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August 13, 2018

Ms. Kimberly Tyson
Michigan Department of Environmental Quality
Office of Waste Management and Radiological Protection
525 West Allegan
Constitution Hall, 4th Floor
Lansing, MI 48933

Re: Revised Corrective Measures Implementation Report Submittal
Former General Electric Apparatus Service Center
18075 Krause Street, Riverview, Michigan
MID 050 616 622

Dear Ms. Tyson:

On behalf of General Electric Company, Environmental Resources Management (ERM) has prepared this Revised Corrective Measures Implementation Report for Former General Electric Apparatus Service Center located at 18075 Krause Street in Riverview, Michigan. This document is substantially revised from the previous version submitted to MDEQ on August 26, 2015.

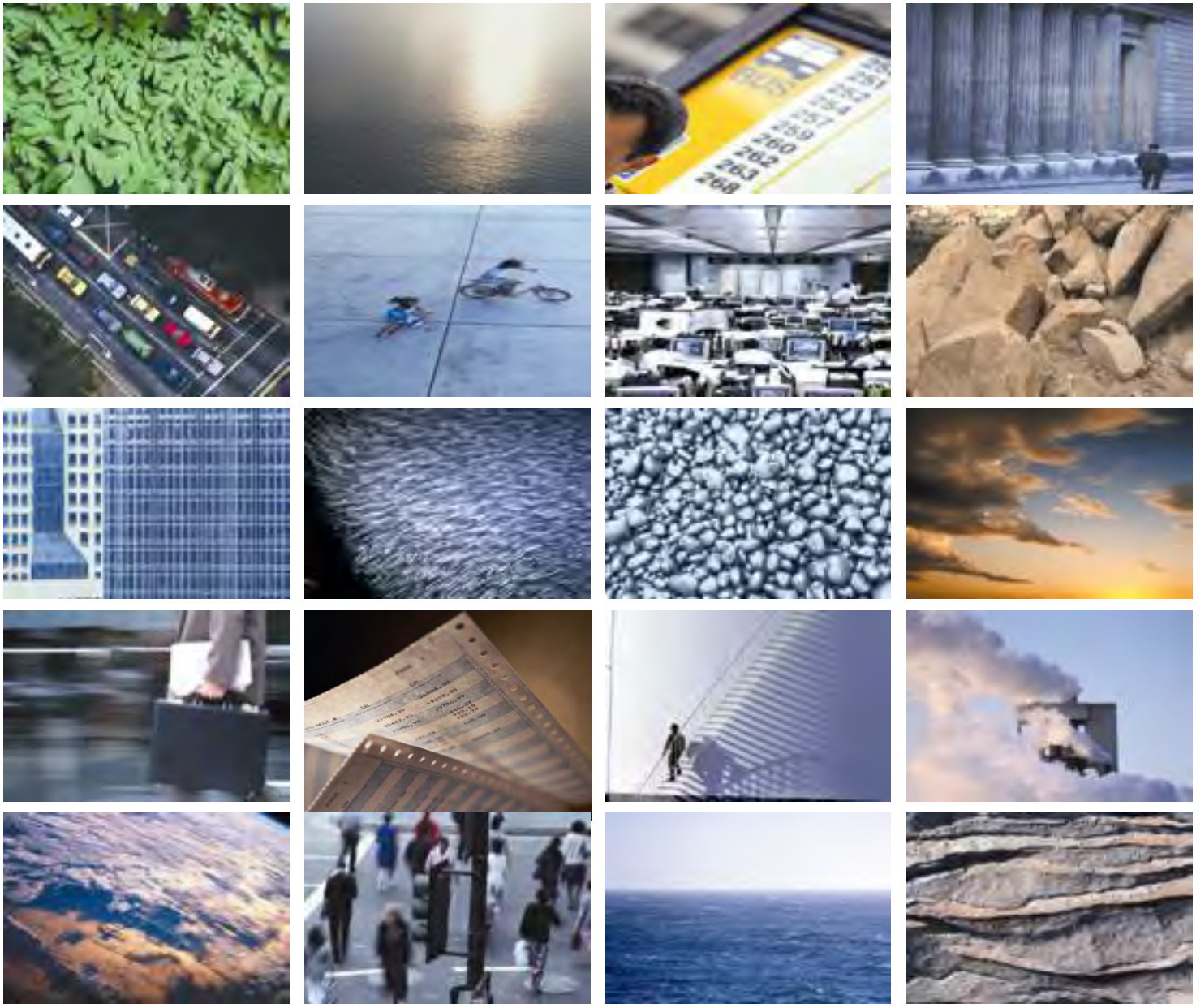
If you have any questions, please do not hesitate to call me at 317-816-7302, or Tom O'Connell at 616-738-7340. Thank you in advance for your assistance.

Sincerely,

Martin Ryan
Principal Consultant

Enclosure

cc: Mr. James Van Nortwick, General Electric Company
Mr. Tom O'Connell, ERM



Prepared For:

General Electric Company

Corrective Measures Implementation Report

Former GE Apparatus Service Center
18075 Krause Street
Riverview, Michigan
MID 050 616 622

August 2015 (Revised August 2018)

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1.0 INTRODUCTION

General Electric Company's (GE's) Former Detroit Apparatus Service Center, located in Riverview, Michigan (the "Site"), filed a Resource Conservation and Recovery Act (RCRA) Part A hazardous waste permit application in November 1980 as a storage facility and operated under interim status until operations ceased in 1986. Two regulated units were identified in the 1980 hazardous waste permit application. Because the Site operated under interim status, it was subject to the requirements of *Part 111 (Hazardous Waste Management)* of the *Michigan Natural Resources and Environmental Protection Act, Public Act 451 of 1994, as amended*, and the associated Administrative Rules, and the interim status requirements defined in the federal *Solid Waste Disposal Act*.

An investigation plan for addressing identified data gaps in accordance with *Part 111 (Hazardous Waste Management)* of the *Michigan Natural Resources and Environmental Protection Act, Public Act 451 of 1994, as amended*, and the associated Administrative Rules, was submitted to the Michigan Department of Environmental Quality (MDEQ) 19 September 2013. That plan, entitled "*RCRA Status Report and Corrective Action Investigation Work Plan*" was approved by MDEQ on 25 October 2013, and implemented in November 2013. Following the implementation of the Work Plan, additional follow-up sampling activities were completed during several mobilizations in 2014 to (1) delineate volatile organic compounds (VOCs) and/or polychlorinated biphenyls (PCBs) identified in structural fill soil beneath the building, and (2) to determine the site-specific arsenic background concentration.

The shop building and foundation were deconstructed in the fall of 2014. In December 2014, under the oversight of Environmental Resources Management (ERM), Brandenburg Industrial Services Company (BISCO) excavated over 4,700 tons of VOC- and PCB-impacted structural fill and soil from the beneath the former building and exterior areas. Those 4,700 tons of waste were transported to Wayne Disposal Site #2 Landfill in Belleville, Michigan and disposed as F001, F001/PCB, or F003 listed hazardous waste. An additional 780 tons of low-level PCBs- or arsenic-impacted soil and railroad ballast were excavated from the exterior yard areas and disposed as non-hazardous, non-TSCA waste at the Waste Management Woodland Meadows landfill.

In September 2017, after additional soil delineation was completed by ERM in 2016-2017, K & D Industries, Inc. excavated 816.07 tons of PCB-impacted soil from the exterior yard areas. Of that total, 441.26 tons of soil, derived from excavations where one or more historical soil PCB

concentration was greater than 50 mg/Kg, was disposed at the Wayne Disposal TSCA-licensed landfill in Belleville, MI. The remaining 374.81 tons, from excavations where all soil PCB concentrations were less than 50 mg/Kg, was disposed at the Woodland Meadows solid waste landfill owned by Waste Management, Inc.

Based on the remediation completed and the results of the confirmatory soil samples, the Corrective Measures Implementation is considered complete and no further actions are necessary other than implementation of a deed restriction following MDEQ review.

1.1 PURPOSE

The purpose of this Corrective Measures Implementation (CMI) Report is to secure a Corrective Action Complete with Controls determination from MDEQ by meeting the requirements of Part 111, Hazardous Waste Management, MCL 324.11101 et seq. (Part 111), and the applicable sections of Part 201, Environmental Remediation, MCL 324.20101 et seq. (Part 201), of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MCL 324.101 et seq. (NREPA). This CMI Report provides the following information collected as part of the "*RCRA Status Report and Corrective Action Investigation Work Plan*" approved by MDEQ on 25 October 2013:

- Summary of the Site geology, hydrogeology, and underground utilities;
- Confirmation of the closed status of the former regulated units;
- Summary of facility decommissioning activities following shut-down of operations in 1986;
- Summary of site investigations (soil sampling, soil gas sampling, and groundwater sampling);
- Summary of corrective measures completed at the Site including remedial excavation of impacted structural fill material and soil; and
- Demonstration that all applicable exposure pathways have been addressed through remediation and deed restrictions.

This CMI Report has been revised from the version submitted to MDEQ in August 2015 to incorporate the following additional items:

- Revisions to the CMI text based on MDEQ's 11 September 2015 e-mailed comments.

- A well abandonment report summarizing the proper decommissioning of the monitoring wells remaining at the Site during September 2015.

- A summary of the 2016-2017 supplemental PCB investigations in exterior yard areas.

- A summary of the September 2017 supplemental soil remediation in the exterior yard areas.

- A summary of the vapor intrusion assessment activities completed from January to March 2018 in response to MDEQ's e-mail request dated 29 August 2017 for GE to "reevaluate all of its VOC data against the Recommended Interim Action Screening Levels (RIASLs) and the Media-specific interim response screening levels (MSSLs)".

- Revisions to the Restrictive Covenant (RC) to accord with the latest template language and Exhibit requirements, including for the vapor intrusion exposure pathway.

1.2 SITE INFORMATION

The project Site occupies approximately 8.2 acres at 18075 Krause Street in Riverview, Michigan. The Site is situated approximately 0.5 miles west of the Detroit River (see **Figure 1**) in a mixed-use area. The Site is bounded to the west by Krause Street, to the east by railroad tracks, and to the north and south by industrial facilities. Riverview Community High School is located immediately west of Krause Street and residential areas are located to the north beyond adjacent industrial properties and east across the railroad property. As shown on **Figure 2**, the Site contained one building approximately 80,000 ft^2 in size (64,000 ft^2 shop area; 16,000 ft^2 office area) and the developed portion of the property immediately around the building is surrounded by a security fence and is mostly paved with either concrete or asphalt driveways and parking. The undeveloped eastern one-third of the property is unfenced and covered in shrubs and trees.

The former Areas of Concern (AOCs) and Solid Waste Management Units (SWMUs) at the Site are listed in **Table 1** and the locations are depicted on **Figure 2.** Other key Site information is summarized in the following table.

