FOURTH FIVE-YEAR REVIEW REPORT FOR THE AIRCO SUPERFUND SITE MARSHALL COUNTY, KENTUCKY

Prepared by

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5/11/17
Date

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LIST OF ABBREVIATIONS & ACRONYMS

ACL	Alternate Concentration Limit
BOC	The BOC Group, Inc. (formerly Airco), now Linde, LLC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
DCA	1,1 dichloroethane
1,2-DCA	1,2 dichloroethane
EDC	ethylene dichloride
FS	Feasibility Study
GPM	gallon per minute
KDEP	Kentucky Department of Environmental Protection
Kg	kilogram
Lb	pound
MCL	maximum contaminant levels
mg/L	milligram per liter
msl	mean sea-level
MNA	monitored natural attenuation
NAPL	non-aqueous phase liquid
NCP	National Oil & Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	operation and maintenance
PAH	poly-aromatic hydrocarbons
PCAP	Plant wide Corrective Action Plan
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
Ppm	parts per million
PVC	polyvinyl chloride
PRP	potential responsible party
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
ROD	Record of Decision
SVE	soil vapor extraction
TCA	trichloroethene
TCE	1,1,2 trichloroethene
TVOC	total volatile organic compounds
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
µg	microgram
VOC	volatile organic compound
UU/UE	Unlimited Use/Unrestricted Exposure

Airco Superfund Site

EPA ID: KYD041981010

Superfund Fourth Five-Year Review Report

I INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order 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 five-year review 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) conducted this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Airco Superfund Site (Airco Site) in Calvert City, Kentucky. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that 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 comprised of the capped Airco Landfill (OU1). The review was conducted by EPA between May 4, 2016, and August 18, 2016.

Several factors affected the ability to fully assess the protectiveness for the Airco Site. Because of this, the protectiveness determination could not be completed at this time and has, therefore, been deferred. Further review will be conducted and an addendum issued to address the protectiveness of the remedy. The factors affecting the assessment of the protectiveness of the remedy include the following:

- The Airco and BF Goodrich sites share a border and common disposal area (i.e., a slough). The two RODs are almost identical and were implemented pursuant to a single CD. Several of the elements in the Airco ROD include components such as the capping of the burn pit which relate to the BF Goodrich site. The Airco ROD needs to be amended in order to remove portions of the remedy that relate to the BF Goodrich site.

- EPA has expanded the scope of its response under CERCLA for the BF Goodrich site. A Remedial Investigation (RI) Report was issued for the BF Goodrich site in 2015, documenting a significantly larger area of contamination and greater degree of risk than addressed in the 1988 ROD. EPA is in the process of evaluating potential modifications to the 1988 ROD for the BF Goodrich Site. Because the BF Goodrich remedy may impact the scope of work at the Airco site, an amendment to the Airco ROD is dependent on a modification to the BF Goodrich ROD.

- Current EPA guidance for conducting FYRs requires that potential exposures for vapor intrusion and "emerging contaminants" be evaluated, as appropriate, as part of the FYR. Because of the

proximity of the BF Goodrich site and potential for VOCs to be present at the Airco site, additional review will need to be completed to fully assess the potential impact vapors and/or "emerging contaminants" may have on the protectiveness of the remedy.

1.1 Site Background

The Airco Site is owned and maintained by Linde, LLC (Linde). The Airco Site is located adjacent to the BF Goodrich Superfund Site (BF Goodrich Site). The BF Goodrich Site includes the former BF Goodrich industrial landfill and the adjacent Burn Pit. Figure 1 shows the site location and Figure 2 depicts the site layout. The Airco Site and the adjacent BF Goodrich Site are two separate but adjacent Superfund sites. The BF Goodrich Site and the Airco Site were placed on the NPL in 1983 and 1984, respectively. These sites were investigated together during the Remedial Investigation/Feasibility Study (RI/FS) phase due to their proximity and have separate yet essentially identical RODs. Three previous FYRs (2001, 2006, and 2011) have been completed for the Airco Landfill Site. Results of this fourth FYR indicate that the remedy for the Airco Site is considered protective of human health and the environment.

The Airco Site consists of a 2.75-acre landfill, which was placed on the National Priorities List (NPL) in 1984. The Site contains one landfill and one flood protection dike. No structures are present at the Site. Figure 1 shows the location of the Airco Site. Figure 2 shows the major features of the Airco Site. Land use at the Airco Site and surrounding properties has not changed since implementation of the ROD and is limited to industrial and agriculture use. The wastes reported to have been disposed of at the landfill include acetylene production waste, caustic material, still bottoms, vinyl stearate catalyst, mercuric acetate, inert ferric oxide chemical precipitate from the waste water treatment plant, off-spec polyvinyl chloride (PVC), and coal ash. A chronology of environmental investigation and remediation is provided in Appendix B. Appendix C provides photographic views of the Airco Site.

The Airco Site is currently fenced. The waste and contaminated materials associated with the landfill are contained within the fenced area under a low-permeability cap. Access to impacted soil and groundwater is restricted and no human receptors are present. Ecological resources near the Airco Site include the Tennessee River.

FOURTH FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Airco Site		
EPA ID: KYD041981010		
Region: 4	**State:** Kentucky	**City/County:** Calvert City / Marshall County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		

Lead agency: EPA
Author name: Brad Jackson
Author affiliation: EPA
Review period: 5/4/2016 – 8/18/2016
Date of site inspection: 5/4/2016
Type of review: Statutory
Review number: 4
Triggering action date: 9/19/2011
Due date *(five years after triggering action date)*: 9/19/2016

II RESPONSE ACTION SUMMARY

2.1 Basis for Taking Action

The Airco Site was used for disposal of industrial waste material predominantly comprised of inert PVC solids and ferric oxide chemical precipitate from the wastewater treatment plant. Results from the 1988 Remedial Investigation (RI) indicated the presence of various volatile organic, semi-volatile, and inorganic contaminants. Contaminants were detected among groundwater, soil, and sediment samples. The most prevalent was ethylene dichloride (1,2-dichloroethane). Also detected were various polynuclear aromatic hydrocarbons (PAH) compounds, and metals. Data from the RI and conclusions from the risk assessment indicated that contaminants had migrated from the landfill and could pose a long-term threat to ground water and the Tennessee River.

2.1.1 Groundwater Impacts

A large area of contaminated groundwater is located immediately west of the Airco Site originating from the BF Goodrich Burn Pit and Landfill. Annual groundwater sampling of wells at the BF Goodrich Site areas, west of the Airco Site, indicate elevated concentrations of 13 VOCs in the groundwater with the primary compounds of concern being 1,2-dichloroethane (1,2-DCA) and benzene. A network of groundwater extraction wells is being operated at the BF Goodrich Site by PolyOne Corporation to prevent movement of contaminants to the Tennessee River. Several extraction wells are located close to the Airco Site (locations are shown on Figure 2). These extraction wells create a localized depression in the groundwater surface near the northwest portion of the Airco Site (URS 2010). A network of soil vapor extraction points and non-aqueous phase liquid (NAPL) removal wells are also operated at the BF Goodrich Site by PolyOne Corporation to capture contaminants. Since 1998, over 150,000 pounds of 1,2-DCA have been removed from the BF Goodrich Site (URS 2010) located approximately 150 feet west from the Airco Site.

