FIRST FIVE-YEAR REVIEW REPORT FOR MERCURY REFINING, INC. SUPERFUND SITE ALBANY COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York , New York

A. Carpenter

Angela Carpenter, Acting Director
Emergency and Remedial Response Division

2.13.19

Date

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm/s	centimeters per second
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
ICs	Institutional Controls
ISS	In-situ Solidification/Stabilization
MCL	Maximum Contaminant Level
MERECO	Mercury Refining Company, Inc.
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSWQS	New York State Water Quality Standard
OU	Operable Unit
O&M	Operation and Maintenance
PCBs	Polychlorinated Biphenyls
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RPM	Remedial Project Manager
SMP	Site Management Plan
SPLP	Synthetic Precipitation Leaching Procedure
TBC	To be considereds
TCLP	Toxicity Characteristic Leaching Procedure
UCS	Unconfined Compressive Strength
UU/UE	Unrestricted Use/Unlimited 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 (EPA) is preparing this FYR 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 first FYR for the Mercury Refining, Inc. Superfund Site (Site). The triggering action for this statutory review is the on-site construction start date of the Operable Unit (OU 1) remedial action. 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 OU which will be addressed in this FYR. The OU1remedy included the excavation and off-site disposal of mercury contaminated sediments, the excavation and off-site disposal of mercury contaminated soils above the water table, and the in-situ solidification/stabilization (ISS) of mercury contaminated soils in the area where dissolved mercury concentrations in groundwater exceed the cleanup level for mercury.

The Site FYR team was led by Thomas Mongelli, EPA remedial project manager. The FYR team included participants from EPA: Rachel Griffiths (hydrogeologist), Nicholas Mazziotta (human health risk assessor), Michael Clemetson (ecological risk assessor), Larisa Romanowski (community involvement coordinator) and from the New York Department of Environmental Conservation (NYSDEC): John Grathwol (project manager). The Potentially Responsible Party (PRP) group was notified of the initiation of the FYR which began on May 2, 2018.

Site Background

The Site (see Figure 1) includes the Mercury Refining Company, Inc. (MERECO) property, located at 26 Railroad Avenue and owned by 26 Railroad Avenue, Inc., in an industrial area on the border of the towns of Colonie and Guilderland, Albany County, New York. This approximately 0.68 acre lot was formerly used as a mercury reclamation facility and is still in use by MERECO for precious metal reclamation. The Site also includes parts of surrounding properties impacted by the past mercury reclamation processes conducted at the MERECO property, namely portions of the Allied Building Products (Allied) property, the SealMaster property (formerly known as Diamond W), and the former Albany Pallet property (also owned by 26 Railroad Avenue, Inc.). The Site also includes the parcel south of the SealMaster property that is still owned by MERECO and the portion of an Unnamed Tributary to the Patroon Creek located on the south end of the MERECO property.

The Unnamed Tributary reportedly received contaminated stormwater drainage from the storm sewer system that formerly serviced the MERECO property. The Unnamed Tributary converges with the Patroon Creek approximately 1,600 feet downstream of the MERECO property. Approximately one mile downstream of the MERECO property there is a dam in the Patroon Creek which forms the I-90 Pond.

The creek flows over the dam's spillway and enters the Hudson River approximately five miles from the stormwater outfall. Groundwater at the Site flows generally in a southerly direction toward the Unnamed Tributary. The area is serviced by a public water supply. The MERECO property currently includes one building, a three-story concrete block structure known as the Phase 1 Building, which is used for MERECO's ongoing precious metals recovery operations. A commercial asphalt roadway and a wide business driveway provide access to the MERECO property.

The Site was placed on the National Priorities List (NPL) on September 8, 1983.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Mercury Refining, Inc.		
EPA ID: NYD048148175		
Region: 2	**State:** NY	**City/County:** Towns of Colonie and Guilderland/Albany County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:** N/A		
Author name (Federal or State Project Manager): Thomas Mongelli		
Author affiliation: EPA		
Review period: 5/2/2018 – 10/1/2018		
Date of site inspection: 7/24/2018		
Type of review: Statutory		
Review number: 1		
Triggering action date: 10/1/2013		
Due date *(five years after triggering action date)*: 10/1/2018		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The MERECO facility used retorts, specialized ovens to distill and recover mercury, to reclaim mercury from batteries and other mercury-bearing materials such as thermometers, fluorescent bulbs, spill debris,

and dental amalgams. Before 1980, various solid waste materials contaminated with mercury from the reclamation processes were dumped over an embankment of the Unnamed Tributary. From 1980 to 1998, waste batteries and other mercury-containing materials were stored in drums on wooden pallets within paved areas of the MERECO property and disposed of off-site.

