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APPENDICES

EXECUTIVE SUMMARY

This report presents the results of the IRM/RI/FS for the Special Metals Corporation, in Dunkirk, New York. SMC has voluntarily been assessing and remediating PCB soil contamination at the SMC facility located at 100 Willowbrook Avenue (see Figure 1). This work is being done under an Order on Consent (# B9-0737-07-02; Site #907031) between SMC and NYSDEC.

BACKGROUND

The facility is bordered to the west, north and east by the former Al-Tech Specialty Steel (Al-Tech) site, which is currently listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites (Registry Site # 907022). Willowbrook Avenue borders the SMC facility to the south beyond which are residential homes.

The tracts of land which make up the SMC facility and the Al-Tech site were formerly owned and operated by a single owner, Allegheny Ludlum Industries, Inc., which utilized the properties for the manufacturing of steel products. Construction on the facility occupied by SMC was underway in 1956.

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In 1976, Allegheny Ludlum Industries, Inc conveyed the Al-Tech Site to Al-Tech Specialty Steel Corporation and retained the Forge facility (SMC facility). SMC obtained title to the Forge facility in 1983 by deed from by Allegheny International, Inc. (formerly known as Allegheny Ludlum Steel Corporation and Allegheny Ludlum Industries, Inc. These entities will be referred to as Allegheny.).

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In July 2006, an expansion of the SMC facility began on the western portion of the existing building for the installation of a new rotary forge. PCB impacted soils were encountered during the expansion which led to two investigations.

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- Delineation of the extent of PCB contamination in the western portion of the facility in the vicinity of the Electric Trench; and
- Completion of a Site Wide Investigation to determine if additional areas of concern needed to be addressed.

Based on a September and December 2006 soil probe delineation event, an area of PCB-impacted soil was identified (soils with a PCB concentration above the 10 ppm subsurface guidance value found in TAGM 4046). The remedial area had a footprint of approximate 6,400 square foot and was located west of the SMC building. This area is referred to as Excavation 1 of the IRM excavations completed (see Section 2.1.1). During the site wide investigation (discussed below), four additional areas were identified with PCBs concentrations in soil above 10 ppm. Minor VOC, SVOC and metals contamination were identified as part of the SWI; however, the detected concentrations did not warrant remedial action (see Appendix A for analytical summary tables of the data from the SWI).

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These four additional areas were addressed as part of the IRM. A total of five areas were identified on-Site prior to the start of the IRM that required remedial action. These areas were identified as Excavation 1 through Excavation 5 as shown on Figure 5. It should be noted that a sixth area of PCB impacted soil, Excavation 6, was identified as a result of the RI, resulting in additional IRM soil excavation and disposal.

INTERIM REMEDAIL MEASURE

SMC implemented an IRM at the Site prior to the start of the RI field activities. The IRM was completed in five areas previously identified with PCB contamination that were generally located in the southwestern portion of the SMC property. As previously noted, a sixth area was identified during RI activities that required remediation (Figure 5 presents the six IRM excavation areas). The IRM involved the excavation and disposal of accessible soil impacted with PCBs at concentrations greater than 10 ppm.

IRM soil excavation activities included the excavation of on-site PCB impacted soils, transportation and disposal of the soils, field screening of soil samples for PCBs and volatile organics, excavation confirmatory sampling, laboratory sample analysis and excavation backfill. The IRM excavation work was done between April 9, 2007 and August 7, 2007. Six (6) excavations were completed by SMC's subcontractor, Pinto Construction of Buffalo, New York and the waste disposal was coordinated and managed by SMC's subcontractor Waste Technology Services Inc., (WTS) of Lewiston, New York.

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Confirmatory soil samples were used to determine the final extent of the PCB impacted soils requiring excavation for disposal. A PCB concentration of 10 ppm was used to determine whether the limits of the excavation had been reached. If the result of the confirmatory sample was approximately 10 ppm or less, no additional soil was excavated. If the concentration was greater than 15 ppm, additional soil was excavated and disposed of and additional field and confirmatory samples were collected.

Analytical sample results from confirmatory soil samples were compared to the NYSDEC TAGM 4046 Recommended Soil Cleanup Objective (RSCO) value of 10 ppm for total PCBs. Analytical results for the VOCs, SVOCs and metals analysis were compared to their respective NYSDEC, Division of Environmental Remediation, 6 NYCRR Part 375, Environmental Remediation Programs Table 375-6.8 (b) for Restricted Soil Cleanup Objective Concentrations, specifically values for Industrial Soil Cleanup Objectives (Part 375 ISCOs).

As part of this IRM work, a total of about 6,700 tons of PCB impacted soil was excavated and disposed of as hazardous waste at the CWM facility located in Model City, New York. A clean fill material (e.g., crushed stone) was placed inside the excavation followed by suitable compaction. The excavations were backfilled to existing ground surface and were eventually resurfaced with asphalt pavement at a later date by SMC.

Upon completion of the IRM, two locations were identified on the SMC property where PCB contamination was present above the Part 375 ISCO of 25 ppm. The north wall of Excavation 2

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(EX-2-NORTH), which abuts the existing SMC building and an eastern wall sample from Excavation 6 (EX-6-EAST-3), which abuts the existing guard house. Soil associated with these sampling locations where left in place due to the presence of the existing structures. The remaining detections above 25 ppm were located along the western property boundary, which is considered to be off-site, because the excavations extended to the property line.

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REMEDIAL INVESTIGATION

RI field explorations were completed at the SMC facility in general accordance with the Field Activities Plan (FAP) to evaluate the subsurface conditions within and around the AOC. The RI work was done between May 10 and May 17, 2007.

A total of 15 locations were explored/sampled. Eight (8) test borings were completed and converted to 2-inch diameter groundwater monitoring wells (identified as MW-1 through MW-8). Seven (7) shallow test borings were sampled to a 4 to 6 foot depth at the southwest portion of the property (within excavation area 6). Select soil samples were collected from the soil probes for analytical testing which included VOCs, SVOC, PCBs and metals.

During the IRM and RI, fill material was encountered at most of the excavation and investigation locations in the form of topsoil (grassy areas), sand, gravel, silt and clay or crushed stone (parking lot and roadways). Fill typically appeared to be less than 3 feet thick, with the exception of the following locations.