Site Location (Figure 1)	18075 Krause Street, Riverview, Michigan 48192 SE quarter of Section 6, Township 4 South, Range 11 East, Wayne County
Ownership	General Electric Company (since 1969); previously vacant land
ID Numbers	MID# - 050616622 (General Electric Co.) Part 201 Site ID and Name – 82000174 (General Electric Service Dept.) Parcel ID**:** 51 013 99 0004 001

Nearby Properties	Mixed use area West: Krause Street and Riverview Community High School North and South: Small industrial facilities East: Railroad Tracks
Zoning	General Industrial (M-2). Properties to north, east, and south are M-2. School property to west is zoned Public/Semi Public Use (PSP).
Nearby Surface Water Bodies	Detroit River is 0.5 miles to the east.
Property Size	8.2 acres
Building Description	One building (deconstructed in 2014) totaling 80,000 ft^2 (64,000 ft^2 shop area; 16,000 ft^2 office area). Steel framed; concrete floors; loading docks on east side.
Grounds Description (Figure 2)	Asphalt pavement in front (west) and on south and east sides, with undeveloped wooded area further east. Grass landscape on north and northeast sides of building. A railroad spur (removed in 2014) extends from the east property line to the plant building.
Utilities	Municipal storm and sanitary sewer. Natural gas, city water, underground electric, phone (utilities have been disconnected).
Former Operations	Operations occurred from 1969-1986. The principal operations were performed inside the building and included repair of electric motors, generators, turbines, switchgears, pumps, compressors, transformers, and related equipment. Specific operations included disassembly, draining of fluids, insulation pyrolysis, parts cleaning (including steam-cleaning, parts immersion in caustic solutions, and solvent or oil wipes), electrical and mechanical component repair, fabrication or replacement, insulating varnish application and curing, reassembly, repainting, and testing.
Current Operations	The Site is vacant and all structures and foundations have been removed to three feet below grade; no operations by GE since closure in 1986.
Site Security	Chain link fence around entire former building area except front office area entrance; undeveloped vegetated area to east is unfenced.
Environmental Land Use Restrictions	"*Notice of MDEQ-Approved Environmental Remediation*" (MDEQ Reference No. NAER-WHM-050-616-622) recorded with Wayne County Register of Deeds on 21 June 2007. The document restricts future uses of the parcel to industrial, consistent with local zoning and Part 201 Industrial Land Use assumptions and Cleanup Criteria. In addition, surface and subsurface soils must be managed in accordance with the requirements of Section 20120c of the Michigan Natural Resources and Environmental Protection Act and other applicable state and federal laws.
Nearby Sites of Environmental Contamination	Based on a review of aerial photographs and a site inspection in November 2011, there are no obvious indicators on adjacent properties that suggest they could have negatively affected the environmental condition of the subject property with the exception of portable storage tanks on the adjacent property to the south. These tanks were noted only in a 2010 aerial photograph but were not observed in a 2011 aerial photograph or during the November 2011 inspection. No indications of releases were evident in the 2010 aerial photograph.

2.0 GEOLOGY, HYDROGEOLOGY, BURIED UTILITIES

2.1 REGIONAL GEOLOGY

The Site is located near the Detroit River just south of the City of Detroit in southeastern Michigan. The Site is located on a relatively flat, low lying plain, and the regional geology developed through a glacial lake environment during the Pleistocene Epoch. Surficial geology in the area consists of unconsolidated sands and gravels deposited by glacial melt water, and silts and clays deposited in glacial lakes. Underlying the glacial deposits, at depths of 50 or more feet, is bedrock consisting primarily of shale, limestone, and dolomite of the Bass Island Group. The Bass Island Group is Silurian in age (approximately 410-440 million years old).

2.2 SITE GEOLOGY

Based on information gathered during the past drilling programs, the Site is underlain by a silty clay unit. In 1967, soil borings installed to evaluate the structural stability of the overburden for the existing building showed stiff, silty clay extending to a depth of 50 feet below ground surface (bgs). As indicated in the cross-section (**Figure 3**), an approximately three to four foot thick structural sand fill layer is present at the location of the former building slab to the top of the clay layer. This structural sand fill does not extend beyond the former building footprint.

2.3 SITE HYDROGEOLOGY

Perched water (i.e., not in an aquifer) less than one-half foot in thickness is present on the clay layer within the structural sand fill beneath the former building slab. When they were originally constructed, the utility trenches leading from beneath the former building were backfilled with clay, which reduces the potential for perched groundwater to migrate away from the Site.

Permeability testing conducted on the clay layer in 2004, as part of a Groundwater Not In An Aquifer (GWNIAA) determination approved by MDEQ, indicated a hydraulic conductivity value in the order of 10^{-7} cm/sec. The clay unit is, therefore, not a source of potable water in the area. Furthermore, discussions with the Wayne County Health Department indicated that no potable water wells are known to exist in the City of Riverview. Drinking water is supplied to the region from surface water sources (i.e., Detroit River located one-half mile to east).

2.4 UNDERGROUND UTILITIES

The Site is serviced by municipal water, natural gas, electric, and municipal storm and sanitary sewers. The locations of these utilities are shown in **Figure 2**. All of the utilities are currently disconnected.

When the Site was active storm water runoff was directed westerly toward Krause Street by two storm water drainage systems. One system was located beneath the south and west parking lots and the other system was located beneath the former shop building and office.

Four storm water catch basins were associated with the parking lot storm drain system, shown on **Figure 2** as MHD1, MHD, MH, and MHW. The base of this 10-inch diameter sewer system is at an approximate depth of 10 feet bgs and discharged to the municipal storm sewer at a manhole at Krause Street located near the southwestern corner of the property. The storm sewer main is at an approximate depth of 12 feet bgs and flows northward along the east side of Krause Street. After active operations at the Site ceased in 1986, the on-site parking lot storm sewers were intentionally partially plugged with concrete at the MH and MHW catch basins to reduce the storm water flow rate and restrict sediment migration in the storm sewer.

The shop building storm sewer extended from the eastern side of the former shop building to a manhole located just west of the former office (see MD-West Office in **Figure 2**), and then on to the Krause Street storm sewer main. The shop building sewer, which is 18" in diameter, 12-feet deep, and constructed of reinforced concrete, was primarily used to convey storm water from the interior roof drains. In December 2014, the sewer was intentionally completely plugged with concrete at manhole MH-West Office. The concrete plug extended approximately one foot into both the inlet and outlet pipes of the manhole structure. In addition, the manhole structure itself was filled with concrete to a sufficient height to completely cover the top of both pipes. The manhole structure itself was not demolished and the buried concrete storm sewer pipes up-gradient and down-gradient of the manhole were left intact. Currently there is no storm water inlets connected to the shop building storm sewer.

The sanitary sewer leading from the Site is approximately five feet deep and extends westward from beneath the middle of the west side of the plant building to a manhole near Krause Street where it connects to the municipal sanitary sewer main. The sanitary sewer main flows northward along Krause Street parallel to the storm sewer. The Krause Street sanitary sewer main is at an approximate depth of 17.5 feet bgs.

3.0 REGULATED UNIT CLOSURE

The following two regulated units were listed on the 1980 hazardous waste permit application:

> **S01** - *Container Storage Building* (referred to as the "Hazardous Waste Storage Building" [HWSB] in subsequent reports)
>
> **S02** – *Tank Storage Area* (referred to as "Outdoor Container Storage Area" and "Drum Storage Area" in subsequent reports)

GE prepared a Closure Plan entitled *Closure Plan for the Electrical Equipment Repair Facility at General Electric's Riverview, Michigan Facility, O.H. Materials Corporation, February 28, 1989 (*"Closure Plan"). The purpose of the Closure Plan was to document closure activities (such as the decontamination of concrete surfaces at S01 and S02) undertaken in 1986 and 1987 by Clayton Environmental Services (Clayton) and additional proposed activities in accordance with the Part 111 Administrative Rules, which is the guiding regulation for implementing the RCRA program in Michigan. The Closure Plan was approved by the Michigan Department of Natural Resources (MDNR) on 23 March 1989**.**

In October 2005, GE submitted a Closure Certification Report for S01, the HWSB, to the MDEQ entitled *Hazardous Waste Storage Building Closure Certification Report, Groundwater & Environmental Services, Inc., October 2005*. In a letter dated 28 July 2006, the MDEQ issued a Certification of Closure for the HWSB after agreeing with GE's GWNIAA determination. The MDEQ released GE from the obligation to maintain financial assurance, and requested that GE file a Notice of Approved Environmental Remediation (NAER) with the Wayne County Register of Deeds stating that the property is restricted to industrial use. A NAER was recorded with the Wayne County Register of Deeds on 21 June 2007. The current EPA Envirofacts online database confirms that S01 was "clean closed" on 28 July 2006.

S02, the Outdoor Container Storage Area, was confirmed closed in the report entitled *Preliminary Assessment/Visual Site Inspection (PA/VSI), General Electric Detroit Apparatus Service Shop, Riverview, Michigan, Final Report, U.S. EPA Office of Waste Programs Enforcement and PRC Environmental Management, Inc., November 9, 1990*, which referred to S02 as SWMU #2 – Outdoor Container Storage Area. The PA/VSI stated that "This unit was closed without an approved closure plan in the fall of 1986. The Closure Plan was approved in 1989." The current EPA Envirofacts online database also confirms that S02 was "clean closed" on 23 March 1989. The PA/VSI,

which is EPA's initial step in ranking facilities for Corrective Action and identifies all AOCs and SWMUs, is discussed in more detail in Section 4.2.

An e-mail from Kimberly Tyson of MDEQ to Damian Foti of GE dated 20 September 2006, confirmed MDEQ's position that the regulated units at the Site have been closed and that "GE has moved into the corrective action administrative track." Corrective Action-related activities completed at the Site since facility operational shutdown in 1986 are discussed in Sections 5.0, 6.0, and 7.0.

4.0 REGULATORY BACKGROUND

Michigan regulations related to the RCRA Corrective Action process include *Part 111 (Hazardous Waste Management)* and *Part 201 (Environmental Remediation)* of the *Michigan Natural Resources and Environmental Protection Act, Act 451 of 1994, as amended* and the associated Administrative Rules. On 3 November 2000, a *Memorandum of Understanding* (MOU) was signed by the EPA and the MDEQ. This MOU establishes EPA Region 5's recognition of Michigan's voluntary cleanup program (i.e., *Part 201*) and its applicability to property redevelopment efforts for facilities regulated under the RCRA corrective action program. Therefore, an MDEQ-approved closure consistent with *Part 201 of Act 451* is being pursued.

GE determined that certain PCB impacted areas at the facility constituted PCB Remediation Waste under TSCA rules because several structural fill samples collected beneath the former shop contained PCB concentrations greater than 50 mg/Kg. Therefore, GE conservatively opted to delineate and remove all impacted fill and underlying soil within the former shop building footprint to a concentration of 1 mg/Kg and dispose of it in accordance with 761.61(b) - "Performance-based disposal."