The results of initial sampling performed by the NYSDEC's Division of Fish and Wildlife in 1981 and 1982 indicated the presence of PCBs and mercury contamination on the southern edge of the MERECO property and on the embankment to the Unnamed Tributary. Results of further sampling confirmed the presence of these contaminants in soils at the MERECO property and mercury contamination in the Unnamed Tributary sediments.

A remedial investigation/feasibility study (RI/FS) was conducted by EPA between September 2000 and February 2003 which revealed the presence of mercury contamination in surface and subsurface soils, groundwater, creek sediments, fish tissue and catch basins. Methyl mercury contamination was also observed in stream and pond sediments and surface water. The human health risk assessment (HHRA) determined that carcinogenic risks and noncarcinogenic hazards for exposures at the Site exceeded the EPA's target hazard index of 1 and EPA's target cancer risk range of 10^{-6} to 10^{-4} for recreational use of the creek/pond and for residential use of the groundwater from exposure to mercury. Potential future cancer risks to workers on the MERECO property and bordering the MERECO property were within the 10^{-6} to 10^{-4} range. Risks to other receptors were below the EPA threshold levels of concem. Results of the Screening Level Ecological Risk Assessment indicated the potential for risk to ecological receptors including aquatic invertebrates, freshwater fish, amphibians, insectivorous birds, and piscivorous birds and mammals from exposure to mercury in surface water, sediment, and soil.

Response Actions

Under a September 1985 Consent Decree with New York State, MERECO excavated and removed approximately 2,100 cubic yards (yd^3) of mercury-contaminated soil and debris and 300 yd^3 of PCB-contaminated soils from the MERECO and Amtrak properties. The excavated area was backfilled with clean fill and covered with a single-layer clay cap. In June 1989, MERECO entered into an Administrative Order on Consent (AOC) with NYSDEC which called for the identification and remediation of mercury-contaminated areas, both on and off of the MERECO property, development of a program to evaluate and abate migration of mercury and other contaminants from the facility, including mercury emissions from both permitted (i.e. the retorts) and fugitive air sources, and investigation of the Patroon Creek.

Another AOC was signed by MERECO and NYSDEC in February 1993 which called for the establishment of a schedule for the completion of all activities, a permanent remedy for the abatement of emissions and migration of pollutants, quarterly groundwater monitoring for ten years, remediation/removal of contaminated soils beneath the old Retort Building, long-term monitoring of areas surrounding the Site, and payment for civil penalties and natural resource damages. In February 1994, construction of new retorts inside the Phase 1 Building was completed. The old Retort Building was demolished and an asphalt and concrete cap was placed over the area. In 1995, a soil investigation beneath the cap found visible free-phase mercury from just below the concrete to approximately 13-18 feet below ground surface (ft bgs).

In December 1996, MERECO received a Hazardous Waste Corrective Action Management Permit pursuant to the Resource Conservation and Recovery Act (RCRA) from NYSDEC for controlling the generation and storage of waste at the MERECO property and for completing the investigation and

remediation of contamination at the property and surrounding areas. In November 1999, after unsuccessful efforts to have MERECO fully comply with the terms of its RCRA permit, NYSDEC requested that the EPA take over as lead agency for the Site under CERCLA.

EPA issued a Record of Decision on September 20, 2008 to address mercury contamination in soils and sediments. The ROD had the following remedial action objectives (RAOs):

- Prevent or minimize potential future human exposures including ingestion and dermal contact with mercury-contaminated soils in excess of 5.7 parts per million (ppm), which is based on New York State's Soil Cleanup Objectives at 6 NYCRR Part 375 for industrial use;
- Prevent or minimize potential ingestion of mercury-contaminated groundwater and minimize mercury contamination in soils as a source of groundwater contamination at the facility. The cleanup level will be applied to the subsurface in the aquifer where the groundwater has a dissolved mercury concentration which exceeds the New York State Water Quality Standard (NYSWQS) of 0.7 parts per billion (ppb); and
- Remediate mercury-contaminated sediments in the Unnamed tributary to levels that are protective of the biota such that the most significant impacts are eliminated.

