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Interim Remedial Measure – Construction Completion Report

Operable Unit 1, Ramapo Paint Sludge Site
Ramapo, New York

August 2016

ARCADIS

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Acronyms

Addendum	Addendum 1 - Utility Corridor Soil Remediation IRM Work Plan for Paint Sludge and Impacted Soil Removal within OU-1
ACOE	Army Corps of Engineers
ARCADIS	ARCADIS of New York, P.C.
ASG	Amy S Greene Environmental Consultants
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene and xylene
Borbas	Borbas Surveying and Mapping LLC.
CAMP	Community Air Monitoring Program
CCR	Construction Completion Report
CKD	cement kiln dust
Creamer	Creamer Environmental Inc.
DER-10	Technical Guidance for Site Investigation and Remediation
DGA	Dense graded aggregate
EQ	Environmental Quality Company
EWMI	Environmental Waste Minimization Inc.
FFS	focused feasibility study
Ford	Ford Motor Company
GW	Groundwater
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
MSA	Material staging area
Mg/kg	milligram per kilogram
NYSDEC	New York State Department of Conservation
OC/AS	Order on Consent/Administrative Settlement
OU-1	Operable Unit 1
PCBs	Polychlorinated biphenyls
PIDs	Photoionization detectors
PS	Paint Sludge Area
SCOs	Soil Cleanup Objectives
SESC	Soil erosion and sediment controls
SRP	Site Restoration Plan
SVOCs	Semi volatile organic carbons
SWPPP	Stormwater Pollution Prevention Plan

TAL	Total analyte list
TCLP	Toxicity Characteristic Leaching Procedure
the Site	OU-1 of the Ramapo Paint Sludge Site located in Ramapo, New York
TOGS	Technical and Operation Guidance Series
United Water	United Water of New York
USEPA	United States Environmental Protection Agency
VOCs	Volatile organic carbons
Work Plan	IRM Work Plan for Paint Sludge and Impacted Soil Removal within OU-1
WWTP	Wastewater treatment plant
XRF	X-ray fluorescence unit

1. Introduction

On behalf of the Ford Motor Company (Ford), ARCADIS of New York, P.C. (ARCADIS) prepared this Construction Completion Report (CCR) for the Interim Remedial Measure (IRM) conducted at Operable Unit 1 (OU-1) of the Ramapo Paint Sludge Site located in Ramapo, New York (the Site, **Figure 1**). Remedial activities associated with the IRM included the excavation, removal and off-site transportation and disposal of paint sludge and impacted soils, backfilling with clean imported fill materials, and site restoration.

1.1 Report Organization

This CCR documents the completed remedial actions in accordance with the New York State Department of Environmental Conservation (NYSDEC) approved IRM Work Plan for Paint Sludge and Impacted Soil Removal within OU-1 (IRM Work Plan) and Addendum 1 - Utility Corridor Soil Remediation IRM Work Plan for Paint Sludge and Impacted Soil Removal within OU-1 (IRM Work Plan Addendum) approved by the NYSDEC on October 23, 2012 and November 5, 2013, respectively. The CCR is organized as follows:

- Section 2 presents the Background and Previous Investigatory Work;
- Section 3 presents the Interim Remedial Measure Objectives;
- Section 4 presents the Interim Remedial Measure and Documentation;
- Section 5 presents the Field Changes;
- Section 6 presents the Schedule;
- Section 7 presents the Conclusion; and
- Section 8 presents the References used in this report.

Data to supplement these sections is presented in the tables, figures and appendices attached. All approvals from the NYSDEC for the IRM, as well as communications with the NYSDEC during implementation, are provided in **Appendix A**.

2. Background and Previous Investigatory Work

The Ramapo Paint Sludge Site consists of three separate areas within southern Rockland County, New York, where paint sludge was historically disposed. The Site consists of three Operable Units (OUs) (**Figure 1**):

- The North of Ramapo Well Field area designated as OU-1;
- The Torne Valley Road area designated as OU-2; and,
- The Camp Hill Road area designated as OU-3.

On March 23, 2005, representatives of the NYSDEC and the Rockland County Department of Health visited the area to evaluate reports of paint sludge being present. The NYSDEC subsequently issued an Order on Consent and Administrative Settlement (OC/AS) to Ford, dated March 16, 2006, outlining requirements for the investigation and corrective actions of the operable units. Ford voluntarily agreed to initiate investigative efforts.

ARCADIS was retained by Ford and initiated a phased site investigation approach for the three operable units that included the review of historic aerial photographs, the performance of detailed field reconnaissance surveys and the collection of surface water, groundwater, sediment, and soil samples. This work was conducted from 2006 through 2007. ARCADIS subsequently conducted Geoprobe® and test pit investigations in 2009 to further delineate the extent of paint sludge in the three operable units and to better evaluate potential remedial alternatives.

2.1 Operable Unit 1

The North of Ramapo Well Field area (OU-1) is approximately 40-acres in size located predominantly in the Town of Ramapo. A small portion of OU-1 (two acres) is located in the Village of Hillburn (**Figure 2**). The Site is primarily undeveloped, but has a history of industrial use.

The area encompassed by OU-1 is undeveloped, with forested areas and open areas overgrown with brush. Debris including car bodies, household items, scrap metal, and industrial slag has also been identified within the area. The land is owned by the Town of Ramapo, with easements granted to United Water New York, Inc. (United Water) for the operation of five water-supply wells.

2.2 Previous Investigatory Work at OU-1

Results of the previous investigatory work indicate that paint sludge was limited to the southern-most portion of OU-1. Results of paint sludge samples obtained during the OU-1 Geoprobe® investigation indicated that volatile organic compounds (VOCs); benzene, toluene, ethylbenzene and xylenes (BTEX), and acetone were detected at concentrations above NYSDEC restricted residential use soil cleanup objectives (SCOs).

A summary of paint sludge results is provided in Table 1 and a figure showing the locations of the survey nodes, investigatory soil borings and test pits is provided as Figure 3.Limits of Excavation

The general excavation limits were defined as paint sludge removal areas (PS-1, PS-2, and PS-3) and were associated with the test pits excavated in the southern portion of OU-1. However, there were a small number of location nodes identified outside the southern portion of the Site where test pits were advanced to confirm no subsurface impacts. Results of these test pits are outlined below and locations are provided on **Figure 3.**

- Test pits 8 and 9 were excavated in the northern portion of OU-1 (Level 1 survey area) to a depth of approximately 7 feet below ground surface (bgs) where native fill was encountered. No subsurface paint sludge was observed.

- Test pits 10 and 11 were excavated to depths of 10 and 8 feet bgs, respectively. Paint sludge was not observed within or beneath the targeted mounded areas.

Paint sludge and impacted soil identified within OU-1 during the investigative work was excavated and removed for off-site disposal. This included all location nodes where surface paint sludge was identified outside the paint sludge removal areas.