Within this report, VOCs and RCRA metals, and total PCB* data for samples collected from the exterior yard areas (outside the former shop building footprint) are compared to the Part 201 Generic Cleanup Criteria ("Part 201 GCC") developed by MDEQ (current version dated 30 December 2013) consistent with the Administrative Rules. Part 201 GCC are land-use based criteria (i.e., residential and nonresidential). Part 201 GCC have been generated for the following exposure pathways:

Part 201 GCC for Soil

- Direct Contact
- Particulate Inhalation
- Volatilization to Indoor Air Inhalation
- Volatilization to Ambient Air
- Leaching to Groundwater and Ingestion as Drinking Water
- Leaching to Groundwater and Migration to Surface Water (also known as Groundwater/Surface Water Interface Protection or GSIP)
- Soil saturation screening levels (Csat)

The GE facility has an approved GWNIAA determination which rules out the leaching to groundwater/ingestion pathway for soil. All other criteria are potentially applicable.

*As a conservative measure, GE chose to voluntarily delineate and remediate total PCB to 1 mg/Kg, the most conservative value for soil listed in 40 CFR 761.61(b) (Performance-based disposal).

Part 201 GCC For Groundwater

- Ingestion
- Volatilization to Indoor Air Inhalation
- Groundwater-Surface Water Interface (GSI)
- Flammability and Explosivity Screening Levels
- Acute Inhalation Screening Levels

The GE facility has an approved GWNIAA determination which rules out the ingestion pathway for groundwater at the Site. All other criteria are applicable.

Cleanup Criteria Used at Site

Based on the current zoning for the Site and since access to the Site is reliably restricted by fencing, the Site meets the Industrial Land Use Category as defined in Operational Memorandum #1 (10 December 2004). Therefore, the nonresidential cleanup criteria are applicable to the Site.

During the 2013-2017 delineation and corrective action activities, GE used the following cleanup criteria:

- PCB impacts in soils within the former shop building footprint (summarized in **Table 2**) and exterior yard area (summarized in **Table 3**) were voluntarily delineated and remediated to 1 mg/Kg (from 40 CFR 761.61(b) Performance-based disposal). This value is more protective than the Michigan Part 201 GCC for *residential* use, which is 4 mg/Kg.

- VOCs and RCRA metals in soil (except arsenic and selenium) were conservatively delineated to the Part 201 GSIP criteria onsite and to residential criteria at the property boundary. GE elected to delineate to GSIP criteria at the Site even though the GSIP pathway is deemed incomplete for the following reasons:

    1. During previous work at the Site related to the GWNIAA request, utility corridors leading from the building were noted to be backfilled with clay soils which would impede perched

groundwater beneath the building from migrating along these corridors or into storm sewers.

2. Soil and groundwater samples collected from the utility trenches leading from the Site during November 2013 did not exceed residential criteria.

3. The former storm sewer leading westward from beneath the building was intentionally completely plugged with concrete near where it exits the property.

4. After active operations at the Site ceased in 1986, the on-site parking lot storm sewers were intentionally partially plugged with concrete at the MH and MHW catch basins to reduce the storm water flow rate and restrict sediment migration from the Site.

- GE also conservatively used GSIP criteria as remedial goals for VOCs and metals in the upper four feet of soil at the Site. Several samples collected greater than four feet below grade in the vicinity of the former shop building storm sewer and the HWSB (discussed below in Sections 6.0 and 7.2) were not remediated even though they exceeded GSIP, and several of those locations also exceeded the less conservative Soil Volatilization to Indoor Air Inhalation Criterion for TCE. No VOCs or metals samples exceeded Nonresidential Direct Contact criteria for soil, which are even less conservative than the inhalation criteria. For reference purposes Part 201 GCC for metals and VOCs at the Site are shown on **Tables 4 and 5**, respectively.

- The results for arsenic in soil, which is known to have a high natural background level in southeastern Michigan, were compared to a site-specific background level determined using background samples collected from the undeveloped southeastern part of the Site and statistical analysis from MDEQ's *Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria* (S^{3}TM). The background arsenic results are listed in **Table 4** as ERM-BG-1 through ERM-BG-10. Using the S^{3}TM guidance ERM determined the site-specific arsenic background concentration to be 11,700 µg/Kg.

- Selenium was detected above the 410 µg/Kg statewide default background level and the 400 µg/Kg GSIP criterion at all 21 soil locations where it was analyzed in 2013 (see EB-3 through EB-33 results in **Table 4**), even though it was not identified in historical documents as having been used at the Site (see Table 2.1 "Typical Service Shop Hazardous Wastes" in the 28 February 1989 *Closure Plan*. Three soil samples, EB-3 (8-10'), EB-4 (5-7'), and EB-5 (10-12'), collected from the utility trenches near the western property boundary were reanalyzed

using synthetic precipitation leaching procedure (SPLP) extraction. The SPLP results at all three locations, including at EB-4 (5-7') where 18,000 µg/Kg was detected (the highest concentration recorded at the Site) using the standard Method 6020 extraction procedure, were <5 µg/Kg (see ALS analytical report 1402599 in **Appendix A**). Based on the SPLP results the GSIP exposure pathway for selenium is incomplete at the Site and is not discussed any further in this report.

- The Site has a GWNIAA determination deeming the groundwater exposure pathway onsite as incomplete. Perched groundwater has been delineated to residential Part 201 GCC in the direction of the property line.

Owners and operators of Part 201 "facilities" (i.e., defined in Part 201 as properties which have contamination exceeding residential Part 201 GCC) have an obligation to exercise due care and maintain documentation of same in accordance with the Part 10 Administrative Rules. To that extent, there are certain Due Care requirements that apply for remaining impacts that exceed Part 201 residential GCC. These Due Care requirements are addressed in the RC (see Section 9.2).

5.0 CORRECTIVE ACTION PRIOR TO 2013

This section provides the Site background for Corrective Action, the 1990 EPA PA/VSI findings, the interim response activities completed as part of Corrective Action, and the results of investigation activities completed as part of Corrective Action prior to 2013. This information was previously provided in the September 2013 *RCRA Site Status Report and Corrective Action Work Plan* which was approved by MDEQ and implemented in 2013. The investigation results from implementation of the September 2013 Work Plan are discussed in Section 6.

5.1 PRELIMINARY ASSESSMENT/VISUAL SITE INSPECTION

As described in Section 3.0, in 1990 the USEPA completed a PA/VSI report which identified the following AOCs and SWMUs (shown on **Figure 2**):

AOC #1 – 1976 Oil Spill Area
AOC #2 – Shop Production Areas
SWMU #1 – Hazardous Waste Storage Building (HWSB)
SWMU #2 – Outdoor Container Storage Area
SWMU #3 * – Underground Grease Traps/Sumps
SWMU #4 – Transformer Oil Storage Tanks

* SWMU #3 consisted of a west sump and an east sump. The west sump has also been referred to in various Site reports as the "North Sump" and the "Bay B Grease Trap" but is referred to in this report as the west sump. The east sump has also been referred to in various Site reports as the "South Sump", "Bay E Grease Trap", and "the Eastern Steam Cleaning Sump (ESCS)." This work plan refers to the east sump as the ESCS.

The EPA's 1990 PA/VSI concluded the following:

- AOC#1, AOC#2, SWMU #2, and SWMU #4 did "not pose a significant threat to the environment" and, therefore, no further action was recommended for these areas;
- Further action was needed at SWMU #1 (the HWSB) to address soil contamination identified during the assessment activities conducted prior to 1990; and
- Further action was needed at SWMU #3 (the ESCS only) to address soil and groundwater contamination identified during the assessment activities conducted prior to 1990. No further action was required at the west sump because there was no evidence of any release at that location.

Additional details regarding these six areas are provided in **Table 1**. Unrelated to the AOCs and SWMUs, previous facility closure activities which included excavation of exterior areas with surficial staining, sampling, and cleaning of storm drains, groundwater testing, and related data gaps, are all discussed in the following subsections.

5.2 INTERIM REMEDIAL ACTIVITIES

5.2.1 Exterior Yard Areas

5.2.1.1 Initial Sampling

During Site visits conducted between April and July 1986, Clayton sampled the following exterior yard areas believed at the time to have potential for PCB contamination:

- Outdoor container storage area on south side of the building
- Loading docks on the east side of the building
- Parking lot on the south side of the building
- Tank farm area east of the building
- Area northeast of the building
- Gravel/sand areas adjacent to the east parking lot
- Railroad track area

Soil samples from visibly stained, unpaved areas were taken at 6-inches and 12-inches bgs, and from the paved areas at 6 inches and 12 inches below the paving base course. The 1986 exterior yard sample locations are identified on **Figure 4** and the corresponding PCB results are presented in **Table 3**. The results indicated that PCB levels decreased rapidly with depth, due to a stiff clay layer underlying the Site.

5.2.1.2 Remedial Activities

GE developed a work plan for the cleanup of the visually-stained outside areas entitled *Cleanup Plan for the General Electric Riverview Plant, Clayton Environmental Consultants, August 5, 1986*. The plan identified a PCB cleanup standard for soil of 10 mg/Kg based on draft PCB guidelines issued by EPA on 12 September 1985. During the cleanup, the exterior yard paved areas, including contaminated asphalt parking areas near the outdoor container storage area, loading docks, and pavement adjacent to the railroad tracks, were excavated to remove the stained asphalt and the base course and underlying soil to a depth of 12 inches. The tank farm concrete dikes and floor were removed and 12 inches of underlying soil were then excavated. An unpaved area along the eastern edge of the

parking area was also excavated to a depth of 12 inches. The approximate areas that were excavated in 1986 are shown on **Figure 4**, based on the written descriptions in Section 3.2 of the 1989 Closure Plan.

5.2.1.3 Confirmatory Sampling Activities

Confirmatory soil samples S-2 and S-3 were collected near SWMU#4 in October 1986 from 0-12 inches bgs. The two confirmatory sample locations are shown on **Figure 4**, and the results are summarized in **Table 3**. The results indicate PCB concentrations of 3.2 mg/Kg in both samples, below the current Part 201 residential criterion of 4 mg/Kg. No other confirmatory soil samples were known to have been collected at that time.

5.2.1.4 Waste Management and Site Restoration Activities

All excavated materials were tested and shipped off-site to Great Lakes Environmental Services, 22077 Mound Road, Warren, Michigan (ID #MID087478574). The excavations were backfilled with clean soils, unpaved areas were reseeded, and paved areas were restored.

5.2.2 Storm Sewer System

5.2.2.1 Background

GE completed certain storm sewer cleaning activities in 1987 and 2010. Those cleaning activities along with associated sampling activities are discussed in the following subsections.

5.2.2.2 Remedial Activities

In 1987, two catch basins, MHD located south of the former outdoor container storage area and MHD1 located farther east (see **Figure 2**), were pumped out and the lines flushed by Great Lakes Environmental Services (GLES).

On 13 October 2009, approximately 5,200 gallons of standing water (parking lot surface puddle and standing water present in the plugged storm drain) were pumped into a tanker truck.

