CORRECTIVE MEASURES IMPLEMENTATION REPORT

Prepared For:

REFINED METALS CORPORATION
Beech Grove, Indiana

Prepared By:

ADVANCED GEOSERVICES CORP.
West Chester, Pennsylvania

Project No. 2003-1046-30
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Paul G. Stratman, P.E., P.G.
P.E. License No. PE19400366
P.G. License No. 2112

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1.0 INTRODUCTION

1.1 PURPOSE

Refined Metals Corporation (RMC or Refined) operated a secondary lead smelter in Beech Grove, Indiana (the "Facility" or the Site) from 1968 through 1995. The facility recycled lead from used automotive and industrial batteries and other lead bearing materials. The Site ceased recycling operations on December 31, 1995. During its operating life, the facility handled materials that were classified as hazardous materials or hazardous wastes under the Resource Conservation and Recovery Act (RCRA). Pursuant to the requirements of RCRA, the facility submitted a Part A RCRA permit application on November 19, 1980. The facility was granted Interim Status as a hazardous waste treatment storage and disposal facility (IND 000 718 130). A Part B permit application was submitted during the mid-1980s; however, the facility closed before full RCRA status was granted.

On July 14, 1998 Refined Metals Corporation entered into a Consent Decree with the United States Environmental Protection Agency (USEPA) and the Indiana Department of Environmental Management (IDEM), Civil Action No. IP902077C. The technical objectives of the Consent Decree were as follows:

1. Effectuate closure of RCRA Subtitle C Interim Status Hazardous Waste Management Units (HWMU Closure);

2. Perform RCRA Corrective Action (RCRA Facility Investigation (RFI); Interim Measures (IM); Corrective Measures Study (CMS); and Corrective Measures Implementation (CMI) for those areas not subject to HWMU Closure.

The oversight from the USEPA applies to all areas of the Site, except the RCRA Subtitle C Interim Status HWMUs. The HWMUs are being closed under the regulatory purview of the Indiana Department of Environmental Management (IDEM). The HWMU Closure Completion Report was submitted to IDEM and USEPA on July 11, 2016.

This report summarizes the Corrective Measures Implementation (CMI) portion of the Corrective Action process. CMI activities occurred between 2014 and 2016.

1.2 REFINED METALS CORPORATE CONTACT

The Refined Metals contact for the Site is:

Refined Metals Corporation
c/o: Matthew Love
Exide Technologies
3000 Montrose Avenue
Reading, PA 19605
(610) 921-4054

2.0 BACKGROUND

2.1 FACILITY LOCATION

The Facility is located at 3700 South Arlington Avenue in Beech Grove, Marion County, Indiana. The Site occupies approximately 24 acres, of which approximately 10 acres represented the manufacturing area (buildings and ancillary structures). The remaining 14 acres included grass and wooded areas. The Site is bounded by South Arlington Avenue towards the East, a CSX railroad right-of-way to the North, Big Four Road to the South and Kinetrex Energy (previously Citizens Gas) to the West. Figure 1 provides a Site Location Map.

2.2 SITE FEATURES

The Site is relatively flat with minimal vertical relief. In plan view, the Facility consisted of approximately 80,000 square feet (sf) of structures. As depicted in Figure 1A, the major building areas were referred to as the battery breaker, wastewater treatment plant, material storage building, furnace room, metals refining area, warehouse, vehicle maintenance structure and offices. These structures were decontaminated and demolished to grade between August 2009 and January 2010; except for the storm water pump houses which were decontaminated but remained operational to continue storm water management functions through the start of the Corrective Measures Implementation. Decontamination and demolition activities were performed in accordance with the *Draft Decontamination and Demolition Plan* (Advanced GeoServices March 4, 2009) and the *Decontamination and Demolition Implementation Plan* (Focus Contracting, June 8, 2009). The pump houses were demolished in 2014 as part of the CMI.

The majority of the ground surface after the demolition remained a combination of intact concrete and partially demolished concrete. Two stockpiles of concrete rubble generated during the decontamination and demolition project remained at the north end of the production area. These stockpiles were covered with a temporary geomembrane liner at the end of the demolition project

and remained until Corrective Measures when the stockpiles were removed and placed in the containment cell.

2.3 OWNERSHIP HISTORY

The Site was reportedly undeveloped woodlands until 1968. In 1968, the property was developed as a lead-acid battery recycling facility/secondary lead smelter by National Lead. National Lead operated the facility from 1968 through 1980, when it was sold to Exide Corporation. In 1985, the site was purchased from Exide Corporation by RMC. RMC continued to operate the facility until the cessation of operations on December 31, 1995. From April 14, 1995 through December 31, 1995, operations were reduced to enriching and casting lead ingots from off-specification lead products. Since 1996, no production has taken place at the facility and operations were limited to a wastewater treatment facility which was used to manage storm water runoff from the former manufacturing areas prior to 2009 demolition activities.

2.4 REGULATORY HISTORY

Following the promulgation of RCRA, the facility submitted a Part A RCRA permit application. On November 19, 1980 the facility was granted Interim Status as a hazardous waste treatment, storage and disposal facility. The RCRA subtitle C units included indoor and outdoor waste piles (used to store batteries and lead bearing wastes), and the 750,000-gallon concrete lined lagoon. A Part B application was submitted during the mid-1980's although full RCRA permitted status was never granted. The EPA maintains that interim status was lost on November 8, 1985 as a result of RMC's alleged failure to comply with Section 3005(e)(2) of RCRA, 42 U.S.C. 6925(e)(2); RMC did not agree with this allegation.

RMC submitted a revised Part A application on October 26, 1988 requesting an increase in the storage volume for spent batteries. The request was granted on September 20, 1989. A subsequent revised Part A application was submitted to IDEM on December 7, 1990 for an additional increase in the storage volume of spent batteries, but IDEM denied the increase. RMC filed for a stay and was granted interim status. IDEM approved the revised Part A application on June 3, 1991 with

the provision that it did not grant interim status under RCRA. The Part B application was not resubmitted. In 1994, the facility withdrew its Part A and Part B permit applications.

A site inspection was performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980. In 1985, a preliminary assessment was performed under CERCLA. No further action was planned under CERCLA at that time.

3.0 PROJECT OVERVIEW

3.1 GENERAL

In the period since the completion of the demolition activities the Site was unoccupied. No personnel were onsite except occasionally a RMC site caretaker would visit the Site for maintenance purposes.

Op-Tech Environmental Services, Inc. (Op-Tech) was retained by RMC to perform the CMI construction. Op-Tech mobilized equipment and manpower to the Site and began work in August 2014. Work was suspended in December 2014 due to weather conditions and the containment cell reaching maximum capacity (21,490 CY) proposed in the Corrective Measures Design (CMD) with significant excavation work remaining. The containment cell was covered with an High Density Polyethylene (HDPE) geomembrane, geonet drainage layer, 18-inch thick soil cover and temporary seeding prior to winter demobilization in December 2014.

Following internal deliberation and discussion with IDEM and USEPA, on June 16, 2015 RMC submitted a request to amend the CMD. The primary component of the request was an expansion of the onsite containment cell to accommodate up to 15,800 CY of additional materials. On July 20, 2015, the USEPA issued an Explanation of Significant Differences (ESD) that approved the requested amendments to the CMD.

In August 2015, Op-Tech returned to complete the remainder of the CMI work. By December 2015 all onsite and offsite excavation was completed and the expanded containment cell (referred to as CCB) was constructed. Excavation backfill and restoration was partially completed. Work was again suspended in December 2015 due to excessively wet conditions which prevented the placement of fill materials and topsoil. Tasks related to topsoil and stone placement, turf establishment, and storm water basins and pipe construction outside the containment cell were completed in the Spring of 2016 when the weather improved.

All work was performed in general accordance with the *Final Corrective Measure Design* as revised May 7, 2014 (prepared by Advanced GeoServices Corp), the requested amendment to the CMD dated June 16, 2015, and the ESD dated July 20, 2015.

3.2 PARTIES AND ROLES

3.2.1 Owner – Refined Metals Corporation (RMC)

RMC owned and operated the Facility. RMC was ultimately responsible for the performance of the corrective measures implementation project. RMC's personnel involved with the project consisted of Mr. Matt Love, who functioned in the capacity as overall project manager.

3.2.2 Environmental Consultant – Advanced Geoservices Corp.

Advanced GeoServices Corp. (Advanced GeoServices) is a multi-discipline civil and environmental engineering consulting company based out of West Chester, Pennsylvania. Advanced GeoServices developed the *Final Corrective Measure Design* that was used as the basis for the performance of the project work. Paul G. Stratman, P.E., P.G was the Advanced GeoServices project manager for this project. Mr. Stratman is a licensed professional engineer in the State of Indiana and is the Certifying engineer for the CMD implementation. The Certifying Engineer was responsible for certifying through signature and seal of this CMI report prepared upon implementation of the CMD, so that all activities have been performed in accordance with the requirements of the specifications and drawings. The Certifying Engineer reported directly to the owner. The Certifying Engineer based certification on his own and project team inspections and observation of CMI work, as-built drawings prepared by Op-Tech and sub-contractors, review of submittal's and reports and review of QA performed by Advanced GeoServices.

Mr. Stratman was assisted by Jan Dobinsky, who assisted with project oversight and daily project management tasks. Scott Ward was the onsite oversight/quality assurance representative (QA). Mr. Ward documented work progress and reported daily activities to the project team. The QA representative was also responsible for managing contractor submittals, scheduling, reviewing contractor invoices and performing independent testing of the Contractor's work.

Advanced GeoServices also coordinated and lead a weekly construction progress meeting/call. The meeting/call participants typically included project personnel representing Advanced GeoServices, RMC, Op-Tech, IDEM, and USEPA. Copies of the meeting minutes are provided in Appendix A.

3.2.3 Contractor – Op-Tech Environmental Services, Inc.

Op-Tech Environmental Services, Inc. (Op-Tech), a subsidiary of NRC Corporation, is the remediation contractor that was selected to perform the physical work associated with the CMI. Op-Tech specializes in emergency spill response, disaster response, industrial services, and waste management and site remediation projects. NRC/Op-Tech has offices located throughout the United States. The crew which performed this project was based out of the Duanesburg, New York office.

Joe Naselli served as the project manager for Op-Tech and provided support to the field personnel. Mr. Naselli was replaced by Todd Scott in late 2015. Eric Hoban assumed the duties of project manager for the 2016 restoration work at the Site. Luther Keyes served as the site superintendent for Op-Tech's work. Zakary Arnhold was the health and safety officer (HSO)for the project. Mr. Arnhold also managed the site air monitoring program and served as the QC Official. Op-Tech generated a weekly progress report. Copies of the weekly progress reports are provided in Appendix B.

3.2.4 Sub-Contractors

During the project, Op-Tech utilized a subcontractor to perform the geosynthetics installation for the containment cell. The subcontractor selected was Chesapeake Containment System, Inc. (Chesapeake) based out of Middle River, Maryland. Chesapeake typically had a combination of 12 workers onsite for the geosynthetics work. Additional subcontractors included the following:

- Vacuum Truck – Clear Crossing and Best Enviro
- Equipment Maintenance- MacAllister Machinery of Indianapolis, Indiana and Hertz Equipment Rental
- Sod, hydroseeding and Erosion Control Mat installation- Myers Sod Farm, LLC. of Seymour, Indiana

3.2.5 Regulatory Oversight

The Indiana Department of Environmental Management (IDEM) and the United States Environmental Protection Agency – Region 5 (USEPA) oversaw and directed the CMI work performed by RMC. IDEM and USEPA participated in weekly construction meetings and participated in decision making when needed to resolve potential conflicts during construction. Tetra Tech supported the USEPA with document review, quality assurance, and field inspections. RMC, Op-Tech, and Advanced GeoServices interacted with regulators during weekly project meetings and as needed to complete the project.

3.2.6 Permitting During Construction

3.2.6.1 **City Of Indianapolis**

Throughout the CMD development process and during preparation for the CMI work, Advanced GeoServices regularly communicated with the City of Indianapolis Department of Codes Enforcement (DCE). The primary subject of communication was Advanced GeoServices efforts to obtain a drainage permit and drainage and floor approval on behalf of Refined Metals

Corporation. DCE issued the necessary permits on June 4, 2014. Advanced GeoServices submitted a request that the permit be amended to reflect the ESD on August 3, 2015. DCE provided a verbal approval of the amended permit conditions on November 23, 2015. DCE used the firm Beam, Longest, and Neff, LLC (BLN) to provide inspection services during construction.

A pre-construction meeting was held at the DCE office on August 25, 2014, with representatives of Op-Tech, Advanced GeoServices, BLN and DCE to review the site construction plans and discuss the work schedule. Op-Tech (Luther Keyes) and Advanced GeoServices (Scott Ward) provided regular updates to the Indianapolis DCE and BLN throughout the project and ensured that inspectors had an opportunity to observe storm water related work.

During the project the BLN inspectors (Scott Knepley), and later (David Whited), visited the Site in conjunction with the issuance of the land disturbance permits. No issues were noted during these visits.

Op-Tech was required to obtain a special discharge permit from the local POTW (CWA Authority, Inc.) in order to discharge treated storm water to the city's sanitary sewer line. The special water discharge permit was granted on August 22, 2014. Copies of the special discharge permit and related monitoring data are provided in Appendix C. DCE drainage permits are provided in Appendix D.

3.2.6.2 **Marion County**

During the project the Marion County Soil and Water Conservation District (MCSWD) representative (Mr. Glenn Lange) visited the project to inspect the erosion and sediment control features installed as well as ensuring Best Management Practices (BMP's) were being implemented. No issues were relayed to RMC during the project. Advanced GeoServices and Op-Tech informed MCSWD that the project was not going to be completed in 2014 and that a winter shutdown was going to take place. Advanced GeoServices notified MCSWD that work was going to resume in August, 2015. No site visits from the MCSWD were conducted in 2015

and Mr. Lange was notified that work would continue in 2016 once the weather warranted construction activity.

3.2.6.3 **IDEM**

A Section 401 Water Quality Certification and Rule 5-Notice of Intent (NOI) application was submitted and approved in 2014 and renewed in August of 2015 for the proposed corrective measures remedial work at the Site. This application form was sent to the Indiana Department of Environmental Management, the Indianapolis DCE and the MCSWD. The NOI described the site acreage and the proposed land disturbance areas. A set of construction plans was submitted with the NOI showing the proposed remedial design and the erosion control features that would be installed to protect the receiving waterway from the Site. An Isolated Wetlands Individual Permit was also obtained for the project. Documentation for these IDEM permits are provided in Appendix D.

3.2.6.4 **United States Army Corps of Engineers (ACOE)**

During the CMD development and prior to construction, RMC was required to perform a wetlands delineation and obtain a Jurisdictional Determination (JD) from the ACOE. During the review of the JD, the ACOE determined that the location of the Containment Cell and Stormwater Management Basin had developed into jurisdictional wetlands and that an ACOE Nationwide Permit (NP-38) was required. Following a meeting in July 2012 the ACOE determined that revisions to the IDEM and EPA-approved CMD were necessary to minimize the amount of wetlands disturbance as a condition for approval of the NP-38. The required revisions were incorporated into the CMD and the NP-38 was authorized by ACOE on May 9, 2013. NP-38 documentation is provided in Appendix D.

3.2.7 Public Relations

3.2.7.1 **Media**

No media sources were involved in the CMI. RMC and its consultants and contractors were never contacted for comment.

3.2.7.2 **Neighboring Property Owners**

Generally, there was not significant interaction with neighboring property owners. On occasion, Indiana Power and Light Company (IPL) would need admittance to the Ste to access electric lines and power poles along the common fence between RMC and Kinetrex Energy (Kinetrex). RMC, Op-Tech, and Advanced GeoServices met with representatives of Kinetrex on several occasions to discuss Site access for surveying and excavations. A survey stake out was performed but no excavation work was completed on the Kinetrex property in 2014. The Kinetrex excavation work began in August 2015 and was completed in early November 2015.

Work performed in the CSX Railroad right-of-way was performed under the terms of an access agreement obtained by RMC to perform the work. The CSX work was performed in the presence of flagmen retained by CSX.

Restoration work was completed in each excavation area once survey as-built and laboratory sample information confirmed that the area was excavated to proper depths and met the offsite remediation standard for lead in soil of 400 mg/kg.