2.3 Previous Interim Remedial Actions at OU-1

On May 17, 2012, ARCADIS and Environmental Waste Minimization, Inc. (EWMI) completed an IRM at OU-1 in response to flooding associated with Hurricane Irene that damaged the river bank and exposed surficial paint sludge approximately 100 yards upstream of Production Well #97.

The IRM consisted of the removal of vegetation along the river bank in the vicinity of surficial paint sludge from an approximate area of 1,200 square feet. The vegetation was removed using chain saws, weed whackers and other hand tools. Super silt fence was installed to replace the existing silt fence along the river bank which was removed as part of this work. The river bank was further stabilized using geotextile to avoid further erosion of the area until implementation of the full-scale remedy. The geotextile was anchored into the ground utilizing a 2-inch deep trench along the upper slope and with natural debris (i.e., rocks and logs) along the eastern and western edges and the toe of slope.

3. Interim Remedial Measure Objectives

Portions of OU-1 are currently used by United Water as a public water supply well field, and zoned by the Town of Ramapo as Restricted Residential. The future plans for OU-1 will be an open space or park; therefore, the IRM objectives established for OU-1 are as follows:

- Remove paint sludge and underlying impacted soils identified during prior investigative work to meet:
    - the NYSDEC restricted residential use SCOs from zero to two feet bgs; and
    - the NYSDEC protection of groundwater SCOs for depths greater than two feet bgs;
- Protect existing groundwater quality and ecological resources; and,
- Eliminate potential risks to maintenance workers, utility workers, and recreators based on direct contact to surficial or subsurface paint sludge.

Table 2 presents a summary of the NYSDEC restricted residential use and protection of groundwater SCOs for reference.

4. Interim Remedial Measure Construction and Documentation

The IRM activities consisted of the following:

- Mobilization and Site Preparation;

- Excavation and Removal of Paint Sludge and Impacted Soil;
- Confirmatory Soil Samples and Test Pits;
- Site Restoration;
- Material Handling and Off-Site Transportation and Disposal; and,
- Reporting.

All work associated with the implementation of the IRM was completed under the direction of ARCADIS and in accordance with the NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10).

4.1 Mobilization and Site Preparation

The removal and disposal of paint sludge and impacted soils was completed in two mobilizations:

- The first mobilization consisted of the excavation, removal, transportation and disposal of paint sludge and impacted soil as outlined in the IRM Work Plan approved by the NYSDEC on October 23, 2012. This work was completed by the Environmental Quality Company (EQ) between February and September 2013. Site restoration was completed by Amy S. Greene (ASG) in October 2013 at the conclusion of the fall planting season in accordance with the NYSDEC approved Site Restoration Plan (SRP) dated October 28, 2013. The approval letter is presented in **Appendix A.**

- The second mobilization consisted of the excavation, removal, transportation and disposal of additional quantities of paint sludge and impacted soil discovered in the utility corridor and outlined in the IRM Work Plan Addendum approved by the NYSDEC on November 5, 2013. The excavation and removal work was completed by Creamer Environmental, Inc. (Creamer) in November and December 2013 with the transportation and off-site disposal being completed by EQ. Site restoration was completed by ASG in April 2014 at the beginning of the spring planting season.

4.1.1 Applicable Permits

The IRM was performed in accordance with the OC/AS issued by the NYSDEC; therefore, Ford was exempt from several state permits. Prior to the initial mobilization, ARCADIS on behalf of Ford, prepared permit packages or equivalencies to meet the requirements of different permitting agencies. The permits obtained include the following (refer to **Appendix A** for approvals):

- Stormwater Pollution Prevention Plan (SWPPP) – A SWPPP, dated September 2011, outlining the soil erosion and sediment controls (SESC) methods and procedures utilized during land disturbance activities was prepared and approved by the NYSDEC and the Rockland County Drainage Agency (RCDA) in October 2011.

  The SWPPP was revised in August 2012 to incorporate the additional work proposed along the river bank. The revised SWPPP was approved by the NYSDEC as an appendix of the IRM Work Plan in a letter dated October 23, 2012. No further approval was required by the RCDA as the IRM activities were mandated by the NYSDEC.

- Wetland Delineation - A wetland's delineation was conducted at the Site in June 2011 to confirm that there were no jurisdictional wetlands at or present within the limits of work. A wetland delineation report was subsequently submitted to the NYSDEC and Army Corps of Engineers (ACOE) Eastern Permitting Branch, dated September 22, 2011. The NYSDEC issued a letter dated October 4, 2011 indicating that no NYS regulated freshwater wetlands were identified within the proposed work area.

- Office of Parks, Recreation and Historical Preservation (OPRHP) - A letter was submitted to the OPRHP, dated July 29, 2011, requesting a no impact determination for the IRM Work Plan construction activities. The OPRHP provided a response letter dated September 6, 2011 identifying an archeological site adjacent to OU-1 and requested additional documentation to confirm no adverse impacts would occur to the archeological site during the IRM implementation.

  ARCADIS, on behalf of Ford, prepared and submitted a response letter dated September 30, 2011 with supporting documentation to the OPRHP for the

construction activities associated with the IRM Work Plan. The OPRHP gave a "No Impact" decision in a letter, dated October 26, 2011.

- Threatened/Endangered Species Request – The NYSDEC Division of Fish, Wildlife and Marine Resources checked the NY Natural Heritage Program database and identified a Chestnut Oak Forest and the Timber Rattlesnake as species of potential concern. Additionally, the United States Fish and Wildlife Department database identified the Indiana Brown Bat and the Bog Turtle in the region of the Site. All determinations were more from a regional standpoint and did not reflect the site conditions at OU-1 during the IRM activities; however, a contingency plan was instituted for notifying the NYSDEC Division of Fish, Wildlife and Marine Resources if a Timber Rattlesnake was located within the limits of disturbance and needed to be relocated.

- Joint Permit Application – A Joint Permit was required for the excavation of paint sludge/ impacted soil within 20 feet of the stream bank adjacent to OU-1. The permit application was submitted to the NYSDEC for Stream Disturbance and to the ACOE for Pre-Construction Notification of Excavation and Fill in Navigable Waters (Nationwide Permit #38). The NYSDEC provided conditional approval of the Joint Permit in a letter dated October 23, 2012.

- During the excavation activities, test pits were installed along the stream bank at the 20 foot limit. These test pits had no evidence of impacted soil and paint sludge; therefore, no further excavation of the stream bank was warranted as referenced in the *Excavation- Along the Riverbank* section below. No approval was granted from the ACOE and no work was conducted in the stream bank.

4.1.2 Health and Safety

All work on this project was performed in compliance with ARCADIS' Health and Safety Standards, the Occupational Safety and Health Administration's Hazardous Waste Operations, and Emergency Response regulation (29 CFR 1910.120). All work was conducted in accordance with the Site Specific Health and Safety Plan (HASP) dated October 2011 which was provided to the NYSDEC as part of the IRM Work Plan.

