SECOND FIVE-YEAR REVIEW REPORT FOR
ALUMINUM COMPANY OF AMERICA – DAVENPORT
SUPERFUND SITE
&
MISSISSIPPI RIVER POOL 15
SUPERFUND SITE

SCOTT COUNTY, IOWA

Prepared by

U.S. Environmental Protection Agency
Region 7
Lenexa, Kansas

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Scott Hayes, Acting Director
Superfund and Emergency Management Division

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
ICs	Institutional Controls
NPL	National Priorities List
O&M	Operation and Maintenance
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
TBC	To Be Considered
UU/UE	Unlimited use and unrestricted exposure

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 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 has prepared this FYR report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 121, consistent with the National Contingency Plan (NCP)(40 CFR §300.430(f)(4)(ii)), and considering the EPA's policy.

This is the second FYR for the Aluminum Company of America – Davenport Superfund Site (Alcoa Site) and the Mississippi River Pool 15 Superfund Site (MRP15 Site). The triggering action for this statutory review is the completion of the previous FYR on July 28, 2017. The FYR was conducted due to the fact that hazardous substances, pollutants, or contaminants remain at both sites above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Alcoa Site and the MRP15 Site are two separate sites that were addressed under one Record of Decision (ROD) dated September 28, 2004. Both sites are addressed in this FYR report, and each site is addressed under a single operable unit (OU).

The FYR was led by EPA Region 7 with support from the Iowa Department of Natural Resources (IDNR). Participants included:

Site Team

Name	Title	Organization
Hoai Tran	Remedial Project Manager (RPM)	EPA Region 7
Pamela Houston	Community Involvement Coordinator	EPA Region 7
Katherine Gulley	Site Counsel	EPA Region 7
Jessica L. Kidwell	Geologist	EPA Region 7
Ann Jacobs	Human Health Risk Assessor	EPA Region 7
Venessa Madden	Ecological Risk Assessor	EPA Region 7
Matt Culp	State Project Manager	IDNR

Site Background

The Alcoa -Davenport Works facility (Alcoa facility) is an active manufacturing plant that has been owned and operated by the Aluminum Company of America (Alcoa Inc.) since 1948. The Alcoa facility is located in Riverdale, Scott County, Iowa (Appendix H, Figure 1-1). The town of Riverdale is adjacent to Bettendorf, Iowa, which is one of the Iowa-Illinois Quad Cities. The Alcoa facility is an aluminum sheet and plate rolling mill that is more than one mile in length and has approximately 120 acres under one roof. Manufacturing and waste management activities at the Alcoa facility resulted in the contamination of soil and groundwater at the Alcoa Site and sediment and fish at the MRP15 Site.

The Alcoa property, or site property, comprises approximately 460 acres of land (Appendix H,

Figure 1-2). The site property is bounded to the north by state Route 67; to the south by the Mississippi River; to the east by industrial use properties; and to the west by South Bellingham Street. The site property is zoned heavy industry. The area to the north, along state Route 67, is zoned residential and commercial. The area bordering the site property to the east is zoned commercial and light industry. At the time of the remedial investigation (RI), the area to the west, along South Bellingham Street, was zoned residential, commercial, and light industry. After the 2004 ROD, Alcoa Inc. purchased all the residential properties and demolished the houses. The area was subsequently rezoned to its current status of light industry and heavy industry. Future land use at the site property and surrounding areas is anticipated to remain the same.

Groundwater at the Alcoa Site is not used for drinking water. Historically, Alcoa Inc. extracted groundwater with process wells and used it for industrial purposes. In 1989, Alcoa Inc. repurposed the process wells primarily for hydraulic containment of contaminated groundwater. The process wells currently operate to hydraulically contain contaminated groundwater. The extracted groundwater is treated by an air stripper system, used for industrial purposes, and discharged to the Mississippi River under a National Pollution Discharge Elimination System (NPDES) permit. Future groundwater use at the Alcoa Site is anticipated to remain the same.

The MRP15 Site (Appendix H, Figure 1-3) spans approximately ten miles of the Mississippi River from Federal Lock and Dam 14 on the upriver end to Federal Lock and Dam 15 on the downriver end. The MRP15 Site starts at river mile 483 and ends at river mile 493. The Alcoa facility is located near river mile 489.

There are no current or future land uses associated with the MRP15 Site because there are no land areas. There are no current or future groundwater uses associated with the MRP15 Site. Surface water in the MRP15 section of the Mississippi River is used for commercial and recreational purposes. Commercial barge traffic is restricted to the channel near the middle of the river. Recreational boating and fishing are enjoyed throughout the MRP15 Site. Future surface water use at the MRP15 Site is anticipated to remain the same.

Alcoa Inc. is the Settling Defendant that is required by the consent decree (CD) to conduct the remedial design/remedial action (RD/RA) at both sites. On November 1, 2016, Alcoa Inc. split into two separate publicly traded companies: Alcoa Corp. and Arconic Inc. After the company split, the legal entity responsible for implementing the RAs became Arconic Inc. To be consistent with the CD, this FYR report will continue to use Alcoa Inc. as the name of the Settling Defendant. Alcoa Inc. was notified of the initiation of the second FYR. The second FYR began on January 28, 2021.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Aluminum Company of America - Davenport Site and Mississippi River Pool 15 Site		
EPA ID: IAD005270160 (Alcoa site) & IAD981117161 (MRP15 Site)		
Region: 7	**State:** IA	**City/County:** Riverdale/Scott

SITE STATUS	
NPL Status: Non-NPL	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Hoai Tran
Author affiliation: EPA
Review period: 1/28/2021 – 7/28/2022
Date of site inspection: 7/9/2021
Type of review: Statutory
Review number: 2
Triggering action date: 7/28/2017
Due date *(five years after triggering action date)*: 7/28/2022

II. RESPONSE ACTION SUMMARY

Alcoa Site

Basis for Taking Action (Alcoa Site)

The Groundwater Remedial Investigation Report dated May 14, 2002, for the Alcoa Site did not identify specific chemicals of concern (COCs), but instead, the RI report identified chemicals of potential concern (COPCs). Chemicals of potential ecological concern (COPECs) were identified in the Ecological Risk Characterization – Facility Site Assessment (FSA) Units dated September 2001. The COPCs and COPECs for the Alcoa Site can be categorized into the following groups of chemicals:

- Volatile organic compounds (VOCs)
- Polynuclear aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)

- Metals

The RI report identified 13 VOCs as COPCs in groundwater that were carried through the baseline risk assessment (BLRA). Due to the size of the site property, the ecological risk assessment separated the site property into several decision units, called facility site assessment (FSA) units (Appendix H, Figure 2-1). The ecological risk assessments for all the FSA units were summarized in the Ecological Risk Characterization – Facility Site Assessment Units dated September 2001. A select list of PAHs, PCBs and metals were identified as COPECs in surface soil and sediment during the ecological risk assessments. The COPCs and COPECs were summarized in the 2004 ROD.

Following the 2004 ROD, the EPA issued an Explanation of Significant Differences (ESD) dated July 2007 to clarify the COPCs and COPECs that would be carried forward, as contaminants of concern (COCs), with performance standards and monitoring levels in the subsequent implementation of the groundwater monitoring program. The COCs and monitoring parameters are presented in Appendix G, Tables 2-1 and 2-2, respectively.

In August 1995, the EPA and Alcoa Inc. entered into an Administrative Order on Consent (AOC) (EPA Docket No. VII-95-F-0026) that required Alcoa Inc. to conduct a BLRA at the Alcoa Site. The BLRA concluded that COPCs in groundwater, if used as drinking water, posed an unacceptable risk to human health. In addition, the BLRA concluded that there were no unacceptable risks to workers or trespassers from soils, or other environmental media, based on the exposure scenarios evaluated pursuant to the 1995 AOC.

An ecological risk assessment was also conducted, which concluded that potential ecological risks were low in the terrestrial areas and the outfalls.