Groundwater concentration data from wells installed at the Airco Site indicate 1,2-DCA has been detected in wells on the Airco Site property at concentrations of 260 milligrams per liter (mg/L) at upper aquifer well GA-3 and 13 mg/L at deep well GA-4. Concentration maps showing the distribution of the VOC are provided in the annual CERCLA monitoring reports prepared on behalf of PolyOne Corporation. This contamination is related to migration from the BF Goodrich Site.

Annual groundwater samples have been collected from 10 monitoring wells installed surrounding the Airco Site since 2009 as part of long-term monitoring conducted by Linde to assess the chemical composition of leachate within the landfill and assess the specific impact of the Airco Site on groundwater. This data indicates the Airco Site groundwater VOC concentrations are below groundwater cleanup goals for the 13 compounds identified in the ROD with exception of two compounds (1,2-DCA and 1,1,2-trichloroethane [1,1,2-TCA]) at one monitoring well location (MW-AL-03A) located in the northwest portion of the Airco Site. These impacts are the result of contamination moving onto the Airco Site from the adjacent Goodrich Landfill Site.

Annual samples have also been collected from the leachate sumps within the Airco landfill. Results of the leachate samples collected indicate the presence of VOCs generally less than 100 micrograms per

liter (µg/L); intermittent detection of low concentrations of pesticides; and slightly elevated levels of metals particularly at leachate sump LS-06. No NAPL was detected in the leachate sumps. Analysis of the leachate samples indicate VOC concentrations are below site-specific groundwater cleanup goals established in the ROD.

2.1.2 Soil Impacts

In 2009 and 2014 an area of suspected wax-like material was observed to be seeping from the landfill and was observed on the landfill surface. Analytical results from a sample of the material indicated it contained elevated concentrations of chlorinated VOCs with vinyl chloride exceeding the limits for hazardous waste as defined by the EPA. Observations within test pits indicated the wax-like material had migrated upwards through the clay cap in thin vertical stringers. The viscosity of the wax-like material was observed to change from a solid to a highly viscous liquid upon warming. Based on these observations it is believed the wax-like material originated from within the upper portion of the landfill and flowed upwards through the clay cap. The wax-like material is likely to have a lower density than surrounding soils and clay which causes the material, when in a semi-liquid state, to flow upwards.

In 2009, an evaluation of the landfill cap was completed to assess the lateral extent of the wax-like material. The material was removed and the landfill cap was repaired. In 2014 the wax like material was found in the same area of the landfill. An excavation was completed that removed approximately 112 tons of soil impacted by the wax like material for off-site disposal. A flexible 30 mm liner was placed over the excavated areas and the low permeability cap and vegetative layers of the cap were restored (Greenstar, 2015).

2.2 Response Actions

As stated in the ROD, the purpose of remedial actions at the Airco Site is to mitigate and minimize potential risks to public health, welfare, and the environment posed by site soils, sediments, and groundwater contamination. The following are cleanup objectives, based on regulatory requirements and levels of contamination found at the combined sites:

- Contain the on-site contaminated groundwater plume by extraction and treatment;
- Bring the landfills into compliance with Kentucky statutes regarding structures on a 100- year floodplain; and
- Protect the public and environment from exposure to on-site contaminated soils and sediments.

The Airco remedy contains the following components, which are identical to those in the BF Goodrich ROD:

- Groundwater monitoring;
- Impose deed restrictions preventing residential development and groundwater use;
- Construct flood protection dike around landfills;
- Upgrade landfill clay caps;

- Install leachate extraction system; and
- Secure entire Site.

On June 24, 1988, the EPA issued two RODs simultaneously for the BF Goodrich Site and Airco Site selecting the preferred remedy described within the FS for the combined sites. The two RODs are essentially the same and established the groundwater alternative concentration limits (ACLs) listed in Table 1, for the combined BF Goodrich and Airco Sites.

Table 1 - ACLs for The Combined BF Goodrich and Airco Sites

Indicator Constituent	ACL (mg/L)	Indicator Constituent	ACL (mg/L)
1,2-Dichloroethane (EDC)	8.5	1,1,2,2-Tetrachloroethane (1,1,2,2-PCA)	0.29
Carbon tetrachloride	8.5	Trichloroethene (TCE)	8.5
Chloroform	0.32	Chlorobenzene	8.5
1,1,2-Trichloroethane (1,1,2-TCA)	1.0	1,1-Dichloroethane (1,1-DCA)	8.5
Benzene	8.5	Bis (2-chloroethyl) ether	0.051
Fluoranthene	8.5	Tetrachloroethene (PCE)	1.5
Acenaphthene	8.5		

As stated in the ROD, overall implementation of the recommended alternative was estimated to take ten years following the design and contract award. The time required to address the landfills, surface soils, and subsurface soils was estimated to be approximately one year. Groundwater extraction and treatment would continue until the clean-up goals for groundwater is achieved. The estimated time for these clean-up goals to be met would be ten years after the initiation of the extraction and treatment system.

On June 29, 1992, the Consent Decree between the EPA, BF Goodrich, and The BOC Group (BOC) was finalized, after being changed slightly to allow KDEP "sufficient participation in the remainder of the cleanup process." On October 27, 1995, BF Goodrich submitted the Final Design for Remedial Action Activities at the combined BF Goodrich and Airco Superfund Sites. The activities described in the document incorporated the components of the remedy from the June 24, 1988, ROD for the Site and the June 29, 1992, Consent Decree. It also reflected the applicable requirements of the Remedial Design/Remedial Action Work Plan approved by the EPA on November 10, 1992. The remedial action final inspection was conducted on June 4, 1997.

2.3 Airco Specific Components Of The ROD

The RODs for the BF Goodrich Site and Airco Site are essentially identical and contain the same remedy requirements because of the proximity of these sites; the combined RI/FS completed for these sites; and the combined remedy components that were implemented. However, it is now recognized that not all remedy components identified in the ROD are applicable to the Airco Site. Components of the ROD which apply to the Airco Site include:

- Groundwater monitoring;
- Deed restrictions preventing residential development and groundwater use;

- Construction of a flood protection dike around the landfill;
- Upgrading the landfill cap to a clay cap;
- Installation of a leachate extraction system; and
- Securing the entire Site.

Components of the ROD that pertain to the BF Goodrich Site, and do not apply to the Airco Site include:

- Pumping contaminated groundwater and treatment by air stripping;
- Excavating surface soils and placement into the Burn Pit;
- Installation of an organic vapor recovery system in the Burn Pit;
- Covering the Burn Pit with a cap;
- Alternative Concentration Limits for 13 chemicals of concern for the Burn Pit; and
- Timeframes for establishing groundwater cleanup goals established based on contaminants at the Burn Pit.

2.4 Status of Implementation

Implementation of the recommended alternative involved imposing deed restrictions to prevent residential development and groundwater use; construction of the flood protection dike; construction of landfill cover improvement; installation of the leachate extraction system; site fencing; and groundwater monitoring. These activities are described in the following sections.

2.4.1 Impose Deed Restrictions

Deed restrictions were filed and recorded for the BF Goodrich Superfund Site and for the Airco Superfund Site in 1999 and 2000, respectively. The deed restrictions for both the BF Goodrich and Airco Superfund Sites are provided in Appendix B of the Second FYR. These deed restrictions are intended to preserve the integrity of the remedy. Although the ROD included deed restrictions to prevent residential development and the installation of wells for potable use, these restrictions were not carried forward into the requirements of the CD. In consultation with EPA and KDEP, restrictions to prevent the use of the property for residential use and prevent the use of groundwater for potable purposes were deferred until a more comprehensive evaluation could be made regarding the scope deed restrictions (or environmental covenants) based on the results from the expanded RI/FS.