4.1.2.1 CAMP Monitoring

Perimeter air monitoring was conducted during removal activities in accordance with the Community Air Monitoring Program (CAMP) dated August 2012 and the Site-

Specific HASP which were provided to the NYSDEC as part of the IRM Work Plan. Air monitoring consisted of the following components:

- Real-time monitoring within the work area for particulates and total VOCs using photoionization detectors (PIDs) and a particulate monitors; and,

- Continuous monitoring at stationary locations along the work zone perimeter using Summa Canisters, PIDs and particulate monitors.

Summa Canisters were placed at the perimeter of the Site along Bridge Street and across the foot bridge from the James T. St Lawrence Recreational Center. These locations were chosen based on the proximity of the work areas to the public (i.e., local business and public recreational facility).

The excavation and material handling/stockpiling activities ceased and corrective actions were implemented, when VOCs and/or levels of particulates exceeded the action levels identified within the CAMP. The corrective actions included temporarily backfilling the excavation with cover materials or applying long duration odor suppression agent to cover impacted soils, as necessary. The long duration odor suppression agent was a water-soluble, non-toxic, non-reactive, and non-volatile foam applied in accordance with the manufacturer's specifications via Rusmar NTC/8 portable foam application unit.

All air monitoring results and actions were documented in the CAMP Reports. Analytical results associated with the Summa Canisters are presented in **Table 3.** CAMP reports and the validated lab reports are included in **Appendix B**.

Exceedances were identified at all air monitoring locations above the United States Environmental Protective Agency (USEPA) National Ambient Air VOC restrictions for select chlorofluorocarbons. These exceedances were identified in the background air samples and have not been detected historically in the paint sludge and impacted material being disturbed at the Site (**Appendix A**).

4.1.3 Site Clearing and SESC Preparation

Prior to any land disturbance, SESCs were established at the Site in accordance with the SWPPP. The SESCs consisted of the following:

- Installation of silt fencing and super silt fencing at the Site boundaries to minimize impacts to the Ramapo River.

- Installation of a construction entrance (located off of Bridge Street) and upgrading the North of Ramapo Well Field access road, as necessary, to stabilize the areas for use by trucks and other heavy equipment.

Vegetation within the proposed work areas was cleared/grubbed, as necessary, to allow for the performance of work activities. Trees and associated tree stumps removed during clearing operations were checked for the presence of paint sludge, and subsequently chipped and disposed off-site at United Sanitations. (**Appendix C**).

All SESCs were left in place after completion of the first phase of paint sludge and impacted soil excavation, removal, transportation and disposal by EQ. For the performance of the second phase of work (excavation and removal of additional paint sludge and impacted soil from the utility corridor), Creamer made the necessary repairs to the silt fencing, construction entrance and access roads.

SESCs were left in place by Creamer as site restoration activities (i.e., planting) could not be conducted in December 2013. These SESCs were removed by ASG in May 2014, following stabilizing of approximately 80% of the surface area through vegetation.

4.1.3.1 Material Staging Area

A Material Staging Area (MSA) was installed by EQ at the Northern portion of the Site as approved by the Town of Ramapo**.** The MSA was constructed in accordance with the IRM WP and used for stockpiling and segregating paint sludge for the IRM work as described in the *Transportation and Disposal of Paint Sludge and Impacted Material* section.

At the completion of EQ's scope of work (the first mobilization), the MSA was dismantled, the surface area was scraped to an average depth of six inches bgs, and soil samples were collected under the direction of the NYSDEC at a frequency of one sample per 2,000 square feet (**Appendix A**). Approximately 1,539 cubic yards of impacted material was removed from beneath the MSA (**Figure 4**) and replaced with clean fill and topsoil to match existing grade. The surface was restored with hydroseed, erosion matting and plantings in accordance with the SRP.

For the second mobilization (Creamer's scope of work), a temporary MSA was setup adjacent to the work area. Creamer's MSA consisted of 12 inches of clean stone overlain with two layers of polyethylene sheeting. The 12 inches of clean stone along with the polyethylene sheeting was disposed of with the paint sludge and impacted soil following completion of Creamer's scope of work.

During all mobilizations, staged paint sludge and impacted material stockpiles were kept covered with plastic sheeting/tarps and secured in-place to minimize potential air emissions and to prevent erosion during rain events.

4.1.4 Utility Clearance and Coordination

The New York One-call System was contacted by EQ and Creamer prior to initiating their respective phases of work to identify subsurface utilities in the vicinity of the work limits associated with OU-1. Additionally, the required work within the utility corridor was completed under the direct oversight of United Water and their consultant who provided an engineer for oversight during the excavation and restoration activities around the existing water line and associated utilities.

4.2 Excavation and Removal of Paint Sludge and Impacted Soil

Paint sludge and impacted soil identified within OU-1 during prior investigative work was excavated and removed for off-site disposal. The general limits were defined as PS-1, PS-2, and PS-3. The paint sludge removal areas were further subdivided into the following categories:

- Utility Corridor
- PS Removal Areas
- River Bank

The proposed and final limits of work in these areas are identified on **Figure 5**. The depth of paint sludge and impacted soil removed is presented on the Cross Sections (**Figures 6A and 6B)**.

4.2.1 Excavation - Within the Utility Corridor

The excavation and removal of paint sludge and impacted soil from the utility corridor was originally described in the IRM Work Plan. In order to complete this work, the

concrete water line and infrastructure associated with the North of Ramapo Well Field were shut down for the months of February and March 2013. Following the completion of work described in the IRM Work Plan and putting the utility corridor back in service, additional quantities of paint sludge and impacted soil were discovered which required the preparation of an IRM Work Plan Addendum.

The concrete water line and associated infrastructure were shut down again in November and December 2013 to compete the work described in the IRM Work Plan Addendum.

Approximately 3,872 cubic yards of paint sludge and impacted soil were excavated from the utility corridor (3,317 cubic yards during the first phase and 555 cubic yards during the second phase) (**Figure 7**).

4.2.1.1 Removal Under the IRM Work Plan (February and March 2013)

EQ employed excavation methods within the utility corridor to include a combination of mini excavators, high vacuum systems, and manual digging to remove paint sludge and impacted soil adjacent to and around the electrical and communication cables and the water line (**Appendix D**). These methods were conducted to minimize the potential for damaging the utilities, water line, well head or supporting structures. The excavation was conducted utilizing a cell-by-cell, segmented approach where no more than ten-foot segment of the concrete water line was completely exposed at a given time to prevent potential settlement or bending.

In the areas where paint sludge was visually identified to be extending below the concrete water line, the materials were removed by EQ using vacuum trucks and hand digging.

Following the completion of the removal, the bottoms and sidewalls of the excavated areas in the utility corridor were visually inspected and sampled by ARCADIS personnel to confirm the absence of paint sludge prior to backfilling. The excavated areas were backfilled with flowable fill to a depth above the concrete water line in accordance with the requirements set forth by United Water (**Appendix A**). No further excavation was allowed along the alignment until the flowable fill was set for a period of 24 hours.