On 12 July 2010, the parking lot storm sewer was cleaned using a vacuum truck. Also on 12 July 2010, after the sediment was cleared from the drain line, a video camera was used to inspect the drain for damage, to see if additional connections to the drain line existed, and to confirm that cleaning was complete. The video investigation revealed that the inlet and outlet lines at catch basins MH and MHW were intentionally

narrowed by partially plugging them with concrete to reduce storm water flow and restrict the potential for sediment to migrate from the Site via the storm sewer.

5.2.2.3 Sampling Activities

Results for sediment samples collected in 1986 by GE from catch basins MHD and MHD1 are presented in **Table 3**. The PCB cleanup standard for soil and sediment used at the Site in 1986 was 10 mg/Kg based on draft PCB guidelines issued by EPA on 12 September 1985. Verification sediment samples were collected from MHD and MHD1 on 17 April 1987 following the 1987 cleaning activities described in 4.3.2.2. The results were 18 mg/Kg for MHD and 5 mg/Kg for MHD1, as summarized in **Table 3.** As discussed in the following section, subsequent inspections of the storm sewers did not indicate any sediment accumulation.

5.2.2.4 Waste Management and Site Restoration Activities

To improve storm drainage, damaged asphalt was repaired and replaced around catch basin MH (see **Figure 2**) by GE in August/September 2009. Damaged asphalt removed during the replacement was containerized in rolloff boxes, sampled, and then disposed off-site at Waste Management's Woodland Meadows RDF in Van Buren, Michigan. A total of 80.36 tons of solid waste were disposed.

Solid waste generated during the July 2010 storm drain cleaning activities was placed in a rolloff box, and liquid waste was placed in a vacuum box. On 14 July 2010, the waste was transported by EQ to their Michigan Disposal Treatment Plant located at 49350 North I-94 Service Drive, Belleville, Michigan for disposal as non-hazardous and non-TSCA liquid waste.

During a site visit on 21 November 2011, ERM inspected the catch basins and confirmed that, as a result of the August/September 2009 repairs and the 12 July 2010 cleaning effort, the sewers contained no accumulated sediment. Based on the current lack of sediment accumulation in the storm sewer system, no additional remedial or sampling actions are planned for the storm sewer sediment.

5.2.3 Eastern Steam Cleaning Sump Removal

5.2.3.1 Background

The ESCS was constructed below the floor of the southeast corner of the building in 1969 as a grease trap to collect runoff from steam and solvent cleaning of equipment parts. The trap was approximately 2.5 feet in

diameter and eight feet deep and constructed of concrete. A drain line extended westward from the sump at a depth of three feet. Subsurface investigations in this area identified approximately 3 to 4 feet of sand beneath the concrete floor. The sand layer was underlain by native stiff clay and the bottom several feet of the ESCS were set into the clay layer.

ESCS sump water samples collected during closure activities by Clayton in 1987 and OHM in 1988 showed concentrations of PCE (up to 2,700 µg/L), TCE (up to 390 µg/L), and PCBs (up to 25.3 µg/L). Following the removal of water from the sump, groundwater returned to the sump.

GE provided MDEQ an updated sump removal work plan titled *RCRA Closure Plan Addendum, GES, July 11, 2002* (revised on 14 August 2002). The work plan was implemented during the week of 15 July 2002, and the ESCS and surrounding soil were removed. The ESCS 2002 closure information is summarized in the following subsections.

5.2.3.2 Remedial Activities

The following tasks were completed on or about 18 July 2002 as part of the ESCS removal:

- The cinder block wall dividing the sump room and the main building was removed. Then a 10 ft x 10 ft area of concrete floor around the sump was cut and removed using a backhoe. The waste cinder block and concrete were containerized in rolloffs.

- Liquids (water and oil) were removed from the sump using a vacuum truck and placed into drums.

- The sump and the surrounding soil were excavated using a backhoe and solid waste was placed into rolloffs and drums. The final dimensions of the excavation were 10 ft x 10 ft x 11 ft deep. The cross section on **Figure 3** depicts the excavation with respect to the geology.

- Based on waste records, a total of 88,560 lbs (44.3 tons) of soil were excavated and disposed of at Chemical Waste Management in Model City, New York.

- During the excavation, the drain line that ran westward from the sump was capped.

5.2.3.3 Sampling Activities

Seven soil closure samples were collected from the excavation. Samples "SS01" and "SS02" were collected from the floor of the excavation; samples "SS03" through "SS06" were collected from a depth of 9.5 feet from each of the four side walls; and a sample (designated as "West Pipe Sand") was collected from a depth of 3 ft from the sand underlying the capped sewer line. Additionally, a duplicate sample designated as "SS07" was collected from the "SS06" location. **Figure 5** depicts the locations of soil samples collected in the vicinity of the ESCS.

A portion of each soil sample collected from the excavation floor and sidewalls was screened using a photo-ionization detector (PID) and the results were as follows:

Sample ID	PID (ppm)	Sample ID	PID (ppm)
SS01	0	SS05	0
SS02	NA	SS06	3.8
SS03	3.3	SS07	3.8
SS04	0	West Pipe	0

The soil closure samples were hand-delivered to Trimatrix Laboratories in Grand Rapids, Michigan on 18 July 2002. Each soil sample was analyzed for Target Compound List (TCL) VOCs by Method 8260, TCL Semi-Volatile Organic Compounds (SVOCs) by Method 8270, and PCBs by Method 8082.

Analytical reports for the sump removal closure samples are included in **Appendix B** and summarized in **Table 6**. Based on the sample results, there were no exceedances of applicable Part 201 GCC noted for any constituents of concern (COC) at any soil sample location in the vicinity of the ESCS with the exception of PCE in the West Pipe Sand sample at a concentration that exceeded the GSIP criterion. That potential data gap was addressed during the Corrective Action Investigation in 2013, presented below in Section 6.2.

5.2.3.4 Waste Management and Restoration Activities

The analytical results for the ESCS waste materials are included in **Appendix B**. In September 2002, the following ESCS wastes were shipped from the Site and received at the Chemical Waste Management facility in Model City, New York:

- TSCA Oil and Water from Sump Cleanout
- TSCA Solids from Sump Cleanout
- Cinderblock and Concrete from the wall and floor

Additional details regarding the disposal of the waste generated during the removal of the ESCS are summarized in **Table 7**. Archived copies of the manifests listed in **Table 7** are available from Waste Management, Inc.

The excavation was backfilled and the concrete floor was replaced. A photograph of the concrete patch is shown below. The concrete floor and patch were removed in 2014 when the building was deconstructed.

Photo 1 - View towards west of patched concrete floor at former ESCS location on 21 November 2011.

5.3 RESULTS OF OTHER INVESTIGATIONS

5.3.1 Soil Sampling Results

Locations where soil samples were collected during investigations at the Site, exclusive of the shallow PCB samples collected in 1986/1987 from the exterior yard areas (presented in Section 5.2.1) and the closure samples collected during the ESCS removal in 2002 (presented in Section 5.2.3), are depicted on **Figures 5 and 6**. A summary of the soil sample results compared to applicable Part 201 cleanup criteria is presented in **Table 8** and laboratory analytical reports are included in **Appendix C**. Results that exceeded applicable Part 201 GCC are discussed below. Note that the drinking water protection criteria, although exceeded as depicted in **Table 8**, do not apply and therefore are not discussed below.

- A PCE concentration in soil of 4,420 µg/Kg was detected at the MW5A boring location near the HWSB, which exceeded the GSIP criterion. The impacted soil beneath the HWSB associated with this sample was excavated in 2014.

- PCE was also detected in soil at MW-8, MW10, and MW-12 but at concentrations below the GSIP criteria (see **Table 8**). East of MW8 and MW10 there were no soil or groundwater data to delineate PCE to less than residential GCC. This data gap was adequately addressed by the completion of boring EB-23 in 2013 (discussed below in Section 6.2).

5.3.2 Soil Gas Sampling

Soil vapor samples were collected at the Site by O'Brien and Gere Engineers, Inc. (OBG) in May 1996. The purpose of the survey was to identify the type and relative concentrations of VOCs, if any, present in shallow soil in the vicinity of the HWSB, the ESCS, and the Outdoor Container Storage Area. Soil vapor samples were collected from the 24 concrete or asphalt-covered sample locations shown on **Figure 7**. A steel probe was driven one to three feet into the soil. A vacuum box was then used to collect a vapor sample from the probe to transfer the sample into a Tedlar® bag. The samples were analyzed on-site using a portable gas chromatograph.

Sample results summarized in **Table 9** indicated the presence of detectable concentrations of VOCs in 12 of the 24 soil vapor samples. Only PCE at SV-18 exceeded the MDEQ Part 201 nonresidential sub-slab acceptable soil gas screening concentration. When considering this data the following information should be noted:

1. The data were collected 19 years ago and there has likely been appreciable natural attenuation since that time;

2. Since no building is present, there is no current vapor intrusion exposure risk.

3. At the request of MDEQ, soil gas sampling was conducted in 2018 to evaluate the vapor intrusion pathway (see Section 8.0). Future potential vapor intrusion exposure risk will be managed by implementing a restrictive covenant, as discussed below in Section 9.2.

5.3.3 Groundwater Sampling

The locations of existing Site monitoring wells OW1 through OW9, plus PZ1 through PZ3, and abandoned monitoring wells MWA, MWB, MWC, MW2, MW3, MW4, MW5, MW9, MW12, and MW13 are shown on **Figure 8**. Monitoring well screened interval and depth-to-water information is provided in **Table 10**.

The MW series of monitoring wells listed above were plugged by Chester Environmental in September 1993. Since there was minimal groundwater present, monitoring wells were never installed at the MW1, MW6, MW7, MW8, MW10, and MW11 locations, though soil samples were collected (except at MW1). MWA through MWC were excavated during the removal of the ESCS in 2002 (see **Figure 5**).

5.3.3.1 Groundwater Sampling Chronology

A chronology of the groundwater sampling events is provided below:

- On 19 April 1989, OHM collected groundwater samples from monitoring wells MW2, MW4, and MW5 and analyzed the samples for select VOCs, PCBs, and pesticides. In August 1989, OHM collected groundwater samples from monitoring wells MW3, MW9, MW12, and MW13 and analyzed the samples for select VOCs and PCBs.

- In April 1991, Environmental Resources Management (ERM) collected a round of groundwater samples from ten wells (MWA, MWB, MWC, MW2, MW3, MW5, MW9, MW12, and MW13) and analyzed the samples for VOCs, SVOCs, PCBs, and pesticides.

- In May and June 1997, OBG conducted an investigation of the HWSB and ESCS areas that included installing monitoring wells OW1 through OW9. On 3 June 1997, OBG collected groundwater samples from the nine new monitoring wells and analyzed those water samples for VOCs and PCBs. Split samples were collected by MDEQ during this event. According to an MDEQ Staff Report dated 30 October 1997, "both sets of data were in close agreement."

- OBG resampled OW1 through OW9 in August 1998 and analyzed the samples for VOCs only.

- In May 2005, as part of the GWNIAA investigation, GES installed piezometers PZ1 through PZ3.