Response Actions (Alcoa Site)

Pre-ROD response activities at the Alcoa Site include the following:

- From 1979 to 1981, Alcoa Inc. performed a voluntary response program to address PCBs in the surface impoundment, which is also referred to as the former oil lagoon or the former waste disposal site (FWDS) (Appendix H, Figure 2-2).
- In February 1984, Alcoa Inc. entered into an AOC with the EPA to install an oil interception and recovery trench at the impoundment and to cap the impoundment with a low-permeability compacted clay.
- In February 1984, Alcoa Inc. disposed of PCB-containing oil and cleaned up three, one million-gallon storage tanks pursuant to two consent agreements with the EPA.
- In August 1986, Alcoa Inc. entered into an AOC with the EPA to formulate and implement a detailed groundwater monitoring plan.
- Just prior to finalizing the 2004 ROD, Alcoa Inc. performed sub-slab gas sampling beneath the basements of two unoccupied houses that were located near the western border of the site property.
- In addition to the work described above, Alcoa Inc. conducted remediation under other environmental regulatory programs, as described in Appendix B, Site Chronology.

RAOs for the Selection of the Remedy (Alcoa Site)

The remedial action objectives (RAOs) for the Alcoa Site were established in the 2004 ROD. The general RAOs for the Alcoa Site are to: 1) prevent exposure to groundwater containing carcinogens and noncarcinogens in excess of applicable or relevant and appropriate requirements (ARARs); and 2) integrate previous or ongoing source and groundwater response actions into a remedial strategy that reduces or eliminates the migration of contaminants from the site property to off-site areas, including the MRP15 Site.

The 2004 ROD also specified RAOs with respect to different portions of the groundwater plume. The specific RAOs are to: 1) manage and monitor the migration of on-site groundwater that contains site-related contaminants at levels above ARARs to prevent contaminant migration in the vicinity of South Bellingham Street; 2) manage and monitor the migration of on-site groundwater to prevent the discharge of site-related contaminants at levels that would result in an unacceptable risk to surface water receptors at the MRP15 Site; and 3) monitor the migration of COPCs in groundwater that currently flows off the site property to the east to ensure concentrations remain below ARARs and manage the off-site flow if groundwater concentrations exceed ARARs.

Remedy Components (Alcoa Site)

The remedy for the Alcoa Site is groundwater containment, which includes the ongoing operation of a groundwater containment extraction and treatment system (GCETS), source area remediation, groundwater monitoring, and institutional controls (ICs).

The remedy established a Technical Impracticability (TI) zone (Appendix H, Figure 2-3) on the site property, within which the groundwater cleanup is not expected to meet drinking water standards within a reasonable timeframe. The remedy specified groundwater monitoring to assure performance standards are met outside the TI zone.

The EPA issued an ESD dated July 2007 to clarify performance standards and monitoring levels for the Alcoa Site. The performance standards and monitoring levels are presented in Appendix G, Tables 2-1 and 2-2, respectively.

Status of Implementation (Alcoa Site)

Following the 2004 ROD, Alcoa Inc. entered into a CD with the EPA on December 11, 2008. The CD required Alcoa Inc. to design and implement the site-specific RA. Pursuant to the CD, Alcoa Inc. submitted the Remedial Design/Remedial Action Work Plan dated September 2011. The RD/RA Work Plan was initially approved in 2011, but it was subsequently revised following the installation of a shallow tray air stripper system in 2012 and the conclusion of a groundwater flow analysis in January 2013. The revised RD/RA Work Plan was approved in May 2013.

In October 2017, Alcoa Inc. petitioned EPA to modify the GCETS monitoring program and the Long-term Groundwater Monitoring Plan (LTMP) in the RD/RA Work Plan (Appendix G, Table 2-3). The EPA approved the modified GCETS monitoring program and LTMP in March 2018 (Appendix G, Table 2-4). In general, the modifications reduced the frequency of water level measurements at all monitoring wells from quarterly to semiannually. Sampling of monitoring wells was also reduced in frequency from quarterly to either semiannually or annually, and the types of analysis was revised to align with the specific objectives of each monitoring well. Groundwater samples throughout the Alcoa Site are

analyzed for all parameters in the year prior to the due date of the FYR report. Alcoa Inc. began implementing the modifications in March 2018.

Pursuant to the CD, Alcoa Inc. submitted the Final Remedial Action Report for the Alcoa and MRP15 Sites dated May 2019 to document the completion of the remedial actions at both sites. The EPA approved the report on September 5, 2019, to certify that the remedial actions at both sites were completed in full satisfaction of the requirements of the CD.

Alcoa Inc. performs long-term operation and maintenance (O&M) at both sites in accordance with the Site Management Plan for the Alcoa and MRP15 Sites (SMP) dated May 2019. The SMP was previously referred to as the O&M Plan, but the title was changed during the most recent update to reflect the scope of the document. The SMP implements the remedies at both sites and contains the following volumes:

Volume I – Management Plan Overview (Text, Tables and Figures)
Volume II – GCETS O&M Plan
Volume III – Alcoa Site Groundwater Plan (GMP) and Quality Assurance Project Plan (QAPP)
Volume IV – MRP15 Monitoring Plan (MMP)
Volume V – Health & Safety Plans (HASPs)

Groundwater Containment Extraction and Treatment System

At the time of the 2004 ROD, Alcoa Inc. was already operating the GCETS. The GCETS uses a primary extraction well for hydraulic containment of contaminated groundwater. A second extraction well serves as a backup when the primary one is shut down for service and maintenance. An air stripper system that was initially installed in November 2002 to treat the extracted groundwater. The treatment system was modified in 2011 and 2012 to replace the original packed tower air stripper with a shallow tray air stripper. The tower equipment was taken out of service in October 2012, but it remains in place and available, if necessary. The GCETS was formally implemented in September 2014.

In October 2017, Alcoa Inc. petitioned EPA to modify the GCETS monitoring program. The modified GCETS monitoring program was approved by EPA in March 2018. Alcoa Inc. is currently operating the GCETS in accordance with the RD/RA Work Plan, as modified, and SMP Volume II.

The majority of the treated effluent water from the GCETS is used by the facility, while a portion is discharged to the Mississippi River. The effluent discharge is regulated by the IDNR under the plant's existing NPDES permit (Number 82-78-1-00). Compliance with the NPDES permit requires sampling of the treated effluent water and submitting the results to the IDNR in discharge monitoring reports (DMR). A summary of effluent sampling data is provided to the EPA in semiannual progress reports. The semiannual progress reports also include data from influent water samples and effluent water samples that are collected monthly to monitor the effectiveness of the air stripper system.

Source Area Remediation

Source area remediation involves the active collection and disposal of subsurface non-aqueous phase liquid (NAPL) from areas within the Alcoa facility wherever technically feasible. PCB-contaminated oil seeps through the sidewalls of various pits and an electrical basement. The PCB-contaminated oil is collected during routine maintenance and disposed of in accordance with the Alcoa facility's PCB Management Plan, which is updated annually.

Long-term Groundwater Monitoring

The Long-term Groundwater Monitoring Plan (LTMP) was originally approved with the RD/RA Work Plan in 2011. The LTMP was formally implemented in September 2014 (Appendix G, Table 2-3). In October 2017, Alcoa Inc. petitioned EPA to modify the LTMP monitoring program. The EPA approved the modifications to the LTMP monitoring program in March 2018. The approved changes reduced the frequency for groundwater monitoring from quarterly to semiannual with sampling scheduled for March and September of each year. Alcoa Inc. is currently implementing the LTMP in accordance with the RD/RA Work Plan, as modified, and the SMP Volume III.

The objective of the LTMP monitoring program is to: a) monitor the effectiveness of the groundwater containment system and to track the movement of groundwater contaminants; b) monitor changes in chemical constituents and chemical concentrations in the groundwater; c) document compliance with the groundwater Performance Standards; and d) evaluate any remedial progress over time.

A description of current, ongoing groundwater sampling activities, including the rationale for the selection of sampling parameters is presented in Appendix G, Table 2-4, and groundwater monitoring locations are presented in Appendix H, Figure 2-4. The ongoing groundwater monitoring program at the Alcoa Site includes 56 monitoring wells. Alcoa Inc. takes water level measurements from all 56 monitoring wells and collects groundwater samples from 40 of them. Sampling is presently conducted on a semiannual schedule, and the results are reported to the EPA concurrent with semiannual groundwater monitoring reports.