4.2.1.2 Removal Under the IRM Work Plan Addendum (November and December 2013)

During the excavation and removal activities in the PS-2 area, paint sludge was discovered to be extending to the Utility Corridor which required removal at a later date as the water line was back in service and could not be shut down due to the high water demand. Ford and United Water agreed to conduct the paint sludge removal activities in late fall or early winter when the water demand is low and the water line could be shut down.

An IRM Work Plan Addendum was prepared to describe the removal of additional paint sludge and impacted soil from the utility corridor in PS-2 area. Due to the depth of the additional paint sludge flow and the limited time provided by United Water to put the water line out of service, Ford agreed with United Water to cut and completely remove an 80-foot segment of the concrete water line, excavate and remove the paint sludge and impacted material beneath the pipe, and replace the pipe.

With the well field shutdown, Creamer temporarily supported the electric and communication lines, cut the water line and temporarily capped the exposed ends to complete the paint sludge and impacted soil excavation and removal. Once the excavation base was determined in the field by ARCADIS personnel as clean (sidewalls were previously excavated during the IRM), post excavation soil samples were collected and the excavation was backfilled and compacted in lifts with dense graded aggregate (DGA) to an elevation corresponding to the depth of the water line bottom.

A 16-inch diameter Class 54 ductile iron water pipe with restrained joint gaskets was then installed in the clean corridor and connected to the existing concrete water line at each joint. Following the installation of the water line, backfilling was completed with DGA to the ground surface in accordance with the requirements set forth by United Water (**Appendix A**).

4.2.2 Excavation - General

Paint sludge and impacted soil was removed from the excavation areas using traditional construction equipment, loaded into off-road dump trucks, and transported to the MSA for waste segregation and characterization prior to off-site transportation and disposal (**Appendix D**).

The lateral and vertical limits of the excavation areas were based on visual identification of paint sludge by ARCADIS, the use of a field X-ray Fluorescence (XRF) unit, collection of confirmation samples and the performance of confirmatory test pits. The XRF unit was used to assess the concentrations of lead, manganese and copper which were targeted as potential indicator metals for the presence of paint sludge within the base and sidewalls of the excavation.

4.2.2.1 Paint Sludge Area 1

Paint Sludge Area 1 (PS-1) was excavated from April to June 2013. Approximately 11,541 cubic yards of paint sludge and impacted soil was excavated from PS-1 and transported to the MSA by EQ for waste characterization and off-site disposal (**Figure 8**).

4.2.2.2 Paint Sludge Area 2

PS-2 was excavated from May to June 2013. Approximately 7,934 cubic yards of paint sludge and impacted soil was excavated from PS-2 and transported to the MSA by EQ for waste characterization and off-site disposal (**Figure 9**).

During the excavation of PS-2, a continuous flow of paint sludge was identified within the utility corridor at depths greater than the known depth of the concrete water line. Since the utility corridor was active, the additional material was left-in-place and removed during the second phase of work completed by Creamer as presented in the *Excavation- Within the Utility Corridor* section.

4.2.2.3 Paint Sludge Area 3

PS-3 was excavated from April to July 2013. Approximately 5,857 cubic yards of paint sludge and impacted soil was excavated from PS-3 and transported to the MSA by EQ for waste characterization and off-site disposal (**Figure 10**).

4.2.2.4 Surface Scrape

Following the completion of excavation and removal of paint sludge and impacted soil from PS-1 through PS-3, the ground surface between the limits of the excavations were scraped by EQ to remove surficial paint sludge as directed by the NYSDEC (**Appendix A**). A portion of the ground surface area to be scraped was located within the active utility corridor; therefore, the ground surface scraping within the utility

corridor was completed by Creamer during the second phase of the IRM work. Approximately 2,127 cubic yards of paint sludge and impacted material (1,851 cubic yards in the first phase and 276 cubic yards in the second phase) was removed during the surface scrape and transported to the MSA/ temporary MSA for waste characterization and off-site disposal (**Figure 11**).

4.2.3 Excavation- Along the Riverbank

A portion of the excavation work within PS-3 was scheduled to be completed along the bank of the Ramapo River. Prior to excavation of this area, four test pits were installed along the top of the bank to confirm the required limits of the excavation (**Figure 10**). The four test pits were conducted under the NYSDEC oversight.

Test pits PS-3-East-01 through PS-3-East-04 were advanced to a depth of eight feet bgs and no paint sludge was observed. Due to the absence of paint sludge in PS-3-East-01 through PS-3-East-04, the portion of excavation planned for along the Ramapo River was not conducted with the approval of NYSDEC. Photographs associated with these test pits are located in **Appendix E**. Details regarding the restoration of the riverbank area are presented in the *Site Restoration* section below.

4.2.4 Dewatering Activities

Groundwater at the Site is influenced by the Ramapo River. The average depth of groundwater is approximately eight to ten feet bgs, which matches the proposed depth of excavation. During the excavation activities, minimal dewatering was required. When dewatering was required, a vacuum truck was utilized to collect the water at the base of the excavation and transfer it to fractional (frac) tanks for storage prior to treatment, sampling, and discharge to groundwater via a dissipation pad.

4.2.4.1 Waste Water Treatment Plant

Water collected during the excavation dewatering and the surface water runoff collected from the MSA was staged in frac tanks and run in batches through an on-site waste water treatment plant (WWTP). The WWTP consisted of bag filters, granular activated carbon vessels, and cartridge filters to remove/reduce particulate matter and total metals concentrations. The WWTP was operated by an operator licensed in the State of New York. Treated water was sampled to confirm that concentrations of constituents were below the New York Technical and Operation Guidance Series (TOGS) Class GA Groundwater (GW) Standards prior to discharge.

The samples from the initial batch of treated groundwater exceeded the New York TOGS Class GA GW Standards for total metals; therefore, a coagulant and flocculant feed system was incorporated into the WWTP to assist in the separation of suspended particles in solution (i.e., total metals). By running the treated water through the coagulant and flocculant feed system, the resulting samples no longer exceeded the New York TOGS Class GA GW Standards for total metals and the treated water was subsequently allowed to be discharged to groundwater and/or used for dust suppression during excavation.

Table 4 presents the analytical results of the treated water sampling prior to and after running through the coagulant and flocculant feed system. These results were presented to the NYSDEC for approval prior to on-site discharge or reuse. The NYSDEC approvals are provided in **Appendix F**, along with the validated laboratory analytical reports. Approximately 305,700 gallons of water was treated through the WWTP during remedial construction. The majority of the treated effluent was used for dust suppression. Excess treated effluent water, not used for dust suppression, was discharged through the dissipation pad. For a summary of treated water disposition, refer to **Table 5**.

4.2.5 Confirmatory Soil Sampling

Confirmation soil samples were collected following the excavation and removal of paint sludge and impacted soil in accordance with the IRM Work Plan, to assure that all paint sludge and impacted soils had been removed. Confirmation soil samples were collected at a frequency of one sample for every 50 linear feet of sidewall and one sample from the excavation floor for every 1,000 square feet of bottom within the main paint sludge areas. A supplemental plan of one sample for every 2,000 square feet of bottom was approved for the surface scrape area and MSA, due to the increased surface area (**Appendix A**). All sample locations and depths were biased towards locations where adjacent impacts were observed to be the greatest, or to areas displaying staining or elevated PID readings.