- In July 2009, Geosyntec collected groundwater samples from monitoring wells OW1 through OW9, and PZ1 and analyzed the samples for VOCs, SVOCs, PCBs, and the 8 RCRA metals.

5.3.3.2 Groundwater Sampling Results

A summary of the groundwater sample results and applicable Part 201 GCC is provided in **Table 11** and laboratory analytical reports are included in **Appendix C**. Note that the data for Sump and MWA, B, and C samples, although highlighted in **Table 11**, represent pre-excavation conditions and are therefore not representative of current conditions.

Based on the MDEQ-approved GWNIAA determination, the perched water presented in **Table 11** is not in an aquifer. Therefore, the drinking water criteria do not apply. However, GE understands that despite the elimination of the drinking water exposure pathway on-site and the NAER restricting the future use of the property to industrial, it is necessary that the extent of COCs exceeding residential criteria be evaluated to ensure there are no unacceptable off-site exposures.

During the first of two sampling events (March 1989), groundwater in MW3 exceeded the contact criteria for PCBs. During the second sampling event (April 1991), PCBs were below the detection limit. This well was abandoned in 1993. Wells OW2, OW3, and OW4, installed in 1997 near the former MW3 location and sampled in 1997 and 2009 have not shown any detectable concentrations of PCBs.

Besides the PCB issue at MW3, no other parameter at any other ESCS monitoring well exceeds any applicable Part 201 GCC.

Other parameters detected at concentrations exceeding applicable groundwater criteria during the 2009 groundwater sampling event included the following:

- **OW1**: Cadmium and silver were detected at OW1, located near the down-gradient property line, during the 2009 sampling event at concentrations that exceeded the GSI criteria.

- **OW4**: Selenium exceeded the GSI criterion. Other wells nearer the property line, such as OW1, OW2, OW7, and OW9, did not exceed the GSI criteria for selenium, indicating that the extent of groundwater with GSI criteria exceedances in this area is limited to the Site.

- **OW5:** Vinyl chloride, chlorobenzene, and arsenic exceed GSI criteria. Other wells nearer the property line, such as OW1, OW7, OW9, and

MW5, did not exceed the GSI criteria for these three constituents indicating that the extent of groundwater with GSI exceedances in this area is limited to the Site.

Wells OW1, OW4, and OW5, plus PZ1 were sampled again in November 2013 as part of the corrective action investigation discussed below in Section 6.2.

6.0 2013-2017 CORRECTIVE ACTION INVESTIGATIONS

6.1 INVESTIGATION METHODS

Soil sampling was conducted using either a hand auger or a Geoprobe® drill rig with direct push technology to advance soil borings to the desired depths. Soil VOCs samples were collected and preserved using EPA method 5035. Soil borings were continuously sampled and logged by an ERM geologist. Sampling and analytical methodologies were consistent with MDEQ protocol outlined in the Remediation Division's 22 October 2004 Operational Memorandum #2 *Sampling and Analysis Guidance*.

Low-flow sampling was utilized for groundwater sample collection. This method lessens the volume of water to be purged, increases the life and integrity of the filter pack, and minimizes disturbance to the well water (i.e., water turbidity).

The analytical laboratory provided all sample containers with the appropriate preservatives. Following collection, all soil and water samples were labeled and promptly placed in an iced cooler. Chain-of-Custody forms were completed and accompany the samples to the laboratory. Analysis of VOCs was performed using EPA method 8260, metals analysis using EPA method 6020A/7470, and PCB analysis using EPA method 8082. All soil and groundwater samples collected from 2013 to 2017 were analyzed by ALS Laboratory in Holland, Michigan, with the exception of soil samples collected during October 2016 which were analyzed by TestAmerica in Valparaiso, IN.

6.2 2013 CORRECTIVE ACTION INVESTIGATION

In November 2013, ERM implemented the investigation sampling specified in the 19 September 2013 corrective action work plan approved by MDEQ on 25 October 2013. The primary goals of that sampling were (1) to confirm the effectiveness of the interim soil removal actions completed in 1986 and (2) to verify that impacts were delineated to residential screening levels towards the property line.

The borings completed in 2013 are listed in **Table 12**, along with the boring depths, geological descriptions, and a list of the analyses performed. The laboratory results are summarized in **Table 3** (PCBs), **Table 4** (metals), and **Table 5** (VOCs) and compared to Part 201 or other applicable criteria. Copies of laboratory analytical reports are provided in **Appendix A**.

The following specific work items were completed by ERM in 2013 as part of the approved work plan:

1. Five soil borings (identified on **Figure 4** as EB-7, EB-8, EB-9, EB-12, and EB-14) were completed near boring locations B-5, B-6, B-7, D-3, and D-4 where PCBs were detected in 1986. That area, located between the outdoor container storage area and catch basin MHD, was excavated in 1986. The sample results showed that PCBs had been adequately remediated (i.e., to below 4 mg/Kg) in that area in 1986; however, 1,3-dichlorobenzene (DCB), 1,4-DCB, and/or chlorobenzene exceeded the GSIP at EB-8 and EB-14 (see **Table 5**). The area around those two points was further delineated in 2014 and eventually excavated as discussed in Section 7.0.

2. Soil from the 0-1' interval at EB-7 south of the former outdoor container storage area contained 15,000 µg/Kg of arsenic, which exceeded the 11,700 µg/Kg site-specific background concentration. The area around this point was further delineated in 2014 and eventually excavated as discussed in Section 7.0.

3. Three soil borings (identified on **Figure 4** as EB-16, EB-19, and EB-20) were completed near former boring location XE1 east of the south loading dock. The sample results confirmed that PCBs had been adequately delineated and remediated (i.e., to below 4 mg/Kg) in that area in 1986.

4. Five soil borings (identified on **Figure 4** as EB-24, EB-25, EB-26, EB-27, and EB-28) were completed near former boring location XE5 located east of the building just off the asphalt pavement. The sample results confirmed that PCBs had been adequately delineated and remediated (i.e., to below 4 mg/Kg) in that area in 1986

5. One soil boring (identified on **Figure 4** as EB-33) was completed between the northeast corner of the north parking lot and the north property line. The sample results confirmed that PCBs had been adequately delineated (i.e., to below 4 mg/Kg) in that area in 1986.

6. Soil boring EB-23 was completed east of the southeast corner of the building to a depth of 10 feet (see **Figure 6**). The sample results (in **Table 5**) confirmed that the eastern extent of the PCE detected in soil in 1989 at MW8 and MW10 had been delineated to applicable Part 201 residential criteria.

7. Five borings (EB-1 through EB-5) were advanced at the west side of the property within the utility corridors where they exit the property to

demonstrate that utility corridors are not acting as preferential migration pathways for shallow groundwater at the property boundary. The results were as follows:

- Discrete groundwater samples collected at EB-1 and EB-2 (on **Figure 8**) near where the shop building storm sewer and sanitary sewer, respectively, connect to the Krause Street sewer mains, were not impacted with COCs.

- Since groundwater was not present in the utility corridors at the southwest area of the property, discrete soil samples were collected at EB-3, EB-4, and EB-5 (on **Figure 6**) near where the water, natural gas, and parking lot storm sewer, respectively, connect to the Krause Street utility mains. None of the three soil samples were impacted with COCs. Note, as stated earlier in Section 4.0, the selenium results were elevated above GSIP at all three locations during the initial Method 6020 analysis, but, when reanalyzed using SPLP procedures, was well below the GSI criterion.

8. The grab sample collected from the shop building storm sewer manhole identified on **Figure 2** as MH-West Office, contained 5.9 µg/L of PCE. This is well below the GSI criterion of 60 µg/L. Note that the sewer was subsequently (in December 2014) plugged with concrete thereby eliminating this migration pathway.

9. Perched groundwater samples were collected from monitoring wells OW1, OW4, OW5, and PZ1 (shown on **Figure 8**) and the samples were analyzed for constituents (As, Ag, Cd, Se, chlorobenzene, and vinyl chloride) that exceeded GSI criteria at one or more of those locations during previous sample events. Chlorobenzene (68 µg/L vs. GSI criterion of 25 µg/L) and vinyl chloride (19 µg/L vs. GSI criterion of 13 µg/L) were detected at OW5, beneath the former outdoor container storage area. However, based on the other 2013 groundwater data and the historical data in **Table 11,** chlorobenzene and vinyl chloride have been delineated within the Site boundaries. Furthermore, there is no indication these VOCs are migrating toward the south storm sewer and infiltrating the sewer. Storm sewer corridors are not a migration pathway as previously discussed.

10. Two soil borings (EB-31 and EB-32 on **Figure 6**) were completed near the eastern property boundary, one north and one south of the rail spur that enters the property. The results confirmed that all COCs were below applicable cleanup criteria at the east property line.

6.3 ARSENIC BACKGROUND INVESTIGATION

In April 2014, ERM collected a background arsenic data set in accordance with the MDEQ S^{3}TM guidance document dated August 2002. A summary of the procedure used to generate a facility specific arsenic background concentration is discussed below.

A background data set was obtained consisting of 10 soil samples (identified as EBG-1 through EBG-10 on **Figure 9)**, collected from two different depths from the same lithology in a part of the Site that was determined to be historically undisturbed. The results are summarized in **Table 4** and the laboratory reports are included in **Appendix A**. According to the analytical data, the underlying statistical distribution of the laboratory results was determined to be log normally distributed using the Shapiro–Wilk test for normality. Suspected outliers were evaluated using Grubb's Test for which no outliers were identified. The site-specific background concentration for arsenic was then calculated by using the mean plus three standard deviations. Since the calculated site-specific background arsenic concentration of 11,700 µg/Kg is greater than the statewide-default background concentration of 5,800 µg/Kg, the site-specific concentration was used for comparison to the soil sample results.

Soil from the 0-1' interval at EB-7 south of the former outdoor container storage area (see **Figure 9**) contained 15,000 µg/Kg of arsenic and boring 2, (2-4') from beneath the southwestern part of the former shop building contained 16,000 µg/Kg of arsenic, both of which exceeded the 11,700 µg/Kg site-specific background concentration

6.4 2014 STRUCTURAL FILL INVESTIGATION

In 2014, GE decided to deconstruct the former Site buildings and slab foundation. As part of the pre-planning for this activity, GE contracted ERM to investigate the structural fill and associated soil beneath the slab foundation for evidence of impacts from PCBs, VOCs, or RCRA metals. The initial investigation completed in April 2014 identified elevated VOCs and PCBs concentrations. Four additional phases were completed (in June, August, September, and December 2014) to delineate the horizontal and vertical extent of the COCs beneath the building, as well as beneath the adjoining HWSB (SWMU #1) and the outdoor container storage area (SWMU #2). In all, a total of 188 borings were completed and 258 samples analyzed for VOCs, PCBs, and/or metals.

The borings completed in 2014 are listed in **Table 12,** along with the boring depths, geological descriptions, and a list of the analyses performed. The

laboratory results are summarized in **Table 2** (interior PCBs), **Table 4** (metals), and **Table 5** (VOCs) and compared to Part 201 or other applicable criteria. Copies of laboratory analytical reports are provided in **Appendix A**.