2.4.2 Construction of Flood Protection Dike

The approved design required that the flood protection dike be constructed to a minimum elevation of 347.0 ft above msl, which is approximately 2.9 feet above the estimated 100-year flood elevation. The flood protection dike was situated with the outboard crest located approximately five feet riverward of the established unit boundaries. Due to the proximity of the Airco Site with the slough located to the

east, it was necessary to construct a portion of the dike over the slough area. Approximately 45,000 cubic yards of fill material was placed for construction of the flood protection dike.

In addition to the flood protection dike, a storm water drainage system consisting of a culvert and 24-inch corrugated metal pipe extending through the flood protection dike; a sluice gate near the culvert outlet; and two storm water pumps were installed near the northeast corner of the Airco Site. During flood conditions (e.g. when the river pool is above the outlet of the culvert), the sluice gate is manually opened by maintenance personnel and storm water is permitted to temporarily pond on the landfill cover. This is necessary to equalize the pressure inside and outside of the flood protection dike. Following the closing of the sluice gate, water is pumped from the landfill by the two storm water pumps equipped with float switches.

2.4.3 Landfill Cover Improvements

A compacted low-permeability clay cap and a 12-inch layer of vegetated fill were installed to achieve the desired grades within the limits of the BF Goodrich landfill and the Airco landfill. Areas within the limits of the BF Goodrich/Airco landfills were backfilled and compacted with approved low permeability soil material.

2.4.4 Leachate Collection System

A leachate collection system was installed to remove leachate that may accumulate above the underlying relatively low-permeability strata beneath the BF Goodrich/Airco landfills. The leachate collection system consists of a series of six sumps located within the BF Goodrich and Airco landfills. Sumps LS-1, LS-2, LS-3, LS-4, LS-5, and LS-6 were installed to depths identified during pre-design investigations (which were two feet below the landfill bottom elevations). LS-1 and LS-2 were installed on the B.F. Goodrich landfill and LS-3 through LS-6 were installed on the Airco landfill. Each sump was equipped with a positive air displacement pump to convey leachate which collects in the sumps. Each of the pumps was individually piped to the Equipment Shed where the discharge is combined through a manifold and temporarily stored in the Transfer Tank, before being pumped to the treatment system located on the Westlake facility. In 2005, the positive air displacement pumps in the six sumps were replaced with electric submersible pumps.

In 2016, Linde requested permission from the EPA to terminate pumping at the four LS wells at the Airco Landfill. EPA granted approval in a letter dated June 2, 2016.

2.4.5 Site Fencing

A chain-linked fence system was installed around the BF Goodrich and Airco Sites, and along the outer crest of the flood protection dike. The fence system consists of a six-foot high chain link fence and is equipped with three strands of barbed wire at the top. Minor modifications were made to the security fencing design which included a fence separating the BF Goodrich and Airco Sites.

2.4.6 Environmental Monitoring

Monitoring of groundwater is required during the post-closure care period. Detailed information regarding the groundwater and surface water monitoring requirements, schedules, procedures, and parameter list is provided in the Draft Phase 2 Supplemental Assessment Sampling and Analysis Plan (Greenstar, 2012). As required by the Consent Decree, the PRPs are required to notify the EPA in writing at least 21 days in advance of the sample collection activity, with subsequent verbal notice not less than three working days prior to implementation of these activities. The Consent Decree also requires that the laboratories perform analyses in accordance with the EPA Contract Laboratory Program (CLP) protocol. These requirements have been complied with during the Five Year Review period.

2.5 System Operations/Operations and Maintenance

The Operations and Maintenance Plan (O&M Plan) for the combined BF Goodrich Landfill and Airco sites, dated May 1997, was prepared to address post-closure care requirements and activities. These activities are completed periodically as needed by on-site representative overseeing site maintenance. The following inspections were completed at the Airco Site as required by the O&M Plan:

- Inspection of the site security fence and gates;
- Inspection of drainage ditches for excessive sediment accumulation;
- Verification that the storm water pumping system is functioning effectively;
- Inspection of the groundwater monitoring wells;
- Inspection of the leachate extraction well pumping systems; and
- Review of equipment maintenance schedules to verify preventative maintenance in accordance with manufacturer's recommendations.

A summary of the completed and ongoing O&M activities since the last FYR review include the monthly inspection of leachate extraction well pumping system and site security fencing, and the annual inspection of drainage ditches, landfill cap, and site monitoring wells.

2.5.1 Summary of Major Maintenance Activities from 2011 to 2016

- Submersible pumps in leachate sumps were replaced numerous times after failure due to silting.
- In 2014 an excavation was completed that removed approximately 112 tons of soil impacted by the wax like material for off-site disposal. A flexible 30 mm liner was placed over the excavated areas and the low permeability cap and vegetative layers of the cap were restored (Greenstar, 2015).

III PROGRESS SINCE THE LAST REVIEW

Table 2: Protectiveness Determinations/Statements from the 2011 FYR.

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	The remedy is considered protective of human health and the environment in the short-term. A determination of "long-term protectiveness" cannot be made because there are remedy elements in the Airco ROD (related to the BF Goodrich site) that have not been implemented. Additionally, institutional controls are in place which prohibit disturbing the landfill cap, but which do not specifically restrict residential development and installation of drinking water wells.

Table 3: Status of Recommendations from the 2011 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Update remedy for Airco Site	The remedy for the Airco Site should be updated to reflect the current understanding of the Site, site conditions, removal of remedy components that are not applicable to the Airco Site, and to identify appropriate cleanup criteria.	Ongoing	A separate and appropriate Record of Decision for the Airco Landfill will be issued after remedial planning is complete for the BF Goodrich Landfill. This is expected to occur before the next Five Year Review in 2021.	12/31/2020
1	Deed Restrictions do not prohibit residential use and the installation of drinking water supply groundwater wells	Amend deed restriction to specifically prohibit residential use and potable well installation.	Addressed in Next FYR	Deed restrictions to prohibit residential use and installation of drinking water supply wells will be completed after the Record of Decision is updated for the Airco Landfill. This is expected to occur before the next Five Year Review in 2021.	12/31/2020

IV FIVE-YEAR REVIEW PROCESS

4.1 Community Notification, Involvement & Site Interviews

The public was formally notified on September 29, 2016, of the Five-Year Review by publishing a notice in a local newspaper. Since publishing the notice, EPA has not been contacted by the public regarding the Five-Year Review.

The results of the review and the report will be made available at the Site information repository located at Marshall County Public Library, Calvert City Branch and the EPA Region 4 office.

4.2 Data Review and Activities Complete During Five Year Review Period

4.2.1 Phase 2 Supplemental Assessment

Since the Third Five Year Review was completed in 2011, a Phase 2 Supplemental Assessment Report was completed by Linde at the Airco Site (Greenstar, 2013) that was a follow-up to the initial Supplemental Assessment Report (SAR) completed in 2011 (Greenstar, 2011). The Phase 2 Supplemental Assessment completed the following activities:

- Assess groundwater flow patterns within and near the Airco Landfill site.
- Assess whether groundwater has been impacted by metals or polychlorinated bi-phenyls (PCB) originating from the Airco Landfill.
- Complete a preliminary screening of monitored natural attenuation (MNA) as a remedy for metals in groundwater which are found to be potential contaminants of concern in site groundwater.

Each of these activities is summarized below.