4.0 SCOPE OF WORK

This section describes the work performed in association with the remedial actions described in the *Final Corrective Measures Design.*

4.1 CORRECTIVE MEASURES SUMMARY

The major components for the remedy for the Site as described in the CMD were as follows:

- Excavation and consolidation of contaminated soils, sediment and debris:
  - The original design estimated approximately 21,490 cubic yards (CY) of material required excavation and consolidation.
  - The final volume of material requiring excavation and consolidation was 36,219 CY.
- Excavation and consolidation material generated from:
  - Closure of site HWMUs (Surface Impoundments/Lagoon, Outdoor Waste Piles, and Indoor Waste Piles).
  - Excavation of impacted soils from other onsite areas (non-HWMU's).
  - Excavation of impacted soils from offsite areas (Arlington Avenue, right-of-way, and Kinetrex property).
  - Excavation of impacted sediments from drainage ditches in CSX right-of-way.
- Installation of an impermeable cap to prevent the movement of contaminants outside of the impermeable cap area.
- Installation of groundwater monitoring wells around the Containment Cell to monitor potential migration of contaminants.
- Site restoration to minimize erosion and control storm water leaving the site.

4.2 REMEDIATION GOALS

The Baseline Health and Human Risk Assessment (BHHRA) established a Preliminary Remediation Goal (PRG) for the onsite exposure areas of 920 mg/kg total lead. The CMD established that the PRG could be applied as a remediation standard in onsite non-HWMU excavations and identified specific excavation areas where removal of soils above 920 mg/kg total lead would satisfy the assumptions of the BHHRA and produce acceptable risk levels for future onsite construction workers.

The IDEM RISC residential direct contact screening value for offsite soil excavation was 400 mg/kg for lead.

Closure of the HWMUs was driven by lead, antimony, arsenic, cadmium, and selenium. The target closure concentrations within the HWMU excavations are:

- Lead: 970 mg/kg
- Antimony: 37 mg/kg
- Arsenic: 20 mg/kg
- Cadmium: 77 mg/kg
- Selenium: 53 mg/kg

Confirmatory sampling for lead was performed in the bottom of all non-HWMU areas subject to soil and sediment excavation. Confirmatory sampling for lead, antimony, arsenic cadmium and selenium was completed in the bottom and internal sidewalls of the HWMU excavation areas. In addition, soil excavations for HWMU and non-HWMUs excavations areas were always extended where waste material (slag or battery casings) were visible.

4.3 SITE PREPARATION

The remainder of Section 4 presents a narrative describing the CMI work in an approximate chronological order (in many cases work tasks overlapped). Progress photographs of the CMI work are provided in Appendix E.

4.3.1 General

Op-Tech field personnel began mobilizing equipment and manpower to the Site on August 5, 2014. Prior to the arrival on-site and before work progressed, all of the necessary permits were obtained and notifications issued.

A pre-construction conference was held with the Indianapolis Department of Codes Enforcement to discuss the site work and review the *Stormwater Management Design & Stormwater Pollution Prevention Plan* issued June 17, 2014. A representative of Beam, Longest and Neff, L.L.C. (BLN) was present for this meeting. BLN acted as the third party inspection service for the erosion and sediment controls and stormwater piping installation work that was performed throughout the project.

Op-Tech's subcontractor, Tri-State Forestry (Tri-State), was utilized to clear trees and vegetation from the area around the containment cell as well as the former railroad spur. This work occurred during the first few weeks of the initial work performed at the Site from August 13, 2014 to August 21, 2014. Stumps, roots, and other cleared materials that were co-mingled with Site soils were placed into the Containment Cell. Cleared materials that were not co-mingled with soils (tree trunks, limbs, branches) were chipped/shredded onsite and sent offsite for reuse.

4.3.2 Surveying

Prior to any intrusive work onsite, Op-Tech utilized Crossroads Engineers (Crossroads) of Beech Grove, Indiana, an Indiana licensed land surveyor, to complete the layout for the limits of disturbance around the wetlands area, installation of additional survey control points, and the mark

out for Erosion and Sediment (E&S) features. Once intrusive work began, Op-Tech utilized USI Consultants, Inc. (USI) of Indianapolis, Indiana to complete the survey work.

Construction stake-out of the proposed Containment Cell footprint, property boundaries, proposed security fencing, E&S controls, excavation areas, wetlands delineation and proposed monitoring wells were performed by USI. During construction, Op-Tech was responsible for documenting excavation depths and tracking quantities for payment using surveying. At the completion of each excavation area, a post-excavation survey was performed to demonstrate that the vertical and horizontal extents were reached in accordance with the CMD. A survey was also completion at each stage of the Containment Cell construction (i.e., cap 'top of waste' subgrade survey, geombrane installation, anchor trench construction, cap cover soil, topsoil).

4.3.3 Utility Abandonment

Prior to any excavation work, the Indiana 811 utility location service was contacted. A utility mark out service then arrived to identify any underground utilities in the excavation area. The 811 permit was renewed during the course of the work to maintain compliance with relevant laws.

4.3.3.1 **Potable Water**

The facility was serviced by a single service connection in South Arlington Avenue for potable, dust control, and fire protection usage. Op-Tech contracted with the City of Indianapolis for the water service.

4.3.3.2 **Electrical Power**

Op-Tech contracted with and paid for electric service from Indiana Power & Light (IPL) during the CMI. Op-Tech utilized a local licensed electrician (Gaylor Electric) to make necessary connections from the IPL electric service meter and the temporary projects and trailers. Op-Tech's electrician also disconnect remaining electrical equipment as needed to perform the demolition of the pump houses and onsite power poles.

4.3.3.3 **Natural Gas**

A natural gas line supplying gas to the Site from a connection in South Arlington Avenue had been disconnected and purged during the decontamination and demolition project in 2009. No other active gas utility services were present onsite during the remedial work.

4.3.3.4 **Sanitary Sewer**

Water that was collected onsite during remedial work was pumped and treated through a series of bag filters. The treated water was pumped into frac tanks and the water was then sampled and analyzed for contaminants identified in the special discharge permit issued by the CWA Authority, Inc. Water that satisfied the conditions of the permit was discharged to the sanitary sewer (POTW). The treated water discharge occurred at a manhole located on the east side of the property near the perimeter fence and South Arlington Avenue. At completion of the on-site remedial work (November 2015) the temporary discharge pipe was grouted shut.

4.4 SEDIMENT AND EROSION CONTROL

Prior to construction, Op-Tech submitted materials related to erosion and sediment control including silt fence manufacturer specifications, construction entrances, and contamination reduction zones. The material submittals were reviewed and approved by Advanced GeoServices for consistency with the design specifications and permit requirements.

Silt fence was installed in accordance with the *Stormwater Management Design and Stormwater Pollution Prevention Plan* dated June 17, 2014. Silt sock sediment barriers were also installed at swales on paved areas surrounding the facility to capture sediment generated by storm water run-off. The sediment and erosion control measures were maintained and replaced as needed by Op-Tech throughout the project.

Storm water runoff from the Site generally drains to the north and east into two drainage ditches along a former railroad spur as shown on final as-built drawing. Erosion and sediment controls such as check dams and silt socks were installed to provide protection against the transport of potentially contaminated sediment from the active remediation areas.

Temporary seed and mulch was placed in disturbed areas around the Site to prevent surface erosion of exposed soils. As specified in the erosion and sediment control plans, an annual ryegrass seed was used as temporary seed

4.5 AIR MONITORING

4.5.1 Overview

During the CMI, Op-Tech was required to perform the remedial activity in a manner that minimized impacts to air quality in the vicinity of the Site and to ensure that personal protective measures utilized by onsite personnel were appropriate. Air monitoring activities included:

1) personnel air monitoring detailed in the Op-Tech's Health and Safety Plan (HASP);
2) real-time monitoring of total suspended particulate (TSP) around the work zone; and,
3) high volume air monitoring for lead in air at the Site boundary.

4.5.2 Metrological Monitoring System

An on-site meteorological monitoring station (weather station) was used to record key meteorological data throughout the project. The following meteorological parameters were recorded daily:

- Wind speed
- Wind direction
- Wind direction variance

- Temperature
- Barometric pressure

Data obtained from the weather station was utilized to evaluate the results from the real-time and high-volume monitors.

4.5.3 Baseline Air Monitoring

During the mobilization period and prior to the start of intrusive work, Op-Tech performed air monitoring and high volume sampling to establish baseline levels for TSP and lead in air. Typically, the monitoring and sampling covered an entire 8-12 hour work shift.

During the baseline monitoring period (August 11 – 18, 2014) for TSP, the real-time DustTrak equipment indicated an average upwind TWA of 0.036 ug/m^3 and an average downwind TWA of 0.037 ug/m^3 for particulate matter. The baseline laboratory results for high-volume samples indicated "non-detect" concentrations for both lead and total particulate.

4.5.4 Personnel Air Monitoring

The personnel air monitoring program was set up to ensure that the workers onsite were not exposed to contaminants at concentrations above the OSHA PEL limits (or that personnel were utilizing proper PPE to control exposure). Air sampler pumps equipped with air sample cassette monitors were affixed to workers to wear in the Exclusion Zone to measure the levels of particulates and lead in the air. Cassette filters were collected at the end each work day and sent to a laboratory to determine the workers exposure to lead during that work period. Results of the cassette filters were reviewed and, if necessary, the level of PPE donned by the employees in the work zone was upgraded. Typically, personnel air monitoring results indicated that Level D PPE was appropriate. The majority of Site work was performed in Level D PPE. However, workers on the ground within active on-site excavation areas did utilize Level C PPE at their own discretion and prior to the receipt of personnel air monitoring data confirming that Level D PPE was appropriate.

4.5.5 Work Zone Perimeter Monitoring

Work zone perimeter monitoring was performed utilizing DustTrak® aerosol monitors. Three monitors were located each day to provide one upwind and two downwind of the active work zones. The monitors recorded continuous measurements throughout the work day and were equipped with an audio alarm that activated when an instantaneous reading established a location specific trigger level. The trigger level was calculated based on the average soil lead concentration for the area being remediated and a target maximum lead in air concentration of 0.15 mg/m3.

An example calculation for an excavation area with an average lead concentrations of 2,000 mg/kg would be as follows:

Average lead concentration of soil being remediated = 2,000 mg/kg = 0.002 mg/mg

Target Maximum lead in air concentration = 0.15 mg/m3

Trigger Level = (0.15 mg/m3)/0.002 mg/mg = 75 mg/m3

If an exceedance of the trigger level occurred, Op-Tech temporarily stopped work activities, reviewed the Site conditions with Advanced GeoServices, identified alternate/additional dust control measures and implemented the agreed on measures before continuing work. Short term periods when the trigger levels were exceeded were not considered a failure of the dust control standards. Regular, long-term protracted exceedances were not permitted. DustTrak sample results are compiled in Appendix F.

4.5.6 Property Boundary Monitoring

A record of air quality was obtained through fixed, hi-volume monitoring stations around the perimeter of the Site. The high Volume air monitors were Tisch Environmental High Volume TSP Particle Samplers equipped with Volumetric Flow Controllers with brush style motors. The high volume samplers ran continuously for 24 hours during periods of work activity. High volume sample filters were removed and replaced at the beginning of each work day. The removed filter

was shipped to the laboratory for analysis. The laboratory analyzed the filter for total lead content. Based on the laboratory result and the sampler flow rate and operating time the concentration of lead in air was calculated. The calculated lead in air concentrations were tracked as a rolling 90 day average and compared against the National Ambient Air Quality Standard (NAAQS) for lead in air (0.150 ug/m^3). The rolling 90 day average for lead in air was not exceeded during the project.

High-Volume laboratory air sample results are compiled in Appendix F.

4.6 DUST CONTROL

During intrusive work within the exclusion zone, such as soil excavation, concrete demolition and other soil handling activities the potential for dust generation release was elevated. Water was the most effective means of controlling particulate emissions. In general, water application was performed in advance of work activities or whenever visible dust was observed within the work zone.

Op-Tech employed dedicated personnel and equipment to direct water onto work areas to minimize dust. Stockpiles and travel paths were also maintained in a damp conditions using water sprays. Dust suppression equipment included two water trucks with sprayer attachments and a hose and a series of portable sprinklers. Water used for dust suppression was obtained from an onsite hydrant located near the former pumphouse #4.

4.7 OFF-SITE WASTE DISPOSAL

Materials remaining from the facility decontamination and demolition project and materials generated as part of ongoing site maintenance and monitoring activities required disposal during CMI. These included materials designated as Universal Wastes and Hazardous Wastes. Arrangements for management and disposal were made by RMC through Heritage Environmental Services and Terra Limited. The materials handled were as follows:

- Nine 55 gallon (steel) drums containing oily water.

- One 55 gallon (steel) drum of PCB ballasts.
- One open top plastic trash can with mercury bulbs.
- One 55 gallon (plastic) drum of metal ion precipitate.
- One 55 gallon (steel) drum of unknown liquid material- not oil.
- Three 55 gallon (steel) of flocculant.
- Five 1 gallon buckets (plastic) of treatability testing material.
- Two trash bags with used baghouse filter bags.
- Three 55 gallon (steel) drums of purge water generated during groundwater well sampling.

Waste disposal documentation is provided in Appendix G.

4.8 DEMOLITION MATERIALS HANDLING

4.8.1 Debris Removal

The few remaining structures consisted of masonry block and concrete structures with steel framing and composite roofs. As the various structures were demolished the building materials were sorted into stockpiles of like materials for handling as described in the following sections.

4.8.2 Scrap Metal

Scrap metal was generated during demolition of the storm water pump buildings, railroad tracks and reinforced concrete floors, and sorted into stockpiles. Scrap metal typically consisted of steel reinforcement (re-bar), stainless steel sumps and metal piping. Scrap metal was sorted into the following categories prior to shipment to the recycling facility:

- Light steel (rebar)
- Heavy steel (railroad rails)
- Stainless steel

The scrap metal was washed/rinsed, if needed, until visibly clean and then loaded into roll-offs of like materials for shipment. Op-Tech received weight tickets for each load of scrap leaving the site. Approximately 22.13 tons of scrap was sent out for recycling to Farnsworth Metal Recycling in Clayton, Indiana and approximately 15.8 tons was sent to All Pro Scrap of Indianapolis.

4.8.3 Concrete Removal

During the previously performed facility demolition, some of the concrete rubble from above grade structures (walls and equipment pedestals) was left onsite. This concrete was previously crushed, stockpiled, and covered with a geomembrane secured with sandbags. During the CMI, the previously stockpiled concrete was placed into the containment cell.

During previously completed demolition of the buildings, the floors and foundations of the facility structures were not demolished or removed. During the CMI, many of the excavation areas were covered by the remaining concrete floor slabs and concrete pavement. The concrete needed to be removed to access the underlying soils. The concrete in these areas was broken into smaller pieces using an excavator with a hydraulic hammer attachment and placed in stockpiles of up to 500 CY.

Op-Tech sampled each stockpile of broken concrete to determine if the concrete was acceptable for re-use as backfill or required placement in the containment cell. Concrete and masonry rubble stockpiles were sampled using a 5-point composite sampling technique where the surface of the concrete was chipped off and combined with equal amount of concrete collected from 4 other locations around the stockpile.

An estimated 4,675 CY of concrete and masonry rubble was generated during the CMI. Approximately 1,340 CY of this rubble was demonstrated to satisfy the CMD criteria for reuse onsite as backfill (CMD Section 6.4.1). In general, crushed concrete rubble that was found to satisfy the HWMU target closure concentrations was placed as backfill within HWMU excavations. Approximately 2,815 CY of concrete was transported and placed within the containment cell and CCB expansion area.

When the Containment Cell reached the maximum design capacity of the CMD in November 2014, approximately 1,039 Tons (approx. 520 CY) of crushed concrete rubble was stockpiled onsite that did not meet CMD criteria for reuse as backfill but was not characteristically hazardous based on TCLP comparison to RCRA standards. This material was shipped offsite to Waste Management - Twin Bridges Landfill as non-hazardous waste (summary provided in Appendix G). Results for all of the concrete characterization samples taken during the project can be found in Appendix H.

4.8.4 Asphalt

Op-Tech removed asphalt in many locations of the Site to access excavation areas required by the CMD. The asphalt was removed and broken into pieces smaller than 4-inches and placed in the containment cell along with excavated soils in accordance with the project Specifications. Approximately 56 CY of asphalt rubble was generated during excavation work in 2014 and 2015.

4.9 PIPING AND WASTELINE CLEANING

During the excavation of the FL4B area a pocket of debris containing several large diameter sections of steel piping was encountered. The purpose of this piping was unknown but it appeared to be part of a former furnace and stack area. The piping contained soil and a hardened ash like substance. Op-Tech used an excavator to elevate the pipes so that they could be cleaned and the material contained within the pipes was transported to the containment cell. This process took place within the incomplete/in progress HWMU excavation areas to prevent cross contamination of other Sitesoils. Once the pipes were free of material, the pipes were washed using the hoses on the water truck until visibly clean. The wash water used during this process was collected in the HWMU areas and sent to the water treatment system onsite for processing.