- MW-2 where fill extended to a depth of approximately 11 feet bgs in the vicinity of the building foundation in the northwestern portion of the property; and
- The deep portion of Excavation 1, which was completed to approximately 10 feet bgs when a polyethylene pipe was encountered in the center of the east-west orientated excavation.

Deleted: Fill material was encountered at most of the investigation locations in the form of topsoil (grassy areas), sand, gravel, silt and clay (near building foundation) or crushed stone (parking lot and roadways). Fill was typically less than 2 feet thick, with the exception at MW-2 where fill extended to a depth of approximately 11 feet bgs. This location (MW-2) was completed in the vicinity of the building foundation in the northwestern portion of the property. ¶

Additionally, during the completion of Excavations 3, 4 and 6, a horizontal black and/or purple layer was observed throughout these excavations. This layer was present at a depth of 1 to 3 feet beneath the existing asphalt parking lot and road way in the southwestern portion of the SMC facility. Due to the size of the area (about 1 acre) where the horizontal "purple" layer was encountered, its thickness (about 1 to 3 inches) and its location beneath the existing asphalt parking lot and road way, it is our opinion that this layer is the result of historical operations (e.g., fill material placement or dust suppression activities prior to the area being paved) before SMC ownership of the property. SMC is not aware of filling operations or a release that has occurred that could be responsible for the presence of PCBs and/or the "purple" layer.

Native overburden soils consist primarily of fine grained silts and clays, with a relatively small percentage of sand and gravel (less than 20%) overlying the bedrock in the area of investigation. At the top of rock, the clay and silt materials contain a higher percentage of shale fragments (20% to 40%). The overburden soil thickness ranges from approximately 15 to 17 feet thick.

Based on the groundwater elevation measurements, groundwater flow at the SMC facility appears to be in a southerly direction. Groundwater velocities for the SMC facility were based on hydraulic

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conductivities measured from six of the eight monitoring wells. No data was generated from monitoring wells MW-6 or MW-7. The groundwater velocities ranged from 15 feet per year (MW-2 and MW-4) to 175 feet per year (MW-8). See Appendix D for groundwater calculations. Using the hydraulic conductivities of 4 of the 6 measured wells (MW-2, MW-3, MW-4 and MW-5), which have similar values, groundwater at the SMC facility is anticipated to move at a rate of roughly 20 feet per year.

No specific source areas of contamination were identified; however, based on previous studies conducted at the SMC facility, and this IRM and RI, several areas involving PCB contaminated fill material were identified. The PCB contamination appeared to be in the subsurface unsaturated fill material zone at depths that generally ranged from about 0.3 to 4-feet bgs. A portion of one excavation (Excavation 1) was required to be extended to a depth of about 10 feet bgs.

Based on the soil analytical results collected neither VOCs, SVOCs nor inorganics are considered to be a concern at the SMC facility.

The RI indentified chlorinated solvents (i.e., cis-1,2 DCE and TCE) in upgradient wells (MW-1 and MW-3) and in MW-5 along with some petroleum compounds in MW-5 at concentrations slightly exceeding groundwater criteria. The chlorinated solvent groundwater contamination is located in the northwestern corner of the SMC facility and appears to be the result of an upgradient source, due to a southerly groundwater flow direction. The petroleum compounds may be the result of possible contamination from the historic use of petroleum products on-site. This historic use and impacts to the overburden soil were remediated as part of the building expansion work done (see referenced NYSDEC Spill Closure Report). The total detected VOC concentrations were considered to be low, as the total concentration for the SMC facility contaminants is less than 0.5 ppm. Downgradient monitoring wells were identified with VOC detections; however, compounds were not detected exceeding Class GA criteria.

Downgradient monitoring wells MW-5, MW-6 and MW-7 were sampled a second time (April 2008) to evaluate downgradient VOC contamination migration. Generally, lower concentrations of total VOCs were identified. It does not appear that impacted groundwater is migrating downgradient and off-site migration of contamination is not expected. Therefore, additional groundwater monitoring is not warranted at the SMC facility.

A water sample collected from a sump located in the basement of the SMC facility did not indicate the present of chlorinated VOCs above method detection limits nor is there an identified concern due to the low concentrations of the three VOCs detected. Therefore, a vapor intrusion assessment is not warranted for the SMC facility.

The RI (and previously completed investigations) identified PCBs as the compound of concern for the SMC Site. The majority of the PCB contaminated soil (about 6,700 tons) was excavated and removed from the Site during IRM activities. The remaining contamination exceeding specific SCGs is considered limited and of low risk to human health and the environment.

FEASIBILITY STUDY

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During the preliminary screening, the intent was to identify remedial technologies that may be appropriate for the SMC facility conditions. Considering that most of the PCB contaminated soils have already been excavated and disposed and that a potential upgradient source of groundwater contamination appears to be migrating onto the northern portion of the property from off-site, a select, focused group of remedial technologies for soil and groundwater is considered.

Three sitewide remedial alternatives were assembled for consideration at the SMC facility. These are discussed below.

Sitewide Alternative No. 1 – No Action

The No Action alternative involves taking no further action to remedy the condition of the SMC facility. This alternative allows for natural attenuation of impacted, soil and groundwater.

Sitewide Alternative No. 2 – Implementation of Site Management Plan

This alternative includes the development of a SMP to reduce potential worker exposure to residual contaminating remaining at the SMC facility. A SMP would outline a program designed for handling, segregating, testing, reuse and disposal of potentially contaminated soil/material encountered during possible future development and building construction activities planned by SMC.

Sitewide Alternative No. 3 – Additional Soil Excavation and Disposal

Two areas are present at the SMC facility beneath structures where PCB impacted soil may be present above SCGs. Excavation of PCB contaminated soils that remain beneath these two buildings at the SMC facility would be completed in the same manner as the IRM activities. Soil probes and soil samples would be done at interior portions of the buildings within areas suspect to be underlain by PCB soil contamination. Once the PCB contamination underneath the buildings has been delineated, an assessment of whether the building would require demolition (guard house) or if excavation could be completed from interior locations without demolition of the building structure, foundation columns and footers (main building).

Unlike Alternatives No. 1 and 2, this alternative reduces the concentration of the remaining PCB contaminated soil by excavation and disposal. This alternative would not reduce the contamination in groundwater. However, based on the additional groundwater sampling done in April 2008, downgradient and off-site contaminant migration is not a concern.