In order to achieve the RAOs for the contaminated soils and sediments, EPA selected the following remedy:

- Excavation and off-site disposal of surface soils and subsurface soils above the water table from the MERECO property and adjoining properties which exceed the cleanup level for mercury in soil of 5.7 ppm for industrial property usage. These soils also include the soils associated with the stormwater sewer/catch basin systems;
- ISS involving mixing or injection of treatment agents at the MERECO and Allied properties to immobilize contaminants in surface soils, subsurface soils, and soils below the water table where the groundwater has a dissolved mercury concentration which exceeds the cleanup level of 0.7 ppb for mercury in groundwater;
- Implementation of institutional controls (ICs) in the form of environmental easements/restrictive covenants to restrict future development/use of the Site. Specifically, environmental easements/restrictive covenants will be filed in the property records of Albany County. The easements/covenants will at a minimum: (a) limit the Site to industrial uses; (b) preserve the integrity of the existing clay cap on the southern portion of the Mercury Refining Property; (c) preserve the integrity of the solidified/stabilized mass; (d) prevent the excavation of soils which lay beneath the Phase 1 Building, which housed Mercury Refining's operations, and the Container Storage Building, which was used to store incoming mercury bearing material for processing, unless the excavation follows a Site Management Plan (see below); and (e) restrict the use of groundwater as a source of potable or process water until groundwater quality standards are met;
- Development and implementation of an EPA-approved Site Management Plan (SMP). The SMP will, among other things, address long-term operation and maintenance (O&M) of the Site, and future excavation of soils, including, but not limited to, soils beneath the Phase 1 and Container Buildings on the MERECO property, and soils on the Albany Pallet property, the Allied property, and the Diamond W property, which will not be remediated by this remedy, to ensure that the soils are properly tested and handled to protect the health and safety of workers and the nearby community. The approved SMP will also require an evaluation of the potential for vapor intrusion at all existing buildings on-Site and/or those to be constructed in the future, and mitigation, if necessary, in compliance with the SMP. Finally, the SMP will provide for the proper management

of all Site remedy components post-construction and shall include: (a) monitoring of groundwater to ensure that, following Site remediation, the contamination has attenuated and the groundwater has been remediated; (b) monitoring and maintenance of institutional controls; (c) a provision for operation and maintenance of the clay cap; (d) periodic certifications by the owners/operators of the Site properties or other party implementing the remedy that the institutional and engineering controls are in place; and (e) a provision to manage the demolition or alteration of the existing buildings on-Site, if such demolition or alteration is proposed in the future, to protect the health and safety of the workers and the nearby community and to ensure proper disposal of any building debris;

- Removal, dewatering, and disposal of the mercury-contaminated sediments in the Unnamed Tributary exceeding the cleanup level for mercury in sediments of 1.3 ppm;
- Verification sampling to confirm the effectiveness of the remedy;
- Sampling of the fish, surface water, and sediments in the Patroon Creek, the Unnamed Tributary, and the I-90 Pond to assess impacts on the biota on an annual basis for five years. Sampling thereafter will be based on the results of the five annual sampling rounds, as reported within the first FYR. Should conditions change with regard to the I-90 Pond dam (i.e. the dam is repaired, removed, or if it should fail), the EPA will evaluate the potential impact of any significant releases and, if necessary, take or require response actions to mitigate their potential impact; and
- In accordance with CERCLA and because the remedy will result in contaminants remaining on-site above levels that will not allow for UU/UE, the remedy will be reviewed at least once every five years.

Table 1: Site Cleanup Goals

Contaminant	Media	Cleanup Goal	Source
Mercury	Soil	5.7 ppm	6 NYCRR Part 375
Mercury	Groundwater	0.7 ppb	NYSWQS
Mercury	Sediment	1.3 ppm	NYSDEC Technical Guidance for Screening Contaminated Sediment, 1994

Status of Implementation

The remedial action was implemented in two phases. On October 1, 2013, the soil and sediment excavation and disposal portion of the remedy was initiated. Soils and sediments containing mercury at concentrations that exceeded the cleanup objectives were excavated and disposed off-site. Waste characterization sampling was performed prior to disposal, and soils with visible mercury or batteries and/or those soils above the toxicity characteristic leaching procedure (TCLP) limit of 0.2 milligrams per liter (mg/L) for mercury were disposed as hazardous waste. In total, 5,588 tons of soil and sediment were disposed of as non-hazardous waste with another 173 tons of material disposed as RCRA hazardous waste. All excavated areas were backfilled with clean soil and returned to original grade and condition (i.e. paved or reseeded). Work associated with this portion of the remedy was completed on December 30, 2013.

During June and July 2014, a pilot study initiated the work associated with the ISS portion of the remedy in order to determine the final cement and reagent mixture. The pilot test determined that a six-foot diameter auger would be used for full-scale implementation. The performance standards selected for the

ISS material were an unconfined compressive strength (UCS) between 50 and 200 pounds per square inch, an average hydraulic conductivity less than or equal to 1×10^{-6} centimeters per second (cm/s) with no single value greater than 1×10^{-5} cm/s, and a reduction in mercury leachability of at least one order of magnitude from the untreated soil using synthetic precipitation leaching procedure (SPLP) testing.