During the lagoon dewatering and demolition, an underground ductile iron pipe was encountered beneath the lagoon liner system. RMC personnel were unaware of the existence and purpose of this pipe. The pipe terminated at the far eastern end of the lagoon and the end of the pipe was a bell shaped end piece. Op-Tech uncovered the pipe and removed several sections of the pipe. A black sludge like material was observed inside of the end of the pipe. RMC was contacted to

determine what should be done with the piping and material contained within. It was decided that the pipes would be cleaned and washed in one of the incomplete HWMU excavation areas to prevent contamination of another area. Once the pipes were clean and free of debris, they were placed in a roll-off for recycling. Wash water used during the cleaning of the pipes was collected and sent to the site water treatment system for processing.

Other PVC and small diameter metal piping was encountered during various excavations within the former manufacturing area. The plastic piping was broken into small pieces by the excavator and was transported to the containment cell along with the soil from the excavation areas. The metal piping was segregated in stockpiles and the pipe was washed using the hose on the water truck. The water from the washing activity and was collected sent to the site water treatment system for processing. Several pipes between the former loading dock wall and the lagoon were left in place in 2014 due to the containment cell reaching its maximum capacity. Once the excavations on the northeast end of the Site were completed in 2015, Op-Tech excavated this area and removed the remainder of the pipes. These pipes were made of schedule 40 PVC and were placed in the CCB along with the surrounding soils.

A manhole filled with sediment was identified during the 2015 work near former pumphouse #4. The manhole was thought to be a former sump associated with the storm water management system. The sediment was sampled and determined to be above the action levels for on-site soils. Op-Tech removed the sediment from inside the manhole using a vacuum truck. The removed sediment was placed in the CCB. The empty manhole measured approximately 12 feet deep and did not contain any pipes. Once the sump was visibly clean it was backfilled to within 3 feet of the ground surface with clean crushed stone and then capped to the ground surface with concrete.

4.10 EXCAVATIONS

Locations of specified excavation areas were provided on the design drawings in the CMD. Each onsite area was designated as either a HWMU or NON-HWMU and the depths for targeted removal were as listed in a table on the CMD excavations drawings (provided for reference in this report). In addition, offsite excavations in the CSX right-of-way, Arlington Avenue right-of-way,

and on the Citizens Gas property were performed in accordance with the CMD. Confirmatory sampling and visual inspection were performed to determine if remediation criteria had been met; or if additional excavation was required. This section describes general excavation procedures and work practices. Detailed summaries of each excavation area are provided in Section 5.0 (HWMU Closure), Section 6.0 (Non-HWMU excavations), and Section 7.0 (offsite excavations).

4.10.1 Excavation Planning Activities

Several excavation planning activities were performed prior to actual excavation. They consisted of layout of the proposed excavation area, familiarization of excavation personnel with the upcoming excavation, utility location verification, evaluation of the predicted weather during the excavation, excavation area preparation, and demolition and handling of concrete slabs and/or as needed to gain access to excavation areas.

4.10.2 Excavation Layout

Prior to commencement of any excavation, the excavation limits were delineated by Op-Tech's surveyor using stakes, flagging, marking paint, or other similar visual indicator that was easily recognizable by the equipment operators. Once the excavation area was identified and marked, Op-Tech reviewed the utility location drawings to ensure that no active utilities were present.

4.10.3 Weather Confirmation

The project team reviewed all planned soil excavation operations prior to the proposed start day and again on the proposed start day to ensure appropriateness with respect to the forecasted weather. Factors that were considered included: temperature, wind direction and speed, cloud cover and precipitation potential.

4.10.4 Pre-Excavation Field Activities

Prior to the start of excavation, Op-Tech cleared vegetation, demolished and removed floors and pavement, and installed erosion and sediment (E&S) control features. In some cases, pre-wetting the work zone was performed to minimize dust generation. Work such as clearing and grubbing and installation of E&S measures was monitored throughout the project and maintenance to E&S features was performed as needed.

4.10.5 Excavation Safety

Op-Tech's HSO monitored all excavation and backfill work and ensured that safe working conditions were maintained at all times. Op-Tech was also responsible for protecting all adjacent site features during and following all excavations. All excavation operations were performed in accordance with the approved Site HASP. The HASP was based on the OSHA requirements for excavations. These requirements included OSHA Standards found at 29 CFR 1926.650, 1926.651 and 126.652.

4.10.6 Excavation Procedures

Op-Tech was not permitted to perform excavation until all the preparatory items for the specific excavation area had been completed, as well as any other preparatory requirements set forth in the CMD.

Track-mounted hydraulic equipment including excavators and bull-dozers were used for excavation and loading activities. Specialized debris sorting equipment was used to sort steel reinforcement and concrete. This consisted of excavators with grapple attachments and skid steers.

Excavations were initially advanced only to the design elevations and grades established on the CMD drawings. Excavation of material outside those lines and grades, based on visual characteristics of adjacent material, was performed in some cases. Confirmatory sampling

determined whether additional excavation outside the intended lines and grades shown on the CMD drawings was performed.

When water management was required within an excavation (storm water), it was collected in temporary sumps and pumped into the on-site water treatment system for treatment. Op-Tech was also responsible for minimizing the amount of water that entered the excavation during active operations. This was achieved by constructing berms and swales to divert surface water around active excavations.

At the completion of each excavation, Op-Tech had a licensed surveyor survey the excavation to document the volume of material removed from each excavation and generated as-built drawing documenting these volumes. The surveyor also documented the bottom and sidewall sample locations in each excavation area. Post-excavation survey drawings and figures are provided in this report.

4.10.7 Loading and Onsite Transport

Material excavated from the onsite excavations (HWMU and NON-HWMU areas) was loaded into off-road dump trucks and transported to the containment cell. The off road trucks dumped the material within the limits of the containment cell and a dozer pushed the material into approximately 18-inch thick lifts. Stockpiling of excavated material was avoided. Op-Tech constructed a stone access road into the containment cell on the south end using a rip-rap overlaying woven geotextile fabric. The rip-rap acted as tire 'scrubbers' to prevent tracking from the containment cell. Dry decontamination (broom sweeping or shoveling) of truck bodies (as well as wheels and undercarriage when necessary) was performed on trucks leaving excavation areas and/or leaving the containment cell when determined to be necessary based on visual inspection. Typically trucks were positioned outside of the excavation areas. Care was also taken by the excavator loading material into the trucks to prevent soils from falling onto the ground surface or on to the sides of the truck. The loading areas were cleaned periodically, as necessary to prevent contamination of subsequent transport vehicles when entering or leaving the loading zone. Dust control was implemented during transport of the excavated material. The established

haul road and other travel paths were maintained to accommodate loaded vehicles including routine maintenance such as smoothing out tire ruts and re-compacting unstable areas. When excavation progress made a haul road section no longer necessary the stone and geotextile materials were removed and placed in the Containment Cell.

4.11 WELL ABANDONMENT

Earth Engineering, Inc. (Earth Engineering) of Indianapolis, Indiana, an Indiana licensed water well driller (License# 2193), performed onsite well abandonment work in mid-August 2014. Abandonment was performed on two former groundwater monitoring wells and one former facility production well. The former groundwater monitoring wells (MW-7 and MW-10) were 2-inch diameter PVC wells measuring 25 ft. and 20 ft. deep, respectively. The production well was a 12-inch I.D. steel cased well identified in County records as being 275 ft.

All three well were abandoned in accordance with the requirements established in 312 Indiana Administrative Code 13-10 (Rule 10). The monitoring well protective covers were removed and the wells were backfilled with bentonite chips. The inner casing of the groundwater monitoring wells was cut down to approximately 2 feet BGS and a concrete plug was placed and the area was finished to match the surrounding grades. The production well outer steel casing was cut and removed to a depth of approximately 2 feet BGS. Attempts to remove the submersible pump from the production well were unsuccessful, therefore, the pump was abandoned in-place. The production well was filled with chlorinated gravel to above the water level. The remainder was filled with bentonite slurry. A concrete plug was placed and the vault area was filled with ready mix concrete. The vault area measured approximately 3ft. by 3 ft. and was approximately 3-ft deep; the production well was approximately 260 feet deep. Notification of abandonment reports of the well abandonment work were submitted by Earth Engineering to IDNR.

On August 25, 2015 Earth Exploration was onsite to abandon groundwater monitoring wells MW-2 (2-inch diameter Schedule 40 PVC 30 foot depth), MW-2D (4-inch diameter, respectively Schedule 40 PVC 80 foot depth) and CC-6 (4-inch diameter Schedule 40 PVC 18 foot depth). All three monitoring wells were located within the proposed footprint of the CCB expansion. The

procedure for the abandonment of these groundwater monitoring wells was performed in the same manner as the groundwater monitoring wells (MW-7 and MW-10) that were previously abandoned onsite. Copies of the well abandonment records sent to Indiana Department of Natural Resources, Division of Water, can be found in Appendix I.

4.12 WELL INSTALLATION

Six new shallow groundwater monitoring wells were installed on November 3 to November 5, 2014 to monitor groundwater quality in the shallow perched zone beneath and in the general vicinity of the proposed containment cell, labeled CC-1 through CC-6. These wells were drilled with a drill rig using a hollow stem auger to depths of approximately 35 ft. with continuous split spoon samples (24 in. drives) taken. Each soil boring was advanced with a 6 ¼ in ID hollow stem auger and a knock out plug to depth and completed as 4-in. ID Schedule 40 PVC wells with 10 ft. of 10-slot screen, a bentonite chip seal, cement-bentonite grout to near the surface, an expandable locking cap and an above-ground well cover concreted in place. An Advanced GeoServices field representative working under the supervision of an Indiana Licensed Professional Geologist was present for the new well installation. Boring logs were recorded and soil samples were collected and analyzed for the following parameters:

- Corrosivity (pH)
- Oxidation Reduction Potential
- Sulfate
- Total Organic Carbon
- TAL Metals
- Arsenite/Arsenate
- Hydrogen

These results as well as slug test data and soil gradation are provided in Appendix I.

On December 5, 2014, Earth Engineering was back onsite to perform a second round of well development on the newly installed monitoring wells. An additional third well re-development event was performed on February 5, 2015. The newly installed wells were surveyed by a professional surveyor to ensure all groundwater measurements are utilizing the same vertical and horizontal datum.

On November 17-19, 2015, installation of two new monitoring wells CC-6A and MW-2A was performed. The two new monitoring wells were needed because of the expansion of the containment cell to the limits of the CCB. CC-6A was advanced to a depth of 18 feet and MW-2A was installed to a depth of 28 feet. The two new wells were installed using the same procedure as CC-1 through CC-6.

Monitoring well MW-8, located in the northeast corner of the production area was damaged during the removal of concrete. The outer casing was compromised and debris was able to enter the well through the broken PVC casing. Repairs to the well were made by exposing the upper three feet of the PVC casing and replacing the section of damaged PVC. The PVC casing was backfilled and a cap was placed over the pipe to protect the well from additional debris entering the opening. Re-development for the well; including flushing the well with potable water to remove debris that had entered the well opening occurred in January 2015. MW-8 was protected using orange safety fence during the remainder of construction. Once final grading was completed in May 2016 a stainless steel protective cover with a locking lid and a concrete base was constructed to protect and secure MW-8.

4.13 TURF ESTABLISHMENT

Grassy areas disturbed during the 2014 construction season, such as the Lagoon and OE excavation areas were not fully restored at the time of the 2014 demobilization. In addition, the containment cell cap did not have topsoil placed at that time. The cap cover soils were seeded using the temporary seed mix. Op-Tech remobilized in the June of 2015 to repair soil erosion damage caused on the slopes of the containment cell following demobilization in December 2014. The existing cap cover soil was regraded to repair channeling and erosion rills. Temporary seed, mulch,

and tackifier was than applied on the existing Containment Cell slopes to prevent additional erosion until an approval of the CCB expansion was received the CMI resumed.

When CMI work resumed in September 2015 a 6 inch layer of topsoil along with seed and erosion control mat (ECM) was placed on the existing north, east, and west slopes of the Containment Cell that were not going to be disturbed by the CCB expansion. Topsoil and seed restoration was also performed to restore disturbed areas outside of the Containment Cell such as the FL excavations, ND excavations, OE excavation, and Lagoon excavation. The South Arlington Avenue excavation areas and portions of the Citizens Gas excavations were restored with topsoil and sod in accordance with the restoration activities specified by the CMD.

Op-Tech was not able to place topsoil, seed and place Erosion Control Mat (ECM) on the CCB expansion due to poor weather conditions in late 2015. Other disturbed areas around the Site were seeded and mulched, as needed. Op-Tech remobilized in 2016 to complete turf establishment on the north slope of the CCB expansion and other areas of the Site such as the Pocket Wetlands, Basin 2, and surrounding areas.

4.14 DEMOBILIZATION

Op-Tech completed the final site grading for the 2014 construction period on December 19, 2014. The following week, Op-Tech temporarily demobilized their equipment and materials from the Site for the winter. Op-Tech had limited manpower present at the Site in early June 2015 to coordinate the erosion repairs with a subcontractor.

Op-Tech remobilized manpower and equipment on August 17, 2015 to complete the work described within the CMD and ESD. Op-Tech was able to complete the excavation of the remaining HWMU, Non-HWMU and offsite areas in 2015. The soil from these areas was placed within the CCB expansion of the containment cell. Due to the onset of poor weather conditions before final restoration on the CCB, Op-Tech demobilized on December 18, 2015 for the winter. A very limited Op-Tech crew was onsite on March 30 – April 1, 2016 to perform stormwater grading in order to promote final drainage conditions and facilitate dry conditions for soil

placement later in the spring. A complete Op-Tech crew remobilized on April 11, 2016 and remained onsite through June 1, 2016 to complete the restoration work including final site grading, stormwater piping installation, stone placement and establishment of vegetation. Op-Tech completely demobilized by June 1, 2016.

5.0 HWMU CLOSURE

The HWMU area had pre-defined horizontal limits as depicted on Drawing 6 of the CMD. Former outdoor waste pile areas carried a "WP" designation. Former materials storage building (indoor waste pile) areas carried an "MSB" designation. The HWMUs were excavated to the pre-defined vertical and horizontal limits and until the soils remaining in the un-excavated portions of the HWMU were below the remediation standards as demonstrated by confirmatory samples, and until visible debris containing slag or battery casings was removed. Drawing A presents the removal limits from the CMD and the actual final limits of removal based on the as-built survey.

In general, the excavation in the majority of the HWMU excavation areas extended beyond the limits shown on CMD Drawing 6 due to the presence of debris. Excavations within the HWMU were also generally deeper than specified on Drawing 6 of the CMD.

For excavations completed in 2014, confirmatory samples collected from the bottom of the excavations were collected from 0 to 6 and 6 to 12 inch depth increments. Sidewall samples were collected from sidewalls greater than 12 inches high relative to the adjacent post soil removal level and situated within the HWMU area. Side wall sampling was not performed on sidewalls extending beyond the limits of the HWMU area. Confirmatory samples were placed in plastic bags, homogenized and analyzed using a hand-held XRF following USEPA method 6200.

During the 2014 CMI, approximately 20% of the samples analyzed by the onsite XRF were sent for offsite laboratory analysis (93 out of 471 XRF samples) Based on the relationship between the XRF and laboratory analysis a "correction factor" for the XRF readings was developed. The corrected XRF results were used to determine if the target closure concentrations were met. For those samples analyzed via both XRF and laboratory analysis, the laboratory result was used to determine compliance with the target closure concentrations. For excavations performed in 2015, the XRF was not used for formal analysis. All 2015 confirmatory samples were sent to the laboratory.

5.1 HWMU CLOSURE WITHIN CCB FOOTPRINT

All or part of seven (7) of the HWMU excavation areas (WP1A, WP1B, WP1C, WP1D, WP2A, WP2C, portions of MSB2A) were located within the limits of the CCB. Excavation within areas WP1B, WP1C, WP1D, and WP2C was completed in 2014. Excavation within areas WP1A, WP2A, and MSB2A was completed in 2015.

Figures 2 through 11 depict the post-excavation survey data along with the final post-excavation sample data for each sub-area within CCB. Drawing A provides a composite of all of the final excavation limits for the former HWMUs and Site-wide Corrective Action.

5.1.1 WP1A

Figure 2 is a post-excavation survey of the WP1A/WP1B excavation that also identifies the post-excavation sample locations and results. WP1A is located in the northwest corner of the HWMU area (see Drawings 6 and A). Excavation in the north and west portions of this area began in 2014 but the entire excavation was not completed until 2015 due to the original containment cell reaching the maximum volume.