The three Sitewide Alternatives are compared on the basis of six environmental and one cost criteria as follows.

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Deleted: A limited groundwater and vapor intrusion monitoring would be performed at the SMC facility to evaluate the concentration of VOC contaminant on to the SMC property. A water sample from the sump present in the basement of the rotoforge building and groundwater samples from MW-5, MW-6 and MW-7 will be collected and analyzed for VOCs. ¶
¶
If chlorinated VOC concentrations are not detected in the sump sample above SGCs, then vapor intrusion monitoring would not be necessary; however if detected above SGCs, then vapor intrusion monitoring would be conducted. If petroleum groundwater concentrations are identified to increase above the NYSDEC Class GA criteria at the downgradient well locations (MW-6 and MW-7), this information will be report to the NYSDEC Spills Division and this matter will be coordinated through that department. Should the concentrations of VOCs remain the same or decrease compared to those identified during the RI, no additional groundwater monitoring would be done. ¶

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Short-Term Impacts and Effectiveness

Alternative No. 1 and No. 2 are not expected to cause potential exposure or disruption to SMC facility operations. Alternative No. 3 involves excavation work, which would likely cause an exposure pathway to contamination during remediation and would likely pose disruptions to current SMC facility operations. The identified soil contamination would require removal or partial demolition of existing structures. Alternative 2 would manage excavation and construction work done at the SMC facility, would reduce potential exposures and properly manage materials generated.

Alternative 3 is expected to achieve the remedial action objectives for soil; although, partial or complete building demolition would be required as the soil contamination is located beneath two buildings. Alternatives 1 and 2 are not expected to achieve these objectives; however, the volume of remaining contamination has significantly been reduced by the IRM and the potential exposure to the remaining soil is minimal.

Deleted: The limited groundwater and vapor intrusion monitoring activities (Alternatives 2 and 3) would not reduce the contamination in groundwater but would be used to assess the extent that VOC contamination migrating from the SMC facility and if vapor intrusion is a concern with the building. Should an increase of VOC contamination be observed at the downgradient well locations, the NYSDEC Spills Department would be notified and discussions for addressing the migrating contamination would be conducted.¶

Long-Term Effectiveness and Permanence

Alternatives No. 2 and 3 are considered to be adequate, reliable remedies for the management and/or remediation of soil contamination. The risks involved with the exposure or direct contact with contaminants, although considered to be low, would be reduced. Alternative No. 1 is not considered to be an adequate, reliable remedy for the management and/or remediation of contaminant soils. As such, the risks involved with the exposure or migration of contaminants and direct contact with soil contaminants, although considered to be of relatively low concentrations, would not be reduced.

Due to the low VOC and non-detect PCB concentrations in groundwater, Alternatives No. 1, 2 and 3 are considered to be adequate and reliable actions for the on-Site groundwater and vapor intrusion. Based on the additional monitoring well and sump sampling done, groundwater monitoring and vapor intrusion are not a concern.

Deleted: The sampling would be for a short term duration (assumed annual for 2 years) to monitor mobility and extent of VOCs migrating from the upgradient source. Alternative No. 1 would not address or monitor groundwater or vapor intrusion and is not considered an adequate, reliable, or permanent long-term remedy for groundwater.

Reduction of Toxicity, mobility and Volume

Alternative No. 3 provides for the greatest reduction of toxicity, mobility and volume of soil contamination. Alternative No. 2 will not reduce the toxicity, mobility and volume of the soil contamination; however, it will reduce the risk of exposure to contaminants should they be encountered during scheduled or planned maintenance or construction activities done at the SMC facility. Alternative No. 1 will not reduce the toxicity, mobility and volume of the soil or groundwater contaminants, except what may occur through possible natural attenuation processes.

Implementability

Alternatives No. 1, 2 and 3 are administratively and technically implementable with readily available methods, equipment, materials and services. Alternative 3 would require removal or

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partial demolition of existing buildings at the SMC facility in an effort to gain access to the remaining contaminated soils as well as causing interruptions or impacting daily operations at the facility.

Compliance with Applicable or Relevant and Appropriate SCGs and Remediation Goals

Of the three alternatives, Alternatives No. 3 is expected to achieve compliance with the chemical-specific SCGs for soil but not for groundwater. Alternative Nos. 1 and 2 will not achieve compliance with chemical SCGs for soil; however, natural attenuation may overtime result in compliance with groundwater chemical specific SCGs.

Low concentrations of VOCs were detected in groundwater and the remaining PCB impacted soil is present beneath two buildings. The risk associated with the contamination present are considered to be low.

Overall Protection of Human Health and the Environment

Alternatives No. 2 and 3 will be protective of human health and the environment. The primary difference between the two alternatives lies in the removal of contaminated soil as part of Alternative 3. Alternative No. 2 provides the methodology and practices for the handling, managing and disposal of the limited contamination that may be encountered via a SMP. This will reduce the risk to human health and environment as part of future construction and/or maintenance work at the SMC facility.

Although the contamination is limited to low concentrations of VOCs in groundwater and two locations of contaminants in soils, Alternative No. 1 does not provide protection of human health and the environment should contaminated environmental media be encountered.

Cost

Alternative No. 1 does not include remedial actions for either on-Site soil or groundwater; and therefore no costs are associated with this Alternative.

Alternative No. 2 cost are associated with the development and implementation of a SMP and has the second highest capital cost, estimated at approximately $10,000.

Alternative No. 3, which includes excavation of remaining contaminated soils, has the highest capital cost estimated at approximately $182,000. There are no long term O&M costs; however, a large portion of the remediation costs would be due to the partial or complete demolition costs and facility/production interference that may occur.

CONCLUSIONS

The IRM has significantly reduced the volume of PCB impacted soil present at the SMC facility. A total of about 6,700 tons of impacted soil was excavated and disposed of as hazardous waste.

Deleted: Alternatives No. 1 will not achieve compliance with the chemical-specific SCGs for soil or groundwater.¶

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Two locations were identified on the SMC property where PCB contamination was present above the Part 375 ISCO of 25 ppm. Both locations where left in place due to the presence of existing structures over the impacted soil. The remaining detections above 25 ppm were located along the western property boundary, which is considered to be off-site, because the excavations extended to the property line.