Prior to full-scale implementation, the ISS area was pre-excavated to a depth ranging from seven to 10 ft bgs in order to allow space for the eventual swelling of the ISS material. This pre-excavation resulted in the off-site disposal on an additional 2,618 tons of non-hazardous soil. Additionally, a portion of the concrete pad overlying the ISS area was found to contain embedded button batteries and was disposed off-site as RCRA hazardous waste. On August 14, 2014, full-scale ISS implementation began and was completed on October 31, 2014.

A total of 235 columns were installed at the Site. Verification sampling for the ISS columns indicate that the UCS and SPLP performance standards were achieved.

IC Summary Table

Table 2: Summary of Planned ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Site Use	Yes	Yes	MERECO Property, Allied Property, SealMaster Property, CSX Property	Restrict site use to industrial activities	Environmental Easement/Restrictive Covenant, Planned – June 2019
Soil	Yes	Yes	MERECO Property	Preserve the integrity of the single-layer clay cap and pavement over the ISS area.	Environmental Easement/Restrictive Covenant, Planned – June 2019
ISS Material	Yes	Yes	MERECO Property, Allied Property	Prevent mechanical disturbance of the stabilized mass.	Environmental Easement/Restrictive Covenant, Planned – June 2019

Soil	Yes	Yes	MERECO Property, Allied Property, SealMaster Property	Ensure proper testing and disposal of any future soil excavations.	Environmental Easement/Restrictive Covenant, Planned – June 2019
Building Materials	Yes	Yes	MERECO Property	Require demolition activities of remaining on-site structures to be conducted in accordance with the SMP.	Environmental Easement/Restrictive Covenant, Planned – June 2019
Groundwater	Yes	Yes	MERECO Property, Allied Property, SealMaster Property, CSX Property	Prohibit use of groundwater as a source of potable or process water until groundwater quality standards are met.	Environmental Easement/Restrictive Covenant, Planned – June 2019
Vapor Intrusion	Yes	Yes	MERECO Property, Allied Property, SealMaster Property	Require a vapor intrusion investigation within the footprint of any proposed future construction in accordance with the SMP.	Environmental Easement/Restrictive Covenant, Planned – June 2019

Systems Operations/Operation & Maintenance

Following the completion of the remedial action, regular monitoring of the Site has been conducted in accordance with the ROD and the SMP. Groundwater monitoring for mercury is completed on a quarterly basis from a total of 12 monitoring wells located in four well clusters. Three of these well clusters are located downgradient of the ISS area, while the fourth is located upgradient of the ISS area near the northeast corner of the Phase 1 Building. Additionally, ecological monitoring is completed on an annual basis and includes surface water, sediment, and fish tissue sampling from the Unnamed Tributary, Patroon Creek, and the I-90 Pond.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

This is the first FYR of the Site.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2018, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 42 Superfund sites in New York, New Jersey, Puerto Rico, and the U.S. Virgin Islands, including the Mercury Refining, Inc. site. The announcement can be found at the following web address:
https://www.epa.gov/sites/production/files/2018-10/documents/five_year_reviews_fy2019_for_web_posting.pdf

In addition to this notification, a notice of the commencement of the FYR was sent to local public officials. The notice was provided to the towns of Colonie and Guilderland by email on August 2, 2018 with a request that the notice be posted in the respective municipal offices and on the town webpages. The purpose of the public notice was to inform the community that the EPA would be conducting an FYR to ensure that the remedy implemented at the Site remains protective of public health and is functioning as designed. In addition, the notice included contact information, including addresses and telephone numbers, for questions related to the FYR process or the Site.

Once the FYR is completed, the results will be made available online (http://www.epa.gov/superfund/mercury-refining) and at the Site information repositories. The information repositories are maintained at the William K. Sanford Town Library, 629 Albany Shaker Road, Loudonville, NY 12211 and the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York.

Data Review

Groundwater

Through December 2017, nine rounds of post-remediation groundwater monitoring have been conducted. The groundwater monitoring program is composed of four monitoring well clusters screened in the shallow, intermediate, and deep overburden for a total of 12 wells that are currently sampled quarterly. Ten of the 12 wells included in the monitoring program met the 0.7 ppb maximum contaminant level (MCL) for dissolved mercury in each of the nine sampling events.

One well, MW-14D, located immediately south-southeast of the ISS area was found to have mercury concentrations of 0.72 ppb and 1.4 ppb in the September 2015 and March 2017 sampling events, respectively. However, these results were for unfiltered samples. Filtered samples analyzed from both of these events exhibited non-detect levels of mercury which indicates that the concentrations were due to suspended sediments in the samples and not dissolved in the groundwater, which is corroborated by elevated turbidity measurements at the time of sampling.