To assess groundwater flow patterns within and near the Airco Landfill site, 13 pressure transducers and one barometric pressure transducer were installed in monitoring wells located on Linde property. One drive point piezometer was installed to collect water elevation data between the Airco Landfill and the adjacent surface water body (slough). The pressure transducers were installed prior to the start of the flooding season in April of 2012. Data collected was used to create groundwater elevation maps and groundwater elevation trend graphs to assess seasonal groundwater fluctuations.

Results of this assessment concluded groundwater in the vicinity of the Airco Landfill follows the surface topography and flows from southwest to northeast with more northerly flow direction on the flood plain outside the dike wall. During normal flow conditions, when high river conditions are not present, groundwater flow patterns are relatively consistent for winter, summer and fall. Spring river flooding conditions cause significant increase in water elevations for wells within the flood plain and a reversal in groundwater flow direction from the river towards the Airco Landfill. Little response to precipitation was observed at monitoring wells within the capped area of the Airco Landfill due to the landfill cap. A perched water table is present within the Airco Landfill that shows less fluctuation compared to the primary water table. Groundwater pumping at extraction well BW-1945, the closest extraction well to the Airco Landfill, has limited effects on monitoring well water elevations. Operation of this extraction well did not significantly affect groundwater flow patterns at the Airco Landfill.

To assess whether groundwater has been impacted by metals or PCB originating from the Airco Landfill, site monitoring wells were redeveloped to minimize turbidity, and groundwater samples were collected and analyzed for total metals and PCB homologues. No detections of PCBs or hexavalent chromium were noted during the 2012 re-sampling of wells for these analytes, which used more sensitive analytical methods compared to previous sampling events. Previously collected hexavalent chromium and PCB data are considered to be false positive results.

A preliminary screening of MNA as a remedy for metals in groundwater was completed using metals data from the 2009, 2010, 2011 and 2012 groundwater sampling events using a Tiered approach as per EPA guidance. The Tier 1 assessment of the seven metals suggests that MNA may be effective in the further reduction of metal concentrations in groundwater downgradient of the landfill. None of these metals have primary MCLs and two have Secondary MCLs based on taste, odor and color (iron and manganese).

Groundwater results from October 2015 for the 'A' and 'B' depth monitoring wells are summarized in Figures 3 and 4. respectively. Groundwater sample results have been compared to groundwater cleanup goals for 13 indicator chemicals established in the ROD for the Site (EPA 1988[1]), and results are below these cleanup goals. Results were also compared to Federal Maximum Contaminant Levels (MCL) which are not cleanup standards for the Site and are used as a comparison because no other site-specific criteria are available for most VOC compounds.

4.2.2 2014 Excavation of Wax-Like Material and Landfill Cap Repair

In 2009, an evaluation of the landfill cap was completed to assess the lateral extent of the wax-like material that had appeared on the surface of the landfill. The material was removed and the landfill cap was repaired. In 2014 the wax like material was found in the same area of the landfill. An excavation was completed that removed approximately 112 tons of soil impacted by the wax like material for off-site disposal. A flexible 30 mm liner was placed over the excavated areas and the low permeability cap and vegetative layers of the cap were restored (Greenstar, 2015).

4.2.3 Termination of LS Well Operation

In 2016, Linde requested permission from the EPA to terminate pumping at the four LS wells at the Airco Landfill. Concentrations of VOC and metals in the leachate are not significantly elevated above Federal MCL and significant long term costs are required for pump maintenance and replacement. Therefore, approval for this request was issued by the EPA in a letter dated June 2, 2016.

4.2.4 Storm Water Sampling

The Third Five Year Review for the Airco Landfill identified the need for storm water discharge sampling as no previous samples of storm water have been collected at this site. Therefore, a storm water sampling plan was issued to the EPA in 2012 (Greenstar, 2012). Storm water was allowed to accumulate by closing the sluice gate at the storm water outfall. The storm water sample was collected at the sluice gate outfall located along the dike wall and the sample was collected from the outfall located outside the dike wall. The storm water sample contained no detected concentration of VOC, SVOC, PCBs, or pesticides. Two metals were detected at concentrations above Kentucky Surface Water Standards including iron and zinc, which were attributed to be the result of interaction with the surface water and galvanized discharge pipe. Due to the limited number of analytes detected the analysis of stormwater samples was reduced to VOC, SVOC and metals. Annual stormwater sampling

[1] EPA 1988. Record of Decision for Airco Superfund Site, Calvert City, Kentucky. June.

was initiated in 2015.

4.3 Site Inspection

The inspection of the Site was conducted on May 4, 2016. In attendance were Brad Jackson, EPA, and on behalf of the PRP, Linde, LLC, David Sordi, P.E. and on behalf of the PRP's contractor, Peter Nimmer, P.G. Because of the routine nature of the review and close coordination between EPA and KDEP during the expanded investigation of the BF Goodrich and Airco sites, KDEP did not participate in the inspection. During the site inspection, the remedial systems were observed and inspected. The inspection evaluated the landfill cap, the flood protection dike, and the site fencing. The Site Inspection checklist is presented in Appendix C. Photographs from the Airco Site inspection are presented in Appendix D. No significant issues were identified regardingthe physical integrity of the site remedial components.

V TECHNICAL ASSESSMENT

The goal of the five-year review is to evaluate if the remedial action at the Airco Site is protective of human health and the environment. The technical assessment of the protectiveness of the remedy is based on the responses to these three questions:

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

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

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

It is important to note that as discussed in Section 2.3, there are several remedy components in the Airco ROD that are related to the BF Goodrich site. The Third Five-Year Review for the Airco site only addressed those elements specific to the Airco site.

5.1 QUESTION A: Is the remedy functioning as intended by the decision documents? YES[2].

5.1.1 Remedial action performance

The components of the remedial design specific to the Airco Site include the landfill cap, leachate collection system, flood protection controls, and site access controls. These remedial measures are in place and are properly maintained. An engineering inspection of the landfill cap was completed as part

[2] The Airco ROD has components (i.e., hydraulic, containment, source treatment, attainment of ACLs) that are related to the BF Goodrich Site. Because these issues are related to the BF Goodrich site, they have not been implemented pursuant to the Airco ROD. Since the components related to the Airco remedial design have been implemented and are functioning properly, a determination of "yes" with to respect to whether the "the remedy is functioning as intended by the decision documents" was made.

of the Supplemental Investigation conducted at the Airco site in 2009 and 2010. The engineering inspection has confirmed that the cap was installed in accordance with the original design, and appears to be functioning as intended. The surface of the cap is in good condition and no slumping, cracking or slope failure was observed. The permeability of the compacted clay cap is lower than the design requirements indicating the cap should be limiting downward migration of precipitation into the waste material. The remedy components specific to the Airco site are functioning as intended[3]. Annual inspections indicated the remedial design components specific to the Airco Site are being properly maintained.

5.1.2 Implementation of Institutional Controls and Other Measures

Deed restrictions are in place to restrict activities that could disturb the remedial system installed at the Site. Although the deed restrictions do not specifically prevent residential development of the property or installation of residential wells at the Site, access to the Site is controlled and monitored monthly. Engineering controls including fencing and signage prevent exposure to waste materials by limiting access to the Airco Site by authorized personnel only. The likelihood of residential development or the installation of potable wells at the Airco site is remote given the current use. Deed restrictions or environmental covenants will be addressed as part of the future ROD amendment.