Additional groundwater samples collected from downgradient monitoring wells (MW-5, -6 and -7) generally indicate a decrease in VOCs concentrations in groundwater from the previous round. No VOCs were detected at the downgradient property line monitoring wells (MW-6 and MW-7) at concentrations that exceed NYSDEC Class GA groundwater criteria. Additional groundwater monitoring is not warranted.

The results of the water sample collected from the sump in the basement of the SMC facility were below method detection limits for chlorinated VOCs nor is there a vapor intrusion concern associated with the low concentrations of the three VOCs detected. Therefore, a vapor intrusion assessment is not warranted.

It is GZA's opinion that SMC has achieved the goals of the project to reduce the volume of contaminated soil present at the facility and reduce potential impact to human health and the environment. A limited quantity of on-site soil contamination may be present beneath existing structures. The low level VOC contamination identified in the groundwater does not pose a significant threat to human health or the environment. Therefore, implementing Sitewide Alternative No. 2 would be a sufficient and cost effective alternative. The development of a SMP would address impacted soil and/or groundwater, if encountered during construction or excavation activities.

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Because residual levels of PCB contamination in subsurface soil remains at the site above unrestricted residential SCOs, but generally below industrial SCOs, proper precautions and management of the residuals addressed by Engineering and Institutional Controls are required. A SMP has been developed (see Appendix J) and an Environmental Easement for the AOC has been filed (see Appendix K for a copy).

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NYSDEC has requested that this IRM/RI/FS Report serve as the Final Engineering Report (FER) for this project relating to the AOC and Order on Consent (Index# B9-0737-07-02). The required FER Certifications and New York State Professional Engineering Stamp and signature are provided in Section 14.

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1.0 INTRODUCTION

This report presents the findings of an Interim Remedial Measure (IRM), Remedial Investigation (RI) and Feasibility Study (FS) done by GZA GeoEnvironmental of New York (GZA) for Special Metals Corporation (SMC). SMC has been assessing and remediating polychlorinated biphenyl (PCB) soil contamination at the SMC facility located at 100 Willowbrook Avenue, Dunkirk, New York (see Figure 1) under an Order on Consent (# B9-0737-07-02; Site #907031)

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between SMC and the New York State Department of Environmental Conservation (NYSDEC). Under the Order on Consent, the "Site" has been identified as the area of concern (AOC), which is located in the southwestern portion of the facility and shaded in red as shown on the attached Facility Plan (Figure 2).

The original Order on Consent became effective on February 21, 2007. It was amended on May 21, 2007 to reflect expansions of the area of the "Site".

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The IRM, RI and FS were conducted under the following NYSDEC approved work plans.

- "Interim Remedial Measures Work Plan, PCB Contaminated Soil Excavation and Removal, Special Metals Corporation, 100 Willowbrook Avenue, Dunkirk, New York, Site #907031", dated February 22, 2007;
- IRM Work Plan Addendum to Mr. Eugene Melnyk (NYSDEC), dated April 6, 2007;
- IRM Work Plan Addendum #2 to Mr. Eugene Melnyk, dated June 18, 2007;
- "Remedial Investigation/Feasibility Study Work Plan, Special Metals Corporation, 100 Willowbrook Avenue, Dunkirk, New York" dated March 22, 2007;
- RI-FS Work Plan Addendum to Mr. Eugene Melnyk, dated May 4, 2007; and
- RI-FS Work Plan Addendum #2 to Mr. Eugene Melnyk, dated June 18, 2007.

In addition to the above mentioned work plans, the RI and FS were completed in general accordance with the following.

- NYSDEC Draft DER-10: "Technical Guidance for Site Investigation and Remediation", dated December 2002 (DER-10); and

- 6 NYCRR Part 375: "Environmental Remediation Programs", effective December 14, 2006

Interpretations presented within this report are based primarily on the work and investigations described herein. Data and results from previous investigations are also presented to provide background to the investigation.

The draft version of this document was reviewed by NYSDEC and revised based on their comments provided in a letter dated April 8, 2009 to SMC. This document will serve as the Final Engineering Report for the AOC under Order on Consent (Index# B9-0737-07-02).

1.1 REPORT ORGANIZATION

The text of this report is divided into fourteen (14) sections. Immediately following the text are the references, tables, figures, and appendices. A brief summary of each report section is provided below.

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- **Section 1.0 Introduction:** The Site background including Site description, Site history and summary of previous studies; purpose of the IRM, RI/FS Report; and scope of work are discussed.

- **Section 2.0 Interim Remedial Measures:** Summarizes the field work conducted as part of the soil excavation to remove PCB impacted soils in the area of concern including soil excavation, health and safety community air monitoring, field screening of soil samples, environmental soil sampling and chemical analysis.

- **Section 3.0 Field Explorations:** Summarizes the field work conducted as part of the RI including completion of test borings, monitoring well installations, water level measurements and environmental sampling.

- **Section 4.0 Physical Characteristics of the Site:** Presents and interprets the various data collected and evaluates Site conditions (e.g., hydrogeology, geology, hydrology, etc.).

- **Section 5.0 Nature and Extent of Contamination:** Discusses the types of chemicals detected in the groundwater and soil.

- **Section 6.0 Contaminant Fate and Transport:** Provides an evaluation of the potential and observed migration pathways, contaminant persistence and predicted extent of contamination.

- **Section 7.0 Qualitative Exposure Assessment:** Presents the results of a general human health exposure assessment conducted for the Site.

- **Section 8.0 Potentially Applicable Standards, Criteria and Guidelines (SCGs) and Remedial Objectives:** Presents the potentially applicable Standards, Criteria and Guidelines (SCGs), establishes cleanup goals and remedial action objectives for contaminated Site media.

- **Section 9.0 Preliminary Screening of Remedial Alternatives:** Presents the remedial action alternatives that have been assembled using the general response actions and remedial technologies.

- **Section 10.0 Development of Sitewide Alternatives:** Presents a description of the three Sitewide alternatives that have been developed.

- **Section 11.0 Detailed Analysis of Alternatives:** Presents a detailed analysis of remedial action alternatives established in Section 10.0. The alternatives are compared on the basis of environmental benefits and costs using the eight criteria established in DER-10. Each alternative is assessed and an appropriate remedy is selected that satisfies the remedial action objectives.