The areas with cleanup criteria exceedances identified during the phased investigation are discussed in the following sections.

6.4.1 Northern Shop Area

An approximately 12,500-ft2 area in the center and northern part of the former shop building (see Figure 10A) showed VOCs impacts (principally PCE) greater than GSIP criteria (see Table 5). Throughout most of the area the impacted fill/soil extended to less than four feet below the floor elevation. Exceptions depicted on cross-section B-B′ on Figure 10B are as follows:

- A 220-ft2 area in the vicinity of boring 154 where VOCs extended to a depth of approximately 10 feet, possibly due to a support column footer serving as a preferential migration pathway.

- Fill and soil beneath the 12-ft deep storm sewer exceeded the PCE GSIP criterion down to a depth of approximately 15 feet. Sample 144 (16-17′) collected from very close to the storm sewer was less than GSIP criteria and sample 144 (20-21′) was completely "non-detect" for all VOCs, indicating that the vertical extent was delineated.

- At borings 147, 149, 150, 152, 153, 174, and 175 (shown on **Figure 10A**) in the northern part of the shop area the approximate 7-10′ soil interval had PCE above the GSIP criterion even though the upper several feet of native clay (from 4 to 7 feet) is not impacted. This suggests that past impacted perched water may have migrated downward from the structural fill/native clay interface along a preferential pathway, such as along a support column footer, and then began migrating laterally within that deeper interval. The northern (down-gradient) extent of PCE within this interval is delineated by deeper soil samples at boring 130 (7-8′, 10-11′, and 13-14′), and by the groundwater sample results at OW1which have been "non-detect" for VOCs on each of the four occasions it was sampled (see **Table 11**).

- At borings 144 (12-13′), 147 (9-10′), and 174 (10-11′) (locations shown on **Figure 10A**) the soil TCE concentrations (summarized in **Table 5**) exceeded the Nonresidential Soil Volatilization to Indoor Air Inhalation Criterion.

6.4.2 HWSB and Outdoor Container Storage Area

An approximately 1,600- ft² area beneath the HWSB and the adjoining outdoor container storage area (see **Figure 11A**) showed VOC impacts (principally PCE, dichlorobenzenes, xylene, and ethylbenzene) greater than GSIP, see results for borings 13 (0-2' and 2-3'), 164 (1-1.5'), 167 (1-1.5'), 169 (1-1.5'), EB-8 (0-1'), and EB-14 (0-1') in **Table 5**). Throughout most of the area the impacted fill/soil extended less than four feet below grade elevation (see cross-section C-C' on **Figure 11B**). An exception was the presence of xylene and ethylbenzene concentrations greater than GSIP criteria within the 4-5' interval at boring 163. VOCs within the 7-8' interval at the same boring were all less than GSIP, so the vertical extent of xylene and ethylbenzene has been delineated at that location.

6.4.3 East Shop Rail Spur

The total PCB concentration exceeded the 1 mg/Kg cleanup criterion in an approximately 3,000 ft² area beneath the former rail spur in the eastern part of the former shop (as shown on **Figure 12A**). Cross-section D-D' (on **Figure 12B**) depicts the vertical extent of PCBs beneath the rail spur, none of which extended any deeper than four feet.

6.4.4 Former Oven Area

As shown on **Figure 12A** an approximately 800 ft² area in the western part of the former shop footprint near the former oven location contained PCBs greater than the 1 mg/Kg cleanup criterion. The PCBs did not extend below four feet in this area.

6.4.5 Other PCB Areas

As shown on **Figure 12A,** two smaller areas (in the vicinity of boring 4 and boring 28) in the southern part of the shop production area; and three other smaller areas clustered near each other in the southeastern part of the shop building (in the vicinity of borings 23, 26, and 42) contained PCBs greater than the 1 mg/Kg cleanup criterion. The PCB impacts did not extend below four feet in any of the areas listed above.

6.5 2014 INVESTIGATION OF EXTERIOR YARD AREAS

The exterior yard areas were investigated extensively as part of interim remedial activities following plant closure in 1986 and during ERM's November 2013 corrective action investigation (discussed in Section 6.2 of this report). As part of planning for deconstruction of the building and

the associated railroad spur, several additional exterior areas were sampled during December 2014, as discussed in the sections below. All exterior yard PCB results, including those collected in 2013/2014, are included in **Table 3**.

The PCB screening level used by GE for the 2013/2014 investigation was 4 mg/Kg, which is the Michigan Part 201 GCC for residential direct contact. As discussed below in Section 6.6, beginning in 2016 GE conservatively began using 1 mg/Kg (from 40 CFR 761.61(b)) as the screening level.

6.5.1 Exterior Rail Spur

Borings RRP-1, OST-1, boring 137, boring 138, and boring 139 were collected from along the railroad spur exterior at the locations shown on **Figure 4**. The purpose for collecting these samples was to (1) determine the extent of PCBs greater than the 4 mg/Kg Part 201 residential direct contact criterion in the vicinity of the railroad spur, and (2) profile the railroad ballast for disposal. None of the samples collected in 2014 contained PCBs greater than the 4 mg/Kg screening level, though samples of the ballast collected in 1986 at RTN and RTS did contain 7.4 and 4.7 mg/Kg, respectively.

6.5.2 Eastern Outdoor Container Storage Area

A concentration of 5.3 mg/Kg PCBs was detected in the 0-2' soil interval at boring 193 (see **Figure 4**). The 4-5' sample from the same location was non-detect for PCBs. Other borings completed in the area (borings 105, 192, 193S, 193E, and 194) sufficiently delineated the horizontal and vertical extent of PCBs to less than the 4 mg/Kg Part 201 residential direct contact criterion.

6.6 2016-2017 SUPPLEMENTAL INVESTIGATION OF EXTERIOR YARD AREAS

ERM completed a supplemental investigation of the exterior yard area to delineate total PCB in soil to less than 1 mg/Kg (compared to the 4 mg/Kg delineation goal used during the 2013/2014 investigation). The supplemental investigation was completed over five separate mobilizations: 19-20 October 2016, 22 November 2016, 14 December 2016, 13-14 February 2017, and 5 September 2017. A total of approximately 175 samples were submitted for analysis of PCB from 117 boring locations. The investigation borings completed in 2016-2017 are listed in **Table 12** along with boring depths and geological descriptions. The boring locations are shown on **Figures 13A** through **13C** and the results are listed

in **Table 3**. Copies of laboratory analytical reports are provided in **Appendix A**.

The results identified 12 distinct areas of the exterior yard area where total PCB exceeded 1 mg/Kg in soil. The remediation of those areas, identified as Excavations #1A, #1B and #2 through #11 on **Figures 13B** and **13C**, completed in September 2017 is discussed below in Section 7.5.

7.0 2014-2017 CORRECTIVE MEASURES

7.1 2014 SOIL REMEDIATION

The shop building and foundation were deconstructed during fall 2014 and in December 2014 over 4,700 tons of structural fill and soil containing VOCs and PCBs were excavated from beneath the former shop building and associated areas and disposed as F001, F001/PCB, or F003 listed hazardous waste at the Wayne Disposal Site #2 Landfill (Wayne Disposal) in Belleville, Michigan. An additional 780 tons of low-level PCBs- or arsenic-containing soil and railroad ballast were excavated from the exterior yard areas and disposed as non-hazardous, non-TSCA waste at the Waste Management, Inc. (WMI) Woodland Meadows Facility. Tables summarizing the waste manifests for the various profiles are included in **Appendix D**. Copies of the manifests are available upon request. No waste water was generated because perched water was practically nonexistent within the excavations.

After the excavation work was completed, the heavy equipment was decontaminated using rags. Wipe samples were collected from the equipment to document that no detectable PCB residue remained. Wipe sample results are included in **Appendix A**.

7.2 CONFIRMATION SAMPLING

Post-excavation confirmatory sidewall and floor samples were not collected. Rather, for project efficiency (to reduce excavator and hauling truck standby) the remedial excavation limits were conservatively defined using soil delineation sampling ahead of excavating. The justification for using delineation samples in lieu of confirmation sampling was discussed in advance with MDEQ staff by telephone and by e-mail on 17 November 2014. GE and ERM also discussed with, and obtained concurrence from, MDEQ regarding the rationale for using the GSIP criterion for delineation purposes (i.e., since the often more restrictive drinking water protection criteria do not apply to the Site). However, as previously stated herein, the likelihood of the GSI and GSIP exposure pathways being complete on the Site are remote.

The delineation sampling was designed to be functionally equivalent to the biased sampling method in Section 1.3 of MDEQ's 2002 S^3TM publication. The delineation sample results were compared on a point by point basis to the applicable Part 201 GSIP criteria for VOCs and, within the former shop building footprint, to 1 mg/Kg for total PCBs. The

numbers of delineation samples defining the excavations completed within the shop building footprint, the HWSB, and the outdoor container storage area adhered to or exceeded the number of confirmatory samples recommended in S^{3}TM.

The specific samples results referred to in the following sections that were used to define the extents of the excavations may be found in **Table 2** (Interior PCBs), **Table 4** (metals), and **Table 5** (VOCs) compared to Part 201 or other applicable criteria

7.3 2014 REMEDIAL EXCAVATIONS

The remedial excavations completed by Brandenburg Industrial Services Company in December 2014, after the building was deconstructed, are discussed in the following sections.

7.3.1 Northern Shop Area

As a corrective measure the fill and soils containing VOCs in the northern shop area was excavated to a nominal depth of four feet bgs, a depth that included the concrete floor, the structural fill, and the upper approximately six inches of native clay soil. In the area surrounding boring 154, the excavation was extended to ten feet bgs to remove soil near a support column footer. The final horizontal and vertical dimensions of the VOC excavation area are shown on **Figures 10A** and **10B,** respectively.

The excavated soil was profiled and disposed as F001-listed hazardous waste at Wayne Disposal, in Belleville, MI.

Photo 2 - View towards west of partially completed northern shop area excavation on 9 December 2014. Tan material is structural fill and gray material is underlying native clay. Note that perched water is practically non-existent within the excavation.

The northern shop area had a final excavation area of approximately 13,000 ft^2. Based on S^{3}TM guidance (Table 1.1), ten confirmatory floor samples would be sufficient for an excavation of this size. The following 14 (four more than recommended) delineation sample locations (all less than GSIP) defined the bottom of the excavation and thus act as the functional equivalent of the floor samples:

7 (4-6′), 130 (4-5′), 153 (4-5′), 152 (4-5′), 149 (4-5′), 145 (4-5′), 146 (4-5′), 148 (4-5′), 150 (4-5′), 151 (4-5′), 143 (4-5′), 142 (4-5′), 155 (4-5′), and 174 (4-5′).