The CMD proposed that WP1A would have a 2.5 feet excavation depth and a removal volume of 744 CY. The actual depth of excavation required in WP1A typically varied from 2.8 feet to 6.0 feet (4.5 feet average). In total, approximately 2,057 CY of soil was removed from WP1A. Figure 2 is a post excavation survey of the WP1A excavation that also identifies the post- excavation sample locations and results.

5.1.2 WP1B

WP1B is located on the west side of the HWMU area immediately to the south of WP1A (see Drawing A). Figure 2 is a post-excavation survey of the 2014 WP1A/WP1B excavation that also identifies the final post-excavation sample locations and results.

Excavation in this area was completed in 2014. The excavation depth proposed in the CMD was 1.0 feet, and a removal volume of 85 CY. Sampling and XRF screening demonstrated that additional soil needed to be excavated from the south and west sidewalls, as well as, from the bottom of the excavation. The final depth of the excavation ranged from 2.8 feet to 5.5 feet and the volume of materials removed from WP1B was approximately 894 CY.

Figure 2 is a post excavation survey of the WP1B excavation that also identifies the post-excavation sample locations and results. As shown thereon, all confirmatory sample results except for the 0 to 6 inch deep bottom sample from location A2 (sample ID: WP1B/1.0-1.5/A2) were below the target closure concentrations. The lab result for lead in the sample collected in the 0-6 inches bottom interval at location A2 was 1,740 mg/kg (sample ID: WP1B/1.0-1.5/A2) which exceeds the target closure concentration of 970 mg/kg. The sample collected at A2 for the 6-12 inches bottom interval had a corrected XRF result of 18.9 mg/kg for lead (sample ID: XRF-WP1B/1.5-2.0/A2), indicating that the lead result observed at the laboratory for the 0-6 inch interval was vertically defined.

The results at the other sidewall and bottom samples in WP1B demonstrate that soils remaining at those locations are below the target closure concentrations. When averaged together, the three (3) bottom sample results for lead from the 0-6 inch interval of soil remaining in the bottom of the WP1B excavation is 596 mg/kg. When averaged together, the six (6) bottom samples results for lead in the 0-12 inch interval of soil remaining in the bottom of the WP1B excavation is 313 mg/kg. Under both evaluations, the average of soils remaining in the bottom of excavation is well below the target closure concentrations. Despite the fact that the laboratory result for WP1B/1.0-1.5/A2 was above 970 mg/kg, but not re-excavated, the intended remediation of soil in this area is achieved because the average remaining soil concentration across the entire bottom of the excavation in the WP1B excavation area is below the target closure concentrations.

5.1.3 WP1C

WP1C is located on the northern central portion of the HWMU area (see Drawings 6 and A). Figure 3 is a post-excavation survey of the WP1C, WP1D and former battery breaker (WP1DX)

excavations that also identifies the "final" post-excavation sample locations and results. Excavation in this area was completed in 2014.

The excavation depth proposed in the CMD was 1.3 feet, which would have resulted in an excavation volume of 67 CY. The final depth of the excavation was over 4.0 feet deep and the volume of materials removed from WP1C was approximately 291 CY.

The WP1D excavation expanded significantly, as required, to remove debris in the former battery breaker area. The depth of excavation within this expanded portion of WP1D was generally the same as the depth of excavation in WP1C. All final post-excavation results were below the target closure concentrations.

5.1.4 WP1D

WP1D is located on the northwestern portion of the HWMU area (see Drawings 6 and A). Figure 3 is a post-excavation survey of the WP1D/WP1DX excavation (WP1C is also included on this figure) that also identifies the "final" post-excavation sample locations and results.
Excavation in WP1D was completed in 2014.

The excavation depth specified for WP1D by the CMD was 3.3 feet, which would have resulted in an excavation volume of 44 CY. The final excavation depth increased to as much as 7.0 feet in some locations (5.1 feet average) as a result of continued debris removal in the former battery breaker area located to the east. The combined soil volume removed from WP1D and the former battery breaker area (WP1DX) was approximately 1,902 CY. All post-excavation results were below the target closure concentrations.

5.1.4.1 **Battery Breaker Area (WP1DX)**

The former Battery Breaker Area lies immediately to the east of WP1D and represents an expansion of the WP1D excavation (see location on Drawings 6 and A). Figure 3 is a post-excavation survey of the WP1D/WP1DX excavation (WP1C is also included on this figure) that

also identifies the "final" post-excavation sample locations and results. During the excavation at the eastern sidewall of WP1D, extensive debris was encountered some of which consisted of a series of concrete walls and bins below grade containing impacted soils and battery fragments. Due to the extent of additional excavation beyond the eastern sidewall, this excavation area was designated WP1DX and was tracked separately from the remainder of the WP1D excavation.

Initially, soils removal was largely based on the presence of debris. Soils were excavated until free of discoloration and debris. Separate bottom and sidewall samples were collected from within this excavation area. The bottom of this area was excavated approximately 3-4 feet deeper than proposed for the WP1D excavation (total depths of over 7.0 feet). Confirmatory sampling and XRF analysis confirm that the soils exceeding the target closure concentrations had been successfully removed from this area.

5.1.5 WP2A

WP2A is located in the north-central portion of the HWMU area (see Drawings 6 and A). Figure 4 is a post-excavation survey of the 2014 WP2A/WP2B excavation that also identifies the WP2A post-excavation sample locations and results.

Excavation in this area began in 2014 but was not completed in 2014 due to the containment cell capacity reaching the maximum volume. WP2A was proposed to have a 7.3 feet excavation depth in the CMD, and a removal volume of 1,137 CY. The actual depth of excavation required in WP2A was approximately 7.3 feet. 1,211 CY of material was removed from the WP2A sub-area in 2014. All post-excavation results were below the target closure concentrations.

5.1.6 WP2C

WP2C is located in the north-central portion of the HWMU area (see Drawings 6 and A). Figure 5 is a post-excavation survey of the WP2C excavation. Excavation in this area began in 2014 but was not completed due to the original containment cell reaching the maximum volume. WP2C was proposed to have a 1 foot excavation depth in the CMD and a removal volume of 103 CY. The

average depth of excavation required in WP2C was approximately 3.7 feet. The final excavation volume was 657 CY. The results of post-excavation sampling demonstrate that the soils remaining in WP2C are below the target closure concentrations and excavation is complete.

5.1.7 MSB2A

MSB2A is located in the central-eastern portion of the HWMU area (see Drawings 6 and A). Figure 6 is a post-excavation survey of the MSB2A excavation that also identifies the final post-excavation sample locations and results. MSB2A was proposed to have a 1.0 feet excavation depth in the CMD and a removal volume of 449 CY. The average depth of excavation required in MSB2A was approximately 3.3 feet. Excavation at portions of the north, east, and west sidewalls progressed into portions of the HMWU area where excavation was not proposed in the CMD. 2,016 CY of material was removed from the MSB2A excavation in 2014. The results of post-excavation sampling demonstrate that the soils remaining in MSB2A are below the target closure concentrations and excavation is complete.

5.2 HWMU CLOSURE OUTSIDE OF CCB

Nine (9) of the HWMU excavation areas lie completely beyond the limits of the CCB expansion. These areas include: WP2B, WP3A, WP3B, WP6A, WP6B, MSB1A, MSB1B, MSB2B, and the Lagoon, as well as portions of the HWMU area that were not originally identified for removal in the approved CMD.

5.2.1 WP2B

WP2B is located on the northeast corner of the HWMU area immediately east of WP2A and an area north of MSB2A that was not specified for excavation in the CMD (see Drawings 6 and A). Figure 4 is a post-excavation survey of the WP2B excavation showing post-excavation sample locations and results.

Excavation in this area began in 2014 but was not completed due to the original containment cell reaching its maximum capacity. The excavation depth proposed in the CMD was 2.5 feet, which would have resulted in an excavation volume of 494 CY. The actual depth of excavation required in WP2B varied from 2.6 feet to 7.5 feet (5.1 feet average).

Materials comingled with the railroad track ballast that extended past the former pump house #3 location to the south were also excavated. Debris removal also proceeded north and east beyond the limits of the HWMU area. Approximately 1,463 CY of material was removed from the WP2B excavation area in 2014 before work ceased.

At the conclusion of work in 2014, plastic sheeting was placed to cover soils and visible debris that remained on the eastern sidewall, as well as, over a portion of the southern sidewall that did not satisfy target closure concentrations so that the remainder of the area could be backfilled to allow for positive drainage towards the north during the winter of 2014 to 2015.

Additional excavation was performed in 2015 to remove impacted materials on the south sidewall. The results of post-excavation sampling demonstrate that the soils remaining in WP2B are below the target closure concentrations and excavation is complete.

5.2.2 WP3A

WP3A is located directly south of WP1DX (Battery Breaker Area) and north of WP3B (see Drawings 6 and A). Figure 7 is a post-excavation survey of the WP3A excavation that also identifies the post-excavation sample locations and results. The excavation depth proposed in the CMD was 1.3 feet which would have resulted in an excavation volume of 50 CY. The actual depth of the excavation in WP3A varied from 2.0 feet to 3.7 feet (2.9 feet average). Approximately 282 CY of materials were removed from the WP3A excavation area.

A power pole with transformers was located at the north end of excavation area WP3A. Indiana Power and Light, Inc. (IPL) removed the electrical service on the west end of the property including the pole located in excavation area WP3A. Then the disconnected poles were removed

and the small volume of impacted soils, approximately 172 CY, remaining around the poles in this area was excavated. The results of post-excavation sampling demonstrate that the soils remaining in WP3A are below the target closure concentrations and excavation is complete.

5.2.3 WP3B

Figure 7 is a post-excavation survey of the WP3B excavation that also identifies the post-excavation sample locations and results. The excavation depth specified in the CMD was 3.3 feet which would have resulted in an excavation volume of 123 CY. The final excavation depth increased to as much as 4.4 feet in some locations (3.9 feet average). The final soil volume removed from WP3B was approximately 230 CY.

The results of post-excavation sampling demonstrate that the soils remaining in WP3B are below the target closure concentrations and excavation is complete.

5.2.4 WP6A

WP6A is located in the southern central portion of the Site (see Drawings 6 and A). Figure 8 is a post-excavation survey of the WP6A excavation that also identifies the post-excavation sample locations and results. The CMD specified excavation depths to 1.0 feet and 663 CY of removal. The actual depth of excavation in WP6A varied between 1.0 feet to 6.9 feet (4.0 feet average) as a result of debris encountered on the east sidewall of the excavation area. The final soil volume removed from WP6A was approximately 1,299 CY. A large concrete obstruction was encountered in the southwest corner of the excavation and effectively functioned as a limit to the sidewall.

No sidewall samples were required to be collected by the CMD. The results of post-excavation sampling demonstrate that the soils remaining in WP6A are below the target closure concentrations and excavation is complete.

5.2.5 WP6B

WP6B is located south of WP6A (see Drawings 6 and A). Figure 8 is a post-excavation survey of the WP6B excavation that also identifies the post-excavation sample locations and results.

The CMD proposed that WP6B have a 1.3 feet excavation depth and removal volume of 17 CY. The actual depth of the excavation required in WP6B varied between 1.4 feet to 1.9 feet (1.7 feet average). The final soil volume removed from WP6B was approximately 37 CY. The results of post-excavation sampling demonstrate that the soils remaining in WP6A are below the target closure concentrations and excavation is complete.

5.2.6 MSB1A

MSB1A is located on the central to east side of the main HWMU area (see Drawings 6 and A). Figure 9 is a post-excavation survey of the MSB1A excavation that also identifies the post-excavation sample locations and results. Excavation at the north end of MSB1A encountered an old pit filled with battery remnants, construction debris and stained soils. Approximately twelve (12) feet of soil and debris was removed from this former pit area until a visually clean bottom and sidewalls were observed. .

The CMD proposed that MSB1A would have a 1.0 feet excavation depth and removal volume of 516 CY. The actual depth of the excavation required in MSB1A typically varied between 1.6 feet and 3.5 feet (2.6 feet average, excluding the former pit). The final soil volume removed from MSB1A was approximately 2,114 CY. The results of post-excavation sampling demonstrate that the soils remaining in MSB1A are below the target closure concentrations and excavation is complete.

5.2.6.1 **Former Furnace Room (MSB1AX)**

As excavation proceeded on the south side of the MSB1A excavation area, it was apparent that there was a significant amount of debris that extended into the area of the former furnace room

located immediately south of the MSB1A area. For purposes of sample tracking, this area was designated as MSB1AX. Figure 10 presents the survey drawing of the MSB1AX excavation including sample locations and results.

This excavation began in 2014 but was not completed in 2014 because the containment cell reached its maximum capacity. Poly sheeting was placed on the western sidewall to provide separation between the clean backfill and soil remaining to be remediated at the sidewall sample I location. The final limits of the excavation were outside of the HWMU area and a large concrete footing was beneath the grade in the area of sidewall sample I. The concrete footing measured approximately 30 feet by 30 feet and was approximately 4 feet thick. Pursuant to discussions with IDEM and USEPA it was decided that the massive concrete structure could remain in-place.

Approximately 659 CY were excavated from area MSB1AX. All post-excavation results were below the target closure concentrations.

5.2.7 MSB1B

MSB1B is an excavation area targeted for deeper excavation located within the footprint of the MSB1A excavation area (see Drawings 6 and A). Figure 9 is a post-excavation survey of the MSB1B excavation that also identifies the post-excavation sample locations and results. Excavation was completed in this area once the surrounding excavation (MSB1A) was taken down to design grade. The soils in this excavation area were removed to the design grade.

The CMD proposed that MSB1B would have a 2.5 feet excavation depth and removal volume of 66 CY. The actual depth of the excavation required in MSB1B typically averaged 3.5 feet. The final soil volume removed from MSB1B was approximately 116 CY. The results of post-excavation sampling demonstrate that the soils remaining in MSB1B are below the target closure concentrations and excavation is complete.

5.2.8 MSB2B

MSB2B is an excavation area targeted for deeper excavation located within the footprint of the MSB2A excavation area (see Drawings 6 and A). Excavation was completed in this area once the surrounding excavation (MSB2A) was taken down to design grade. Figure 6 is a post-excavation survey of the MSB2B excavation that also identifies the post-excavation sample locations and results.

The CMD proposed that MSB2B would have a 6.0 feet excavation depth and removal volume of 369 CY. The actual depth of the excavation varied between 6.2 feet to 6.5 feet (6.4 feet average). The final soil volume removed from MSB2B was 547 CY (including additional excavation on southeast sidewall). The results of post-excavation sampling demonstrate that the soils remaining in MSB2B are below the target closure concentrations and excavation is complete.

5.3 LAGOON CLOSURE

The former Lagoon is located on the eastern edge of the former facility portion of the property (see Drawing 6). Figure 11 is a post-excavation survey of the 2014 Lagoon excavation that also identifies the post-excavation sample locations and final results. The Lagoon was partially full with water at the start of the CMI work in 2014 and the water volume varied during work based on the volume of storm water generated onsite by various storm events. Water from the Lagoon was pumped through an onsite filtration system and discharged to the local POTW under a permit obtained by the Contractor.

Excavation of the Lagoon area began once the area was dewatered. The sediment, vegetation growing in the sediment and synthetic liner were removed and placed in the containment cell. After liner removal, the concrete layer beneath the liner was demolished, removed and stockpiled for sampling. Excavation of soils from the bottom of the Lagoon began on the south end and progressed to the north end. Excavated bottom soils were placed in the containment cell.

The CMD proposed that the Lagoon would have a 1.0 feet excavation depth and removal volume of 343 CY from an area of just over 1,000 SY. Including the side slopes of the Lagoon, the actual area was over 2,400 SY and the actual depth of the excavation was over 1.5 feet. The final soil volume removed from the Lagoon area was 1,243 CY.

The results of post-excavation sampling demonstrate that the soils remaining in the Lagoon are below the target closure concentrations and excavation is complete.

6.0 NON-HWMU EXCAVATIONS

The onsite NON-HWMU areas had pre-defined horizontal limits as depicted on Drawing 7 of the CMD (provided with this report for reference).

For excavations completed in 2014, confirmatory samples collected from the bottom of the excavations were collected from 0 to 6 inches below the bottom of the excavation. Sidewall samples were not required in the non-HWMU areas. Confirmatory samples were placed in plastic bags, homogenized and analyzed using a hand-held XRF following USEPA method 6200. During 2014, approximately 20% of XRF samples were sent out for offsite laboratory analysis (93 out of 471 samples). Based on the relationship between the XRF and laboratory analysis, a "correction factor" for the XRF readings was developed. The corrected XRF results from non-HWMU onsite excavations were compared to the applicable remediation criteria (PRG 920 mg/kg total lead). For those samples analyzed via both XRF and laboratory analysis, the laboratory result was used to determine compliance with the applicable remediation criteria. For excavations performed in 2015, the XRF was not used for formal analysis. All 2015 confirmatory samples were sent to the laboratory.