Confirmation soil samples were analyzed for VOCs using USEPA SW-846, Method 8260B, semi-volatile organic carbons (SVOCs) using USEPA SW-846, Method 8270C, polychlorinated biphenyls (PCBs) using USEPA SW-846, Method 8082, and Target Analyte List (TAL) metals using USEPA SW-846, Methods 6010 and 7471. All samples were submitted to a laboratory accredited pursuant to the New York State Department of Health Environmental Laboratory Accreditation Program for the category of parameters analyzed.

Confirmation sample results were compared to the restricted residential SCOs for excavation depths less than two feet bgs and to protection of groundwater SCOs for excavation depths greater than two feet bgs. A summary of the confirmation soil samples collected is presented below and in **Tables 5 through 10.** Confirmation soil sample locations are shown in **Figures 4 and 7 through 11**. Laboratory Analytical Reports are provided in **Appendix G.**

4.2.5.1 PS-1

A total of 66 confirmation soil samples (32 base samples and 34 sidewall samples) were collected from PS-1. The analytical results of the soil samples collected from PS-1 indicated that VOCs, SVOCs, PCBs and TAL metals were below the laboratory reported detection limits or below the restricted residential and protection of groundwater SCOs with the exception of the following four samples that were left in place:

- PE-P1-West 14SW (3.5-4.0) and PE-P1-West-13B (5.0-5.5) – Concentrations of manganese were detected in these samples at 3,050 milligrams per kilogram (mg/Kg) and 3,100 mg/Kg, respectively in excess of the protection of groundwater SCO of 2,000 mg/kg. Manganese in these subsurface samples is not related to paint sludge or a contaminant of concern; therefore, no further excavation was required (**Appendix A**).

- PE-P1-East-5SW (0.5-1.0)E and PE-P1-East-5SW (1.0-1.5)F- Concentrations of Indeno(1,2,3-cd)pyrene were detected at 0.668 mg/Kg and 0.565 mg/Kg, respectively in excess of the restricted residential soil SCO of 0.5 mg/Kg. Concentrations of benzo(b)fluoranthene were also detected at 1.32 mg/Kg and 1.09 mg/Kg, respectively in excess of the restricted residential soil SCO of 1 mg/Kg. As these exceedances were marginal and within the river bank, the NYSDEC did not require any further excavation to meet SCOs (**Appendix A**).

The confirmatory soil sample locations and analytical results are provided on **Figure 8** and **Table 5**, respectively.

4.2.5.2 PS-2

A total of 47 soil confirmation samples (29 base samples and 18 sidewall samples) were collected from PS-2. The analytical results of the soil samples collected from PS-2 indicated that VOCs, SVOCs, PCBs and TAL metals were below the laboratory

reported detection limits or below the restricted residential and protection of groundwater SCOs. The confirmatory soil sample locations and results are provided on **Figure 9** and **Table 6**, respectively.

4.2.5.3 PS-3

A total of 38 soil confirmation samples (23 base samples and 15 sidewall samples) were collected from PS-3. The analytical results of the soil samples collected from PS - 3 indicated that VOCs, SVOCs, PCBs and TAL metals were below the laboratory reported detection limits or below the restricted residential and protection of groundwater SCOs. The confirmatory soil sample locations and results are provided on **Figure 10** and **Table 7**, respectively.

4.2.5.4 Surface Scrape

A total of 45 soil confirmation samples were collected from the surface scrape areas. The analytical results of the soil samples collected from the surface scrape areas indicated that VOCs, SVOCs, PCBs and TAL metals were below the laboratory reported detection limits or below the restricted residential and protection of groundwater SCOs. The confirmatory soil sample locations and results are provided on **Figure 11** and **Table 8**, respectively.

4.2.5.5 Utility Corridor

A total of 20 soil confirmation samples (7 base samples and 13 sidewall samples) were collected from the utility corridor. The analytical results of the soil samples collected from the utility corridor indicated that VOCs, SVOCs, PCBs and TAL metals were below the laboratory reported detection limits or below the restricted residential and protection of groundwater SCOs with the exception of two samples:

- PE-P2-Cell-2B (9.5-10) – Acetone, ethylbenzene, tetrachloroethene, xylene, and lead were detected in this sample at a concentration of 0.257 mg/Kg, 1.27 mg/Kg, 0.945 mg/Kg, 9.58 mg/Kg and 829 mg/Kg, respectively. These concentrations were in excess of the protection of groundwater SCO of 0.05 mg/Kg, 1 mg/Kg, 0.7 mg/Kg, 1.6 mg/Kg, and 450 mg/kg for acetone, Ethylbenzene, tetrachloroethene, xylene and lead, respectively. As these exceedances were within the utility corridor, no further excavation was required due to the nature of the excavation (**Appendix A**).

- PE-P3-Cell47-3B (6.0-6.5) – Acetone was detected in this sample at a concentration of 0.0559 mg/Kg in excess of the protection of groundwater SCO of 0.05 mg/kg. As this exceedance was within the utility corridor, no further excavation was required due to the nature of the excavation (**Appendix A**).

The confirmatory soil sample locations and results are provided on **Figure 7** and **Table 9**, respectively.

4.2.5.6 MSA

A total of 41 soil confirmation samples were collected from the MSA. The analytical results of the soil samples collected from the MSA indicated that VOCs, SVOCs, PCBs and TAL metals were below the laboratory reported detection limits or below the restricted residential and protection of groundwater SCOs with the exception of two sample.

- SS-WSA-6B (1.0-1.5) – Concentrations of benzo(a)anthracene, benzo(b)pyrene, and indeno(1,2,3-cd)pyrene were detected at 1.62 mg/Kg, 1.58 mg/Kg, and 1.14 mg/Kg, respectively. These concentrations are in excess of the restricted residential SCOs of 1 mg/Kg, 1 mg/Kg, and 0.5 mg/Kg for benzo(a)anthracene, benzo(b)pyrene, and indeno(1,2,3-cd)pyrene, respectively. As these exceedances were marginal, the NYSDEC did not require any further excavation to meet SCOs (**Appendix A**).

- SS-WSA-5B (0.5-1.0) –Acetone was detected in this sample at a concentration of 0.0697 mg/Kg in excess of the protection of groundwater SCO of 0.05 mg/Kg. As this exceedance was within the utility corridor, no further excavation was required due to the nature of the excavation (**Appendix A**).

The confirmatory soil sample locations and results are provided on **Figure 4** and **Table 10**, respectively.