The northern shop area excavation sidewall had an area of approximately 1,800 ft^2 based on a 450 linear foot length and a four-foot height. The S^{3}TM guidance recommends in Table 1.2 seven confirmatory sidewall samples be collected for such a sidewall area. The following 23 (16 more than recommended) iterative delineation sample locations (all less than GSIP) defined the perimeter of the excavation and thus acted as the functional equivalent of the sidewall samples:

20 (0-2′), 62 (0-2′), 27 (0-2′), 25 (0-2′), 134 (2-2.5′), 99 (0-2′), 135 (2-2.5′), 136 (1.5-2′), 4 (0-2′), (2-4′), 184 (2-2.5′), 185 (2-2.5′), 183 (2-2.5′), 39 (0-2′), 94 (0-2′), 141 (2-2.5′), 106 (0-2′), 176 (2-2.5′), 97 (0-2′), 131 (2-2.5′), 96 (0-2′), (2-4′), 181 (2-2.5′), 98 (0-2′), (2-4′), 19 (0-2′) (see locations on **Figure 10A**).

During building deconstruction and soil excavation activities, a Bentomat™ bentonite mat was emplaced at a depth of four feet bgs within

the approximately 5,000 ft^2 portion of the northern shop area as a conservative measure to help manage stormwater that could accumulate in the open excavation. The bentonite mat was not intended to be an engineering control or an "excavation marker" and damage or excavation of the mat would not require any repairs or special handling from a waste disposal perspective.

Photo 3 – Bentonite mat being installed in northern shop area excavation on 23 December 2014. Four feet of clean fill is being placed over the top of the mat. View is eastward.

7.3.2 HWSB and Outdoor Container Storage Area

As a corrective measure, the VOC-impacted fill and soil beneath the former HWSB and outdoor container storage area was excavated to a nominal depth of four feet bgs, a depth that included the concrete floor or pad, the underlying fill, and approximately one foot of native clay soil. The final horizontal and vertical dimensions of the VOCs excavation area are shown on **Figures 11A** and **11B**, respectively. The excavated soil was profiled and disposed as F001-listed hazardous waste at Wayne Disposal, in Belleville, MI.

Photo 4 – Initiation of HWSB remedial excavation on 23 December 2014. View is eastward.

The HWSB and outdoor container storage area had a final excavation area of approximately 2,300 ft^2. Based on S^{3}TM guidance (Table 1.1) five confirmatory floor samples would be sufficient for an excavation of this size. The following five (same number as recommended) delineation sample locations (all less than GSIP) defined the bottom of the excavation and thus act as the functional equivalent of the floor samples:

162 (4-5'), 163 (7-8'), 164 (4-5'), 167 (4-5'), and 169 (4-5').

The HWSB and outdoor container storage area excavation sidewall had an area of approximately 960 ft^2 based a 240 linear feet length and a four-foot thickness. The S^{3}TM guidance recommends in (Table 1.2) five confirmatory sidewall samples be collected for such a sidewall area. The following seven (two more than recommended) iterative delineation sample locations (all less than GSIP) defined the perimeter of the excavation and thus acted as the functional equivalent of the sidewall samples:

165 (1-1.5'), 166 (1-1.5'), 168 (1-1.5'), 189 (1-1.5'), 188 (1-1.5'), 190 (1-1.5'), and EB-7 (0-1') (see locations on **Figure 11A**).

7.3.3 Interior PCB Impacted Areas

GE excavated the PCB-containing soils beneath the building greater than 1 mg/Kg. The soils were excavated to a nominal depth of four feet bgs, a depth that included the concrete floor, the structural fill, and the upper

approximately six inches of native clay soil. The final horizontal and vertical dimensions of the PCB excavation areas are shown on **Figures 12A** and **12B**, respectively**.**

The excavated soil, because it also contained detectable levels of F001-listed VOCs, was conservatively profiled and disposed as mixed TSCA/F001-listed hazardous waste at Wayne Disposal, in Belleville, MI. A summary of the PCB waste manifests is included in **Appendix D**.

7.3.3.1 Shop Building Rail Spur Excavation

The shop building rail spur excavation, shown on **Figure 12A**, had a final area of approximately 3,500 ft^2. Based on S^{3}TM guidance (Table 1.1) six confirmatory floor samples would be sufficient for an excavation of this size. The following 11(five more than recommended) iterative delineation sample locations (all with less than 1 mg/Kg of PCBs) defined the bottom of the excavation and thus acted as the functional equivalent of the floor samples:

20 (2-4'), 120 (2.5-3'), 7 (4-6'), 123 (3-3.5'), 126 (2-2.5'), 9 (2-4'), 27 (2-4'), 121 (2.5-3'), 122 (3-3.5'), 124 (2.5-3'), 125 (2.5-3') (see locations on **Figure 12A**).

The shop building rail spur excavation sidewalls had an area of approximately 1,080 ft^2, based on a 270 linear feet length and a four-foot thickness. The S^{3}TM guidance recommends in Table 1.2 six confirmatory sidewall samples be collected for such a sidewall area. The following 14 (eight more than recommended) iterative delineation sample locations (all less than 1 mg/Kg of PCBs) defined the perimeter of the excavation and thus acted as the functional equivalent of the sidewall samples:

EB-20 (0-0.5'), 179 (2-2.5'), 65 (0-2'), 115 (1.5-2'), 80 (0-2), 61 (0-2'), 62 (0-2'), 57 (0-2'), 6 (0-2') and (2-4'), 59 (0-2'), 68 (0-2'), 69 (0-2'), 178 (2-2.5'), 117 (1.5-2') (see locations on **Figure 12A**).

7.3.3.2 Former Oven Area Excavation

The former oven area excavation, shown on **Figure 12A**, was approximately 1,000 ft^2. Based on S^{3}TM guidance (Table 1.1) four confirmatory floor samples would be sufficient for an excavation of this size. The following four (same number as recommended) iterative delineation sample locations (all with less than 1 mg/Kg of PCBs) defined the bottom of the excavation and thus acted as the functional equivalent of the floor samples:

34 (3-3.5'), 108 (3-3.5'), 84 (3-3.5'), 15 (2-4') (see locations on **Figure 12A**).

The former oven area excavation sidewalls had an area of approximately 1,080 ft^2, based on a 270 linear feet length and a four-foot thickness. The S^{3}TM guidance recommends in Table 1.2 six confirmatory sidewall samples be collected for such a sidewall area. The following 14 (eight more than recommended) iterative delineation sample locations (all less than 1 mg/Kg of PCBs) defined the perimeter of the excavation and thus acted as the functional equivalent of the sidewall samples:

EB-20 (0-0.5'), 179 (2-2.5'), 65 (0-2'), 115 (1.5-2'), 80 (0-2), 61 (0-2'), 62 (0-2'), 57 (0-2'), 6 (0-2') and (2-4'), 59 (0-2'), 68 (0-2'), 69 (0-2'), 178 (2-2.5'), 117 (1.5-2') (see locations on **Figure 12A**).

7.3.3.3 Other Smaller Excavations

Each of the five smaller PCB excavations centered on boring 4, boring 28, boring 23, boring 42, and boring 26 and shown on **Figure 12A**, was less than 500 ft^2 in area and had the equivalent of one floor sample and four side wall samples.

7.3.4 2014 Exterior Yard PCB Excavations

Soil and ballast in the exterior yard area known to be impacted greater than the 4 mg/Kg Part 201 residential criterion were excavated. The excavated soil was properly disposed as nonhazardous/non-TSCA waste at WMI Woodland Meadows. A table summarizing the nonhazardous manifests is included in **Appendix D**.

7.3.4.1 Exterior Rail Spur

Approximately 450 feet of railroad track, rail ties, and ballast were removed from the east end of the former shop building to the eastern property line. Included within the excavated area were the 1986 ballast samples referred to as RTN and RTS on **Figure 4** and in **Table 3** and which contained 4.7 mg/Kg and 7.4 mg/Kg total PCBs, respectively. The 75-foot section of asphalt east of former building was also removed. As shown on **Figure 4**, ballast and soil within a 20-foot strip centered on the railroad track was removed along the 100-foot long stretch beginning 30 feet west and extending to 70 feet east of the perimeter fence. An eight-foot wide strip was excavated from the remaining spur to the eastern property line.

Photo 5 – View eastward along excavated rail spur on 5 January 2015 prior to restoration.

7.3.4.2 East Outdoor Container Storage Area

A 300 ft² area (shown on **Figure 4**) at the eastern end of the former outdoor container storage area was excavated to a depth of four feet to address the 5.2 mg/Kg total PCB concentration detected at boring 193. The excavation was restored to grade using with clean fill. Four side wall samples and a floor sample were below the 4 mg/Kg criterion for PCBs.

7.3.4.3 Northeast Corner of Parking Lot

In 1986, the composite surface soil sample (from aliquots denoted as B1 to B4 on **Figure 4**) collected from 0-6″ in the low area just of the northeast corner of the parking lot contained a PCB level of 15 mg/Kg (see **Table 3**). The 6-12″ inch sample from the same area was <1 mg/Kg. A 625 ft² (shown on **Figure 4**) encompassing the entire low area was excavated to a depth of 12 inches.

7.4 OTHER 2014 CORRECTIVE ACTIONS

7.4.1 Storm Sewer Plugging

During December 2014, the 18-inch diameter concrete storm sewer was plugged with concrete at the manhole located immediately west of the former office. Brick was placed inside the inlet and outlet pipes. Concrete was then troweled against the bricks to form a plug. Next, concrete was poured into the manhole until the depth of the concrete was higher than the top of the inlet and outlet pipes, effectively creating a solid concrete plug the same width as the manhole.

7.4.2 Resin Pit Cleaning

During deconstruction activities a 10 foot x 10 foot wide x 12 foot deep concrete structure was discovered beneath the concrete floor near the southwest corner of the former shop building. Historic plant drawings referred to the structure as the resin pit and it was believed to be used when lacquering certain pieces of equipment. A sample of the gravel fill material showed elevated levels of 1,2,4-trimethylbenzene, xylene, and toluene (see sample referred to in **Table 5** as "Resin Pit (2-4')).

An excavator operated by BISCO was used to clean all of the gravel and debris from the resin pit. The excavated material was conservatively disposed as F003 listed hazardous waste at Wayne Disposal, in Belleville, MI. The concrete-lined pit was determined to be 12 feet deep, and the walls and floor of the pit appeared to be intact. According to the GE project manager the upper three feet of the walls of the pit were demolished and the bottom of the structure was pierced with the excavator to prevent future accumulation of water. The structure was then backfilled with clean gravel fill.

7.4.3 Arsenic Excavation

A 375 ft^2 area southeast of the HWSB was excavated to a depth of two feet to address arsenic levels greater than the calculated site-specific background at EB-7. The location of EB-7 and the excavation are shown on **Figure 9**. The excavated soil was properly disposed as nonhazardous/non-TSCA waste at WMI Woodland Meadows. The excavation was restored to grade using with clean fill. Four side wall samples and a floor sample were shown to contain arsenic concentrations below the site-specific background level (and Part 201 criteria)

Arsenic at boring 2 (2-4') had a concentration of 16,000 µg/Kg, which exceeded the 11,700 µg/Kg site-specific background. The overlying 0-2' interval at the same location contained only 1,600 µg/Kg. The structural fill in the vicinity of boring 2, was not excavated since it is delineated at the western property line within the utility trenches and did not exceed the 37,000 µg/Kg nonresidential direct contact criterion.