The LTMP outlines the process for implementing certain contingency activities. If any contaminant in Appendix G, Table 2-1, is detected above performance standards in groundwater outside the TI zone, Alcoa Inc. will provide written notification of the exceedance(s) to the EPA when the analytical results are submitted. Within 30 days of notification, Alcoa Inc. will submit the follow-up action plans to address the exceedance(s) to the EPA for review and approval. If any contaminant in Appendix G, Table 2-2, is detected above monitoring levels in groundwater outside the TI Zone, Alcoa Inc. will provide written notification of the exceedance(s) to the EPA when the analytical results are submitted. Following this notification, the EPA will determine if additional response actions are necessary.

Short-term Management Plan

In accordance with the 2004 ROD, Alcoa Inc. finalized the Short-Term Management Plan (STMP) dated October 17, 2011. The STMP describes the land-use restrictions, exposure controls, and potential future land-use changes for the site property. The STMP is currently being implemented in accordance with the RD/RA Work Plan, as modified.

Institutional Controls

As stated in the 2004 ROD, the selected remedy for the Alcoa Site includes the use of ICs to prohibit the installation of any water supply wells for domestic purposes at the Alcoa facility; to assure the site property is used only for industrial purposes; and to continue the listing of the Alcoa Site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B.426. ICs are summarized in the table below.

Summary of Institutional Controls

Institutional Control (IC)	Impacted Parcel(s)	Objective	Instrument	Status
Prohibit the installation of any water supply wells for domestic purposes	See Appendix I	Restrict cross connecting a residential groundwater supply with the city water supply	Originally, Iowa State Plumbing Code 641.25.6 Currently, the Iowa American Water Cross Connection Program	Completed
To assure the site property is used only for industrial purposes	See Appendix I	Restrict land and building use	Riverdale local zoning ordinances	Completed
Prohibit the installation of any water supply wells for domestic purposes	See Appendix I	Prohibit construction of drinking water wells within the entire fenced boundary of Alcoa property	Environmental Protection Easement or Environmental Covenant	Completed
To continue listing on the Registry of Hazardous Waste or Hazardous Substance Disposal Site	See Appendix I	Prohibit: (1) any "substantial change" in property use without prior written approval by the director of IDNR (2) any sale, conveyance, or transfer of title without IDNR's prior approval	Registry of Hazardous Waste or Hazardous Substance Disposal Sites: Iowa Administrative Code 455B.426 and 455B.430[1]	Replaced by environmental covenant and no longer required

1. Current Iowa Administrative Code (Sec. 5. Section 455B.426, Code 2011, Subsection 4) states that "A site placed on the registry of confirmed hazardous waste or hazardous substance disposal sites prior to July 1, 2011, shall be removed upon the execution of a uniform environmental covenant pursuant to the provisions of chapter 455I relating to the contaminated portions of the property listed on the registry." Accordingly, once the environmental covenant submitted for the EPA review is approved by IDNR, listing of the Alcoa Site on the Iowa Registry of Hazardous Waste Disposal Sites may no longer be necessary.

All ICs have been implemented to satisfy the requirements in the 2004 ROD. Zoning restrictions are in place to restrict land use at the site property to industrial purposes. The ICs to prohibit the installation of any water supply wells for domestic purposes have been fully implemented. The Iowa American Water Cross Connection Program restricts cross connecting a residential groundwater supply with the city water supply, and an environmental covenant to prohibit domestic wells within the site property was filed at the Scott County, Iowa County Recorder's Office on April 29, 2019 (Appendix I). The environmental covenant replaces the requirement for the Alcoa Site to be listed on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites for the state of Iowa. In accordance with Iowa Administrative Code, the Alcoa Site became eligible to be removed from the registry prior to the final recording of the environmental covenant when it was submitted to EPA for review. IDNR approved the environmental covenant prior to the final recording and removed the Alcoa Site from the registry on December 31, 2018 (Appendix I).

System Operation and Maintenance (Alcoa Site)

Alcoa Inc. operates the GCETS in accordance with the SMP Volume II. The performance of the GCETS is monitored by sampling the treated effluent groundwater for the parameters in Appendix G, Tables 2-5 and 2-6. The results are submitted to EPA and IDNR in progress reports. In March 2018, the EPA approved a proposal by Alcoa Inc. to reduce the reporting from quarterly to semiannual.

Historically, the GCETS utilized PW-06 as the primary groundwater extraction well. In 2008, PW-06 had decreased pumping efficiency and was taken out of service and properly sealed. PW-07 replaced PW-06 and served as the primary groundwater extraction well until December 2020. In December 2020, PW-07 had reduced flow rates and was taken off-line for evaluation and potential rehabilitation. The backup well, PW-05, was activated to become the primary groundwater extraction well. PW-05 is currently serving as the primary well, and PW-01 serves as the backup.

MRP15 Site

Basis for Taking Action (MRP15 Site)

For the MRP15 Site, the COPCs and COPECs were originally identified in the Human Health Risk Assessment Report dated May 2000 and the Ecological Risk Assessment Report dated November 2002. The only COPCs and COPECs carried forward as performance standards for the MRP15 Site are PCBs in fish tissue.

The human health risk assessment evaluated risk to human health based on the following exposure scenarios: shoreline trespasser, recreational boat fisherman, and recreational shoreline fisherman. The risk assessment concluded that there were no significant risks to shoreline trespassers, but there was an unacceptable risk to recreational boat fisherman and recreational shoreline fisherman based on fish consumption.

The ecological risk assessment concluded that there were no significant risks to carnivorous birds and mammals. Potential risk to benthic invertebrates was identified on a localized basis, but the ecological significance of the potential risk appeared to be minimal because of the small size of the area and the anticipated further reductions in contaminant concentrations.

Response Actions (MRP15 Site)

Pre-ROD activities at the MRP15 Site include the following:

- In 1989, the IDNR issued a Fish Consumption Advisory for carp on the Iowa side of the MRP15 Site.
- In April 1990, the IDNR issued a second Fish Consumption Advisory for carpsuckers (also referred to as white carp).
- The 1990 AOC required biennial fish sampling from specified locations at the MRP15 Site, a sediment investigation in on-site drainage ways (including the adjacent wetland) at the Alcoa Site, and sediment investigations at the MRP15 Site.

RAOs for Selected Remedy (MRP15 Site)

The RAOs for the MRP15 Site are to: 1) reduce PCB concentrations in fish to levels that are protective of human health and the environment; and 2) monitor natural recovery processes, including sediment depositional processes, to evaluate the potential for future exposures to contaminated sediments.

Remedy Components (MRP15 Site)

The selected remedy for the MRP15 Site is monitored natural recovery (MNR) with management of on-site media on the Alcoa Site property.

The RD/RA Work Plan specified the performance standards for PCBs in fish tissue as 226 micrograms per kilogram (µg/kg) for channel catfish and 231 µg/kg for common carp.

Status of Implementation (MRP15 Site)

The MNR Program Plan (MNRPP) was approved in conjunction with the RD/RA Work Plan in 2011, it specified the fish tissue sampling and sediment monitoring requirements for the MRP15 Site. The MNRPP originally included analysis of shoreline succession, but the analysis is no longer used as a sediment monitoring tool because shoreline succession was more indicative of changing river stages than sedimentation processes. The MNRPP is currently being implemented in accordance with the RD/RA Work Plan.

In 2016, the IDNR published a Fish Consumption Advisory advising the public not to eat more than one meal per week of common carp greater than 20 in. in length from the MRP15 Site. The IDNR based the advisory on data from fish tissue sampling they conducted in 2014, and the baseline fish tissue sampling conducted by Alcoa Inc. in 2012. The advisory was issued independently by the IDNR and is not a component of the remedy at the MRP15 Site.