4.2.6 Data Quality and Validation

The analytical data associated with the Site generated 142 Sample Delivery Groups (SDGs) evaluated using USEPA Method performance criteria and analytical laboratory control limits for soil, water, and air matrices. The data validation process addresses data quality and completeness for Site samples and QC samples (associated field and laboratory samples). Data impacted by noted excursions from the quality

assurance/quality control criteria were qualified based on professional judgment and guidance provided in the following documents: EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (USEPA 1999/2005); EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA 2002/2004); and, New York State DEC Analytical Method ASP 2005 TO-15 (QA/QC Criteria R9 TO-15) (Modified 2008/2009).

All of the samples collected during the excavation and removal activities were analyzed by Accutest Laboratories, located in Dayton, New Jersey (NY Cert. #10983). Soil and water samples were analyzed in accordance with USEPA SW846 Methods 8260C, 8270D, 8082A, 6010C, 7470A/7471B; and, air samples were analyzed in accordance with USEPA Method TO-15. The data validation resulted in a number of detect/non-detect sample results being qualified as estimated (J/UJ) respectively due to minor quality control deviations and qualified as non-detect (UB) due to associated quality assurance blanks (i.e., method, trip and field blanks) contamination.

Completeness is defined as the percentage of measurements that are judged to be valid or usable to meet the prescribed data quality objectives. The completeness criterion is essentially the same for all data uses -- the generation of a sufficient amount of valid data. In total, 73,386 sample results were generated during these sampling events. Of that total, 2,061 individual analyte results (or 0.03 percent) were qualified as rejected. The actual completeness of this analytical data set had an overall usability greater than 99.9%.

All laboratory data was reviewed and validated by ARCADIS as being acceptable for the intended purpose with comments and observations being noted in the Data Validation Usability Summary Report included in Appendix F and G for wastewater and soil, respectively

4.2.7 Confirmatory Test Pits

Upon the confirmation of clean sidewalls, confirmatory test pits were advanced every 50 feet around the perimeter of the paint sludge areas as presented on **Figures 8 through 10.** Confirmatory test pits were advanced to eight feet bgs to confirm the absence of paint sludge and that no further excavation was required. Photographs associated with these confirmatory test pits are located in **Appendix E**.

4.3 Site Restoration

Subsequent to the completion of the excavation and removal work, all cleared or disturbed areas were restored through the placement of clean fill, topsoil, seeding and

planting, as necessary to minimize erosion in accordance with the NYSDEC approved SRP (**Appendix A**).

4.3.1 Flowable Fill

Flowable fill was used during the first mobilization as backfill around the water line within the utility corridor. A total of 817 cubic yards of flowable fill was imported from Eastern Concrete Materials and used as backfill, after the impacted soil and paint sludge were removed beneath the water line.

The material specification, and fill logs and weight tickets for the flowable fill are provided as **Appendix H** and **Appendix I**, respectively**. Figures 12 and 13** show the extent of flowable fill used during excavation within the utility corridor.

4.3.2 General Fill

In general, the excavations were backfilled at the end of each work day to minimize the risk of potential erosion associated with flooding in the event of precipitation. The base of the excavation was demarcated using geotextile fabric to allow the identification of the extent of excavation (**Appendix D**).

A total of 28,881 tons of general clean fill was imported by EQ to backfill the excavation areas to within six inches of the original grade. The general backfill was sourced from the Braen Van Orden Pit located in Ringwood, New Jersey.

The analytical and geotechnical parameters for the approved fill material are provided in **Appendix J**. Fill logs and weight tickets are provided in **Appendix K**.

4.3.3 Topsoil

A total of 5,200 cubic yards of topsoil was furnished on-site to restore the top six inches of excavated/disturbed areas to original grade. EQ and Creamer imported the topsoil from RER Supply located in Riverdale, New Jersey.

The analytical parameters for the approved topsoil are provided in **Appendix L.** Fill logs and weight tickets are provided in **Appendix M**.

4.3.4 Quarry Process and Imported Aggregate

In addition to the backfill and topsoil materials used to backfill and restore the Site, quarry process and other aggregate material was imported for establishing the construction entrance, access roads, MSA and on-site features. A total of 9,567 tons of various sized aggregate was furnished by EQ and 2,120 tons of various sized aggregate was furnished by Creamer as backfill. EQ and Creamer imported the quarry process and aggregate from Tilcon Materials located in West Nyack, New York.

Geotechnical parameters and certifications for each aggregate material are provided in **Appendix N.** Fill logs and weight tickets are included in **Appendix O**.

4.3.5 Site Restoration

In total, 1.9 acres of upland forest was restored in place of the MSA, and a total of 3.05 acres of upland forest was restored in the southern portions of OU-1 with an additional area of 0.07 acres characterized as riverbank restoration area. Restoration of these areas was completed in stages consisting of final grading and temporary seeding by Viasant and Creamer, and permanent seeding and plantings completed by ASG. The planting of trees was in a sporadic pattern to make the Site appear natural with sufficient open space to allow routine work in the vicinity of the production wells by United Water and the Town of Ramapo (**Appendix D**). Plantings were installed by ASG in accordance with the NYSDEC approved SRP (**Appendix A**).

Additionally, at the request of the TOR and with the NYSDEC's approval, a 0.49 acre (approximately 100 feet by 200 feet) of the disturbed area, previously identified as upland forest, was converted into a medicine garden. The medicine garden is enclosed by a 6 foot-high wooden fence and is illustrated on **Figure 14**. The medicine garden was planted with sweet grass and other medicinal herbs and is being maintained by the local community.

4.3.5.1 Final Grading and Temporary Seeding

Backfill and topsoil was placed in a manner to promote drainage on-site towards the river bank and to prevent any soil erosion and sedimentation from occurring (**Appendix D**). Elevations were verified during backfill and topsoil placement using grade stakes marked at the desired elevation in conjunction with surveying instrument verification at points across the entire cover area. All excavated areas were contour graded as shown on **Figure 14** and presented in the cross-sections (**Figure 6A and 6B**).

Hydroseeding with annual rye grass and straw was completed in September 2013 for work completed under the first mobilization of the IRM work. Additionally, broadcasting seeding occurred in April 2014 for the areas disturbed during the second mobilization.

4.3.5.2 Permanent Seeding and Plantings

All restoration areas were permanently stabilized with a native upland meadow seed mix in accordance with the approved SRP. Seed was spread via a Vibram seeder throughout areas that received erosion control matting during final grading, to adequately spread the seed into the matting. Seed was cut with Milorganite to aid in the spreading weight and overall coverage. This application was generally completed in the fall of 2013, allowing seed to gain soil contact through the freeze and thaw process during the winter. Areas which did not contain erosion control matting were harrowed, and immediately broadcast seeded. To ensure adequate seed-to-soil contact, these areas were also raked and drag harrowed following the seed application.

Following the permanent seeding of the restoration areas, planting of the restoration areas was implemented. Planting of the MSA and the majority of OU-1 was conducted in October 2013, while the remainder of the areas was planted in May 2014. All plant material was inspected by ASG for nursery source, health, disease, vigor, and species verification prior to being brought to the Site. All plant material was found to be true to species and in good health. Minor alterations were made to the approved planting plan based on availability of species and size. A total of 350 large containerized trees (8-10 feet in height), 539 containerized whip trees (5-6 feet in height.), and 310 containerized shrubs (3-4 feet in height.) were installed throughout the restoration areas.