7.5 2017 REMEDIAL EXCAVATIONS

Remedial excavations were completed in the exterior yard area from 18-21 September 2017 to address PCB greater than 1 mg/Kg in soil. The work was completed by K&D Industries, Inc. of Midland, Michigan with oversight provided by ERM. Twelve distinct excavations were completed at the locations identified on **Figures 13B** and **13C** as Excavations #1A, #1B, and Excavations #2 through #11. Each excavation was completed to a total depth of 1.5 ft below grade. Smaller areas within the footprints of Excavations #1B, #4, #8, and #10 were excavated to a depth of 3.5 feet, as shown on **Figures 13B** and **13C.**

A total of 816.07 tons of soil was excavated and disposed. Of that total, 441.26 tons of soil derived from excavations #1B, #4, and #8, where one or more historical soil PCB concentration was greater than 50 mg/Kg, was disposed at the Wayne Disposal TSCA-licensed landfill in Belleville, MI. The remaining 374.81 tons, from excavations where all soil PCB concentrations were less than 50 mg/Kg, was disposed at the Woodland Meadows solid waste landfill owned by Waste Management, Inc.

Weigh tickets and other documentation from the 2017 soil remediation are located in **Appendix D.** Copies of manifests are available upon request.

Several photographs taken during the 2017 soil remediation are included below.

Photo 6 – View eastward towards ongoing Excavation #1B activities on 19 September 2017.

Photo 7 – View eastward towards ongoing Excavation #7 along south side of the rail spur on 20 September 2017.

The following table summarizes the sample locations (all with less than 1 mg/Kg of PCB) that defined the bottom of each excavation and thus acted as the functional equivalent of the floor samples.

2017 Excavation Floor Samples

Excav-ation #	Approx. Area of Floor - ft^2	Floor Samples Collected	Sample ID of Floor Samples
1A	1,000	4	XS-1 (1-2') Exc-1A S (1-2') Exc-1A SW (1-2') Exc-1A W (1-2')
1B	540	5	XS-2 (1-2') XS-2 W (3.5-4') Exc-1A SE (1-2') Exc-1B (1-2') Exc-1A N (1-2')
2	150	1	XS-4 (1-2') One sample was considered sufficient based on the small size of the excavation and the low maximum PCB concentration of 2.6 mg/Kg.
3	100	1	XS-6 (1-2') One sample was considered sufficient based on the small size of the excavation and the low maximum PCB concentration of 2.1 mg/Kg.
4	1,275	7	XE-4 (3.5-4') XE-4 5'S (1-2') Exc-4 NE (1-2') Exc-4 SW (1-2') Exc 4 W (2-3') Exc-4-01 (1-2') Exc-4-08 (1-2')
5	100	1	S-2 (1-2') One sample was considered sufficient based on the small size of the excavation and the low maximum PCB concentration of 3.2 mg/Kg.
6	100	1	S-3 (1-2') One sample was considered sufficient based on the small size of the excavation and the low maximum PCB concentration of 3.2 mg/Kg.
7	400	5	138 (1-2') 138 5'E (2.5-3') 138, 5'W (2.5-3') Exc-7 E (1-2') Exc-7 E2 (1-2')
8	2,700	8	XE-8 (1-2') XE-8 S (1-2') XE-9 (1-2') XE-9 S (1-2') XE-9 W (1-2') XE-14 (1-2') Exc-08 N2 (2-3') Exc-08 N6 (2-3')
9	700	3	XE-7 (1-2') XE-7 E (1-2') XE-7 W (1-2')
10	1,200	3	XE-17 (1-2') Exc-10-02 (1-2') Exc-10-03 (2-3')
11	180	3	XE-3 (1-2') XE-3 N (1-2') XE-3 E (1-2')

The following table summarizes the sample locations (all with less than 1 mg/Kg of PCB) that defined the perimeter of each excavation and thus acted as the functional equivalent of the sidewall samples:

2017 Excavation Sidewall Samples

Excav-ation #	Approx. Area of Sidewall - ft^2	Sidewall Samples Collected	Sample ID of Sidewall Samples
1A	195	5	EB-9 (0-1') EB-12 (0-1') Exc-1A S (0-1') Exc-1A SW (0-1') Exc-1A W (0-1')
1B	244	4	Exc-1A SE (0-1') XS-2 E (0-1') Exc-1A N (0-1') Exc-1B (0-1')
2	75	4	XS-4 E (0-1') XS-4 S (0-1') XS-4 W (0-1') Exc-2 N (0-1')
3	60	4	XS-6 N (0-1') XS-6 E (0-1') XS-6 S (0-1') XS-6 W (0-1')
4	362	9	Exc-4 N1(0-1') Exc-4 S (1-2') Exc-4 W2 (0-1') Exc-4-02 (0-1') Exc-4-03 (0-1') Exc-4-07 (0-1') Exc-4-08 (0-1') Exc-4-09 (0-1') Exc-4-10 (0-1')
5	60	4	S-2 5'N (0-1') S-2 5'E (0-1') S-2 5'S (0-1') S-2 5'W (0-1')
6	60	4	S-3 5'N (0-1') S-3 5'E (0-1') S-3 5'S (0-1') S-3 5'W (0-1')
7	150	7	138, 5'N (0-1') 138, 5'W (0-1') 138, 5'S (0-1') Exc-7-02 (0-1') Exc-7-03 (0-1') Exc-7 N (0-1') Exc-7 S (0-1')
8	517	7	EX-8, E (0-1') XE-15 (0-1') Exc-8 N1 (0-1') Exc-8 N3 (0-1') Exc-8 N5 (0-1') Exc-8 N7 (0-1') Exc-8 N8 (0-1')
9	165	4	XE-7 (0-1') XE- 7E (0-1') XE-18 (0-1') Exc-9-01 (0-1')
10	436	3	Exc-10-01 (0-1') Exc-10-04 (0-1') Exc-10-05 (0-1') Boring 117 (Interior)
11	81	4	XE-3 N (0-1') XE-3 E (0-1') Exc-11-02 (0-1') Exc-11-06 (0-1')

7.6 SITE RESTORATION

All 2014 excavations were backfilled to the former grade surface with certified clean limestone sand fill from a virgin source quarry in Sylvania, MI owned by Great Lakes Aggregate. Over 8,000 tons of clean fill were imported into the Site to fill the excavated areas.

The Sylvania pit sand source was depleted prior to 2017. Therefore, the 2017 excavations were backfilled with 839.50 tons of certified clean MDOT Class II sand imported to the Site from Natural Aggregate Corp.'s Milford, MI quarry.

In September 2015 the remaining Site monitoring wells, PZ1, PZ3, and OW1 through OW9 on **Figure 8**, were plugged and abandoned per MDEQ protocols. A well plugging summary report is included in **Appendix E**.

8.0 VAPOR INTRUSION SCREENING

In an e-mail dated 29 August 2017 MDEQ requested that GE re-evaluate the Site VOC data against the Michigan August 2017 RIASLs and the MSSLs. Based on the results of that reevaluation, ERM prepared a work plan to complete a vapor intrusion screening assessment. The draft work plan was submitted to MDEQ on 12 October 2017 and a revised version on 30 November 2017. ERM's work plan was approved by MDEQ in a letter dated 26 December 2017.

The vapor intrusion screening field work was completed in two phases, January 2018 and March 2018. Six locations at the north, west and south sides of the property were investigated. Soil vapor samples were not collected at all locations due to the presence of shallow groundwater; therefore, groundwater samples were collected to evaluate the vapor intrusion pathway at these locations. The results of the screening investigation were transmitted to MDEQ in a memorandum dated 27 April 2018. A copy of the 27 April 2018 ERM memo to MDEQ, plus field documentation and analytical reports, is included in **Appendix F**.

ERM's memorandum recommended that additional vapor intrusion screening not be completed for the GE property at this time because multiple lines of evidence point to the vapor intrusion exposure pathway being screened out as a potential risk. In its letter dated 12 June 2018 (included in **Appendix F** of this report), MDEQ concurred "that no additional work is necessary to evaluate the vapor intrusion exposure pathway at this time." In an e-mail dated 21 June 2018 (included in **Appendix F**), MDEQ stated that the soil gas points should be abandoned in accordance with Appendix F-1, Section 2.4 of the DEQ Guidance Document for the Vapor Intrusion Pathway. A summary report for the 2018 soil gas port abandonments is included in **Appendix E,** along with the 2015 monitoring well plugging information.

9.0 CONDITION OF SITE AND NEED FOR RESTRICTIVE COVENANT

9.1 CURRENT CONDITION OF SITE

The current condition of the restored Site is summarized below:

- The Site is vacant with the shop building and all associated structures, floors, and foundations deconstructed to three feet below grade. Deeper foundations may still exist below three feet.
- The Site is level and covered with areas of compacted gravel, asphalt, grass, and woody vegetation, as shown on **Figure 14**.
- The buried water, gas, and sanitary sewer utilities are disconnected and capped near the western boundary of the Site. Buried sections of deactivated utility lines remain at the Site.
- The storm sewers are still present at the Site but have been plugged with concrete at their downstream (western) ends.
- An approximately 5,000-ft^2 bentonite mat is located beneath the north-central part of the former shop building footprint (see **Figure 14**) at approximately four feet below current grade.
- All monitoring wells and soil vapor probes have been properly plugged and abandoned.

9.2 RESTRICTIVE COVENANT

A Declaration of Restrictive Covenant ("Restrictive Covenant") is required for hazardous waste facilities that do not require closure as a landfill but that have soil and/or groundwater contamination that requires the preparation of a restrictive covenant to comply with Part 111, Hazardous Waste Management, MCL 324.11101 et seq. (Part 111), and the applicable sections of Part 201, Environmental Remediation, MCL 324.20101 et seq. (Part 201), of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MCL 324.101 et seq. (NREPA). A Notice of MDEQ-Approved Environmental Remediation (MDEQ Reference No. NAER-WHM-050-616-622) was recorded for the Site with the Wayne County Register of Deeds on 21 June 2007. The document restricts future uses of the parcel to industrial, consistent with local zoning and Part 201 Industrial Land Use assumptions and Cleanup Criteria, and requires that surface and subsurface soils on the Site be managed in accordance with the requirements of Section 20120c of NREPA and other applicable laws.

Recording a new Declaration of Restrictive Covenant which provides more information than the current NAER is proposed (draft provided in **Appendix G)**.

GE plans to file the Restrictive Covenant with the Wayne County Register of Deeds within 14 days of MDEQ approval of the CMI report. Once the Restrictive Covenant has been recorded, GE requests that it receive from MDEQ a Corrective Action Complete with Controls determination for this Site.