Fish tissue sampling has been conducted at the MRP15 Site at various times since 1983. However, the formal baseline fish tissue sampling event in support of the MNRPP was conducted in 2012. Alcoa Inc. completed a second round of fish tissue monitoring in September 2016 and submitted the results to EPA in report entitled the Mississippi River Pool 15 Monitored Natural Program – 2016 dated January 2017. In August 2018, the MNRPP was subsequently modified to discontinue the monitoring program. The

discontinuation of fish monitoring was based on an evaluation of the data collected in September 2016, which indicate that the PCB concentrations in fish at the MRP15 Site are declining in trend, statistically equal or lower than fish at reference areas and below performance standards.

The MNRPP specifies sediment monitoring (Appendix H, Figure 2-5) be conducted during the fourth year of each FYR period. Sediment monitoring includes two specific field tasks: tree line surveys and sediment elevation measurements. Baseline tree line surveys were conducted in 2003 and 2012, and baseline sediment elevation measurements were collected in 2012. Sediment monitoring is ongoing with the most recent event completed in October 2020, and the results reported in EPA in the Site Monitoring Report dated December 29, 2020.

Alcoa Inc. completed the Mississippi River Pool 15 (MRP15) Interim Remedial Action Report – 2017 dated December 2017. The report designates the end remedial action phase of the MNRPP remedy and the beginning of the long-term monitoring phase.

System Operation and Maintenance (MRP15 Site)

The MRP15 Site does not require active remediation; therefore, O&M is not required.

III. PROGRESS SINCE THE LAST REVIEW

Alcoa Site

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Previous Five-Year Review:
None

Issues and Recommendations Identified in the Five-Year Review:

Alcoa Site	Issue Category: Monitoring			
	Issue: The vapor intrusion pathway has not been fully evaluated.			
	Recommendation: A vapor intrusion assessment should be performed in buildings on the Alcoa Site property.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	9/30/2019

Alcoa Inc. performed a vapor intrusion (VI) assessment of the facility to address the issue. The VI assessment included two field sampling events and a chemical product inventory of the facility. Field sampling activities were performed under the under the Phase I VI Work Plan dated August 2018, as modified by an addendum dated February 4, 2019.

The VI sampling events were performed in October/November 2018 and March/April 2019. The first VI sampling event involved a building inspection and subslab vapor screening and sampling from areas in the facility where VOCs were stored, regularly used or potentially released (Appendix H, Figure 3-1). Small holes were drilled through the facility floor and screened with a photoionization detector (PID). Passive vapor samplers were deployed to collect analytical data at locations where PID readings indicate elevated levels of VOCs. The data from the first round of subslab sampling indicated that VOCs were potentially present to the northwest and northeast of the initial sampling area.

The second VI sampling event was performed in March/April 2019 to collect subslab samples from the areas to the northwest and northeast of the initial sampling area that needed further investigation. The Phase I VI Work Plan was modified with an addendum dated February 4, 2019, and a second sampling event was performed in March/April of 2019 to collect analytical data from the newly found areas. The results of subslab sampling are presented in Appendix G, Table 3-1 and Appendix H, Figures 3-2 thru 3-4.

The VI assessment included pressure differential monitoring to measure the potential air flow from beneath the building. Pressure differential data were collected in October 2018, February/March 2019 and March/April 2019 (Appendix G, Table 3-2).

Following the subslab sampling events, a chemical product inventory was conducted to evaluate potential indoor sources of VOCs in the facility. An inventory was taken of chemicals used as part of normal plant operations. The inventory consisted of two steps. The first step was a review of the Safety Data Sheets (SDS) for all the chemicals used at the facility, and the second step was a walkthrough of the facility to record the chemicals in use. Alcoa Inc. completed the SDS review in August 2019 and the walkthrough in October 2019 (Appendix G, Table 3-3).

As recommended by the previous FYR, Alcoa Inc. completed a VI assessment of the facility. The results of the VI assessment were reported to the EPA in the Alcoa Site Vapor Intrusion Investigation Report dated July 2020. These results are discussed in Sections IV and V of this FYR report. The issue has been addressed and will not be carried forward.

Alcoa Site	**Issue Category: Institutional Controls**			
	Issue: An IC to prohibit the installation of any water supply wells for domestic purposes has not been implemented on the site property.			
	Recommendation: An environmental covenant should be implemented on the site property to prohibit the installation of any water supply wells for domestic purposes.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	9/30/2019

Alcoa Inc. recorded an environmental covenant to prohibit domestic wells within the site property to address the issue. The environmental covenant was filed at the Scott County, Iowa County Recorder's Office on April 29, 2019 (Appendix I). The environmental covenant replaces the requirement for the Alcoa Site to be listed on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites for the state of Iowa. In accordance with Iowa Administrative Code, the Alcoa Site became eligible to be removed from the registry prior to the final recording of the environmental covenant when it was submitted to EPA for review. IDNR approved the environmental covenant prior to the final recording and removed the Alcoa Site from the registry on December 31, 2018 (Appendix I).

As recommended by the previous FYR, Alcoa Inc. recorded an environmental covenant to prohibit domestic wells within the site property at the Scott County, Iowa County Recorder's Office on April 29, 2019. The issue has been addressed and will not be carried forward.

MRP15 Site

MRP15	**Issue Category: Monitoring**			
	Issue: Sediment monitoring was not conducted because of elevated river stages.			
	Recommendation: The evaluation of sediment-bed stability in areas along the shoreline near the Alcoa facility and in the adjacent wetland should be conducted.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	9/30/2019

Alcoa Inc. completed sediment monitoring in September 2017 to address the issue. The MNRPP specifies sediment monitoring be conducted during the fourth year of each FYR period. Sediment monitoring is ongoing with the most recent event completed in October 2020, and the results reported in EPA in the Site Monitoring Report dated December 29, 2020.

As recommended by the previous FYR, Alcoa Inc. is conducting sediment monitoring in accordance with the MNRPP. The issue has been addressed and will not be carried forward.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by a newspaper posting in the *Quad-City Times* on June 20, 2021 (Appendix I). The *Quad-City Times* is a local newspaper that serves the Davenport and Bettendorf areas. The public notice stated that there was an ongoing FYR, and invited the public to submit any comments to the EPA. The results of the FYR and this FYR report will be made available through the EPA's internet-based information repository, which can be accessed by the public through the following websites:

- https://semspub.epa.gov/src/collection/07/AR4202
- https://semspub.epa.gov/src/collection/07/AR11444
- https://semspub.epa.gov/src/collection/07/AR11883
- https://semspub.epa.gov/src/collection/07/AR4583

Interviews

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedies that have been implemented to date. Interviews were conducted with the following people:

- Pat Cook, Supervising Contractor, Tetra Tech.
- Matt Culp, Senior Environmental Specialist, IDNR
- John Riches, Communications & Public Affairs Manager, Alcoa Inc.

None of the interviewees noted any issues or concerns which may impact the protectiveness of the remedies. Copies of the interview records are provided in Appendix F, Interview Record.

Data Review

The FYR evaluated data to assess the effectiveness of the remedies at both sites. Data collected in the previous five years (from March 2017 to the present) were analyzed, along with historical sampling data, to track progress towards attaining RAOs. A list of site-related documents reviewed during this FYR is provided in Appendix A.

Data Review (Alcoa Site)

The LTMP component of the RD/RA Work Plan, as modified, provides a detailed description of the required sampling and monitoring activities, and the 2007 ESD sets forth the performance standards for the Alcoa Site. Sampling data were compared to performance standards for VOCs, SVOCs and PCBs and monitoring levels for inorganics to track progress towards meeting RAOs.

The LTMP, within the SMP, prescribes the following contingency actions for exceedances of performance standards:

“For the Alcoa Site, if groundwater outside the TI Zone is found to contain any contaminant in Table 2-1 above the groundwater Performance Standard, or treated effluent discharge is found to contain any contaminant in Table 2-3 above the effluent Performance Standard, Arconic will provide notification of the exceedance(s) to EPA with the analytical results submittal. Then, within 30 days of the notification, Arconic will submit for EPA review and approval follow-up action plan(s) that addresses the exceedance(s). In addition, if groundwater outside the TI Zone is found to contain any contaminant in Table 2-2 above the monitoring level, or treated effluent discharge is found to contain any contaminant listed in Table 2-4, Arconic will provide notification of the situation to EPA with the analytical results submittal. Following the notification, and submittal of follow-up action plan(s) if needed, EPA will determine if additional response actions are necessary as described in the SOW.”