Finally, one well, MW-12S, located south-southwest of the ISS area, has failed to meet the 0.7 ppb MCL in six of the nine sampling events. The results in this well have ranged from 0.29 ppb (filtered) in June 2016 to 2.2 ppb (filtered) in December 2016 (Appendix D). In September 2016, the mercury concentration in the filtered sample was 4.2 ppb, but this is considered an anomalous result since the unfiltered sample had a concentration of 1.6 ppb during the same event. The concentrations in MW-12S show seasonal variations with an overall decreasing trend for both filtered and unfiltered mercury.

Sediment

Sediment samples are collected every November from five locations (two in the Unnamed Tributary, two in the Patroon Creek, and one in the I-90 Pond). To date, three sampling events have been conducted. Total mercury concentrations have ranged between 0.041 ppm to 0.64 ppm in the 2017 and 2015 sampling events, respectively. No observations have exceeded the ROD-specified sediment cleanup objective of 1.3 ppm. Concentrations of methyl mercury have ranged from 0.082 ppb to 2.9 ppb in the 2015 and 2016 sampling events, respectively. Currently, there is no NYSDEC or EPA criterion for methyl mercury in sediments.

Surface Water

Surface water samples are collected every November from three locations (one in each of the Unnamed Tributary, Patroon Creek, and I-90 Pond). To date, three sampling events have been conducted. Total mercury has never been detected in samples analyzed at a minimum detection limit of 120 parts per trillion (ppt). The NYSDEC chronic water quality criterion for mercury for the protection of aquatic life is 770 ppt (dissolved). Using a more sensitive laboratory analytical method, methyl mercury concentrations have ranged from non-detect to 0.17 ppt in the 2017 and 2015 sampling events, respectively. There is currently no NYSDEC criterion for methyl mercury. The Oak Ridge National Laboratory Tier II Secondary Chronic Value for freshwater aquatic life is 2.8 ppt.

Fish Tissue

Fish tissue samples are collected every November from three locations (one in each of the Unnamed Tributary, Patroon Creek, and I-90 Pond). Since the completion of the remedial action, three sampling events have been conducted. Mercury concentrations in fish tissue have consistently been non-detect at detection limits below the EPA target fish tissue concentration of 0.3 ppm for methyl mercury. By comparison, data collected while the NYSDEC served as lead agency indicated concentrations of mercury in fish which ranged from 7 ppb to 914 ppb within the lower reaches of Patroon Creek. The RI detected mercury in fish tissue at 110 ppb in a sample from the 1-90 Pond and 220 ppb and 130 ppb in two fish caught between MERECO and the 1-90 Pond. Mercury concentrations in fish collected for the BERA ranged from 48 ppb in fish collected from the background portion of the Unnamed Tributary to 175 ppb in fish from the Unnamed Tributary.

Site Inspection

The Site inspection was conducted on July 24, 2018. In attendance were Thomas Mongelli, EPA, John Grathwol of NYSDEC, and Geoff Seibel and John Rolfe of de maximis, inc., contractor for the PRP group. The purpose of the inspection was to assess the protectiveness of the remedy.

No physical anomalies were observed during the site inspection. All 12 monitoring wells were locked and appeared to be in good condition. Site fencing was in good condition and the entrance gate was observed to be functioning. Vegetated areas appeared to be thriving with no visible signs of erosion, and paved areas were well maintained including over the ISS area. The team noted that the "Quonset Hut," or former Albany Pallet building, had been demolished and is now being used as a parking area for school buses and other commercial vehicles. Neither EPA nor the PRP group had been informed of the demolition as required by the SMP. The PRP group requested the required documentation of the demolition from the property owner and is currently reviewing to ensure that all documentation required by the SMP is in place. The demolition occurred in mid-September 2017.

V. TECHNICAL ASSESSMENT

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

The remedy is currently functioning as intended by the ROD. Mercury-contaminated sediments and shallow soil have been excavated and disposed off-site. Soil in areas where mercury concentrations in groundwater exceeded MCLs has been treated via ISS, and long-term groundwater and ecological monitoring is ongoing. ICs are not yet in place, though this does not effect the current protectiveness of the remedy.

Remedial Action Performance

The remedial actions taken at the Site continue to operate and function as designed. One shallow monitoring well located downgradient of the ISS continues to exhibit mercury concentrations consistently above the 0.7 ppb cleanup objective with a maximum observed dissolved mercury concentration of 2.2 ppb. However, this concentration represents more than a 99% reduction from the maximum mercury concentration of 901 ppb observed prior to the ROD and the location exhibits decreasing trends. All sediment samples taken since the completion of remedial actions have met the ROD cleanup goal of 1.3 ppm.