The onsite excavation limits and remediation standard of 920 mg/kg (total lead) presented in the approved CMD (CQAP Appendix A Section 1.2.1 and 2.1) were based on the findings of the Baseline Human Health Risk Assessment (BHHRA). The BHHRA also assumed that imported fill materials would have a total lead concentrations of less than 50 mg/kg. These criteria were satisfied, therefor the remediation required by the CMD is complete.

The PRG-based remediation standard was applied in the following onsite excavation areas outside of the HWMU (non-HWMUs): NW, OE1, ND1, ND2, DW1, DW2, FL1, FL2, FL3, FL4, FL4B, and FL5. Remediation of each onsite non-HWMU excavation area is summarized in the remainder of this Section.

6.1 NW

NW is an excavation area located within the footprint of the Containment Cell at the north end of the Site (see CMD drawing 7, provided with this report for reference). Figure 12 is a post excavation survey of the NW excavation that also identifies the post- excavation sample locations and results. The CMD proposed that NW would have an excavation depth of 1.0 ft and removal volume of 782 CY. The actual depth of the excavation varied between 0.66 ft to 1.72 ft (1.2 ft. average). The final soil volume removed from NW was 977 CY. The results of post-excavation sampling demonstrate that the soils remaining in NW are below the PRGs and excavation is complete.

6.2 OE1

The OE1 excavation is an excavation area located on the south end of the Site to the south and west of the former Lagoon area (see CMD drawing 7, provided with this report for reference). Figure 13 is a post excavation survey of the OE1 excavation that also identifies the post- excavation sample locations and results. The CMD proposed that OE1 would have an excavation depth of 0.5 ft and a removal volume of 252 CY. The actual depth of the excavation varied between 0.5 ft to 1.1 ft (0.6 ft average). The final soil volume removed from OE1 was 334 CY. The results of post-excavation sampling demonstrate that the soils remaining in OE1 are below the PRG's and excavation is complete.

6.3 ND1 and ND2

ND1 and ND2 are excavations in swales at the north end of the Site on either side of the former railroad spur (see CMD drawing 7, provided with this report for reference). Figure 14 is a post excavation survey of the ND1 and ND2 excavations that also identifies the post- excavation sample locations and results. Excavation areas ND1 and ND2, along the former railroad spur began in November 2014. The containment cell volume reached maximum capacity during the November 2014 excavation. As a result, excavation in portions of ND1 and ND2 was post-poned until Op-Tech remobilized in 2015. The CMD proposed that ND1 would have an excavation depth of 1.0

ft and a removal volume of 173 CY. The actual depth of the excavation varied between 1.0 ft to 2.7 ft (1.8 ft. average). The final soil volume for ND1 was 372 CY. The CMD proposed that ND2 would have an excavation depth of 1.0 ft and a removal volume of 179 CY. The actual depth of the excavation varied between 1.2 ft to 3.4 ft. (1.2 ft average). The final soil volume for ND2 was 325 CY. The results of post-excavation sampling demonstrate that the soils remaining in ND1 and ND2 are below the PRGs and excavation is complete.

6.4 DW1

DW1 is an excavation area south of the Lagoon area and directly west of excavation DW2 along the Site driveway (see CMD drawing 7, provided with this report for reference). Figure 15 is a post excavation survey of the DW1 excavation that also identifies the post- excavation sample locations and results. The CMD proposed that DW1 would have an excavation depth of 2.0 ft and removal volume of 474 CY. The actual depth of the excavation varied between 1.2 ft to 3.3 ft (1.9 ft average). The final soil volume for DW1 was 564 CY. The results of post-excavation sampling demonstrate that the soils remaining in DW1 are below the PRGs and excavation is complete.

6.5 DW2

DW2 is an excavation area east of excavation area DW1 along the Site driveway (see CMD drawing 7, provided with this report for reference). Figure 16 is a post excavation survey of the DW2 excavation that also identifies the post-excavation sample locations and results. Excavation in this area was performed in September 2015. The CMD proposed that DW2 have an excavation depth of 2.0 ft and a removal volume of 405 CY. The actual depth of the excavation varied between 1.65 ft to 2.75 ft (1.7 ft. average). The final soil volume for DW2 was 383 CY. The results of post-excavation sampling demonstrate that the soils remaining in DW2 are below the PRG's and excavation is complete.

6.6 FL1

FL1 is an excavation area located on the southwest corner of the CCB expansion area along the western portion of the Site (see CMD drawing 7, provided with this report for reference). Figure 17 is a post excavation survey of the FL1 excavation that also identifies the post-excavation sample locations and results. Excavation in area FL1 was performed in September 2015. The CMD proposed that FL1 have an excavation depth of 0.5 ft and removal volume of 163 CY. The actual depth of the excavation varied between 0.4 ft to 3.8 ft (1.0 ft. average). The final soil volume for FL1 was 345 CY. The results of post-excavation sampling demonstrate that the soils remaining in FL1 are below the PRG's and excavation is complete.

6.7 FL2

FL2 is an excavation area located south of excavation area FL1, north of excavation area FL3 and west of excavation areas WP3A and WP3B along the western fence line of the Site (see CMD drawings 7, provided with this report for reference). Figure 18 is a post excavation survey of the FL2 excavation that also identifies the post- excavation sample locations and results. A portion of excavation area FL2 was excavated in 2014. Excavation in FL2 continued in 2015 to approximately 1.5 feet over the design depth. The CMD proposed that FL2 have an excavation depth of 1.0 ft and removal volume of 683 CY. The actual depth of the excavation varied between 1.3 ft to 2.7 ft (2.3 ft. average). The final soil volume for FL2 was 1,374 CY. The results of post-excavation sampling demonstrate that the soils remaining in FL2 are below the PRG's and excavation is complete.

6.8 FL3

Excavation area FL3 is located on the western fence line of the Site and south excavation area FL2 and north of excavation FL4A (see CMD drawing 7, provided with this report for reference). Figure 19 is a post excavation survey of the FL3 excavation that also identifies the post-excavation sample locations and results. Excavation in area FL3 began in September 2015. The CMD proposed that FL3 have an excavation depth of 3.0 ft and removal volume of 1,178 CY. The actual

depth of the excavation varied between 2.4 ft to 5.4 ft (4.3 ft. average). The final soil volume for FL3 was 1,772 CY. The results of post-excavation sampling demonstrate that the soils remaining in FL3 are below the PRGs and excavation is complete.

6.9 FL4A

Excavation area FL4A is located on the western fence line of the Site and south of excavation area FL3 and north of excavation area FL5 (see CMD drawing 7, provided with this report for reference). Figure 20 is a post excavation survey of the FL4A excavation that also identifies the post-excavation sample locations and results. Excavation in area FL4 began in late September 2015. The CMD proposed that FL4A have an excavation depth of 1.0 ft and removal volume of 409 CY. The actual depth of the excavation varied between 1.0 ft to 2.8 ft (2.1 ft. average). The final soil volume for FL4A was 822 CY. The results of post-excavation sampling demonstrate that the soils remaining in FL4A are below the PRGs and excavation is complete.

6.10 FL4B

FL4B is an excavation area on the west end of the Site and due east of excavation area FL4A (see CMD drawing 7, provided with this report for reference). Figure 21 is a post excavation survey of the FL4B excavation that also identifies the post- excavation sample locations and results. Excavation began on the east end of area FL4B and Op-Tech worked towards the west. As the excavation progressed to the west, an area with debris and stained soils was encountered that were subsequently removed resulting in a large over excavation to the north and south of excavation area FL4B referred to as the 'debris trench'. See Section 6.10.1 for a specific description of the work involved with the debris trench work. The CMD proposed that FL4B would have an excavation depth of 1.0 ft and removal volume of 169 CY. The actual depth of the excavation varied between 1.0 ft to 3 ft (2 ft. average). The final soil volume removed from FL4B was 391 CY. The results of post-excavation sampling demonstrate that the soils remaining in FL4B are below the PRGs and excavation is complete.

6.10.1 Debris Trench

An area not identified for removal in the CMD was encountered in the NON-HWMU area during the excavation in area FL4B, an area of battery and construction debris was encountered at the north and south sidewalls along the western end of the proposed excavation area. An XRF was used screen the soils to determine if additional excavation was necessary. Formal samples were not collected in this area. Approximately 935 CY were removed during this excavation and transported for placement in the onsite containment cell. Once all of the debris was removed from this area and the soils were confirmed to be below the PRGs, the area was backfilled in lifts with imported structural fill soil. The extents of the Debris Trench excavation area depicted on Figures 21A and 21B.

6.11 FL5

Excavation area FL5 is located along the western fence line of the site and south of excavation area FL4A (see CMD drawing 7, provided with this report for reference). Figure 22 is a post excavation survey of the FL5 excavation that also identifies the post- excavation sample locations and results. Excavation in area FL5 began in early October 2015. The CMD proposed that FL5 have an excavation depth of 3.0 ft and removal volume of 1,311 CY. The actual depth of the excavation varied between 1.9 ft to 3.6 ft (2.9 ft. average). The final soil volume for FL5 was 1,297 CY. The results of post-excavation sampling demonstrate that the soils remaining in FL5 are below the PRGs and excavation is complete.

6.12 ARLINGTON AVENUE RIGHT-OF-WAY

The excavation within areas AA1 through AA6 was performed on RMC property that lies within the Right-of-Way (ROW) for Arlington Avenue. The excavations were performed within a shallow grassy swale within the shoulder of the road that existed from the edge of pavement to the existing site fence. A Right-of-Way permit was obtained by Op-Tech for the work along the roadside.

When excavation and restoration work was performed, the nearest travel lane was closed as required by the Traffic Control Plan approved as part of the right-of-way permit using cones, flaggers, and other markers to divert vehicle (and pedestrian) traffic. On-road trucks were used as the excavation was adjacent to a turning lane leading south into the site driveway.

6.12.1 AA1

Excavation area AA1 is located in the north section of the Arlington Avenue road shoulder adjacent to the Site (see CMD drawing 7, provided with this report for reference). Figure 23 is a post excavation survey of the AA1 excavation that also identifies the post-excavation sample locations and results. The CMD proposed that AA1 have an excavation depth of 0.5 ft and removal volume of 295 CY. The actual depth of the excavation varied between 0.4 ft to 1.3 ft (1.1 ft. average). The final soil volume for AA1 was 372 CY. The results of post-excavation sampling demonstrate that the soils remaining in AA1 are below the IDEM RISC Default Residential Standards for Direct Contact Lead (400 mg/kg) and excavation is complete.

6.12.2 AA2

Excavation area AA2 is located in the north section of the Arlington Avenue road shoulder adjacent to the Site and north of excavation area AA3 and south of excavation area AA1 (see CMD drawing 7, provided with this report for reference). Figure 24 is a post excavation survey of the AA2 excavation that also identifies the post-excavation sample locations and results. The CMD proposed that AA2 have an excavation depth of 1.0 ft and removal volume of 142 CY. The actual depth of the excavation varied between 0.5 ft to 1.8 ft (0.9 ft. average). The final soil volume for AA2 was 125 CY. The results of post-excavation sampling demonstrate that the soils remaining in AA1 are below 400 mg/kg and excavation is complete.

6.12.3 AA3

Excavation area AA3 is located in the north section of the Arlington Avenue road shoulder adjacent to the Site and north of excavation area AA4 and south of excavation area AA2 (see CMD

drawing 7, provided with this report for reference). Figure 25 is a post excavation survey of the AA3 excavation that also identifies the post- excavation sample locations and results. The CMD proposed that AA3 have an excavation depth of 1.5 ft and removal volume of 167 CY. The actual depth of the excavation varied between 1.0 ft to 2.0 ft (1.6 ft. average). The final soil volume for AA3 was 147 CY. The results of post-excavation sampling demonstrate that the soils remaining in AA3 are below 400 mg/kg and excavation is complete.

6.12.4 AA4

Excavation area AA4 is located in the north section of the Arlington Avenue road shoulder adjacent to the Site north of the Site driveway and south of excavation area AA3 (see CMD drawing 7, provided with this report for reference). Figure 26 is a post excavation survey of the AA4 excavation that also identifies the post-excavation sample locations and results. The CMD proposed that AA4 have an excavation depth of 2.0 ft and removal volume of 179 CY. The actual depth of the excavation varied between 1.1 ft to 2.4 ft (2.0 ft. average). The final soil volume for AA4 was 184 CY. The results of post-excavation sampling demonstrate that the soils remaining in AA4 are below 400 mg/kg and excavation is complete.

6.12.5 AA5

Excavation area AA5 is located in the south section of the Arlington Avenue shoulder adjacent to the Site south of the Site driveway and north of excavation area AA6 (see CMD drawing 7, provided with this report for reference). Figure 27 is a post excavation survey of the AA5 excavation that also identifies the post-excavation sample locations and results. The CMD proposed that AA5 have an excavation depth of 1.5 ft and removal volume of 84 CY. The actual depth of the excavation varied between 1.2 ft to 3.1 ft (1.7 ft. average). The final soil volume for AA5 was 111 CY. The results of post-excavation sampling demonstrate that the soils remaining in AA5 are below 400 mg/kg and excavation is complete.

6.12.6 AA6

Excavation area AA6 is located in the south section of the Arlington Avenue shoulder adjacent to the Site south of the AA5 and north of Big Four Road (see CMD drawing 7, provided with this report for reference). Figure 28 is a post excavation survey of the AA6 excavation that also identifies the post-excavation sample locations and results. The CMD proposed that AA6 have an excavation depth of 1.0 ft and removal volume of 553 CY. The actual depth of the excavation varied between 1.0 ft to 3.0 ft (0.8 ft. average). The final soil volume for AA6 was 368 CY. The results of post-excavation sampling demonstrate that the soils remaining in AA6 are below 400 mg/kg and excavation is complete.

6.13 WETLANDS

During rough grading and preparation for construction of the Pocket Wetland (located east of HWMU excavation area WP2B) a pocket of battery-related debris was encountered. The impacted soils were excavated, removed, and placed into the Containment Cell.

Soils in this area were excavated to a depth of approximately 3 feet to remove visible debris. Following excavation, five (5) soil samples were taken from the 0-6" interval in the designated 'Wetlands Excavation' area and all five samples were below the onsite PRG criteria for Lead. Approximately 704 CY of soil was removed from this area. The results of post-excavation sampling demonstrate that the soils remaining in the Wetlands excavation are below the PRG's and excavation is complete. Documentation of the removal limits in this area was obtained using field measurements collected by Op-Tech.

7.0 OFFSITE EXCAVATIONS

The offsite excavation areas had pre-defined horizontal limits as depicted on Drawing 7 and Drawing 8 of the CMD (which are provided with this report for reference). Off-site excavations were completed in 2015 due to the containment cell reaching its maximum capacity in late 2014. A composite of offsite post-excavation survey information is provided on Drawings A and B.

7.1 CSX RIGHT-OF-WAY

Excavation in area CSX began in late October of 2015. Figure 29 is a post excavation survey of the CSX excavation that also identifies the post- excavation sample locations and results. The CSX excavation consisted of soil and sediment removal in a swale on the north end of the RMC property in the Right-of-Way of a CSX rail line (see CMD drawing 8, provided with this report for reference). Inspections were periodically performed by a subcontractor (AECOM) for CSX. The CSX inspection reports for the site visits can be found in Appendix K. The CMD proposed that CSX have an excavation depth of 1.0 ft and removal volume of 177 CY. The actual depth of the excavation varied between 1.3 ft to 1.9 ft (1.8 ft. average). The final soil volume for CSX was 718 CY. The results of post-excavation sampling demonstrate that the lead concentration in soils remaining in CSX drainage ditch are below 400 mg/kg and excavation is complete.

7.2 CITIZENS GAS/KINETREX ENERGY

During the course of the CMI, the ownership of the adjacent property changed to Kinetrex Energy (Kinetrex). The CMD specifies work in the stormwater drainage ditch on the northern boundary of the Kinetrex property (areas CG1 and CG2), on a mowed lawn section along the southern boundary of the Kinetrex property (AMT1, AMT2, and AMT3), and that a deed restriction be recorded on the Kinetrex property.

7.2.1 CG1 and CG2

Excavation in areas CG1 and CG2 took place on October 21, 2015. These areas are located on the Kinetrex property in a drainage swale on the north end of the property along a fence line (see CMD drawing 8, provided with this report for reference). Figure 30 is a post excavation survey of the CG1 and CG2 excavations that also identifies the post-excavation sample locations and results. The area consisted of a concrete spillway on the east end of the area and saturated soils, standing water and cattail vegetation. Prior to excavation, Op-Tech set up a large pump to dewater the area. The water was pumped through a filter bag and discharged into a downstream swale on the west end of the Kinetrex property.