Groundwater Flow

Potentiometric surface maps from groundwater monitoring, conducted from March 2017 to September 2021 (Appendix H, Figures 4-1 thru 4-33), were used to analyze groundwater flow in the shallow bedrock, intermediate bedrock, and deep bedrock units at the Alcoa Site. The potentiometric maps from the most recent monitoring round (September 2021) were used to evaluate the current conditions, while all monitoring rounds were used to monitor potential changes in groundwater flow over time. The analysis was focused on the portions of the contaminated groundwater plume with specific RAOs in the 2004 ROD.

The primary extraction well for the GCETS was changed during the FYR period. PW-07 served as the primary extraction well at the beginning of the FYR period until December 2020. In December 2020, PW-07 had reduced flow rates and was taken off-line for evaluation and potential rehabilitation. The backup well, PW-05, was activated to become the primary groundwater extraction well. PW-05 is currently serving as the primary well.

The groundwater flow analysis was based on the general concepts that groundwater flows from higher hydraulic head (indicated by higher groundwater elevations) towards lower hydraulic head (indicated by lower groundwater elevations) and that groundwater flow towards the primary extraction well indicates capture. The groundwater elevations in all three bedrock units, specifically at monitoring wells near the northwestern boundary and along the east boundary, were higher than at PW-07 from March 2017 to August 2020 and at PW-05 in March 2021 and September 2021. The difference in groundwater level elevations indicates that PW-07 and PW05 sufficiently captured the contaminated groundwater plume throughout the TI zone throughout the FYR period.

The potentiometric maps along the river shoreline in the unconsolidated zone/shallow bedrock units are provided in Appendix H, Figures 4-34 thru 4-44. During the September 2021 monitoring event, the water level elevation of the Mississippi River was higher than groundwater elevations in the unconsolidated zone at five monitoring wells and lower at five monitoring wells. In the unconsolidated/shallow bedrock unit, groundwater elevations were higher than the river for one well and below the river for one well. One well (GM-05) was dry and could not be evaluated. Groundwater flow along the river shoreline is away from the river and towards the primary extraction well for the GCETS for five monitoring wells. At five monitoring wells, groundwater flow is influenced by both the extraction well and the river. Groundwater elevations remained consistent for all rounds.

Groundwater Monitoring

The monitoring wells at the Alcoa Site are grouped into the following five locations: upgradient, plant interior, western facility boundary, river shoreline and eastern facility boundary. Monitoring wells at the upgradient and plant interior locations are only used to measure groundwater levels, and analytical samples were not collected in the two areas. The data review evaluated analytical results from groundwater sampling at the western facility boundary, river shoreline and eastern facility boundary locations, conducted from March 2017 to September 2021 (Appendix G, Tables 4-1 thru 4-11).

VOCs

<u>Western Facility Boundary</u>

During the FYR period, thirteen monitoring wells were sampled along the western facility boundary. Seven monitoring wells [ED, ES, HX, LNI LS(S), WA-01I, WDS-2 and WDS-3] did not have any VOC concentrations exceeding performance standards.

Benzene exceeded the performance standard of 5 µg/L at one monitoring well (EI) as high as 990 µg/L. The source of benzene is suspected to be a petroleum tank farm not associated with Alcoa Inc. The tank farm is located off the site property but immediately adjacent to EI.

Three monitoring wells [HS(S), PA-14S and PA-17S] had exceedances of *cis*-1,2-dichloroethene (*cis*-1,2-DCE), tetrachloroethene (PCE), trichloroethene (TCE) and vinyl chloride above the performance standards of 790 µg/L, 5 µg/L, 5 µg/L and 2 µg/L, respectively. PA-17S also had exceedances of 1,1-dichloroethene (1,1-DCE) above the performance standard of 7 µg/L as high as 7.3 µg/L, and HNI had a detection of vinyl chloride equal to the performance standers (2 µg/L).

During the FYR period, the highest concentrations of VOCs were found at PA-17S located near the northwester property boundary just inside the TI Zone. This area was impacted by historical releases of VOCs from two PCE aboveground storage tanks, which have been removed. Concentrations at PA-17S were as high as 7.3 µg/L for 1,1-DCE, 120 µg/L for *cis*-1,2-DCE, 4200 µg/L for PCE, 970 µg/L for TCE at and 18 µg/L for vinyl chloride.

Trend graphs of the primary VOCs (*cis*-1,2-DCE, PCE, TCE and vinyl chloride) in monitoring wells near northwestern property boundary [HNI, HS(S), LNI, PA-14S and PA-17S] are provided in Appendix H, Figures 4-45 thru 4-49. The graphs include concentrations observed in the monitoring wells during the RI to evaluate changes over a longer timeframe. Since the RI, concentrations of PCE and TCE have declined in monitoring wells HNI, HS(S) and PA-14S and have not increased in PA-17S. Concentrations of c*is*-1,2-DCE have also declined in wells HNI, HS(S), PA-14S and LNI and have not increased in PA-17S. During the FYR period, concentrations of *cis*-1,2-DCE, PCE and TCE have not increased in HNI, HS(S), LNI, PA-14S and PA-17S. Vinyl chloride, which was not frequently detected during the RI, has been present at detectable concentrations in HNI, HS(S), PA-14S and PA-17S during the FYR period.

All exceedances of 1,1-DCE, *cis*-1,2-DCE, PCE, TCE and vinyl chloride performance standards occurred at monitoring wells [HNI, HS(S), PA-14S and PA-17S] located within the TI Zone. Compliance points LNI and LS(S) are located outside of the TI Zone to the southwest of PA-14S and northwest of PA-17S. Groundwater flow in this area and throughout the TI zone is towards the primary extraction well. Therefore, LNI and LS(S) are hydraulically upgradient to PA-14S and PA-17S. LNI had detections of acetone, *cis*-1,2-DCE and TCE, and LS(S) had detections of acetone, toluene and TCE. None of the detections at LNI and LS(S) exceeded performance standards, which indicates that VOCs detected in PA-14S and PA-17S are not migrating from the TI zone along the western boundary.

River Shoreline

The river shoreline locations consist of eighteen monitoring wells within the TI Zone. Thirteen monitoring wells (AD, AI, AX, GM-04R, GM-06R, JI, JS, JX, KD, KI, KS, LBD-01D and WDS-5) did not exceed VOC performance standards. The remaining five monitoring wells exceeded the performance standard for vinyl chloride (2 µg/L) as high as 8.6 µg/L at ANS, 11 µg/L at AS, 11 µg/L at EDS-2 µg/L, 2.8 µg/L at GM-09, and 2.1 µg/L at GM-10. No other VOCs exceeded performance standards along the river shoreline. Alcoa Inc. notified EPA of the exceedances of vinyl chloride in the progress reports. Since the exceedances of vinyl chloride were within the TI Zone, no additional contingency actions are

required by the SMP. Sampling for vinyl chloride will continue to follow the modified LTMP, which was approved by EPA in March 2018, described in Appendix G, Table 2-4.

Eastern Facility Boundary

The eastern facility boundary locations consist of eight monitoring wells outside the TI Zone. No exceedances of VOC performance standards occurred during the FYR period, which indicates that VOC are not migrating from the TI Zone along the eastern boundary.

SVOCs

Sitewide

SVOC concentrations did not exceed performance standards during the FYR period in monitoring wells for all three areas (western facility boundary, river shoreline and eastern facility boundary).

PCBs

Western Facility Boundary

PCB concentrations did not exceed performance standards during the FYR period in monitoring wells at the western facility boundary locations.

River Shoreline

Along the river shoreline, PCB concentrations did not exceed performance standards at eleven monitoring wells (AD, AI, AX, EDS-2, JI, JX, KD, KI, KS, LBD-01D and WDS-5) and exceeded performance standards at seven monitoring wells (ANS, AS, GM-04R, GM-06R, GM-09, GM-10 and JS). The highest exceedances of Aroclor-1242 and Aroclor-1248 were 17 µg/L and 220 µg/L, respectively, at GM-10.

