hill (SEAL)
Flora M. Hill

STATE OF VIRGINIA ,

COUNTY OF ROANOKE, TO-WIT:

I, Derwood H. Rusher, Commissioner in Chancery for the Circuit Court of Roanoke County, Virginia, do hereby certify that this day personally appeared before me E. C. Hill and Flora M. Hill, his wife, whose names are signed to the foregoing deed bearing date of January 3, 1966, and acknowledged the same before me in my County and State aforesaid.

Given under my hand this 13th day of ~~January~~ April, 1966.

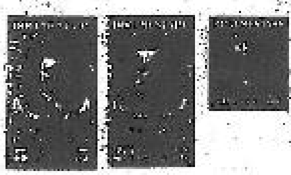
Derwood H. Rusher
Derwood H. Rusher, Commissioner in Chancery for the Circuit Court of Roanoke County, Virginia

DERWOOD H. RUSHER
ATTORNEY AT LAW
SALEM, VIRGINIA

STATE OF VIRGINIA,

COUNTY OF ROANOKE, to-wit:

This day personally appeared before me, the undersigned Notary Public in and for the State and County aforesaid, Charles B. Phillips, Attorney and Assistant Commonwealth's Attorney of Roanoke County, Virginia, who, upon his oath says that he was appointed by the Judge of the Circuit Court of Roanoke County, Virginia, to examine the title to the real estate described in the foregoing deed; and from his examination of said title, he is of the opinion that the Board of Supervisors of Roanoke County has, by this deed, a good and sufficient title in fee simple to the said real estate, and that same is free from encumbrances; and further, the said Charles B. Phillips, as Assistant Commonwealth's Attorney of Roanoke County, doth approve the form of said deed as required by Section 15.1-286 of the Code of Virginia, as amended to date. And Paul B. Matthews, County Engineer, whose name is also signed hereto, doth acknowledge that he accepts said deed on behalf of Roanoke County, pursuant to a resolution passed by the Board of Supervisors of said County on the 15th day of November, 1965, and of record in the Board of Supervisors Book 13; Page 172.



Charles B. Phillips
Attorney and Assistant Commonwealth's Attorney of Roanoke County, Virginia

[signature]
County Engineer

Subscribed and sworn to before me by Charles B. Phillips, Attorney and Assistant Commonwealth's Attorney of Roanoke County, and Paul B. Matthews, County Engineer, this 14 day of April, 1966.

[signature]
Notary Public

My commission expires
[illegible] 10 1968

State Tax	$	In the Clerk's Office of the Circuit Court for the County of
County Tax	$	Roanoke, Va., this 14 day of April 1966 this deed was
Transfer Fee	$	presented, and with the certificate of acknowledgement thereto
Clerk's Fee	$ 5.00	annexed, admitted to record at 10:00 o'clock A M.
Plats	$ 1.00	Having affixed thereto duly cancelled United States
Total	$ 6.00	Internal Revenue Stamps of the value of $ 8.25

Teste: R.C. [signature] Clerk
By Mary P. Hollingsworth Deputy Clerk

799
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INSTRUMENT #201211958
RECORDED IN THE CLERK'S OFFICE OF
ROANOKE COUNTY ON
OCTOBER 16, 2012 AT 02:34PM

STEVEN A. MCGRAW, CLERK
RECORDED BY: FRS

9

APPENDIX I – INTERVIEW FORMS

Dixie Caverns County Landfill Superfund Site **Five-Year Review Interview Form**

Site Name: **Dixie Caverns County Landfill** **EPA ID No.:** **VAD980552095**

Interviewer Name: **Daniel Taylor** **Affiliation:** **EPA**
Subject Name: **David Henderson** **Affiliation:** **County**
Time: **1:30 pm.** **Date:** **08/29/2017**

Interview Format: **Phone**

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?

   Has a general knowledge of what happened at the site. Know it is closed site and the fly ash and his responsibility to keep it from being eroded and tampered with.

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?

   Feels fine.

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

   Not really an issue, but there was one time where the police were leaving equipment on site and the landfill. Once David communicated the issue there was no more problems. Just had to educate the police of the situation.

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

   No

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

   No

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?

   No communication to surrounding property owners. Does not think it is necessary to contact them. The neighbors prefer to be left alone.

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

Long term inspection. Will it ever be stopped/reduced?
Having a third party do inspections help county know it still exist. The site is not very active and could be forgotten about it inspections did not occur.