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- **Section 12.0 Comparative Analysis of Remedial Alternatives:** Provides a comparative analysis of the alternatives on the basis of the eight criteria, based on the detailed analysis provided in Section 11.0.

- **Section 13.0 Site Management Plan and Environmental Easement:** Provides a general description and purpose of the Site Management Plan and the Environmental Easement which have been prepared and included in Appendix J and Appendix K, respectively.

- **Section 14.0 Final Engineering Report Certifications:** Provides the required certifications and signature of the individual licensed in accordance with Article 145 of the education law to practice engineering for the Final Engineering Report.

1.2 BACKGROUND

1.2.1 Site Description

The SMC facility consists of an approximate 8-acre industrial property in Dunkirk, New York (see Figure 1) located at 100 Willowbrook Avenue that is used for the manufacture of alloys for the aerospace industry. The facility is bordered to the west, north and east by the former Al-Tech Specialty Steel (Al-Tech) site, which is currently listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites (Registry Site # 907022). Willowbrook Avenue borders the SMC facility to the south beyond which are residential homes.

The ground surface at the SMC facility is generally flat, with the exception of a beautification berm which was constructed on the southern portion of the property in late 2006/early 2007 with soil removed from the subsurface as part of the SMC building expansion and rotary forge installation (see Section 1.2.2).

1.2.2 Site History

The tracts of land which make up the SMC facility and the Al-Tech site were formerly owned and operated by a single owner, Allegheny Ludlum Industries, Inc., which utilized the properties for the manufacturing of steel products. According to a historic drawing reviewed, the SMC facility building was under construction in 1956. Allegheny Ludlum Steel Corporation conveyed the Al-Tech Site to Al-Tech Specialty Steel Corporation in 1976 and retained the Forge facility (SMC facility). SMC obtained title to the Forge facility in 1983 by deed from Allegheny International Inc., formerly known as Allegheny Ludlum Steel Corporation and Allegheny Ludlum Industries, Inc. These entities will be referred to as Allegheny for this report).[1].

[1] Copies of the 1979 deed (and the 1978 corrective deed) for the Al-Tech site and the 1983 deed for the SMC facility are included in this report as Appendix L. Available documentation indicates that SMC assumed operation of t he Forge facility on January 1, 1979 from what is referred to as Allegheny's Ajax Forging and Casting Division. The current SMC was incorporated in 1983 and merged with the existing SMC..

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SMC operates two New York manufacturing facilities – the subject one in Dunkirk, New York and one in New Hartford, New York. SMC filed a Chapter 11 bankruptcy petition on March 27, 2002 and emerged from bankruptcy on November 26, 2003. On May 25, 2006, Precision Castparts Corporation completed its acquisition of SMC.

In July 2006, an expansion of the SMC facility had begun on the western portion of the existing building for the installation of a new rotary forge. This expansion included construction of a new building addition over an area of about 72-feet (north-south) by 87-feet to the west (see Figure 2).

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Prior to building expansion construction and as part of its due diligence process, SMC requested that GZA prepare a Soils and Site Management Plan[2] (SSMP) that sets forth the procedures to be followed in the event contaminated or suspected contaminated soils and/or groundwater are encountered during the construction activities. A copy of this SSMP was provided by SMC to the NYSDEC Region 9 Office as Appendix A of the February 2007 IRM Work Plan.

As part of the building expansion, four utility trench excavations were completed within the vicinity of the AOC for the placement of various subsurface utilities (see Figure 2). A summary of observations made in these excavations is presented below.

1. A natural gas and water line trench excavation was done in August 2006 along the southern and western sides of the new building expansion, north of the AOC. Olfactory or visual evidence of impacted soil was not noted in this excavation. Additionally, impacted soils were not observed in the soil excavation for the building expansion foundation, located approximately 5 to 10 feet north of the natural gas and water line excavation.

2. An electrical conduit trench was excavated along the western portion of the property from an electrical pole to the building expansion area (the "Electric Trench"). During the Electric Trench excavation (August 30, 2006), odors were detected within a portion of the trench. Based on these observations, SMC requested that its earthwork contractor stockpile the soil excavated from the trench on the asphalt surface and collect soil samples for analytical testing.

   Results of the soil sampling indicated that PCBs were present at a concentration of 140 parts per million (ppm) and 31 ppm in samples identified as Electric Trench 1 and Electric Trench 2, respectively. Other compounds were also detected, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals (See Table 1 of IRM Work Plan). The detected levels of VOCs and SVOCs are relatively minor, but the PCB concentration of 140 ppm is above the 50 ppm threshold for the material, which classified the excavated soil as a hazardous waste in New York (6 NYCRR § 371.4(e)).

[2] Soils and Site Management Plan, Special Metals Corporation, Dunkirk, New York, July 2006, GZA Project File: 21.0056196.0.

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Of the metals detected, chromium was the only one that posed a potential concern due to its concentration identified above NYSDEC soil cleanup objectives.[3] However, subsequent toxicity characteristic leachate procedure (TCLP) testing that was done on samples collected as part of the soil probe delineation did not indicate the presence of chromium above the hazardous waste threshold.

The elevated detections of chromium were located within the area delineated for excavation and disposal which was done as part of the IRM (see Section 2.0). The analytical results of environmental soil samples collected as part of the geotechnical work for the building expansion were reflected in the development of the SSMP. These samples also had detections of total chromium above TAGM 4046, but within the range of the TAGM 4046 Eastern USA Background levels.

Analytical data from the adjacent Al-Tech Site[4], included the detection of chromium at levels consistently above TAGM 4046 at multiple locations around the property and in many instances above Eastern USA Background levels. The presence of chromium may be attributed to the apparent presence of historic fill material that was likely placed when the Al-Tech Site and SMC facility were operated as one facility under Allegheny.

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The impacted soil stockpiled from the Electric Trench excavation was placed in roll-off containers and disposed of at the landfill facility operated by CWM Chemical Services in Model City, NY (CMW) on September 22, 2006. Approximately 16 tons (14,545 kg) of soil were disposed (see IRM Work Plan for disposal documentation). Waste Technology Services, Inc. (WTS) assisted SMC in making the disposal arrangements.