When compared to data collected during the prior FYR period (2014-2016), exceedances of PCBs during the current FYR period were within the prior range (i.e., below the highest levels from the previous FYR) at four monitoring wells (AS, GM-04R, GM-06R and GM-09) and above the prior range (i.e., above the highest levels from the previous FYR period) at three monitoring wells (ANS, GM-10 and JS). The number of sampling rounds where PCBs were higher than the prior FYR period were four of eleven sampling rounds at ANS, one of eleven sampling rounds at GM-10 and one of seven sampling rounds at JS.

Alcoa Inc. notified EPA of the exceedances of PCBs in the progress reports. Since the exceedances of PCBs were within the TI Zone, no additional contingency actions are required by the SMP. Sampling for PCBs will continue to follow the modified LTMP, as described in Appendix G, Table 2-4.

Eastern Facility Boundary

Along the eastern facility boundary, Aroclor-1248 was detected above performance standards in August 2020 at NS (1.1 µg/l). NS is located outside the TI Zone boundary by about 150 feet. Subsequent progress reports by Arconic note the following lines of evidence indicating no increased risk:

- As noted in the ROD, the groundwater risk assessment did not evaluate groundwater along the river shoreline because there are no receptors and
- The Environmental Covenant recorded at the Alcoa Site prohibits the use of groundwater for drinking or other domestic purposes.
- The vertical gradients in this area show a downward flow from the shallow bedrock groundwater to the intermediate bedrock zone, where groundwater is captured by the operation of the GCETS.

The August 2020 event was the first time that PCBs were detected in NS. The groundwater monitoring program for subsequent events was modified to include sampling for PCBs at NS. In March 2021, Aroclor-1248 was detected below performance standards at NS (0.086 µg/l). NS was inadvertently not sample during the September 2021 event.

Inorganics

Sitewide

During this FYR period, concentrations of arsenic above the monitoring levels of 10 µg/L were found at eight monitoring wells as high as 10 µg/L at HS(S), 11 µg/L at ANS, 26 µg/L at AS, 45 µg/L at GM-04R, 15 µg/L at GM-06R, 24 µg/L at GM-09, 27 µg/L at GM-10 and 14 µg/L at NS. Detections of arsenic were within the TI Zone, except NS. With the exception of NS, the exceedances of arsenic were within the TI Zone; therefore, no additional contingency actions are required by the SMP. Sampling for arsenic will continue to follow the modified LTMP, as described in Appendix G, Table 2-4.

When compared to data collected during the prior FYR period (2014-2016), exceedances of arsenic during the current FYR period were within the prior range (i.e., below the highest levels from the previous FYR) at five monitoring wells (ANS, GM-06R, GM-09, GM-10 and NS) and above the prior range (i.e., above the highest levels from the previous FYR period) at three monitoring wells (HS(S), AS and GM-04R). The number of sampling rounds where arsenic was higher than the prior FYR period were one of four sampling rounds at HS(S), AS and GM-04R.

Concentrations of iron above the monitoring level of 4900 µg/L and manganese above the monitoring level of 300 µg/L were found at twenty-two and seventeen monitoring wells, respectively. Iron and manganese data indicate that both metals are ubiquitous (i.e., naturally occurring) across the Alcoa Site. No additional follow-up actions are required for iron and manganese by the SMP. Sampling for iron and manganese will continue to follow the modified LTMP, as described in Appendix G, Table 2-4.

Concentrations of thallium above monitoring level of 0.5 µg/L were found at four monitoring wells as high as 0.52 at WA-01I, 0.6 µg/L at OID (intermediate zone), 0.72 µg/L at OID (deep zone) and 3 µg/L at OS. All four monitoring wells are located outside the TI Zone. Since the exceedances of thallium were within the TI Zone, no additional contingency actions are required by the SMP. Sampling for thallium will continue to follow the modified LTMP, as described in Appendix G, Table 2-4.

Concentrations of vanadium above the monitoring level of 7 µg/L was detected at two monitoring wells as high as 9.1 µg/L at AS and 14 µg/L at KS. AS and KS are located along the river shoreline and within the TI Zone. Since the exceedances of vanadium were within the TI Zone, no additional follow-up

actions are required by the SMP. Sampling for vanadium will continue to follow the modified LTMP, as described in Appendix G, Table 2-4.

FWDS Product

Fluid-level elevations were obtained from the collection manholes located in the oil interception trench at the FWDS (Appendix H, Figures 2-2). None of the manholes contained any measurable product during this FYR period, which indicates that oil from the FWDS is not migrating away from the site property.

Groundwater Containment with Extraction and Treatment

The primary extraction well for the GCETS was PW-07 until December 2020. In December 2020, PW-07 had reduced flow rates and was taken off-line for evaluation and potential rehabilitation. The backup well, PW-05, was activated to become the primary groundwater extraction well. PW-05 is currently serving as the primary well, and PW-01 serves as the backup. From January 2017 to November 2020, the monthly volume of groundwater extracted by PW-07 ranged between 7,135,000 gallons and 9,844,000 gallons with a monthly average of 8,743,000, and the flow rate at PW-07 ranged between 161 gallons per minute (gpm) and 221 gpm and averaged 199 gpm. December 2020 to October 2021, the monthly volume of groundwater extracted by PW-05 ranged between 7,501,000 gallons and 9,843,000 gallons with a monthly average of 9,081,000, and the flow rate at PW-05 ranged between 174 gpm and 221 gpm and averaged 207 gpm (Appendix G, Table 4-12).

Influent

Samples of the influent groundwater are analyzed monthly for VOCs. From January 2017 to October 2021, VOCs were detected in the influent, including PCE, TCE, *cis*-1,2-DCE and vinyl chloride. VOC detections are listed in Appendix G, Table 4-13.

Effluent

From January 2017 to October 2021, the GCETS extracted and treated approximately 511 million gallons of groundwater. Effluent water samples are collected on a monthly basis and analyzed for VOCs, PCBs, PAHs and select inorganic compounds. No performance standards were established for treated effluent water other than PCE, TCE and *cis*-1,2-DCE. Alcoa Inc. is required to report any detections of the effluent monitoring parameters (Appendix G, Table 2-4). For the reporting period January 2017 to October 2021, no performance standards were exceeded for effluent water. However, effluent water samples contained low levels of several inorganics during each monthly sampling event.

Data Review (MRP15 Site)

Fish Tissue Sampling

Prior to the FYR period, baseline fish tissue sampling was conducted in September 2012, and subsequent sampling was performed in September 2016. The target fish species were common carp and channel catfish. The objectives of the fish tissue monitoring program were to:

1) Evaluate trends of PCB concentrations in fish tissue collected from the MRP15 Site and reference areas;
2) Compare fish tissue PCB concentrations collected from areas adjacent to the Alcoa facility to PCB concentrations of fish collected from representative reference areas; and
3) Evaluate fish tissue concentrations for the protection of human health and the environment; that is, comparison with fish tissue performance standards. The performance standard for channel catfish is 226 µg/kg, and for common carp is 231 µg/kg.

Trends in fish tissue PCB concentrations were evaluated by examining graphical representations of total PCB concentrations in fish tissue from 1990 to 2016 (Appendix H, Figures 4-50 thru 4-53). The following conclusions were drawn:

- Concentrations of total PCBs in channel catfish tissue for the MRP15 Site in 2016 were the lowest among all monitoring events since 1990. Declining trends in total PCBs were also apparent when examined on a site-by-site basis (Sites 2, 3 and 4).
- Concentrations of total PCBs in common carp show a relatively rapid decline between 1992 and 1998. An increase was noted from 1998 to 2012, which is likely the result of larger fish with higher lipid concentrations. During the 2016 study, the concentration of total PCBs in common carp were lower than all previous survey periods and below the performance standard.