A complete seeding and planting list can be viewed on the Final Restoration figure (**Figure 14**).

4.3.5.3 Monitoring Program

Following the completion of the planting/seeding within the restored project areas, monitoring is being used to determine if the requirements of the approved SRP are met and if additional maintenance and monitoring is necessary to meet the goals of the project. Monitoring commenced in the fall of 2014 and will continue until 2018.

During the monitoring period, planted species and any additional "volunteer" species will be identified. The average percent coverage of vegetation will be estimated and noted for the annual and final reports. Permanent sampling station locations and

photograph locations have been established on-site in order to illustrate the relative success of the project and annual changes in vegetative cover. The locations of these permanent sampling stations are shown on **Figure 14.**

Invasive weed species and the overall health and vigor of the plantings will be evaluated. Herbivory will be evaluated, to determine if it is resulting in plant mortality. In addition, any maintenance activities (such as hand weeding, application of a pesticide or other approved method for the removal of invasive/noxious species in the restoration site) will be identified.

4.4 Transportation and Disposal of Paint Sludge and Impacted Soil

As part of the IRM Work Plan implementation, paint sludge and impacted soil excavated from OU-1 was transported in off-road trucks for stockpiling at the MSA located on the northern portion of the Site to allow for waste sorting, segregation, and characterization sampling, prior to off-site transportation and disposal. The MSA measured approximately 270-foot long by 192-foot wide (51,840 square feet) and was constructed of a subgrade liner protected by quarry process stone. The MSA was graded in such a way to drain water from the stockpiled soil towards a sump which temporarily collected and staged runoff prior to on-site treatment and discharge to groundwater. **(Appendix D)**.

During the implementation of the second mobilization, excavated paint sludge and impacted soil were placed in a temporary MSA located adjacent to the work area. The temporary MSA measured approximately 90-foot long by 50-foot wide (4,500 square feet) and was constructed of a double layer of polyethylene liner on top of compacted quarry process stone.

4.4.1 Sorting and Segregating

The MSA constructed during the first mobilization was subdivided into six bins to allow for sorting, segregation, and characterization of paint sludge and impacted material prior to off-site transportation and disposal. Each bin had the capacity to hold approximately 500 tons of wastes. Based on visual observation during excavation work, ARCADIS directed EQ to the appropriate designated stockpile for emptying the off-road dump trucks. The stockpiles were identified as follows: (1) no visual paint sludge, (2) paint sludge intermingled with soil, and (3) paint sludge only. When a bin reached capacity (approximately 26 truckloads), the bin contents were sampled for waste characterization.

For stockpiles where paint sludge was intermingled with soil, a mechanical screener was utilized to segregate the paint sludge and impacted soils (**Appendix D**). The paint sludge segregated was placed in a paint sludge only stockpile and designated for thermal treatment. The impacted soil was then sampled for waste characterization prior to off-site transportation and disposal as outlined in Section 4.4.3 of this report.

The temporary MSA constructed for the second mobilization of the IRM was divided into two stockpiles: one for no visual paint sludge and one for paint sludge intermingled with soil. When a stockpile reached an estimated 500 tons of waste, the stockpile was sampled for waste characterization purposes. For the stockpile where paint sludge was intermingled with soil, paint sludge was segregated using mechanical means and methods. The segregated paint sludge was designated for thermal treatment and the impacted soil was sampled for waste characterization prior to off-site transportation and disposal as outlined in Section 4.4.3 of this report.

4.4.2 Waste Characterization Sampling

Waste characterization samples were collected at a frequency of one sample per every 500 tons of excavated materials. Waste characterization samples were analyzed for full toxicity characteristic leaching procedures (TCLP), ignitability, corrosivity, and reactivity. Waste characterization samples were collected on a 72-hour turnaround time to avoid paint sludge and impacted material being staged on-site for long periods of time. The analytical results were incorporated into waste profiles setup at the beginning of the project.

A total of 85 waste characterization samples were collected from the Site (81 samples during the first mobilization and four samples during the second mobilization). The waste characterization samples indicated that the paint sludge and impacted soil could be segregated into six waste streams:

- Non-hazardous materials for daily cover;
- Non-hazardous materials for landfilling;
- Hazardous materials for metals treatment and Subtitle “D” landfilling;
- Hazardous materials for Subpart ‘CC/DD’ Primary Chemical Oxidation treatment and Subtitle “C” landfilling;

- Hazardous materials for chemical treatment by 90% Reduction and Subtitle “C” landfilling; and,

- Hazardous materials for thermal treatment (i.e., incineration) and landfilling.

A summary of the waste characterization sample results is presented in **Table 11.** The Laboratory Analytical Reports are presented in **Appendix P.** Waste profiles for each disposal facility are provided in **Appendix Q**.

4.4.3 Material Load Out and Off-Site Transportation

Non-hazardous materials were transported by tri-axle trailers for use as daily cover or direct landfilling to one of the following approved off-site disposal facilities (**Appendices R and S**):

- Middlesex County Landfill located in East Brunswick, New Jersey for use as daily cover; or,

- Clean Earth of New Jersey, Inc. located in Kearney, New Jersey for Subtitle “D” landfilling.

Hazardous materials were transported by tri-axle trailers to Clean Earth for metals treatment and Subtitle “D” landfilling at the above address or to a trans-load facility in Newark, New Jersey for rail transportation to the following approved disposal facilities (**Appendices T through W**):

- Michigan Disposal, Inc. in Belleville, Michigan for Subpart ‘CC/DD’ Primary Chemical Oxidation treatment;

- Michigan Disposal, Inc. in Belleville, Michigan for chemical treatment by 90% Reduction and Subtitle “C” landfilling; or,

- Clean Harbors Aragonite, LLC in Aragonite, Utah for thermal treatment and landfilling.

A total of 41,007 tons of impacted soil and paint sludge were disposed of at the approved off-site disposal facilities. **Table 13** provides a list of waste streams and identifies the total quantity of material disposed and final disposal location for each waste stream. The waste streams are summarized as follows**:**

- Non-Hazardous Soil – 19,112.8 Tons (693 total truck loads)
- Non-Hazardous Soil - Subtitle "D" Landfilling - 1,017 Tons (38 total truck loads)
- Hazardous Soil - Metals Treatment & Subtitle "D" Landfilling – 10,604.9 Tons (401 total truck loads)
- Hazardous Soil - Subpart "CC/DD" Primary Chemical Oxidation Treatment & Subtitle "C" Landfilling – 5,268.10 Tons (197 total truck loads)
- Hazardous Soil - Chemical Treatment by 90% Reduction & Subtitle "C" Landfilling – 2,025.1 Tons (76 total truck loads)
- Hazardous Soil - Thermal Treatment & Landfilling – 2,978.7 Tons (126 total truck loads)

Prior to load out, waste material was reviewed to confirm that the material passed the paint filter test for transportation. Approximately 500 cubic yards of non-hazardous material did not pass the paint filter test and required mixing with cement kiln dust (CKD) material prior to off-site transportation and disposal. CKD was only used for stabilization of saturated material following the NYSDEC approval (**Appendix A**). A total of 34 cubic yards of CKD were used at the Site.