3. A trench excavation was dug on December 12, 2006 for a communication utility line along the western side of the existing building from the building expansion south to the Guard House (see Figure 2). The excavation is located in the eastern portion of the AOC. When olfactory evidence of impacted soil was noted, SMC had its earthwork contractor stockpile the soil on polyethylene sheeting. A composite sample (designated Trench Stockpile) was collected from the soil stockpile and tested for PCBs. Results of the sampling indicated that PCBs were present at a concentration of 370 ppm. Re-analysis of a split sample by another laboratory indicated that PCBs were present at a concentration of 1,200 ppm.

   The soil stockpiled from the communication trench was placed in roll-off containers and disposed of at CWM on January 9 and 23, 2007 (see IRM Work Plan for disposal documentation) with the assistance of WTS.

[3] NYSDEC, Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046: Determination of Soil Cleanup Objectives and Cleanup Levels, dated January 24, 1994 and revised December 20, 2000 (referred to herein as "TAGM 4046").

[4] "Phase I RCRA Facility Investigation Report, Al Tech Specialty Steel Corporation, Dunkirk, New York, Volume 1 of 6" dated October 22, 1998. Prepared by Environmental Strategies Corporation.

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4. A trench excavation was dug on December 13, 2006 for electric and communication utility lines along the southwestern portion of the property (see southern trench on Figure 2). The trench was excavated from the utility pole south to the back flow prevention meter along Willowbrook Avenue. During the course of this excavation, olfactory evidence of impacted soil was noted in a 2-foot wide by 3-foot long by 1-foot deep (6 cubic feet) area of the trench. This soil was removed and placed with soil stockpiled from the communication trench excavation (see Item 3 above) that was dug east of the AOC.

1.2.3 Previous Site Investigations

Following the identification of the PCB impacted soils in the Electric Trench, SMC retained GZA to do the following.

- Delineate the extent of PCB contamination in the western portion of the facility in the vicinity of the Electric Trench; and
- Complete a Site Wide Investigation to determine if additional areas of concerns needed to be addressed.

This section provides a summary of the two investigations completed.

The PCB delineation work in the western portion of the facility was done in two events, September 2006 and December 2006, using a soil probe rig to collect subsurface soil samples. A total of 28 soil probes were generally done to a depth of approximately 12 feet below ground surface (bgs) during the two delineation events (see Figure 3A for approximate locations).

Soil samples were collected in two feet intervals and were field and headspace screened for organic vapors using an organic vapor meter (OVM) equipped with a photoionization detector (PID). No significant OVM readings were noted from the screened soils.

Select soil samples were field screened for PCBs using a Dexsil L2000 DX PCB Analyzer. Based on the findings from the field screening, olfactory observations and for broader coverage, fifty six (56) soil samples were selected and submitted for laboratory analysis that included PCBs (via EPA Method 8082), RCRA 8 Metals (via EPA Method 60l0B17470), Total Compound List (TCL) VOCs (via EPA Method 8260, SVOCs (via EPA Method 8270 Full List), and TCLP Chromium (via EPA Method 1311/6010B). Laboratory reports were included in Appendix D of the February 2007 IRM Work Plan and are summarized in tables presented in that IRM Work Plan.

Results of the sample analysis from the delineation effort were consistent with the findings of the two Electric Trench samples in that PCBs were the primary contaminant of concern. VOC and SVOC contamination was detected but not at levels of concern.

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During the first round of sampling completed by GZA (September 16, 2006), metals were analyzed using a direct methodology that detected the presence of chromium above TAGM 4046, but not above the industrial use standard for chromium (trivalent) specified in the recently promulgated amendments to 6 NYCRR Part 375.

During GZAs second round of sampling (December 2, 2006), TCLP methodology was used to determine if chromium was present above the hazardous waste threshold of 5 mg/l (as per 6 NYCRR § 371.3(e)(1)). None of the samples tested for chromium were found to exceed the hazardous waste threshold.

Based on the September and December 2006 soil probe delineation events, an area of PCB-impacted soil was identified using the 10 ppm subsurface PCB standard found in TAGM 4046. The remedial area had an approximate 6,400 square foot footprint located west of the SMC building, which is referred to as Excavation 1 of the IRM excavations completed (see Section 2.1.1). During the site wide investigation (discussed below), four additional areas were identified with PCBs above 10 ppm that required soil removal.

Based on the findings of the PCB delineation probes, GZA completed a Site Wide Investigation (SWI) in March 2007 to determine if other potential areas of concern were present at the SMC facility. The SWI consisted of the completion of 40 soil probes for soil and groundwater sample collection and the collection of five surface soil samples (see Figure 3B). Select soil and groundwater samples were submitted for chemical analysis which included TCL VOCs via EPA Method 8260, Full List SVOCs via EPA Method 8270, PCBs via EPA Method 8082, and Total Analyte List (TAL) Metals via USEPA Method 60l0B/7471. A total of forty-three (43) subsurface soil, five (5) surface soil and seven (7) groundwater samples (excluding quality control samples) were submitted for analytical testing.

Based on the findings of the SWI, PCB impacted soils were identified at four additional locations at concentrations greater than 10 ppm. These four additional areas were addressed as part of the IRM. A total of five areas were identified on-Site prior to the start of the IRM that required remedial action. These areas were identified as Excavation 1 through Excavation 5 as shown on Figure 5. It should be noted that a sixth area of PCB impacted soil, Excavation 6, was identified as a result of the RI, resulting in additional IRM soil excavation and disposal. Minor VOC, SVOC and metals contamination were identified as part of the SWI; however, the detected concentrations did not warrant remedial action (see Appendix A for analytical summary tables of the data from the SWI).

1.3 PURPOSE

The purpose of this RI is to characterize the nature and extent of potential contamination on-Site, with a concentration on PCBs, to provide data for completing a FS. The FS will identify and evaluate technologies/alternatives for remediation of the Site and will be used as the basis for final selection of the appropriate remedial response.

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In an effort to remediate potentially hazardous levels of PCBs, SMC implemented an IRM at the Site prior to the start of the RI field activities. The IRM was completed in five areas previously identified with PCB contamination and generally located in the southwestern portion of the SMC property. As previously noted, a sixth area was identified during RI activities that required remediation (see Figure 5 for the six IRM excavation areas). The IRM involved the excavation and disposal of accessible soil impacted with PCBs at concentrations greater than 10 ppm.