5.2 QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid? NO.

The answer to Question B is "No" because the Airco Site ROD includes remedial components that are specific to the BF Goodrich site. Components in the Airco ROD that are not applicable to the Airco Site include 1) pumping contaminated groundwater, 2) treatment of groundwater by air stripping; 3) excavating surface soils and placing in the Burn Pit; 4) installation of an organic vapor recovery system in the Burn Pit; and 5) covering the Burn Pit with a cap. These remedial components are associated with the BF Goodrich Site and are not applicable to the Airco Site.

Moreover, additional assessment is required to fully assess potential exposures from the migration of vapors into the ambient air and exposure to "emerging contaminants" such as 1,4-dioxane.

5.2.1 Alternate Cleanup Levels

Changes in EPA policy with respect to the use of ACLs warrant a review to evaluate whether the criteria should be revised to include MCL-based groundwater criteria.

[3] Although a wax-like material has been observed, on the landfill surface, it does not appear to be an indication of permeability or integrity issues with the cap. The observance of the wax-like material appears to be the result of the physicochemical properties of the material, the material's shallow depth, and sensitivity to changes in temperature. On the three occasions when this material has forced its way to the surface, the localized area has been excavated and the cap repaired to comply with, or exceed, original design standard.

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

The answer to Question C is "Yes". As discussed previously, the Airco Site ROD includes remedial components that are specific to the BF Goodrich site. Components in the Airco ROD that are not applicable to Airco Site include 1) pumping contaminated groundwater, 2) treatment of groundwater by air stripping; 3) excavating surface soils and placing in the Burn Pit; 4) installation of an organic vapor recovery system in the Burn Pit; and 5) covering the Burn Pit with a cap. These remedial components are associated with the BF Goodrich Site and are not applicable to the Airco Site.

Moreover, additional assessment is required to fully assess potential exposures from the migration of vapors into the ambient air and exposure to "emerging contaminants" such as 1,4-dioxane.

5.3.1 Technical Assessment Summary

Remedy components specific to the Airco Site are functioning as intended by the decision documents. However, because of the uncertainty of the effect of modifications to the BF Goodrich remedy and the need for further assessment of potential exposure from vapors emitted to the ambient air and exposure to "emerging contaminants" such as 1,4-dioxane, the determination of the protectiveness of the remedy warrants further evaluation.

VI ISSUES/RECOMMENDATIONS

As noted previously, several factors affected the ability to fully assess the protectiveness for the Airco Site. Because of this, the protectiveness determination could not be completed and has been deferred. Further review will be conducted and an addendum issued to address the protectiveness of the remedy. The factors affecting the assessment of the protectiveness of the remedy include the following:

- The Airco and BF Goodrich sites share a border and common disposal area (i.e., a slough). The two RODs are almost identical and were implemented pursuant to a single CD. Several of the elements in the Airco ROD include components such as the capping of the burn pit, that relate to the BF Goodrich site. The Airco ROD needs to be amended in order to remove portions of the remedy that do not relate to the Airco site.

- EPA has expanded the scope of its response under CERCLA for the BF Goodrich site. A Remedial Investigation Report was issued for the BF Goodrich site in 2015, documenting a significantly larger area of contamination and greater degree of risk than addressed in the 1988 ROD. EPA is in the process of evaluating potential modifications to the 1988 ROD for the BF Goodrich Site. Because the BF Goodrich remedy may impact the scope of work at the Airco site, an amendment to the Airco ROD is dependent on a modification to the BF Goodrich ROD.

- Current EPA guidance for conducting FYRs requires that potential exposures for vapor intrusion and "emerging contaminants" be evaluated, as appropriate, as part of the FYR. Because of the proximity of the BF Goodrich site and potential for VOCs to be present at the Airco site,

additional review will need to be completed to fully assess the potential impact vapors and/or "emerging contaminants" may have on the protectiveness of the remedy.

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1	**Issue Category: Changed Site Conditions**			
	Issue: The existing Record of Decision for the Airco Site includes components which are specific to the adjacent BF Goodrich Site and do not apply to the Airco Site. Moreover, additional assessment is required to fully assess potential exposures from the migration of vapors into the ambient air and exposure to "emerging contaminants" such as 1,4-dioxane.			
	Recommendation: The remedy components unrelated to the Airco Site should be removed and criteria specific to the Airco Site identified. Conduct further assessment of the potential impact from vapors and "emerging contaminants."			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
Yes	Yes	EPA	EPA	9/19/2019

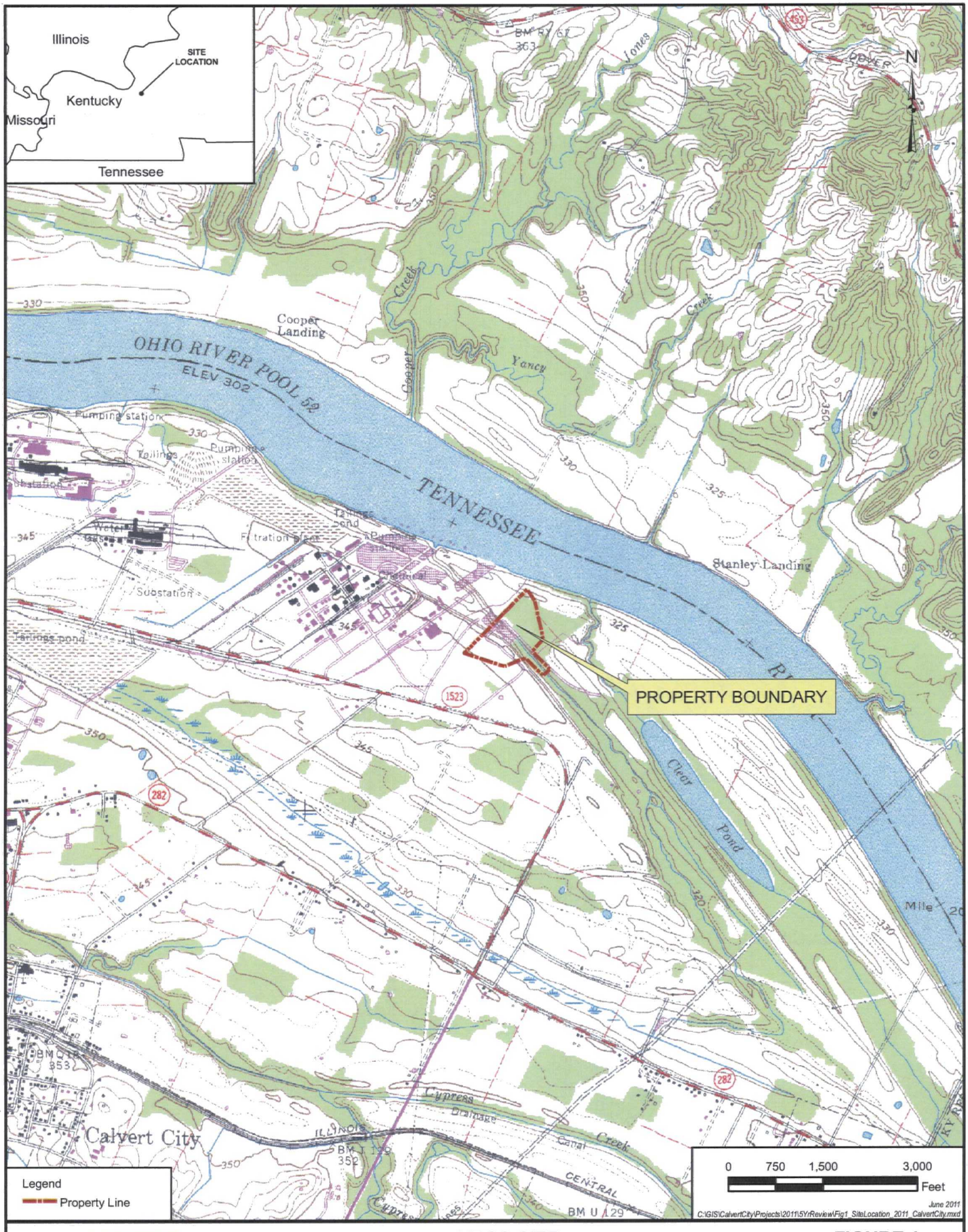
OU(s): 1	**Issue Category: Institutional Controls**			
	Issue: Institutional controls currently in place ensure the protection of the remedy, but do not specifically restrict residential development or the installation of potable drinking water wells.			
	Recommendation: Implement deed restrictions or environmental covenants as part of the amended ROD to also restrict residential development and potable well installation.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
Yes	**Yes**	**PRP**	**EPA**	**9/19/2019**