4.5 Reporting

Activities associated with the IRM were completed under the direction of ARCADIS, on behalf of Ford. Daily field activities were documented by ARCADIS in daily reports. A copy of the daily reports is presented in **Appendix X**.

4.5.1 As-Built Documentation

Borbas Surveying and Mapping LLC. (Borbas, a licensed surveyor in the State of New York) was contracted for documenting daily progress and preparation of as-built documentation. The as-built documentation provides spot elevations illustrating the depth of excavation, spot elevations showing the location and depth of pond fill, and final elevation contours associated with the topsoil. A copy of the as-built documentation is provided in **Appendix Y.**

5. Field Changes

During the course of construction, minor field changes were made to the IRM Work Plan and Addendum to address existing conditions and other unforeseen conditions encountered in the field. The changes were documented in the daily reports. Some of the key field changes are as follows:

- Lateral and vertical limits of excavations were redefined in the field based on the visual identification of paint sludge (or the lack thereof), in conjunction with the use of XRF, confirmation samples and confirmatory test pits. In addition to the revised lateral and vertical limits within the paint sludge areas, the followings were also completed (**Figure 5**).
    - A surficial scrape was conducted between paint sludge areas to remove any surficial impacts to a minimum depth of one foot bgs (**Figure 7**).
    - Soils beneath the MSA were excavated to a minimum depth of one foot bgs to remove any residual surficial impacts as a result of staging the impacted materials (**Figure 4**).
- During the excavation within the utility corridor, an EQ operator damaged the concrete water line. As the well field was shut down during these activities, Ford was able to work with United Water and replace the damaged section of the water line in an expedited manner. EQ created a clean corridor in the location where the concrete water line was damaged and temporarily supported the electric and communication lines. A United Waters contractor, Creamer, was procured by ARCADIS to cut the damaged section of the concrete water line and replace it with ductile iron. Following the repair of the water line, EQ backfilled the open excavation to match existing grade.
- Treated water meeting the New York TOGS Class GA groundwater standards was used for dust suppression upon approval from the NYSDEC (**Appendix F**).
- Manual and mechanical means of sorting and segregation were implemented in the MSA to assist with waste sorting and subsequent characterization and disposal of paint sludge and impacted soil. Paint sludge was segregated and staged for immediate off-site transportation for thermal treatment and landfilling. The resulting soil piles were sampled and disposed of in accordance with the waste characterization results.

- CKD material was brought on-site to stabilize wet/saturated waste materials as required to pass the paint filter test for transportation on local roads and State highways as per the Department of Transportation regulations.

Field changes were conducted under the direction of ARCADIS, on behalf of Ford, and as approved by the NYSDEC (**Appendix A**).

6. Schedule

The IRM field activities were started on January 28, 2013 and were completed on December 20, 2013 with the final site restoration completed in April 2014.

Following completion of the IRM field activities, a restrictive covenant was established for OU-1 and OU-2 and recorded with the Rockland County Clerk on April 24, 2014 to restrict the use of the Site to "Restricted Residential."

A Feasibility Study (FS) is being prepared for the Site. The timeframe associated with the FS and future correspondences to the NYSDEC as required by the DER-10 is provided as Appendix Z.

7. Conclusion

The CCR provides a description and documentation of the work conducted at OU-1 of the Ramapo Paint Sludge Site from January 2013 to April 2014 as outlined in the IRM Work Plan and Addendum. The excavation and off-site disposal of paint sludge and impacted material, backfilling with clean fill materials and site restoration was performed successfully. Ford will submit a FS to assist with the NYSDEC preparation of the Record of Decision for the Site in the Fall 2016.

7.1 Limitations and Exceptions

Construction observations and monitoring were conducted under the conditions stated above. Conclusions made in this report were based on these observations and the data obtained from field and laboratory test conducted.

8. Certifications

These authorizations are signed as required by the NYSDEC. Documentation authorizing signature on behalf of the TOR is provided in Appendix A.

- I, Joseph J. Corrado certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject construction program, and I certify that the Interim Remedial Measure was implemented and that all construction activities were completed in substantial conformance with the DER-approved Interim Remedial Measure Work Plan.

- I certify that all documents generated in support of this report have been submitted in accordance with the DER's electronic submission protocols and have been accepted by the Department.

- I certify that all data generated in support of this report have been submitted in accordance with the Department's electronic data deliverable and have been accepted by the Department.

- I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Joseph J. Corrado, am certifying as Owner's Designated Site Representative and I have been authorized and designated by all site owners to sign this certification for the Site.

9. References

ARCADIS. 2007. Site Characterization Report, Ramapo Paint Sludge Site, Town of Ramapo, Rockland County, New York, Site #34404 (June 20, 2007)

ARCADIS. 2008. Ramapo River Investigation, Site #3-44-064, Ramapo Paint Sludge Site, Rockland County, New York (October 21, 2008)

ARCADIS. 2009. OU-1 Geoprobe Investigation Report, Site #3-44-064, Ramapo Paint Sludge Site, Rockland County, New York (September 15, 2009)

ARCADIS. 2010. Remedial Investigation Report, Ramapo Paint Sludge Site, Town of Ramapo, Rockland County, New York, Operable Units 1 & 2 (September 1, 2010)

ARCADIS. 2012. Interim Remedial Measure Work Plan for Paint Sludge and Impacted Soil Removal within Operable Unit 1, Ramapo Paint Sludge Site, Ramapo, New York (August 24, 2012)

ARCADIS. 2013. Addendum 1- Utility Corridor Soil Remediation, Interim Remedial Measure Work Plan for Paint Sludge and Impacted Soil Removal within Operable Unit 1, Ramapo Paint Sludge Site, Ramapo, New York (October 17, 2013)

NYSDEC. 2012. RE: Interim Remedial Measure Work Plan for Paint Sludge Removal within Operable Unit 1, Ramapo Paint Sludge Site, Site No. 3-44-064, Town of Ramapo, Rockland County (October 23, 2012)

NYSDEC. 2013a. RE: Revised Site Restoration Plan, Interim Remedial Measure, Operable Unit 1, Ramapo Paint Sludge Site, Site No. 3-44-064, Town of Ramapo, Rockland County (October 28, 2013)

NYSDEC. 2013b. RE: Addendum 1 – Utility Corridor Soil Remediation Interim Remedial Measure Work Plan for Paint Sludge and Impacted Soil Removal within Operable Unit 1, Ramapo Paint Sludge Site, Site No. 3-44-064, Town of Ramapo, Rockland County (November 5, 2013)