1.4 SCOPE OF WORK

The following tasks, as described in this IRM, RI/FS report, were completed by GZA.

- Coordinated work and discussed project details with NYSDEC;
- Interim Remedial Measures (excavation and disposal of PCB impacted soil);
- Completion of test borings and soil probes;
- Installation of groundwater monitoring wells;
- Hydraulic conductivity testing;
- Collection of groundwater level measurements from monitoring wells;
- Health and safety and community air monitoring;
- Environmental sampling (including soil and groundwater samples);
- Baseline qualitative exposure assessment;
- Analytical data evaluation;
- Evaluation of potential remaining contamination and evaluation of remedial alternatives;
- Preparation of a Site Management Plan;
- Preparation of an Environmental Easement; and
- Preparation of this report.

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2.0 INTERIM REMEDIAL MEASURES

The purpose of the IRM was to remove accessible soil contaminated with PCBs that had concentrations greater than 10 ppm, to reduce the potential threat to human health and the environment. Based on the delineation work done on the western side of the property and the results of the SWI, PCBs were determined to be the focus of the IRM. The IRM work was done in general conformance with the IRM Work Plan dated March 22, 2007; IRM Work Plan Addendum #1, dated April 6, 2007; and IRM Work Plan Addendum #2, dated July 18, 2007, which were approved by NYSDEC.

2.1 SOIL EXCAVATION ACTIVITIES

IRM soil excavation activities included the excavation of on-site PCB impacted soils, transportation and disposal of the soils, field screening of soil samples for PCBs and volatile organics, excavation confirmatory sampling, laboratory sample analysis and excavation backfill. The IRM excavation

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work was done between April 9, 2007 and August 7, 2007. Six (6) excavations were completed by SMC's subcontractor, Pinto Construction of Buffalo, New York and the waste disposal was coordinated and managed by SMC's subcontractor Waste Technology Services Inc., (WTS) of Lewiston, New York.

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The six (6) excavations were completed using a track mounted excavator. All materials encountered within the limits of the excavations (i.e., asphalt, sub-base, fill material, concrete) were excavated from ground surface to the bottom of the excavation. No segregation of material was done. Soil from the excavations was either excavated and directly loaded into a dump trailer for transportation and disposal or temporary stockpiles were made within the limits of the respective excavation, until a dump trailer was available for transportation. Excavated soil was not staged outside of the respective excavation area, nor was there a stockpile of PCB impacted soil left exposed over night or over a weekend at the Site.

Soil excavated for disposal was loaded into plastic lined dump trailers for transportation to the CWM disposal facility. Soils were not staged outside of the respective open excavation area. Polyethylene sheeting was also placed on the ground beneath the truck loading area to contain PCB impacted soil that may have fallen during loading activities (see Photograph 1 in Appendix H). Prior to leaving the loading areas, the polyethylene liner underneath the truck was inspected for loose soils. Soil observed on the polyethylene sheeting was removed and placed back into the excavation. Trucks were not allowed to leave the loading area if their tires had contacted contaminated soil without being cleaned. If the polyethylene sheeting became torn, it was placed in a dump trailer for disposal and new sheeting was placed in the loading area.

The initial excavation limits were preliminarily defined by the results of previous PCB soil sample analysis results and PCB field screening measurements done as part of the IRM investigations. The final limits of the on-Site excavations were defined by either physical barriers (e.g., property boundary or existing structures) or from confirmatory analytical samples collected from sidewalls and floor locations of the excavations. These samples were collected by hand (i.e., latex glove and stainless steel spoon) from the sidewalls and floors of the excavation, with the exception of the two samples (EX-1-FL-3 and EX-1-FL-6) which were collected from the deep portion of Excavation 1. These two samples were collected using the bucket of the excavator due to the depth of the excavation (~10 ft bgs).

Confirmatory soil samples were used to determine the final extent of the PCB impacted soils requiring excavation for disposal. However, as the excavation work was completed field screening was conducted using test kits and a Dexsil L2000 DX PCB Analyzer. A PCB concentration of 10 ppm was used to determine whether the limits of the excavation had been reached. Once the field screening indicated that an acceptable level had been reached a confirmation analytical sample was collected and submitted for analysis using a 24 hour turn around time. If the result of the confirmatory sample was approximately 10 ppm or less, no additional soil was excavated. If the concentration was greater than 15 ppm, additional soil was excavated and disposed of and additional field and confirmatory samples were collected.

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The confirmatory samples collected were submitted to Severn Trent Laboratories in Buffalo, New York, primarily for PCB analysis; however, approximately one of every five samples collected was also tested for TCL VOCs, TCL SVOCs, TAL metals and hexavalent chromium, as per the IRM Work Plan. The analytical results were submitted to DATAVAL, Inc. for completion of a data usability summary report (DUSR). As required by the Division of Environmental Remediation, the analytical data packages and the DUSR have been included in an electronic data submittal and are not included as attachments or appendices to the report.

Analytical sample results from confirmatory soil samples were compared to the NYSDEC TAGM 4046 Recommended Soil Cleanup Objective (RSCO) value of 10 ppm for total PCBs. Analytical results for the VOCs, SVOCs and metals analysis were compared to their respective NYSDEC, Division of Environmental Remediation, 6 NYCRR Part 375, Environmental Remediation Programs Table 375-6.8 (b) for Restricted Soil Cleanup Objective Concentrations, specifically values for Industrial Soil Cleanup Objectives (Part 375 ISCOs).

As part of this IRM work, a total of 6,736 tons of PCB impacted soil was excavated and disposed of as hazardous waste at the CWM facility located in Model City, New York. The soil disposal documentation has been included in an electronic data submittal and is not included as an attachment or appendix to this report.

A clean fill material (e.g., crushed stone) was placed inside the excavation followed by suitable compaction. The backfill material was supplied by Buffalo Crushed Stone's Wehrle Drive Pit. The excavations were backfilled to existing ground surface and were eventually resurfaced with asphalt pavement and/or grass cover at a later date by SMC. See Photographs 2 through 7 in Appendix H for surface restoration at the six excavation areas.