An excavator with a ditching bucket was used to remove soils. Excavated soils were loaded into off road trucks for transport to the CCB area.

The CMD proposed that CG1 have an excavation depth of 0.5 ft and removal volume of 35 CY. The actual depth of the excavation varied between 1.4 ft to 1.5 ft (1.4 ft. average). The final soil volume for CG1 was 113 CY. The CMD proposed that CG2 have an excavation depth of 1.0 ft and a removal volume of 135 CY. The actual depth of the excavation varied between 0.9 ft to 1.4 ft (1 ft. average). The final soil volume for CG2 was 121 CY. The results of post-excavation sampling demonstrate that the soils remaining in CG1 and CG2 are below 400 mg/kg and excavation is complete.

7.2.2 AMT-1

The AMT-1 excavation was located to the west of AMT-2 and immediately west and south of the southwestern fence line of the Kinetrex property (see CMD drawing 7, provided with this report for reference). Figure 31 is a post-excavation survey of the AMT-1 excavation that also identifies the post- excavation sample locations and results. Soils were removed approximately 4 feet deeper than the design depth in the eastern end of the area to remove railroad debris encountered in this area. The CMD proposed that AMT-1 have an excavation depth of 0.5 ft and removal volume of 51 CY. The actual depth of the excavation varied between 1.1 ft to 5.8 ft (0.8 ft. average). The

final soil volume for AMT-1 was 394 CY. The results of post-excavation sampling demonstrate that the soils remaining in AMT-1 are below 400 mg/kg and excavation is complete.

7.2.3 AMT-2

The AMT-2 excavation was located to the west of AMT-3 and east of AMT-1 along the southern Kinetrex fence line (see CMD drawing 8, provided with this report for reference). Figure 32 is a post excavation survey of the AMT-2 excavation that also identifies the post-excavation sample locations and results. Soils were removed approximately 5 feet deeper than the design depth in the western end and 1.5 feet in the east end of the excavation area to remove railroad related debris. The CMD proposed that AMT-2 have an excavation depth of 1.0 ft and removal volume of 217 CY. The actual depth of the excavation varied between 1.5 ft to 5.8 ft (0.8 ft. average). The final soil volume for AMT-1 was 394 CY. The results of post-excavation sampling demonstrate that the soils remaining in AMT-2 are below 400 mg/kg and excavation is complete.

7.2.4 AMT-3

The AMT-3 excavation was located to the east of AMT-2 to the south of the Kinetrex southern fence line. The AMT-3 excavation area also extended to the east of the Kinetrex site driveway (see CMD drawing 7, provided with this report for reference). Figure 33 is a post-excavation survey of the AMT-3 excavation that also identifies the post-excavation sample locations and results. Soils were removed approximately 1 foot deeper than the design depth. A vac truck was used on the excavation east of the Kinetrex driveway due to utilities in the area including a fiber optic line. The vac truck carefully removed overlying soil to avoid damaging live utilities near the curb and fence lines. This area did not contain railroad debris.

Soil present beneath the Kinetrex driveway (concrete pavement) was not removed. The CMD proposed that AMT-3 have an excavation depth of 0.5 ft and removal volume of 5 CY. The actual depth of the excavation varied between 0.2 ft to 2.1 ft (1.1 ft. average). The final soil volume for AMT-3 was 53 CY. The results of post-excavation sampling demonstrate that the soils remaining in AMT-3 are below 400 mg/kg and excavation is complete.

7.2.5 Kinetrex Property

As specified in the CMD (Section 6.6.3), RMC is working with Kinetrex and the USEPA to record a deed restriction for the Kinetrex Property. The deed restriction will prohibit the use of the Kinetreex property for any residential purpose including, but not limited to, residential housing, hotels or motels, hospitals or in-patient medical care, playgrounds or recreational facilities, or daily care facilities (i.e., day care centers, schools, senior citizens facilities, nursing homes, or extended living facilities).

8.0 SAMPLING AND ANALYSIS

8.1 FIELD XRF SCREENING

During excavation of most HWMU, NON-HWMU and Offsite areas, a portable handheld XRF device was utilized to guide excavation and serve as a real-time aid in vertical and horizontal delineation of contaminated material. XRF screening was typically performed by placing the XRF instrument on a plastic bag/sheet in direct contact with soils within the excavation. If XRF screening indicated that the remediation goals for that area were satisfied then formal sampling and analysis was performed.

8.2 POST-EXCAVATION SOIL SAMPLING

During 2014, an onsite XRF was used as the primary means of sample analysis. XRF samples were placed in sealed plastic bags, homogenized for no less than one minute and analyzed with the XRF in general accordance with USEPA Method 6200. Seven separate readings were performed on each sample and the results were recorded and then averaged. Approximately 20 percent of the XRF samples were submitted to Pace for laboratory analysis (93 out of 471 XRF samples) and these results were utilized to develop a correct factor for the other XRF results. The correction factor that was developed was presented to USEPA and IDEM in a memo dated November 3, 2014; and the use of the correction factors was subsequently approved by USEPA and IDEM (see communication in Appendix L).

During 2015 all post-excavation soil samples were sent for offsite laboratory analysis.

Laboratory soil analysis is summarized in Appendix J, Table 1 and 4. XRF soil analysis is summarized in Appendix J, Table 2, 3, and 5. In addition, each excavation area post-excavation survey figure includes a table of the final post-excavation sample data for that excavation area.

Confirmation soil samples were collected directly from the HWMU, non-HWMU and Offsite excavation areas. Confirmation soil samples consisted of sidewall samples collected for horizontal delineation (HWMU only) and bottom samples for vertical delineation, based on the CMD requirements (0 to 6 inch depth in the non-HWMU areas and from the 0 to 6 and 6 to 12 depth increment within the HWMU areas).

Soil samples were placed in sealed plastic bags, homogenized for no less than one minute. Samples were placed on ice and transported in laboratory coolers and stored inside of the onsite trailer for XRF analysis and/or laboratory analysis of confirmation samples

For the majority of soil sample collection standard lab containers and equipment were used. This included:

- Appropriate PPE (i.e. gloves, Tyvek suit, hard hat, respirator, safety glasses and boots, etc.);
- A disposable, plastic trowel to dig into soil to collect samples from 0-1 foot below the bottom of the excavation surface;
- New, clean disposable plastic baggies (gallon size); and,
- 120 mL/4-oz. pre-cleaned clear glass jars.

8.2.1 HWMU Excavations

Post-excavation confirmatory soil sampling for HWMU areas was performed once the excavation was completed to the vertical and horizontal extents as designed in the CMD. Bottom samples were collected from two depth intervals: 0-6 inches and 6-12 inches and sidewall samples were generally collected every 20 feet of sidewall that existed in the excavation. In many cases, HWMU areas adjacent to each other would have no final sidewall remaining after soils were removed or the lateral extent of the excavation extended beyond the pre-defined HWMU limit. In these cases, sidewall samples were not required by the CMD and were not collected. Samples collected from the HWMU areas were sent to the lab for 24-hour analysis for the following analyses:

Parameter	Soil Standard
Antimony	37 mg/kg
Arsenic	20 mg/kg
Cadmium	77 mg/kg
Lead	970 mg/kg
Selenium	53 mg/kg

8.2.2 Non-HWMU Excavations

Post-excavation confirmatory soil sampling for Non-HWMU areas was performed after the excavation was completed to the vertical and horizontal extents as designed in the CMD. Bottom samples were collected from the 0-6 inch interval of remaining soil. No sidewall samples were required to be collected from these areas. Non-HWMU soil samples were analyzed for lead only. The soil lead PRG calculated by the risk assessment for the Site was 920 mg/kg. The PRG was applied to post-excavation samples on a point-by-point basis within each excavation area to ensure that the post-remediation average within each excavation area was less than 920 mg/kg. This agrees with the assumptions of the BHHRA to ensure that remaining soils onsite do not pose an unacceptable risk to future workers. A point-by-point evaluation is conservative by comparison to an excavation area-wide PRG evaluation.

8.2.3 Offsite Excavations

Post-excavation confirmatory soil sampling for Offsite areas was performed after the excavation was completed to the vertical and horizontal extents as designed in the CMD. Similar to the Non-HWMU areas, the Offsite Excavations were sampled and analyzed for lead only. The lead results were compared to the IDEM RISC Residential Default Criteria standard of 400 mg/kg.

8.3 ONSITE FILL TESTING

Onsite fill material was typically generated using concrete rubble that remained onsite from the previous demolition activity, the pumphouse demolition performed during the CMI, or from

concrete slabs/foundations that were removed to access underlying soils during excavation. The rubble was generally demolished to a nominal size of 4 inches to 8 inches in diameter. The crushed concrete rubble was segregated and stockpiled in piles of 500 CY or less. Op-Tech used a hammer drill to collect concrete samples to determine if the concrete could be used for backfill. Crushed concrete was analyzed to demonstrate that concentrations of contaminants were below the HWMU target closure concentrations. Concrete rubble that was below the target closure concentrations was reused as backfill within HWMU excavations. Any concrete rubble that did not meet the target closure concentrations for the HWMU was placed in the containment cell or shipped offsite for disposal. Data for concrete rubble generated onsite is provided in Appendix H.

8.4 IMPORTED FILL SAMPLING

Imported fill was required to backfill and complete restoration of excavation areas (onsite and offsite) as well as placement over the onsite containment cell. Imported fill consisted of many soil types: Structural Fill, General Site Fill, Cap Soil Fill, Granular Fill and Topsoil, as described in the project Specifications. Imported fill samples were collected and analyzed for analytical and geotechnical parameters. Op-tech was responsible for collecting and analyzing the imported soils for TAL Metals (6010/6020)/TCL VOCs and SVOC (Methods 8260 and 8270) and the compounds were required to be less than the IDEM RISC Default Residential Standards for Direct Contact to Soil and Groundwater. In some instances metal analytes (arsenic, thallium, cobalt, iron, and manganese) were detected at concentrations above the residential screening limits in soil characterization samples collected at offsite fill sources. A background level was established for the imported fill as various analytes exceeded the residential screening limits. Correspondence between IDEM and USEPA was conducted and it was decided that the proposed fill source(s) was acceptable for use due to background levels of soil in the state of Indiana. See Appendix L for correspondence regarding this issue.

Soil fill material was also analyzed for gradation, plasticity index (P.I.) and Modified Proctor results for each 3,000 CY imported to the Site. In addition, the internal shear, interface friction and cohesion tests were required for structural fill soils placed above the geosynthetics on the containment cell. In addition to the laboratory testing, imported fill was visually inspected by

Advanced GeoServices onsite representative prior to placement onsite. Analytical and geotechnical data for imported fill materials are provided in Appendix H.

8.5 WATER SAMPLES

As part of water management onsite, the Op-Tech was required to collect stormwater and decontamination water. The collected water was sampled and treated in batches. Post-treatment samples were submitted to the POTW for approval prior to any discharge the water to the POTW in accordance with the Special Discharge Permit through CWA Authority, Inc. of Indianapolis, IN.

Post-treatment water samples, collected by the Contractor, were analyzed for pH and Total Lead at a frequency of once per 30,000 gallons which roughly equated to a frac tank volume. A composite sample was required comprised of a mixture of 3 equally sized aliquots (upper, middle and lower levels) from the effluent holding tank. Once each batch sample was approved by CWA Authority, Inc. the water was allowed to be discharged to the POTW at a rate of 90 gallons per minute. Post-treatment laboratory analysis for the water samples can be found in Appendix C.

8.6 AIR SAMPLES

During the remediation, the high-volume stations located along the perimeter of the Site continuously collected samples on a 24 hour increment using a disposable filter media to collect airborne dust. Op-Tech was responsible for maintaining the high-volume units and collecting the filters for laboratory analysis on a daily basis. The filters were sent to Pace Analytical for laboratory analysis and the filters were analyzed for:

- the level of soil particles (dust) in the air known as Total Suspended Particulates (TSP); and,
- total lead (Pb).

The Dustrak units were set up around the work zone(s) and analyzed TSP on a continuous basis by Op-Tech. The data for each work day was downloaded and placed in a spreadsheet. In general, the Dustrak data showed very low TSP concentrations with an occasional spike due to a local dust events. On some occasions, moisture in the air gave a false reading for elevated TSP especially in the mornings with heavy fog or dew.

The National Ambient Air Quality Standards (NAAQS) for total suspended particulate (TSP or PM10 less than 150 ug/m^3) and lead (less than 0.15 ug/m^3) were used as the basis for evaluating air quality. As described in Section 4.5.5, the onsite action level for TSP was re-calculated periodically based on the anticipated lead concentrations in the current work area. However, an onsite action level of 75 ug/m^3 was typically established for the real-time DustTrak monitors which measured TSP. A stop work action was taken when the TSP levels reached 150 ug/m^3 at any given time during work activity. These action levels were determined to be protective of lead concentrations in soil in the 2,000 – 4,000 mg/kg range.

The air monitoring data generated during the project is provided in Appendix F.

8.7 SAMPLE QUALITY CONTROL

Duplicate samples, equipment blanks and matrix spike/matrix spike duplicate (MS/MSD) samples were collected at a rate of one sample per twenty (20) samples sent for lab analysis.

Soil sample duplicates were collected and homogenized before being split. Field duplicate samples provided precision information of homogeneity, handling, shipping, storage, preparation and analysis. The duplicate QC samples were labeled with distinct identification location and times, and submitted to the laboratory as regular samples. The actual identification of the duplicate QC samples was recorded in the log book and on the Advanced GeoServices' copy of the Chain-of-Custody.

Matrix spike samples/matrix spike duplicate samples were collected and analyzed for the same parameters as the parent sample. To ensure sufficient sample volume, MS/MSD sample locations had additional soil volume collected from the same diameter and depth interval as the parent sample immediately adjacent to the parent sample location. Both soil volumes were composited together and analyzed with the XRF before being placed in the laboratory supplied sample jars. Each sample was labeled with the same sample number as the parent sample, designated as an MS/MSD sample, and submitted to the laboratory for the appropriate analyses. MS and MSD samples determine accuracy by the recovery rates of the compounds added by the laboratory (the MS/MSD compounds are defined in the analytical methods). The MS samples also monitored any possible matrix effects specific to samples collected from the Site and the extraction/digestion efficiency. In addition, the analysis of MS/MSD samples checked precision by comparison of the two spike recoveries. One MS/MSD sample was collected for every twenty (20) investigative and duplicate soil samples collected and sent to the offsite lab for analysis.

8.8 SAMPLE HANDLING

When sampling was performed, a Chain-of-Custody form was completed identifying the sample date, sample time, sample name, sample location, and analyses requested.

8.8.1 Field Sampling Documentation Procedures

Field sampling operations and procedures were documented by Site personnel in waterproof hard-bound field logbooks. Documentation of sampling operations included the following:

- Sample identification
- Location collected
- Time and date collected

8.8.2 Sample Custody

Sample identification and Chain-of-Custody documentation was maintained throughout the project using the following procedures:

- Sample labels were placed on each sample container to prevent misidentification of samples.
- Field logbooks were maintained to record information about the sample collection procedure.
- Chain-of-Custody records were created to establish the documentation necessary to track sample possession from the time of collection to laboratory analysis.
- Laboratory logbooks and analysis notebooks were maintained at the laboratory to records all pertinent information about the sample.

Chain-of-Custody requirements complied with standard operating procedures indicated in the IDEM and USEPA sample handling protocols. The Chain-of-Custody indicated any special preservation required which typically was limited to placing ice on the sample containers in a cooler. A temperature blank was also placed in the cooler with the samples to ensure that the proper temperature was maintained upon delivery to the laboratory. The Quality Assurance (QA) representative that collected the samples transferred the samples to the subcontracting laboratory courier who picked samples up directly from the Site. The party relinquishing the samples and receiving the samples would execute the Chain-of-Custody by signing, dating and noting the time on the document. An original copy accompanied the shipment of the samples and copies were kept by the QA representative for record keeping.

8.8.3 Sample Designation

Samples collected from each location, were identified by using a standard label which was attached to the sample container. The following information was included on each sample label:

- Site name;

- Date and time of sample collections;
- Designation of the sample (i.e., grab or composite);
- Type of sample with brief description of sampling location (depth);
- Initials of sampler;
- Sample preservative used (if necessary); and,
- General types of analyses to be conducted.

8.8.3.1 Post-Excavation Sample Identification System

The following sample identification system was utilized to identify the location, type and depth of each soil sample collected during the CMI. The excavation area identification matched the designations shown on the design drawings and the sample location utilized an alpha-numeric designation developed by the Advanced GeoServices Representative in consultation with Op-Tech. Additional information included depth of sample relative to pre-remediation ground surface.