Implementation of Institutional Controls and Other Measures

ICs called for in the ROD include restricting the Site to industrial use, preventing use of groundwater for potable or process purposes until groundwater standards are met, and preventing disturbance of the ISS area, among others. While these controls are not yet in place, they are currently being met through adherence to the SMP and because groundwater is not currently used at the Site for any purpose. These controls should be formalized through an environmental easement on the Site properties to ensure long-term compliance. Engineering controls, such as site fencing and paving, are being maintained due to the Site's continued use as an industrial facility.

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 B Summary:

Human Health

There have been no changes in the physical conditions of the Site over the past five years that would change the protectiveness of the remedy. The HHRA concluded that future residential exposure to groundwater (via drinking water) and construction worker exposure to soil (via direct contact) would result in human health risk and hazard exceeding EPA threshold criteria due to mercury exposure. The exposure assumptions and pathways considered in the 2008 ROD followed the Risk Assessment Guidance for Superfund used by the Agency and remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid. In addition, some of the toxicity values that were used in the HHRA have changed; however, the changes would not impact the remedial decision that was made for the Site.

The RAOs continue to remain valid and the selected remedy is protective of human health. The excavations performed, coupled with soil stabilization and cap implementation, effectively interrupt

potential direct contact exposures to workers at the Site. Site fencing further reduces access to receptors other than site workers as well. Once established, the ICs provided in Table 2 will continue to restrict site use to industrial activities, prevent exposure to stabilized soils beneath the cap, and ensure the proper handling and disposal of any future soil excavations in accordance with a SMP. Although groundwater beneath the Site is classified by New York State as "Class GA", indicating a potable source of drinking water, the Site and surrounding properties are connected to a municipal drinking water supply. Establishing environmental easement/restrictive covenants, discussed in Section II, will further restrict access to site groundwater in the future until the cleanup standards are met, thereby interrupting all human exposure pathways of potential concern. Ongoing groundwater monitoring has also indicated considerable reductions in mercury concentrations and will continue until the RAOs have been achieved.

The ROD established the class GA NYSWQS, NYSDEC Part 375 SCO and NYSDEC Technical Guidance for Screening Contaminated Sediment values as the cleanup criteria for mercury in groundwater, soil and sediment, respectively. All of which remain valid. Although exposures to sediment, surface water and fish tissue were not associated with appreciable levels of risk to human receptors, continued monitoring of each media has indicated nondetections or concentrations of mercury below the applicable ecological-based standards.

Vapor Intrusion

At the time of the HHRA, worker exposure to mercury vapors in indoor air exceeded the EPA noncancer threshold. However, the ROD determined that the selected remedy could not address this exposure pathway because the release of mercury vapor was occurring solely within the active workplace, and the release of hazardous substances within an active facility is not considered a release under CERCLA. Nevertheless, the O&M plan established for the Site called for two rounds of vapor monitoring within the facility. These sampling events were conducted in 2015 and 2016. The results from each event found soil vapor levels below the risk-based concentration of 3.1 $\mu g/m^3$. This screening level was calculated using a 10 fold adjustment on the EPA Regional Screening Level (RSL) for mercury within residential indoor air (0.31 $\mu g/m^3$). This is a conservative value since the commercial sub-slab EPA Vapor Intrusion Screening Level (VISL) for mercury is 43.8 $\mu g/m^3$. During the 2016 event, indoor air results exceeding the residential RSL were observed, but were determined to be from interior sources. Furthermore, these results (ranging between 1 and 1.25 $\mu g/m^3$) were below the applicable EPA commercial VISL. Based on these results, vapor sampling was discontinued. While vapor intrusion is not currently considered to be a pathway of concern at the Site, a vapor intrusion evaluation should be completed prior to any future construction at the Site in accordance with the SMP.

Ecological

Based upon the review of the Post-Remedial Monitoring Ecological Verification Sampling Report, the remedy is protective of ecological receptors. The remedy has eliminated exposure to ecological receptors through the excavation and disposal of the contaminated soil and sediment in Unnamed Tributary. Additionally, a monitoring program involving periodic sediment and surface water chemistry, as well as fish tissue analysis assesses the ecological protectiveness of the remedy. Total mercury concentrations in sediment have not exceeded the ROD-specified cleanup objective of 1.3 ppm. Total mercury and methyl mercury concentrations in surface water have not exceeded ecological screening values. The mercury concentrations in fish tissue in 2016 and 2017 were non-detect at detection limits ranging from 0.21 to 0.25 ppm and 0.13 to 0.14 ppm, respectively.