Fish tissue PCBs measured in common carp and catfish at the MRP15 Site were statistically compared with tissue PCBs in common carp and catfish collected from the combined reference areas. Reference area data were combined between Site 1 and Site 7 as there was no statistically significant difference in PCB concentrations between the two areas in either common carp or channel catfish. The following conclusions were drawn:

- Channel catfish – The concentrations of total PCBs in channel catfish at the MRP15 Site are statistically equal to or less than total PCBs in channel catfish collected from the reference areas.
- Common carp – The concentrations of total PCBs in common carp at the MRP15 Site are statistically equal to or less than total PCBs in channel catfish collected from the reference areas.

The performance standards are risk-based concentrations used for comparison with the 95% UCL of the mean total PCB concentration in tissue from fish within the target size range. The following conclusions were drawn from that comparison:

- Channel catfish – The mean total PCB concentration in channel catfish at the MRP15 Site (84 µg/kg) is well below the Performance Standard of 226 µg/kg, and only two of 29 individual channel catfish exceeded the Performance Standard. The 95% UCL total PCB concentration in channel catfish fillet tissue at the MRP15 Site was estimated as 101 µg/kg, and is also below the performance standard.
- Common carp - The mean and 95% UCL total PCB concentrations in common carp at the MRP15 Site were 117 µg/kg and 138 µg/kg, respectively, both of which are well below the performance standard for common carp of 231 µg/kg. Only one of 24 individual fish exceeded the performance standard.

In addition to the performance standards noted above, FWS expressed concern relative to PCB associated risks to mink in the vicinity of Duck Creek. PCBs in common carp and channel catfish tissue were used to estimate PCB concentrations in forage fish, specifically gizzard shad and emerald shiner, using ratios relative to historical concentrations. Gizzard shad and emerald shiner were evaluated as forage fish in the mink diet consistent with the ecological risk assessment, resulting in a no-adverse-effect Environmental Endangerment Quotient of 0.6. The results indicate that residual PCBs in MRP15 are unlikely to pose risks to mink.

No fish tissue sampling was performed during the current FYR period. In December 2017, Arconic Inc. proposed to modify the MNRPP for the MRP15 site to discontinue fish monitoring activities, and EPA approved the modification in August 2018. The approval was based on an evaluation of the most recent fish tissue data collected in September 2016 which indicate that the PCB concentrations in fish at the MRP 15 site are declining in trend, statistically equal or lower than in fish at reference areas and below performance standards. By attaining performance standards, the remedy at the MRP15 site has achieved the RAO to reduce PCB concentrations in fish to levels that are protective of human health and the environment.

Sediment Monitoring

The remedy at the MRP15 Site includes sediment monitoring to evaluate natural recovery processes and the potential for future exposures to contaminated sediments. Monitoring activities are described in the Volume IV of the Site Management Plan for the Alcoa and MRP15 Sites dated May 2019. The goals of the MRP15 monitoring plan are, as follows:

- Field documentation of tree line/vegetation documented using global positioning system (GPS) mapping. Use of aerial photography to supplement field documentation of tree line/vegetation succession; and
- Field observations of potential erosive activities documented with photograph evidence.

During the current FYR period, monitoring activities were performed at the MRP15 Site in September 2017 and October 2020. Tree line delineation was performed, and sediment elevation measurements were taken from the following three areas, along the west bank of the Mississippi River and adjacent to the Alcoa facility (Appendix H, Figure 2-5):

1) depositional areas adjacent to Arconic Outfall 006;
2) depositional areas downstream of the Arconic water intake to historical Outfall 004; and
3) depositional areas between Arconic Outfalls 002 and 003.

Tree Line Delineation

Changes in the tree line, along the shoreline of the Mississippi River, provide an indication of depositional processes over time. Field observations of vegetation at the three monitoring areas are recorded over time to provide evidence regarding the stability of sediment/soil. A baseline tree line survey was conducted in the central area downstream from the Alcoa facility's water intake structure in 2003. Subsequent tree line surveys were conducted on September 15, 2012, and September 6, 2017, in all three study areas (Appendix H, Figures 4-54 thru 4-56).

The conclusions from the tree delineation are, as follows:

1) Depositional areas adjacent to Outfall 006 - The tree line appears to have remained relatively static between 2012, 2017 and 2020.
2) Depositional area downstream of the Arconic water intake to Outfall 004 - Prior to 2017, the tree line in the area remained unchanged. From 2017 to 2020, the tree line expanded slightly.
3) Depositional areas between Outfalls 002 and 003 - The tree line has remained relatively static between 2012 and 2020.

Field observations were supplemented with aerial photography from the National Agriculture Imagery Program (NAIP). High resolution aerial NAIP photography 1994 to 2019 (Appendix H, Figures 4-57 thru 4-59) provide further evidence that tree lines have remained stable or expanded in all three observation areas.

Sediment Survey

Sediment surveys are performed at the three depositional areas along the shoreline of the Mississippi River. A baseline survey was performed on October 1, 2012. During the FYR period, sediment surveys were performed on September 6, 2017, and October 7, 2020.

The conclusions from the sediment surveys are, as follows:

1) Depositional areas adjacent to Outfall 006 – From 2017 to 2020, sediment levels remained stable, and vegetation growth increased.
2) Depositional area downstream of the Arconic water intake to Outfall - From 2017 to 2020, sediment levels remained stable or increased in some areas, and vegetation growth increased.
3) Depositional areas between Outfalls 002 and 003 – From 2017 to 2020, sediment levels remained stable or increased in some areas. Vegetation growth was well established and remained stable.

The results of sediment monitoring indicate that sediment deposition has remained static or increased in the three study areas.

Site Inspection

An inspection of both sites was conducted on July 9, 2021. The purpose of the inspection was to assess the protectiveness of the remedy. A record of the site inspection, including photos, can be found in Appendix D, Site Inspection Checklist and Appendix E, Photographs. In attendance were:

- Hoai Tran (EPA), Remedial Project Manager
- Pat Cook (Tetra Tech), Supervising Contractor

The site inspection assessed the overall maintenance of the Alcoa Site. In December 2020, PW-07 had reduced flow rates was replaced by the backup well, PW-05. During the site inspection, PW-07 remained off-line and was still being evaluated, and PW-05 was serving as the primary groundwater extraction well.

A land-use review indicated that land use remains industrial. No new construction or plant modification were observed.

Overall, the site inspection concluded that the remedy components were functioning properly and well maintained. PW-05 was performing at levels equivalent to historical levels at PW-07 (prior to December 2020). No other maintenance issues were identified.

V. TECHNICAL ASSESSMENT

Alcoa Site

Question A: Is the remedy functioning as intended by the decision documents (Alcoa Site)?

The remedy for the Alcoa Site is groundwater containment, which includes the ongoing operation of a GCETS, source area remediation, groundwater monitoring and ICs. The GCETS was formally implemented in September 2014 and is currently operating. Source area remediation is performed by following the PCB Management Plan, and groundwater monitoring is being performed to fulfill the requirements of the LTMP. The remedy is functioning as intended by the 2004 ROD and in accordance with the RD/RA Work Plan.

Remedial Action Performance

Groundwater Containment Extraction and Treatment System

Groundwater flow analysis indicates that the GCETS captures deep and intermediate bedrock groundwater over the entire TI Zone and shallow bedrock groundwater over most of the TI Zone. Sampling data from influent groundwater and treated effluent water indicate that the air stripper system is effectively eliminating contamination in extracted groundwater to below performance standards.

System Operations/O&M

During the FYR period, the primary extraction well for the GCETS was PW-07 from July 2017 until December 2020. In December 2020, PW-07 had reduced flow rates and was taken off-line for evaluation and potential rehabilitation. The backup well, PW-05, was activated to become the primary groundwater extraction well. PW-05 is currently serving as the primary well, and PW-01 serves as the backup.

The monthly volume of groundwater extracted by the GCETS (Appendix G, Table 4-12) indicate that system operations have performed as designed. No equipment breakdowns or changes were identified that would indicate a potential issue affecting protectiveness. In addition, Alcoa Inc. did not identify any large variances in operational costs that could indicate a potential problem with the remedy.