VII PROTECTIVENESS STATEMENT

Protectiveness Statement	
Operable Unit:1	*Protectiveness Determination:* Protectiveness Deferred
Protectiveness Statement: The protectiveness determination for the Airco Site is deferred pending the further assessment of the impact of the modification of the BF Goodrich remedy on the Airco site and the further assessment of potential impact from vapor intrusion and exposure to "emerging contaminants" such as 1,4-dioxane. These additional factors will be evaluated as an Addendum to this FYR.	

VIII NEXT REVIEW

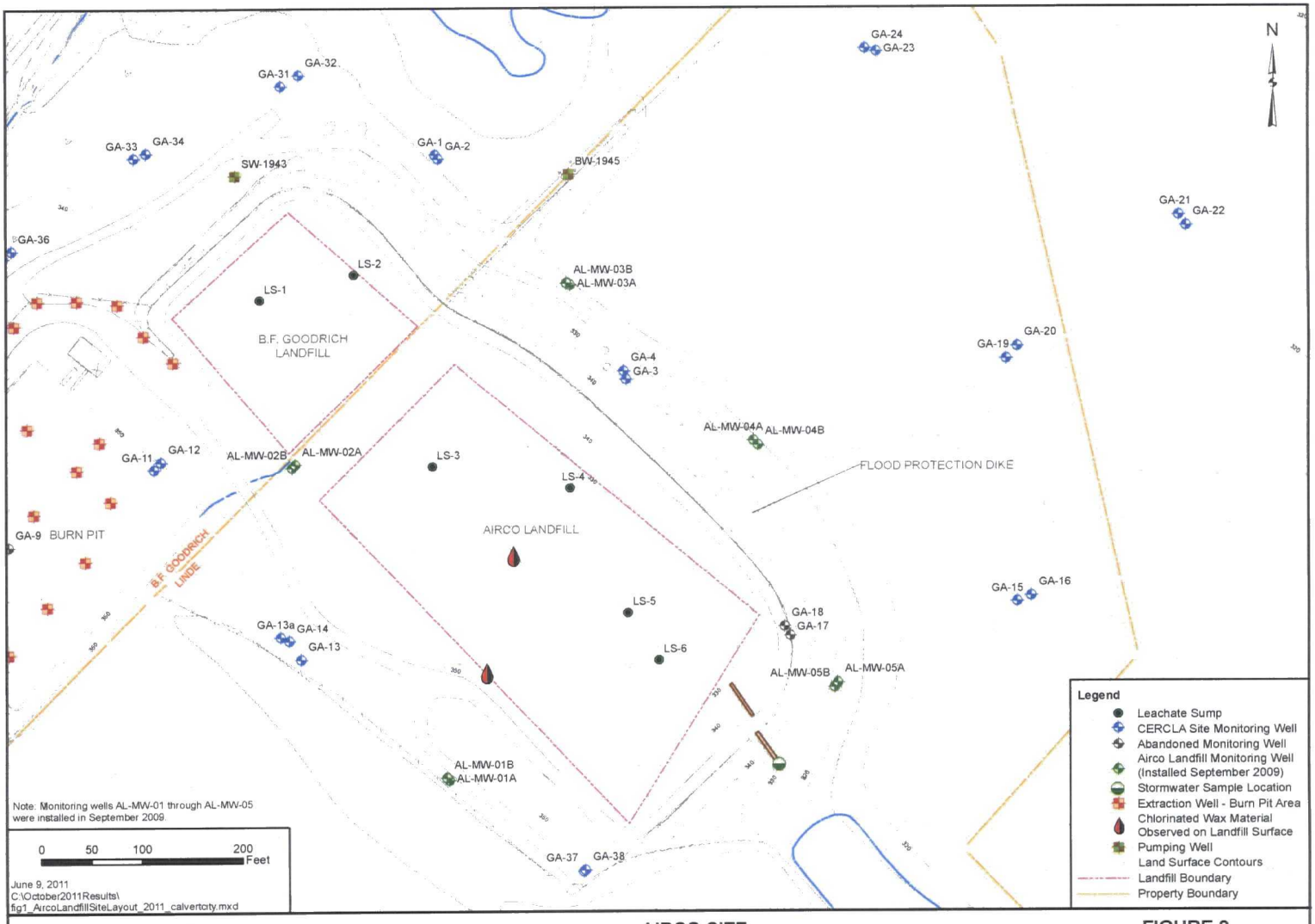
The next five-year review report for the Airco Superfund Site is required five years from the completion date of this review.