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

No other information has been identified that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

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

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1	Issue Category: Institutional Controls			
	Issue: Institutional controls are not yet in place.			
	Recommendation: Site surveys should be completed or updated, as appropriate, and environmental easements should be finalized for each of the on-site properties following EPA and State review of the draft documents.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	3/31/2019

OTHER FINDINGS

In addition, the following recommendation, identified during this FYR may reduce costs and improve management of O&M but does not affect current and/or future protectiveness:

- Based on the results of post-remediation sampling, consider reducing the groundwater monitoring frequency.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: 1	*Protectiveness Determination:* Short-term Protective	*Planned Addendum Completion Date:* N/A
Protectiveness Statement: The remedy at OU1 is protective of human health and the environment in the short term because all exposure pathways have been addressed. In order for it to be protective in the long term, institutional controls need to be put in place.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	*Planned Addendum Completion Date:* N/A
Protectiveness Statement: The remedy at OU1 is protective of human health and the environment in the short term because all exposure pathways have been addressed. In order for it to be protective in the long term, institutional controls need to be put in place.	

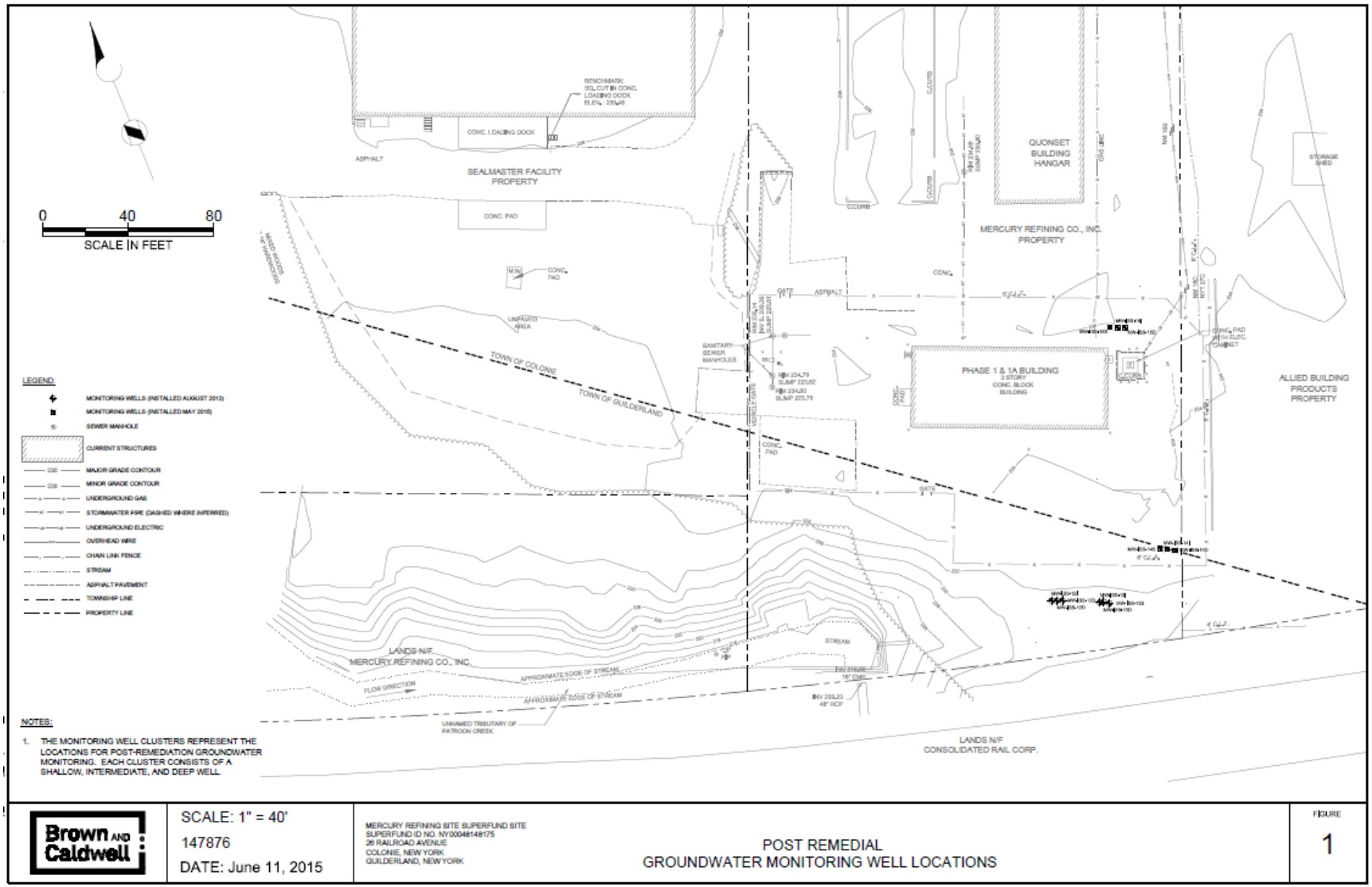
VIII. NEXT REVIEW

The next FYR report for the Mercury Refining, Inc. Superfund Site is required five years from the completion date of this review.