Implementation of Institutional Controls and Other Measures

All ICs have been implemented to satisfy the requirements in the 2004 ROD. Zoning restrictions are in place to restrict land use at the site property to industrial purposes. The ICs to prohibit the installation of any water supply wells for domestic purposes have been fully implemented. The Iowa American Water Cross Connection Program restricts cross connecting a residential groundwater supply with the city water supply, and an environmental covenant to prohibit domestic wells within the site property was filed at the Scott County, Iowa County Recorder's Office on April 29, 2019 (Appendix I). The environmental covenant replaces the requirement for the Alcoa Site to be listed on the Registry of

Hazardous Waste or Hazardous Substance Disposal Sites for the state of Iowa. In accordance with Iowa Administrative Code, the Alcoa Site became eligible to be removed from the registry prior to the final recording of the environmental covenant when it was submitted to EPA for review. IDNR approved the environmental covenant prior to the final recording and removed the Alcoa Site from the registry on December 31, 2018 (Appendix I).

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? (Alcoa Site)

There have been no changes in exposure assumption, toxicity data, cleanup levels, and RAOs that could affect the protectiveness of the remedy at the Alcoa Site. There have been no changes in the physical conditions or the land use at the Alcoa Site that would affect the routes of exposure and the protectiveness of the remedy. Land use on and near the Alcoa Site is not expected to change in the foreseeable future.

Changes in Standards and TBCs

The 2007 ESD updated and clarified the federal and state chemical-specific ARAR and "to be considered (TBC)" concentration values for COCs at the Alcoa Site, and established the following hierarchy for the performance standards and monitoring levels:

1. Federal primary MCL
2. EPA lifetime health advisory levels (HAL)
3. Iowa statewide groundwater standards (ISGS)

There are no changes in these standards that would call into question the protectiveness of the remedy at the Alcoa Site.

Changes in Toxicity and Other Contaminant Characteristics

No changes in toxicity and other contaminant characteristics were identified that could affect the protectiveness of the remedy at the Alcoa Site.

Changes in Risk Assessment Methods

Several changes in risk assessment methodologies have occurred groundwater baseline risk assessment. No changes in risk assessment methodologies have been identified that could affect the protectiveness of the remedy at the Alcoa Site.

Changes in Exposure Pathways

The Alcoa facility is an active industrial facility. Land use on and near the Alcoa Site has not changed and is not expected to change in the foreseeable future. Therefore, no changes in exposure pathways were identified that could affect the protectiveness of the remedy at the Alcoa Site.

Vapor Intrusion

The VI pathway was evaluated in 2020. Most volatile COCs detected were identified as components of chemical products actively used at the site (Geosyntec, 2020). The chemical products used by Arconic comply with and are managed under OSHA regulations (OSHA, 2012). As a result of continued use of these products, background levels of volatile COCs associated with on-site industrial activities could not conclusively be differentiated from potential vapor intrusion contributions from subsurface contamination. Sub-slab data included detections of three volatile COCs that were not identified in the plant inventory: *cis*-1,2-dichloroethene (DCE), 1,1-dichloroethane (DCA), and vinyl chloride. The VI investigation report notes that 1,1-DCA and vinyl chloride may be trace ingredients in products but not noted on safety data sheets; therefore, the vapor intrusion contributions of 1,1-DCA and vinyl chloride are equally difficult to distinguish from industrial process use. Although *cis*-1,2-DCE may be present as a degradation product of PCE and TCE in groundwater, this compound does not have a sub-slab soil gas or indoor air screening level. Additionally, sub-slab to indoor differential pressure monitoring did not indicate a significant driving force for vapor intrusion in these areas.

Expected Progress Towards Meeting RAOs

The remedy at the Alcoa Site is progressing, as expected, towards meeting RAOs. No new site conditions have been identified that could impact RAOs and remedy protectiveness.

MRP15 Site

Question A: Is the remedy functioning as intended by the decision documents? (MPR15 Site)

The selected remedy for the MRP15 Site is MNR with management of on-site media on the Alcoa site property. The MNRPP specifies the fish tissue sampling and sediment monitoring requirements for the MRP15 Site. Alcoa Inc. is implementing the remedy in accordance with the MNRPP and RD/RA Work Plan, and the remedy is functioning as intended by the 2004 ROD.

Remedial Action Performance

Based on the most recent fish tissue monitoring results from September 2016, PCB concentrations in fish at the MRP 15 site have declined and are statistically equal to or less than concentrations at reference areas and are below performance standards. By attaining the fish tissue performance standards, the remedy at the MRP15 site has achieved the RAO to reduce PCB concentrations in fish to levels that are protective of human health and the environment.

The sediment monitoring survey performed in October 2020 indicates that sediment deposition has remained static or increased in the survey areas. The tree line delineation indicates the tree line has remained relatively static near Outfall 006. The tree line immediately downstream from the Arconic water intake expanded between 2003 and 2012, and remained relatively unchanged between 2012 and 2017, but increased between 2017 and 2020. Between Outfalls 002 and 003, the tree line appears to have remained relatively static between 2012 and 2020. No erosion has occurred and the sediment environment at the site remains stable.

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 (MPR15 Site)?

There have been no changes in exposure assumption, toxicity data, cleanup levels and RAOs that could affect the protectiveness of the remedy at the MRP15 site. No changes in the physical conditions or the land use at the MRP 15 site that would affect the routes of exposure and the protectiveness of the remedy (Arconic-Davenport, 2020). Land use on and near the MRP15 site is not expected to change in the foreseeable future.

Changes in Standards and TBCs

No changes in standards and TBCs were identified that could call into question the protectiveness of the remedy at the MRP15 Site.

Changes in Toxicity and Other Contaminant Characteristics

No changes in toxicity and other contaminant characteristics were identified that could affect the protectiveness of the remedy at the MPR15 site.

Changes in Risk Assessment Methods

No changes in risk assessment methods were identified that could affect the protectiveness of the remedy.

Changes in Exposure Pathways

No changes in exposure pathways were identified that could affect the protectiveness of the remedy. Land use on and near the MRP15 Site has not changed and is not expected to change in the foreseeable future.

Expected Progress Towards Meeting RAOs

The remedy is progressing as expected towards meeting RAOs at the MRP15 Site.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy (MRP15 Site)?

No other information has come to light that could call into question the protectiveness of the remedy at the MRP15 Site.

VI. ISSUES/RECOMMENDATIONS

Alcoa Site

No issues were identified during the second FYR that would impact the protectiveness of the remedy at the Alcoa Site.

Other Findings

Subslab concentrations of COCs are significant enough to contribute to the vapor intrusion pathway, but these contributions cannot be readily distinguished from the contributions of indoor industrial processes. To the extent reasonable, recommendation is to minimize these contributions by addressing leaky plumbing, open sumps, floor cracks, and other slab perforations that might facilitate migration of hazardous vapors from the subsurface to indoor air.

Efforts to rehabilitate PW-07 and establish a backup well for PW-05 should continue.

The Fall 2021 groundwater sampling report indicated that well NS was inadvertently not sampled for PCBs during September 2021 but will be sampled during the March 2022. At a minimum, well NS also will need to be sampled in August/September 2022 to more closely approximate seasonal groundwater/surface water conditions at the time of the Performance Standard exceedance.

To prepare for potential climate change effects, the site and remedy should be assessed for potential climate-related vulnerabilities. Steps to build resiliency should be identified.

MRP15 Site

No issues were identified during the second FYR that would impact the protectiveness of the remedy at the Alcoa Site.

Other Findings

To prepare for potential climate change effects, the site and remedy should be assessed for potential climate-related vulnerabilities. Steps to build resiliency should be identified.

VII. PROTECTIVENESS STATEMENT

Alcoa Site

Protectiveness Statement(s)		
Alcoa Site	*Protectiveness Determination:* Protective	
Protectiveness Statement: The remedy at the Alcoa Site is protective of human health and the environment.		

MRP15 Site

Protectiveness Statement(s)		
MRP15 Site	*Protectiveness Determination:* Short-term Protective	*Planned Addendum Completion Date:* 9/30/2019
Protectiveness Statement: The remedy at the MRP15 Site is protective of human health and the environment.		

VIII. NEXT REVIEW

The next FYR for the Alcoa Site and the MRP15 Site is required five years from the completion date of this review.