GREENSTAR
Environmental Solutions, LLC

AIRCO SITE
CALVERT CITY, KENTUCKY

FIGURE 1
SITE LOCATION



GREENSTAR

AIRCO SITE
CALVERT CITY, KENTUCKY

FIGURE 2
SITE LAYOUT

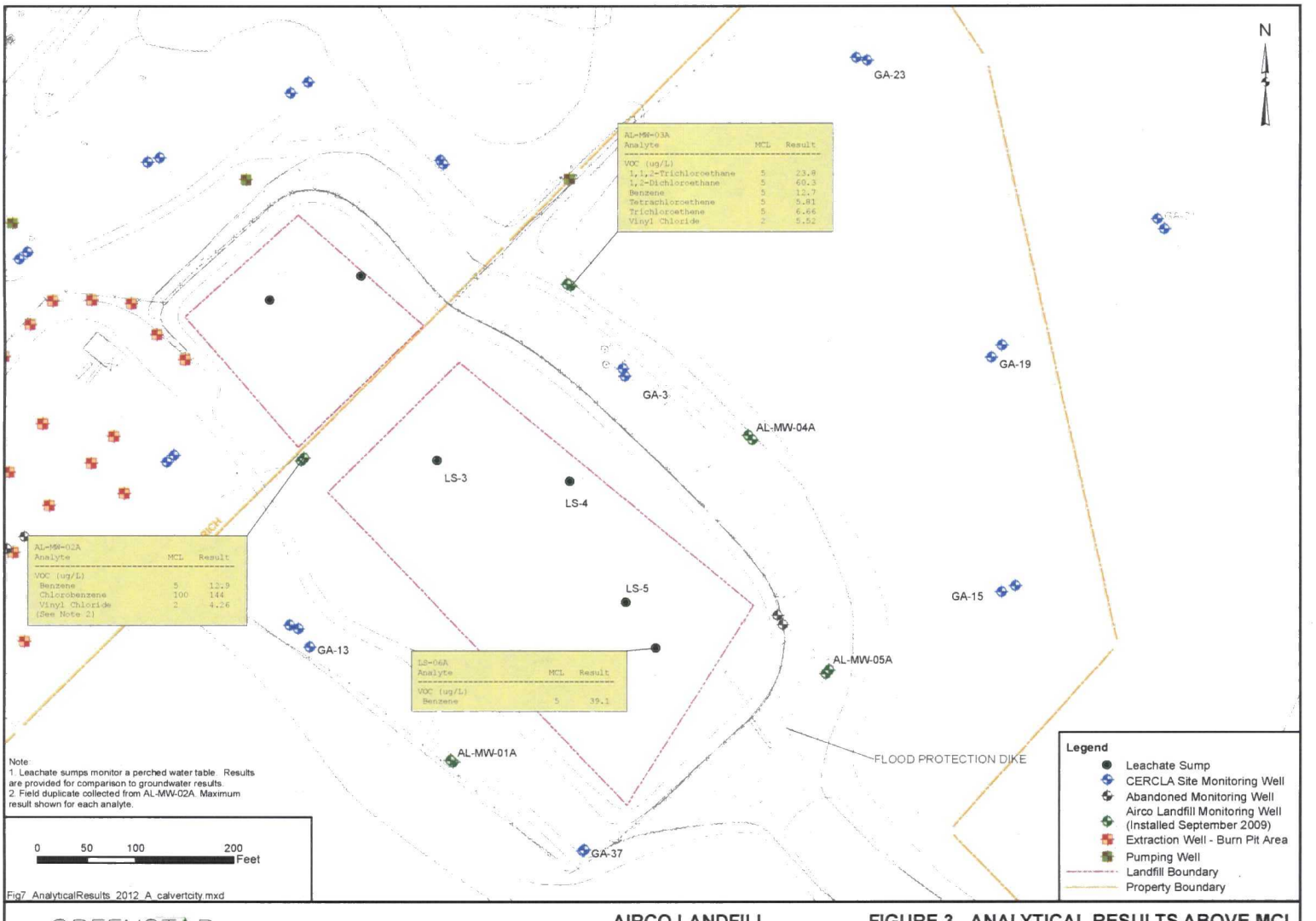


Fig7_AnalyticalResults_2012_A_calvertcity.mxd

GREENSTAR

AIRCO LANDFILL
CALVERT CITY, KENTUCKY

FIGURE 3 - ANALYTICAL RESULTS ABOVE MCL
LEACHATE SUMPS/'A' WELLS, OCTOBER 2015

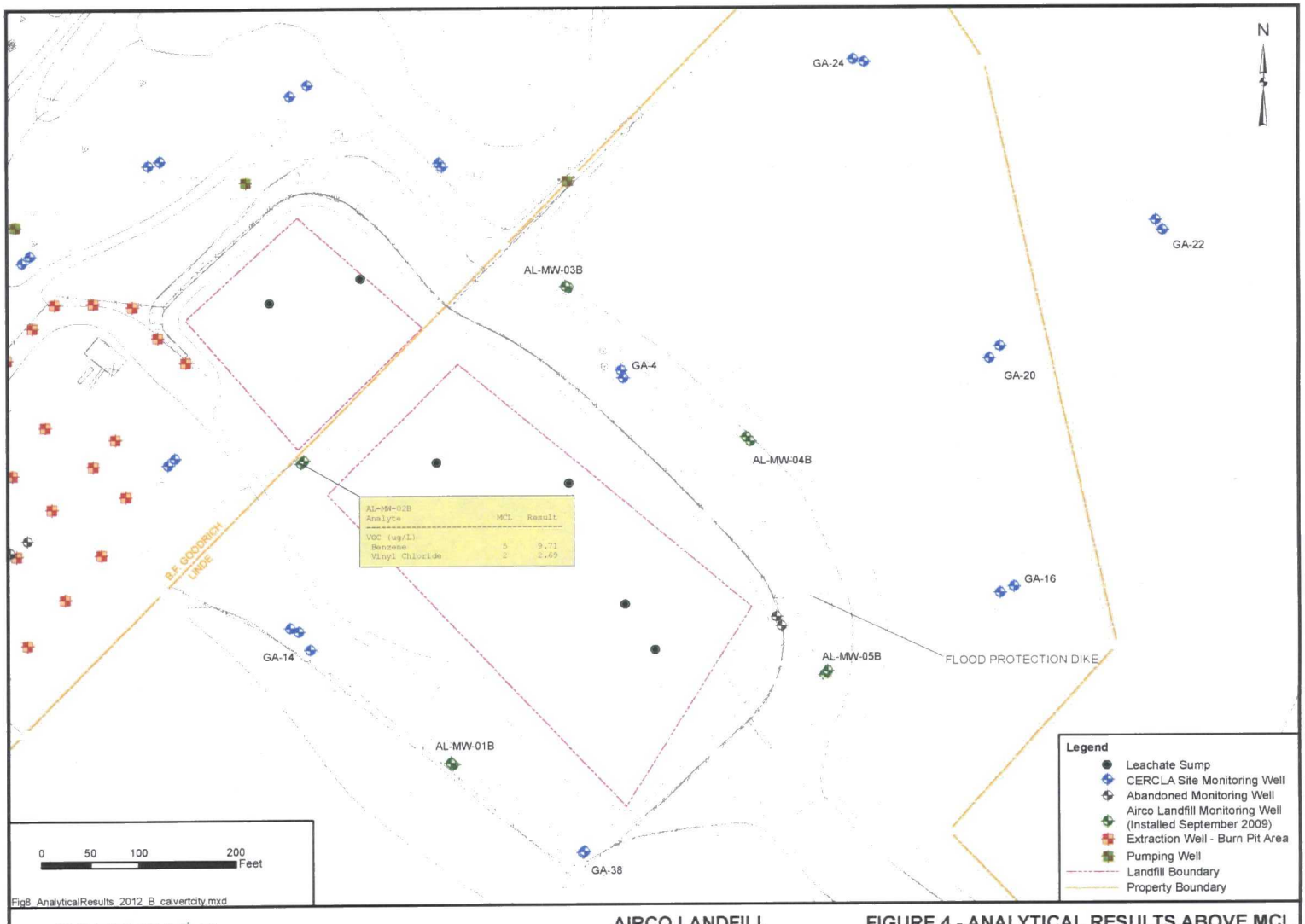


Fig8_AnalyticalResults_2012_B_calvertcity.mxd

GREENSTAR

AIRCO LANDFILL
CALVERT CITY, KENTUCKY

FIGURE 4 - ANALYTICAL RESULTS ABOVE MCL
'B' WELLS, OCTOBER 2015

Comprehensive Five-Year Review Guidance (OSWER No. 9355.7-03B-P). US Environmental Protection Agency. June 2001.

Comprehensive Groundwater Sampling Report-Draft, Calvert City, Kentucky. Dames & Moore. February 13, 1997.

Second Five-Year Review, BF Goodrich/Airco Superfund Site, Calvert City, Kentucky. URS. August 24, 2006.

Third Five-Year Review, BF Goodrich/Airco Superfund Site, Calvert City, Kentucky. URS. September 19, 2011.

Greenstar 2011. Draft Supplemental Assessment Report, Airco Landfill, Calvert City, Kentucky. January.

Greenstar 2012. Storm Water Sampling Plan, Airco Landfill, Calvert City, Kentucky. 24 February 2012.