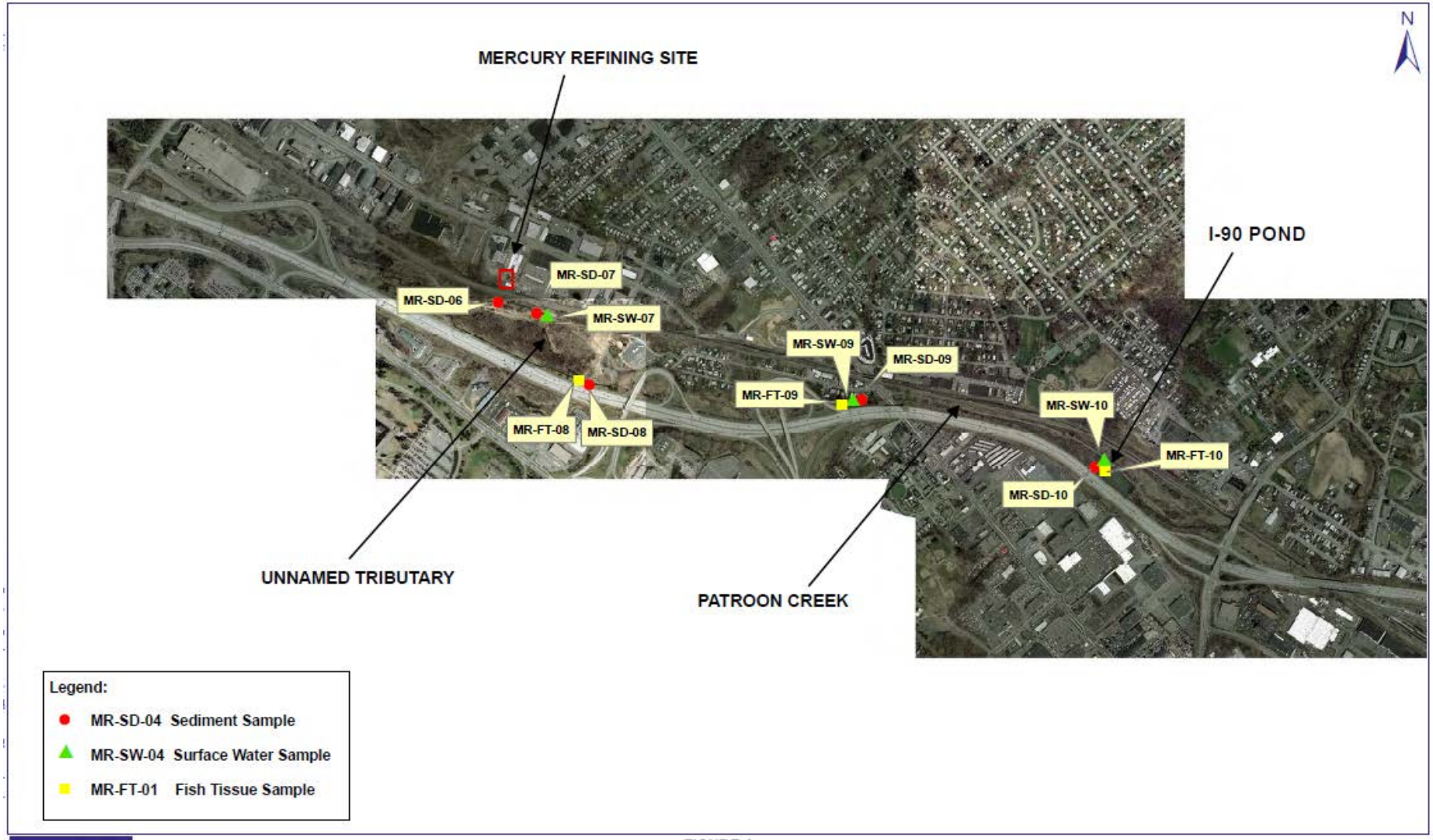
APPENDIX A – REFERENCE LIST

- Record of Decision, Mercury Refining Site, EPA, September 2008
- Superfund Preliminary Site Close-Out Report, Mercury Refining Superfund Site, EPA, April 2015
- Remedial Action Report, Mercury Refining Superfund Site, Brown and Caldwell, August 2015
- Quarterly Progress Reports, Mercury Refining Superfund Site, de maximis, inc., 2015-2018

APPENDIX B – SITE MAP



APPENDIX C – ECOLOGICAL SAMPLING LOCATIONS



Brown AND Caldwell

FIGURE 1
ECOLOGICAL SAMPLE LOCATIONS
MERCURY REFINING SUPERFUND SITE
COLONIE, NY

APPENDIX D – MW-12S TRENDS