Type of Sample	Excavation ID/Depth (in feet)/Location
XRF Bottom Confirmation (WP1A excavation area; 0-6 inches below excavation; A1 location with 1 foot initial excavation depth)	XRF-WP1A/1.0-1.5/A1
XRF Bottom Confirmation (WP1A excavation area; 6-12 inches below excavation; A1 location)	XRF-WP1A/1.5-2.0/A1
XRF Bottom Confirmation (WP1A excavation area; 0-6 inches below excavation; A2 location with 1 foot initial excavation depth)	XRF-WP1A/1.0-1.5/A2
XRF Bottom Confirmation (WP1A excavation area; 6-12 inches below excavation; A2 location)	XRF-WP1A/1.5-2.0/A2
Lab Analysis Confirmation	WP1A/1.0-1.5/A1
Duplicate	WP1A-D/1.0-1.5/A1
2nd Deeper resamples following (re-excavation to 2 feet depth)	WP1A/2.0-2.5/B1
	WP1A/2.5-3.0/B1
3rd Deeper resample	WP1A/3.0-3.5/C1

Note: Depth interval listed in sample identifier is based on depth from bottom of original excavation.

Type of Sample	Excavation ID/Location
XRF Sidewall Confirmation	XRF-WP6A/sidewall-A
Lab Analysis Confirmation	WP6A/Sidewall-A
2nd Resample	WP6A/Sidewall-A2
3rd Resample	WP6A/Sidewall-A3

Note: In many cases the quantity and identification of sidewall samples was originally laid out based on the quantity anticipated on Drawing 6 of the CMD and a frequency of 1 per 20 feet of sidewall. However, as described previously the final excavation conditions often resulted in a final sidewall alignment that was shorter than anticipated on Drawing 6, or was outside of the pre-defined HWMU limits. In these instances when an alphabetical identification was assigned, but not used, the sample identifiers within an excavation area will not utilize consecutive letter designations. The post-excavation soil sampling data can be found in Appendix J.

8.8.4 Soil Sample Analysis

The site contaminants that were analyzed in soil samples were:

Non-HWMU	HWMU
Lead	Antimony
	Arsenic
	Cadmium
	Lead
	Selenium

Samples were analyzed onsite using the XRF as well as sent to Pace Analytical for laboratory analysis. Laboratory soil analysis was conducted using USEPA approved methods EPA SW-846, Method 6010 or 6020/ASTMD 2794-87. During the 2014 CMI work, soil analysis was typically

performed using an XRF. The XRF analysis was performed in a manner based on USEPA SW-846, Method 6200 and described in the CMD. Typically seven (7) readings was taken for each sample. The readings were recorded in a field book and the results were averaged to provide an uncorrected concentration.

The XRF unit was calibrated each morning using the reference standards provided by Pine Environmental. Calibration was typically performed prior to the first use of the XRF each day and in the afternoon. For the majority of the XRF analysis, a Thermo Niton XL2 980 GOLD unit was utilized. However, an Olympus Alpha 2000 unit was substituted over a period of approximately two (2) weeks (starting on October 11, 2014) while the Niton unit was sent for servicing. The Olympus unit was observed to produce similar results to the Niton unit when re-analyzing samples and standards.

Approximately 20.0% of the HWMU post-excavation soil samples collected in 2014 (93 out of 471) were sent to Pace Analytical (Pace) Indianapolis laboratory for total metals analysis using methods USEPA SW-846, Method 6010/ASTMD 2794-87. Initially, the samples that were sent to Pace which spanned a range of metals concentrations based on XRF analysis. This was done to establish a correlation between laboratory and XRF data and was then used to establish the correction factors for XRF data. The correction factor was developed by Advanced GeoServices and submitted to IDEM and USEPA for approval in a memo dated November 3, 2014. The use of the proposed correction factors was approved by IDEM and USEPA in an email received on November 7, 2014. Correspondence pertaining to the acceptance of the XRF correction factor is provided in Appendix L.

As work progressed in 2014, samples were submitted for laboratory analysis when XRF analysis produced a result that was close to the target closure concentrations. Lab data is given precedence over XRF results when results differ.

During the 2014 CMI work, the time required to analyze and record data for an XRF sample was observed to approach 30 minutes per sample. Due to considerations on the best use of time by onsite personnel and overall project cost, during the 2015 CMI work, the XRF was primarily used

as a real-time screening tool and was not relied upon for post-excavation confirmation samples. Post-excavation confirmation soil sample analysis was performed by Pace. An additional 160 post-excavation samples from were analyzed by Pace in 2015.

During the entirety of the project approximately 723 post-excavation samples were collected. Approximately 471 were analyzed using the XRF and 252 were analyzed by Pace.

A summary of data generated by laboratory analysis of HWMU excavation samples is provided as Appendix J Table 1. Raw (uncorrected) XRF data from the 2014 HWMU post-excavation samples is provided as Appendix J Table 2. Corrected XRF data from 2014 HWMU post-excavation samples is provided as Appendix J Table 3. A summary of data generated by laboratory analysis of non-HWMU and offsite post-excavation samples is provided as Appendix J Table 4. A summary of XRF data from 2014 non-HWMU post-excavation samples is provided as Appendix J Table 5. Figures showing the post-excavation conditions for each excavation area (HWMU, non-HWMU, and offsite) include a summary table of the final post-excavation bottom and/or sidewall sample results are included in the figures section. Laboratory reports and validation reports are included in this submission electronically as part of Appendix J.

8.9 SAMPLING EQUIPMENT

For the majority of soil sample collection standard lab containers and equipment were used. This included:

- Appropriate PPE (i.e. gloves, Tyvek suit, hard hat, respirator, safety glasses and boots, etc.).
- A disposable trowel was used to dig into soil to collect samples from 0-1 foot below the surface.
- New, clean disposable plastic baggies (gallon size).
- 120mL/4-oz. pre-cleaned clear glass jars.

8.10 EQUIPMENT DECONTAMINATION

Soil samples were collected by hand using disposable plastic trowels, clean nitrile gloves, and new Zip-lock plastic bags or laboratory supplied containers for each sample. Since disposable trowels and new laboratory supplied containers were used, no equipment decontamination was necessary.

8.11 DATA VALIDATION PROTOCOL

Validation of analytical soil data as received from the laboratory was performed by Advanced GeoServices QA Scientists. Validation was performed in general accordance with the following data validation guidance documents, where applicable:

- National Functional Guidelines for Inorganic Data Review, Multi-Media, Multi-Concentration. USEPA, February 1994.
- Region V Standard Operating Procedures for Validation of CLP Inorganic Data, USEPA, September 1993.

Specifically, the information examined consisted of sample results, analytical holding times, sample preservation, Chains-of-Custody, initial and continuing calibrations, field and laboratory blank analysis results, instrument performance check sample results, MS/MSD recoveries and RPD and field duplicate recoveries. If the criteria listed in the analytical method were not met for any parameters, the associated samples were flagged as described in the referenced validation guidelines. During data validation, data was also reviewed for transcription, calculation, and reporting errors. Calculations for obtaining concentration data for all parameters may be found in the referenced methods.

The purpose of data validation was to verify and retrace the path of the sample from the time of receipt for analysis to the time the final data package report was generated. Upon completion of data validation, the results were reported in tabular form with data validation flags applied as appropriate to determine the usefulness of the data. The data validation flags were consistent with the USEPA data validation guidelines. A data validation report was written and distributed to

assist in making decisions based on the analytical results. Data validation reports for post-excavation soil samples analyzed by an offsite laboratory are provided in Appendix J.

8.11.1 Data Evaluation

The laboratory analytical data was validated and/or qualified according to guidance provided in CQAP provided in the CMD.

Advanced GeoServices QA duties were to:

1) Perform audits to confirm that regular calibration of testing equipment was properly conducted and recorded;
2) Perform audits to confirm that the testing equipment, personnel and procedures did not deviate from their standards or ensuring that any changes did not adversely impact the value of the test data used to determine compliance with the CMD;
3) Perform periodic audits to confirm that the monitoring reports and test data were accurately recorded and maintained; and,
4) Perform audits to confirm that the raw data was properly recorded, validated, reduced, summarized, and interpreted.

8.12 DATA REPORTING

All data deliverables from the laboratory were paginated in ascending order. The laboratory kept a copy of the paginated package in order to be able to respond efficiently to data validation inquiries. Any errors in reporting identified during the data validation process were corrected by the laboratory as requested. All data validation inquiries to the laboratory were addressed by a written response from the laboratory. The data deliverable required for this project included a case narrative, the sample results (Form 1s), blank data, MS/MSD percent recoveries and relative percent differences, laboratory control sample percent recoveries, and any other quality control data.

A. The data for the post-excavation soil sampling results performed in 2014 and 2015 can be found in Appendix J section.

1) Table 1 – HWMU Post-Excavation Soil Data (Lab Analysis)
2) Table 2 – HWMU Post-Excavation Soil Data (Raw XRF Analysis)
3) Table 3 – HWMU Post-Excavation Soil Data (Corrected XRF Analysis)
4) Table 4 – Non-HWMU Post-Excavation Soil Data (Lab Analysis)
5) Table 5 – Non-HWMU Post-Excavation Soil Data (XRF Analysis)

B. Laboratory data reports and validation reports for the post-excavation soil sampling are provided in Appendix J as well.

C. Air monitoring data generated by Op-Tech is provided in Appendix F. This data was reviewed but not validated.

D. Surface/stormwater sample data generated by Op-Tech is provided in Appendix C. This data was reviewed but not validated

E. Sample data from concrete materials being reused onsite or disposed of offsite and fill materials being imported to the Site are provided in Appendix H. This data was reviewed but not validated.

F. The figures section includes post-excavation survey drawings of each HWMU excavation area that also feature a summary table of the final post-excavation soil results for that excavation.

9.0 HEALTH AND SAFETY

Op-Tech developed a Health and Safety Plan (HASP) and submitted a final revised version on August 6, 2014. The HASP was prepared in accordance to the Final CMD specification Section 01351- Health and Safety Plan Requirements. Each person entering the site was required to review the HASP with the onsite Health and Safety Officer and sign a sheet indicating that the information in the HASP was understood. The HASP conformed to the following sections:

- Final CMD (including attachments)
- United States Federal Government- Code of Federal Regulations (CFR)
  - 29 CFR 1910- Occupational Safety and Health Standards
  - 29 CFR 1910.120- Hazardous Waste Operations and Emergency Response
  - 29 CFR 1910.134- Respiratory Protection
  - 29 CFR 1910.1200 Hazard Communication
  - 29 CFR 1926- Construction Standards
  - 29 CFR 1910.1025- Lead in Construction

Op-Tech provided a full time Site Safety Officer (SSO) to implement and manage the Health and Safety program. The duties of the SSO were to

- Limit exposures if anyone working onsite could be exposed;
- Conduct health and safety audits and review field activities for performance;
- Maintain safety awareness among any person working at the Site;
- Review project plans and revisions to determine if health and safety program procedures were maintained during work activities;
- Notify RMC and Advanced GeoServices of the need to initiate corrective actions in the event of an emergency or accident;
- Notify onsite personnel to alter work practices that are deemed unsafe;
- Suspend onsite personnel from violating requirements of the HASP;

- Coordinate with emergency response personnel and medical support facilities in the event of an emergency;
- Monitor health and safety conditions during working hours;
- Conduct daily safety talks, and,
- Familiarize all site visitors and subcontractors with the HASP.

Zakary Arnhold was Op-Tech's SSO and reported to Mr. Keyes, the Site Superintendent, on any issues or concerns involving worker and site safety. Mr. Arnold also reported to Aaron Farrell, the corporate Health and Safety Manager and, the Project Managers for the RMC-Beech Grove project. The SSO also managed the air monitoring program onsite including the hi-volume air samplers placed around the perimeter of the site and the Dustrak units surrounding the perimeter of the work zone. Air monitoring results were recorded and reported to Advanced GeoServices and RMC on a weekly basis. Air monitoring data is provided as Appendix F to this report.

Op-Tech tabulated and recorded weekly updates to the Health and Safety program including any changes or incidents. Safe work hours were recorded for Op-Tech employees, sub-contractors, visitors and other vendors or personnel visiting the Site. This information was provided in weekly reports submitted by Op-Tech and was presented in the weekly meeting agenda for discussions during the progress meetings. Copies of the Contractor Weekly Reports can be found in Appendix B. The weekly reports, air monitoring data, and health and safety summary were typically discussed during weekly progress meetings. The minutes of the weekly progress meetings, including health and safety summaries are provided in Appendix A.

During the early stages of the project, Level C PPE was worn by anyone entering the work zone. The SSO frequently administered personal air pumps that were placed on individuals or inside equipment working in excavation areas. The cartridges measured the employee exposure to lead over the work day and a determination was made by the SSO if the level of personal protection could be reduced based on laboratory results compared to OSHA Permissible Exposure Limit (PEL) levels. The work zone was identified by the SSO with barriers and signage. Boot wash stations, PPE only identified waste cans, emergency spill kits, first aid kits and fire extinguishers were in place for each work area.

Prior to employees working onsite, Advanced GeoServices and RMC were provided health and safety documentation including OSHA 40 hour training certificates, OSHA 8 hour refresher training certificates, respirator fit test results and pre/post work blood lead testing results. Sub-contractors working onsite were also required to provide the aforementioned documentation. The SSO maintained clean working conditions including a sanitization area, potable drinking water and PPE necessary for weather and changing working conditions.

No OSHA recordable incidents occurred during the periods of work in 2014 and 2015. For the 2014 work onsite there were 113 days without any OSHA recordable incident resulting in 8,749.50 project man hours. For the 2015 work there were 94 days without any OSHA recordable incident resulting in an additional 6,380.35 man-hours worked by Site personnel. For the 2016 restoration work, there were 24 days without an OSHA recordable incident resulting in an additional 1386 man hours worked by Site personnel.

Work zone air monitoring and the use of appropriate PPE were maintained throughout each new work operation at the site (i.e., excavation areas with high levels of contaminant). During excavations and other work activities operations were minimized to reduce any unnecessary risk associated with physical and chemical hazards. Contaminant exposure was prevented by conducting work in accordance with the HASP, by conducting removal in a phased approach to minimize the amount of exposed at any one time.

Typically, Op-Tech's laborers and equipment operators donned Level C PPE to perform their work unless personnel air monitoring data warranted a downgrade in PPE. Level D PPE was generally adequate for other onsite personnel when not within the active work areas. Respirators were worn anytime personnel were within the exclusion zone designated by Op-Tech's onsite Health and Safety Officer.

During excavations in excavation area WP6A and various excavations within the Former Material Storage Building area, an acidic odor was detected by several employees. Op-Tech suspended work in the area and a PID meter as well as a Draeger tube were used to check the presence of gases which could be harmful to human health. Caution tape and proper signage was placed around each of these areas to keep workers and equipment from entering these excavations. In each of these instances the meters did not detect the presence of gases; however, Op-Tech decided to have the workers in this area upgrade their levels of PPE to Level C including a full face mask respirator.

Op-Tech was able to complete the work without any lost-time injuries to its workers onsite and without causing harm or damage to neighboring properties. All sub-contractors and site visitors were given a safety briefing prior to entering the exclusion zone. All visitors were escorted by site personnel to prevent injury.

10.0 CONSTRUCTION QUALITY ASSURANCE

Sampling, testing, and construction monitoring were conducted in accordance with the approved Construction Quality Assurance Plan (CQAP) for the site that were included as part of the CMD. The CQAP was most recently updated in September 2013.

10.1 OVERVIEW

General construction monitoring and oversight was performed at all stages by Advanced GeoServices, RMC, and Optech personnel in accordance with the CQAP, requirements of the CMD and the Specifications to ensure good construction practices were utilized and the work was performed in accordance with the contract documents.

Construction Quality Assurance/Construction Quality Control (CQA/CQC) monitoring was performed during the construction of the containment cell to ensure the work performed in accordance with the design drawings and specifications and that the finished product provided an impermeable barrier to surface water that would be durable and stable in the post-construction period. The cap systems consisted of the following components (from bottom to top):

- Cap subgrade soil material located directly beneath geotextile
- Non-woven geotextile fabric
- 60-mil textured HDPE geomembrane layer
- 18 inch cap cover soil
- 6 inch topsoil layer

10.2 CAP SUBGRADE

Cap subgrade material consisted of excavated soils from the HWMU and NON-HWMU areas. Cap subgrade soil varied greatly across the site from and was generally free of angular particles. The entire cap subgrade surface was proof rolled (where applicable) and compacted prior to geomembrane installation. Each lift of excavated soil placed and compacted in the containment

cell and CCB was tested by a third party inspection firm Alt & Witzig Engineering Inc. of Carmel, Indiana. In-place density testing results for the lifts placed can be found in reports issued in Appendix M. The final subgrade surface was inspected by the Advanced GeoServices, Op-Tech, RMC and Chesapeake prior to the placement of geosynthetics.