Greenstar 2012. Draft Phase 2 Supplemental Assessment Sampling and Analysis Plan. Airco Landfill, Calvert City, Kentucky. 27 July.

Greenstar 2013. Draft Phase II Supplemental Assessment Report, Airco Landfill, Calvert City, Kentucky. 5 August 2013.

Greenstar 2015. Letter to Brad Jackson, US EPA RPM, Re: Chlorinated Wax Removal at the Airco Landfill, Calvert City, Kentucky. Dated 7 March 2015.

Groundwater Collection and Treatment System (Revision 2), BF Goodrich/Airco Site, Calvert City, Kentucky. Dames & Moore. August 10, 1995.

Operation and Maintenance Plan, BF Goodrich/Airco Superfund Site, Calvert City, Kentucky. Dames & Moore. May 1997.

RCRA Corrective Action Program, 2005 Comprehensive Groundwater Monitoring, Former BF Goodrich Company. URS. April 4, 2006.

Record of Decision, BF Goodrich Site (EPA ID: KYD041981010), Marshall County, Kentucky, (EPA, 1988).

Record of Decision, Airco Site (EPA ID: KYD041981010), Marshall County, Kentucky, (EPA, 1988).

Remedial Investigation Report, BF Goodrich/Airco Site, Calvert City, Kentucky. Dames & Moore. March 14, 1988.

2008 URS. Focused Remedial Investigation/Feasibility Study Work Plan, Revision 1. July
Dames and Moore 1988b. Feasibility Study, B.F. Goodrich/Airco Superfund Site, Calvert City, Kentucky. March.

A chronology of the major events for the BF Goodrich and Airco Superfund Sites are summarized below. Prior to 2007 these sites were investigated together.

Event	Date
BF Goodrich plant operations begin.	1953
Airco Site activities begin	1956
BF Goodrich leases portion of Airco Site and BF Goodrich landfill	1962
BF Goodrich purchases leased portion of land from Airco	1964
Airco Site leased to Air Products and Chemicals Inc.	1971
BF Goodrich Landfill closed with a clay cap and vegetative cover	1980
Site Investigation initiated by Kentucky Department of Environmental Protection	1980
Airco Site closed with a clay cap and vegetative cover	1981
BF Goodrich Landfill listed on National Priorities List	1983
Airco Site listed on National Priorities List	1984
Remedial Investigation /Feasibility Study of BF Goodrich and Airco Superfund Site completed	1988
Records of Decisions signed for BF Goodrich and Airco Superfund Site	1988
Six groundwater extraction wells (four barrier wells and two source wells) installed and activated	1991
Consent Decree between USEPA, BF Goodrich, and BOC signed	1992
Remedial Design/Remedial Action Work Plan approved by USEPA	1992
Excavation /consolidation of surface soil and drainage ditch sediment into Burn Pit Area	1996
RCRA cover system installed over Burn Pit Area	1996
Clay and vegetative cover system replaced over BF Goodrich and Airco Sites	1996
Installation of soil vapor extraction system in Burn Pit Area (13 Wells)	1996
Installation of leachate extraction system (six sumps) at the BF Goodrich and Airco Sites	1996
Construction of flood protection dike completed	1996
Leachate redirected to steam stripper owned by BF Goodrich and operated by Westlake Monomers	1997
Vapor from soil vapor extraction system redirected to steam-stripper operated by Westlake Chemicals	1998
First Five-Year Review of BF Goodrich and Airco Superfund Site completed	2001
Groundwater extraction well (BW-1954) installed down gradient of the Burn Pit and activated	2001
Ten dual-phase extraction wells installed west and north of Burn Pit Area	2002

Existing Burn Pit SVE wells (13 wells) modified for dual phase extraction	2002
Second Five-Year Review of BF Goodrich and Airco Superfund Site completed	2006
Separation of the BF Goodrich Site and Airco Site initiated	2007
Investigation of BF Goodrich Landfill, Burn Pit and Westlake Property initiated	2007
Investigation of landfill cap and groundwater completed for Airco Site	2010
Draft Supplemental Assessment Report completed for the Airco Site	2011
Storm water sampling program initiated	2012
Draft Phase 2 Supplemental Assessment Report completed for the Airco Site	2013
Excavation of wax-like material and Landfill cap repair	2014
Termination of pumping at four LS wells	2016

APPENDIX C

SITE INSPECTION CHECKLIST

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Airco Landfill	**Date of inspection: 5/4/2016**
Location and Region: Calvert City, Marshal County, Kentucky **USEPA Region 4**	**EPA ID: KYD041981010**
Agency, office, or company leading the five-year review: EPA, Linde	**Weather/temperature: Overcast, 55 degrees**

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☐ 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 no. _____
   Problems, suggestions; ☐ Report attached _____
   No site manager present. No interviews conducted.

2. **O&M staff** Peter Nimmer, PG, LSRP Sr. Geologist, Greenstar Envt. Solutions 5/4/2016
   Name Title Date
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 917-655-5123
   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, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

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 & 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 **No permits required for site operations.**

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 **Provided annually to EPA in letter summarizing annual sample results.**

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

   Remarks **Provided annually to EPA in letter summarizing annual sample results.**

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
☐ Other_____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

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 **Perimeter fence and gates in good condition.**

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

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

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
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 _____
_____
_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks _____
_____

2. **Land use changes on site** ☒ N/A
Remarks _____
_____

3. **Land use changes off site** ☒ N/A
Remarks _____
_____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

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

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal 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
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____
   _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A ☒
   Remarks_____
   _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____
   _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
- ☐ Wet areas ☐ Location shown on site map Areal extent_____
- ☐ Ponding ☐ Location shown on site map Areal extent_____
- ☐ Seeps ☐ Location shown on site map Areal extent_____
- ☐ Soft subgrade ☐ Location shown on site map Areal extent_____

Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
Areal 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 ☒ 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** ☐ Location shown on site map ☒ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☒ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☒ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☒ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☒ No obstructions
☐ Location shown on site map Areal 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 Areal 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. **Leachate Extraction Wells**
☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks **Three of four leachate sumps not operating due to pump malfunction. Termination of Pumping from LS-3 to LS-6 requested from EPA in May 2016.**

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** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____

2. **Erosion** Areal 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
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** ☒ Functioning ☐ N/A
   Remarks **Stormwater discharge sluice gate operational.**

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

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

D. 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 which are 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 to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Landfill cap, flood protection dike and perimeter fencing is in good condition and functioning as intended.

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 O+M of the landfill cap, flood protection dike and site fence is adequate.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. **An area of chlorinated wax material was observed and remediated in 2014. The landfill cap in this area was repaired. The wax like material has not been observed subsequent to these repairs.**

D.	***Opportunities for Optimization***
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. **Termination of pumping from LS-3 to LS-6 requested from EPA in May 2016.**

APPENDIX D

SITE PHOTOS

Photo 1 - View of Airco Landfill looking north from road along flood protection dike. Photos taken May 4, 2016 during Five Year Review site inspection.

Photo 2 - View of Airco Landfill looking north from road along flood protection dike showing BF Goodrich Landfill in background.

Photo 3 – Monitoring wells GA-13, GA-14A and GA-14 along western fence line.

Figure 4 – Storm water collection area and leachate sumps LS-05 and LS-06.

Photo 5 – Flood protection dike showing dike condition and lack of rooted vegetation.

Figure 6 - Monitoring wells AL-MW-04A and AL-MW-04B showing typical monitoring well construction.