10.3 GEOTEXTILE

The geotextile selected for the containment cell and CCB expansion was Skaps GE180- 8 oz. This material consisted of a 100% polypropylene, needle-punched nonwoven geotextile. The geotextile was inspected for its integrity by Advanced GeoServices and Op-Tech prior to geombrane placement.

10.4 GEOMEMBRANE

The geomembrane selected for construction was Solmax 60 mil HDPE smooth/textured liner. The CQC activities were performed by the liner subcontractor, Chesapeake Containment Systems, Inc. CQA work was performed by Advanced GeoServices as well as Op-Tech.

Prior to liner placement, the subcontractor provided Advanced GeoServices with a panel layout plan. Each panel was given an identification code and a unique number to track placement. Each seam was also given a unique identifier that was consistent with the layout plan. As-built drawings of the completed liner were generated by the Contractor and are provided in Appendix N.

10.5 MATERIAL CONFORMANCE TESTING

Geomembrane testing was completed in accordance with the CQAP and the project specifications. Material conformance testing was performed by the manufacturer and this data was supplied to Advanced GeoServices before the materials arrived on-site. Once the materials were approved and shipped to the site, Op-Tech and Advanced GeoServices ensured that the materials were handled and stored in the proper manner. Material conformance testing was performed in

accordance with ASTM D4759. One test was performed for every 100,000 sf of material installed. Conformance testing included the following:

- Density (ASTM D792 or D1505)
- Thickness (ASTM D1593)
- Tensile characteristics (ASTM D638-NSF)
- Tear resistance (ASTM D1004)
- Dimensional stability (ASTM D1204)
- Carbon black content (ASTM D1603)

10.6 FIELD SEAMING

Geomembrane was unrolled and laid out to form large panels. The panels were field seamed to create a single impermeable geomembrane surface. Field seaming was performed as follows:

1. The Installer checked that adjacent panels of geomembrane were overlapped by a minimum of four (4) inches.
2. Seams aligned across the slope were overlapped such that the upslope panel lied over the downslope panel.
3. Seam preparation - Prior to seaming, the following procedures were followed:

    a) The seam area was checked to confirm it was clean and free of moisture, dust, dirt, debris of any kind, and foreign matter. The seam was brushed and washed on the overlap portion of each panel as necessary to ensure clean contact between the panels.

    b) For extrusion welding, the geomembrane was roughed with a hand held rotary grinder having 80 grit or finer sandpaper. Grinding was done perpendicular, to the seam.

4. Weather Conditions - The following weather restrictions applied to seaming operations. Weather conditions were recorded in the daily progress reports.

   a) Seaming did not take place during precipitation, in the presence of excessive moisture (i.e., fog, dew, frost) in areas of ponded water or in the presence of excessive winds.

   b) Seaming was scheduled to be conducted when the geomembrane sheet temperature was between 32°F (0° C) and 104°F (40°C). Due to below freezing temperatures during portions of the liner work, a higher frequency of QA sampling and testing was performed in accordance with GSI's *GRI Test Method GM9 – "Cold Weather Seaming of Geomembranes"* after being discussed and agreed upon by the USEPA.

5. Field seaming was performed utilizing a double seam welder and an extrusion welder, depending on seam location. Test seams were performed prior to liner seaming in accordance with the specifications. When temperatures were below 32°F, trial weld frequency testing was increased and performed every two hours.

10.7 NON-DESTRUCTIVE SEAM TESTING

Non-destructive seam tests were completed on all seams to ensure continuity. Any defects and resulting repairs were recorded by the Installer. The non-destructive field seam tests were performed with a pressurized dual seam instrument and the results were entered into daily QC reports and are presented in Appendix N.

10.8 DESTRUCTIVE SEAM TESTING

Destructive seam tests were performed once for every 500 lineal feet of liner installed. Due to below freezing temperatures during the installation of the geomembrane layer in 2014, destructive seam testing was increased to once for every 250 lineal feet of liner installed. An 18 in. x 36 in. section of liner/seam was cut out to create a coupon for laboratory testing. A representative

number of the various seams were selected for the destructive testing (i.e., smooth to textured, smooth to smooth, textured to textured). These coupons were cut into thirds; one for Op-Tech and two sections for Advanced GeoServices. Additional destructive seam samples were taken in December 2014 due to liner installation below 32°F as it was agreed up that twice as many destructive seam samples were to be taken when work performed was done when the ambient air temperature was below 32°F. These sections were cut into ten strips and sent to independent laboratories to perform 5 Shear Strength and 5 Peel Adhesion tests, in accordance with method ASTMD-4437 NSF Modified. The required properties for the destructive seam laboratory tests are shown below in Table 1:

Table 1 - Required Seam Properties

TEST	TYPE OF BREAK	REQUIRED STRESS
Shear Strength	FTB greater than 100% elongation ASTM 4437-NSF Modified	100 lb/in, min.
Peel Adhesion	FTB less than 30% separation ASTM 4437-NSF Modified	75 lb/in, min. (Fusion)

The laboratory results of the destructive seam testing the geomembrane are shown in Table 2 below. The locations of the destructive seam tests are shown on an as-built drawing provided in Appendix N.

Table 2 - Geomembrane Destructive Seam Sample Results

Geomembrane Destructive Seam Laboratory Results				
Sample ID	Date Tested	Result- average (lbs/in)	Type of Test (Peel or Shear)	Location of Destructive Seam Result
DS-1	11/25/2014	132.0/146.0	Peel	Containment Cell**
DS-1	11/25/2014	179.0	Shear	Containment Cell**
DS-2	11/25/2014	127.0/136.0	Peel	Containment Cell**
DS-2	11/25/2014	177.0	Shear	Containment Cell**
DS-3	11/25/2014	130.0/130.0	Peel	Containment Cell**
DS-3	11/25/2014	173.0	Shear	Containment Cell**
DS-4	11/25/2014	142.0/139.0	Peel	Containment Cell**
DS-4	11/25/2014	170.0	Shear	Containment Cell**
DS-5	11/25/2014	132.0/135.0	Peel	Containment Cell**
DS-5	11/25/2014	175.0	Shear	Containment Cell**
DS-6	11/25/2014	128.0/141.0	Peel	Containment Cell**

Geomembrane Destructive Seam Laboratory Results				
Sample ID	Date Tested	Result- average (lbs/in)	Type of Test (Peel or Shear)	Location of Destructive Seam Result
DS-6	11/25/2014	171.0	Shear	Containment Cell**
DS-7	11/25/2014	132.0/141.0	Peel	Containment Cell**
DS-7	11/25/2014	177.0	Shear	Containment Cell**
DS-8	11/25/2014	131.0/132.0	Peel	Containment Cell**
DS-8	11/25/2014	173.0	Shear	Containment Cell**
DS-9	11/25/2014	134.0/144.0	Peel	Containment Cell**
DS-9	11/25/2014	175.0	Shear	Containment Cell**
DS-1	11/25/2014	135.9/141.2	Peel	Containment Cell*
DS-1	11/25/2014	167.4	Shear	Containment Cell*
DS-2	11/25/2014	122.3/131.9	Peel	Containment Cell*
DS-2	11/25/2014	165.7	Shear	Containment Cell*
DS-3	11/25/2014	125.9/133.9	Peel	Containment Cell*
DS-3	11/25/2014	165.3	Shear	Containment Cell*
DS-4	11/25/2014	126.8/131.6	Peel	Containment Cell*
DS-4	11/25/2014	163.6	Shear	Containment Cell*
DS-5	11/25/2014	132.7/131.1	Peel	Containment Cell*
DS-5	11/25/2014	163.6	Shear	Containment Cell*
DS-6	11/25/2014	128.2/138.1	Peel	Containment Cell*
DS-6	11/25/2014	159.4	Shear	Containment Cell*
DS-7	11/25/2014	130.4/121.1	Peel	Containment Cell*
DS-7	11/25/2014	164.7	Shear	Containment Cell*
DS-8	11/25/2014	130.6/137.0	Peel	Containment Cell*
DS-8	11/25/2014	164.9	Shear	Containment Cell*
DS-9	11/25/2014	127.4/136.8	Peel	Containment Cell*
DS-9	11/25/2014	163.0	Shear	Containment Cell*
DS-10	12/8/2014	132.0/140.0	Peel	Containment Cell**
DS-10	12/8/2014	174.0	Shear	Containment Cell**
DS-11	12/8/2014	143.0/149.0	Peel	Containment Cell**
DS-11	12/8/2014	177.0	Shear	Containment Cell**
DS-10	12/8/2014	128.9/136.2	Peel	Containment Cell*
DS-10	12/8/2014	157.8	Shear	Containment Cell*
DS-11	12/8/2014	139.2/130.8	Peel	Containment Cell*
DS-11	12/8/2014	171.4	Shear	Containment Cell*
DS-1	11/17/2015	125.6/121.0	Peel	CCB*
DS-1	11/17/2015	158.8	Shear	CCB*
DS-2	11/17/2015	123.8/125.0	Peel	CCB*
DS-2	11/17/2015	161.1	Shear	CCB*
DS-3	11/17/2015	116.1/121.0	Peel	CCB*
DS-3	11/17/2015	154.1	Shear	CCB*
DS-4	11/17/2015	133.1/132.7	Peel	CCB*
DS-4	11/17/2015	146.8	Shear	CCB*

Geomembrane Destructive Seam Laboratory Results				
Sample ID	Date Tested	Result- average (lbs/in)	Type of Test (Peel or Shear)	Location of Destructive Seam Result
DS-5	11/17/2015	133.9/139.4	Peel	CCB*
DS-5	11/17/2015	157.8	Shear	CCB*
DS-6	11/17/2015	116.7/121.2	Peel	CCB*
DS-6	11/17/2015	162.6	Shear	CCB*
DS-1	11/17/2015	125.0/120.0	Peel	CCB**
DS-1	11/17/2015	167.0	Shear	CCB**
DS-2	11/17/2015	124.0/119.0	Peel	CCB**
DS-2	11/17/2015	164.0	Shear	CCB**
DS-3	11/17/2015	121.0/134.0	Peel	CCB**
DS-3	11/17/2015	161.0	Shear	CCB**
DS-4	11/17/2015	124.0/140.0	Peel	CCB**
DS-4	11/17/2015	159.0	Shear	CCB**
DS-5	11/17/2015	140.0/138.0	Peel	CCB**
DS-5	11/17/2015	171.0	Shear	CCB**
DS-6	11/17/2015	122.0/121.0	Peel	CCB**
DS-6	11/17/2015	162.0	Shear	CCB**

*Lab samples sent by Op-Tech

**Lab samples sent by AGC

10.9 GEOMEMBRANE REPAIR

The liner condition was inspected daily by Advanced GeoServices, Op-Tech, and RMC for defects. If a defect was discovered, it was clearly marked and labeled and the location was surveyed. No repairs were required as a result of failed destructive seam test results, however the sections removed to create the destructive test coupons required repairs.

The repair procedures were as follows:

- Tears or pinholes were repaired by extrusion welding or patching.
- Blisters, larger holes, undispersed raw materials, and areas contaminated by foreign matter were repaired by patches.
- Patches were round or oval in shape, made of the same materials as the geomembrane, and extended a minimum of six (6) inches beyond all edges of the

defect. Patches were applied using extrusion fillet welding or other techniques approves by Advanced GeoServices.

- Repairs were numbered and logged by Op-Tech and Installer. Repair information included repair type, welding machine used, welder, and location, date of repair and details of non-destructive and/or destructive seam evaluation.

Photographs were taken before and after each repair. The results of the repairs and testing, including sample locations and QC documents can be found in Appendix N.

10.10 CAP SOIL FILL

The cap soil fill was imported from the Brookfield borrow source to serve as the drainage media and support over the cap geomembrane layer. Cap soil fill was sampled for analytical and geotechnical requirements. One sample for every 3,000 CY used on site was sent to a laboratory for analysis consisting of:

- TAL Metals (Method 6010/6020)
- TCL VOCs and SVOC compounds (Methods 8260 and 8270)

Results for imported cap soil fill were required to be less than IDEM RISC Default Residential Standards for Direct Contact and Soil to Groundwater, whichever is more stringent. A background limit was established for some inorganic analytes. Communication describing the development and approval of the background limit is provided in Appendix L. Analytical test results are presented in Appendix H.

10.11 GEOTEXTILE FABRIC

A geotextile fabric was installed between the cap subgrade and the geomembrane. SKAPS GE-180 8-oz. non-woven geotextile fabric was selected for the cap construction. The Geotexile fabric met the following requirements:

- Grab strength $\geq$ 150 lbs
- Puncture strength $\geq$ 75 lbs
- Tear strength $\geq$ 70 lbs
- Mass per Unit Area $\geq$ 80 oz/sy
- Apparent Opening (US sieve No.) $\leq$ 70
- Ply Adhesion $\geq$ 1 lbs/in

The geotextile rolls were placed on the subgrade, overlapped a minimum of 6-in. and then sewn or heat lystered together. Geotextile fabric was placed on all of the areas of the cap above the subgrade.

10.12 TOPSOIL

Topsoil was sampled in accordance with the project specifications and analyzed at a rate of 1 sample per 1,000 CY placed for the following parameters: organic content, nutrients, and pH. Topsoil placement was monitored to ensure that it was graded to promote drainage, prevent ponding and that it was placed to the depth specified. Topsoil was placed for turf establishment and to sustain sod placed in designated areas. Geotechnical testing was also performed to determine the soil classification.

The topsoil placed to complete the containment cell was imported from off-site sources. All off-site soil sources for any use, including topsoil was analyzed for TAL Metals/TCL VOCs and SVOC compounds and was less than IDEM RISC Default Residential Standards for Direct Contact and Soil to Groundwater. Topsoil was submitted to a soils laboratory for analysis to ensure that the topsoil was amended with the proper amount of fertilizer and agricultural lime. Seed and fertilizer were selected and applied as recommended by the local UDSA Soil Conservation Office. Seed variety was selected based on the planting season and to ensure a viable stand of grass is established with a minimum amount of maintenance. Seed was state-certified seed of last season's crop. Copies of the test results are presented in Appendix H.

Topsoil was spread in uniform 6-inch thick un-compacted lifts and compacted and tracked into place with low ground pressure equipment to produce a firm seed bed. Topsoil on the containment cell took place during 2014 work. Topsoil was not placed on the CCB expansion of the containment cell in 2015 due to poor weather conditions. Topsoil, seeding and erosion control mat placement was completed during Op-Tech's restoration work in 2016.

11.0 POST-CLOSURE CARE

Post-closure care will be enforced for 30 years following closure per 40 CFR 264.117 unless in the opinion of USEPA or IDEM the monitoring period may be shortened or must be extended. Post-closure care will be evaluated periodically to determine if modified post-closure activities are sufficient to protect human health and the environment. Post-closure of the site involves the inspection and maintenance of the following:

- Vegetative Cover
- Containment Cell Cap Stability
- Institutional Control and Site Security
- Storm Water System
- Groundwater Monitoring
  - Containment Cell Groundwater Monitoring
  - MNA Groundwater Monitoring

The Contractor responsible for conducting inspections and performing groundwater sampling should observe and maintain a HASP for the proposed O&M activities. Detailed descriptions of the various post closure care tasks are presented in the O8M Plan found in Appendix O. Written inspection information and analytical data packages for sampling will be provided to USEPA.

12.0 CERTIFICATION

I certify that the Corrective Measures for the Refined Metals Corporation property in Beech Grove, Indiana, have been completed in full satisfaction of the requirements of the Consent Decree, dated August 31, 1998 negotiated between Refined Metals Corporation, the United States Environmental Protection Agency, and the Indiana Department of Environmental Management (Civil Action No. IP902077C); the Statement of Basis issued by the United States Environmental Protection Agency in June 27, 2008; the Final Decision and Response to Comments For Selection of a Remedial Alternative issued by the United States Environmental Protection Agency dated September 15, 2009; and the Final Corrective Measures Design revision dated May 7, 2014 and that the applicable performance standards have been met.

I certify under penalty of law that the information presented in this Corrective Measures Implementation Report pertaining to the Corrective Measures performed at the Refined Metals Corporation property in Beech Grove, Indiana and all its related attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Name: Paul G. Stratman, P.E., P.G.

Signature:

Title: Certifying Engineer

8/30/16

PAUL G. STRATMAN REGISTERED No. 19400366 STATE OF INDIANA PROFESSIONAL ENGINEER

PROFESSIONAL PAUL GERARD STRATMAN No. 2112 STATE OF INDIANA GEOLOGIST