Soil samples collected from the six excavations completed as part of the IRM activities were primarily designated by the excavation from which they were collected from (e.g., EX-1 is from Excavation #1). Secondary designations were used to include the location from the specific excavation and the number of that respective sample. Examples include the following.

EX-1-SW-4	: Excavation 1, fourth side wall sample
EX-3-FL-6	: Excavation 3, sixth floor sample
EX-2-NORTH	: Excavation 2, north wall sample
EX-5-SS	: Excavation 5, sediment soil sample (Excavation 5 only)

Other collected samples were typically identified by their location or observation (e.g., Pipe Contents).

One-hundred and six soil samples (excluding duplicate samples) were collected from the excavations completed as part of the IRM. The analytical results are presented by excavation area in Tables 2 to 6, with the exception of EX-5, which only has one sample result and is discussed in Section 2.1.5. Confirmatory soil sample locations are shown by excavation area on Figures 6 to 11.

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The following is a breakdown of the number of samples collected per excavation.

EX-1: 27 samples plus 2 duplicates
EX-2: 8 samples plus 2 duplicates
EX-3: 41 samples
EX-4: 6 samples
EX-5: 1 sample
EX-6: 23 samples plus 2 duplicates

A general description of each excavation follows. Figure 5 shows the location of the six (6) excavation areas.

2.1.1 Excavation 1

Excavation 1 was done on the western side of the Site to address the PCB impacted soil encountered in the vicinity of the Electric Trench during the building expansion. Figure 6 shows the approximate limits of the excavation and provides the confirmatory sample locations along with the PCB results. This excavation had a foot print of about 7,600 square feet (sf) and a depth that ranged from about 2 foot below ground surface (bgs) (see Photograph 8) to 10 feet bgs (see Photograph 9). Approximately 90% of the area was excavated to a depth of about 2 feet bgs; however, a small portion of Excavation 1 was excavated to depths ranging to about 10 feet bgs (see Figure 6).

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The deep excavation associated with Excavation 1 was completed over a process sewer pipe which conveyed water to Willowbrook Pond (see Photograph 33 and 34). The material excavated and removed for disposal from this deep portion of Excavation 1 appeared to be fill material associated with the placement of the process sewer pipe, as further discussed in Section 4.5.

Table 1 provides a summary of the analytical samples collected from Excavation 1 and Table 2 is a summary of the analytical data from the confirmatory soil samples. Five of the 27 confirmatory samples collected were also tested for VOC, SVOC and metals. The results of the confirmation sample analysis indicated that the soils at the limits of Excavation 1 (i.e., sidewalls and floor) generally have PCB concentration detections below 10 ppm with the exception of two sample locations. Samples EX-1-SW-2 (2'-9') and EX-1-SW-17 had detected concentrations of PCB of 28 ppm and 10.2 ppm, respectively.

Soil sample, EX-1-SW-2 (2'-9'), was collected from along the western property boundary with the former Al-Tech property, which limited further soil excavation. Soil sample, EX-1-SW-17, slightly exceeds the NYSDEC RSCO value of 10 ppm and is considered to be negligible so no additional excavation was done in this area. VOCs, SVOCs and/or metals were identified in samples; EX-1-FL-1, EX-FL-2, EX-1, SW-11, EX-1-SW-16 and EX-1-SW-17. The concentrations detected did not exceed their respective Part 375 ISCO criteria (see Table 2).

2.1.2 Excavation 2

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Excavation 2 was done to the east of Excavation 1 and north of Excavation 3. Figure 7 shows the approximate limits of the excavation and provides the confirmatory sample locations along with the PCB results. Excavation 2 addressed the PCB impacted soil identified during the SWI and had a foot print of about 300 square feet and a depth of about 4 feet bgs (see Photograph 10).

Table 1 includes a summary of the analytical samples collected from Excavation 2 and Table 3 is a summary of the analytical data from the confirmatory soil samples. One of the seven confirmatory samples collected was also tested for VOCs, SVOCs and metals. The results of the confirmatory sample analysis indicated that the soils at the limits of Excavation 2 have PCB concentrations which were detected below 10 ppm with one exception. Sample, EX-2-North, had a PCB concentration of 32 ppm. Additional soil could not be removed because the northern side of the excavation extended to an existing building foundation. Some PCB impacted soil may remain under the building in this area. VOCs, SVOCs and/or metals detected in sample EX-2-West did not exceed their respective Part 375 ISCO criteria.

2.1.3 Excavation 3

Excavation 3 was done south of the Site building, primarily in the area of the paved parking lot and access road. Figure 8 shows the approximate limits of the excavation and provides the confirmatory sample locations along with the PCB results. This excavation was done to address PCB impacted soils identified during the SWI. The foot print was about 22,500 square feet and had an average depth of about 2.5 feet bgs (see Photographs 11 through 13).

During the work associated with Excavations 3, Excavation 4 and Excavation 6, a horizontal black and/or purple layer was encountered at a depth of 1 to 3 feet beneath the existing asphalt parking lot and road way in the southwestern portion of the SMC facility. Analytical samples collected from this layer or containing some of this layer as part of the composite (EX-3, Black Lens, EX-6-West-1, EX-6-West-2, SPR-7) yielded some of the higher detections of PCBs during the IRM and RI activities. See Section 4.5 for further information.

Table 1 includes a summary of the analytical samples collected from Excavation 3 and Table 4 is a summary of the analytical data from the confirmatory soil samples. Six of the 40 confirmatory samples collected were also tested for VOCs, SVOCs and metals in addition to PCBs. The results of the confirmatory sample analysis indicated that the soils at the limits of Excavation 3 have PCB which were detected below 10 ppm with two exceptions. Two soil samples, EX-3-North-7 and EX-3-East-5, had detected PCB concentrations of 12 ppm and 13 ppm, respectively. Due to the slight RSCO exceedance, soils within these areas were left in place and covered with a clean imported fill material, minimizing the potential for exposure. The detected concentrations are also well below the ISCO of 25 ppm.

During the excavation activities, eight (8) samples that were collected and analyzed had PCB concentrations that required further excavation. These samples are as follows.

- EX-3-North-2: 140 ppm

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- EX-3-North-3: 70 ppm
- EX-3-North-4: 120 ppm
- EX-3-Black Lens: 3,000 ppm
- Parking Lot North Trench: 650 ppm
- EX-3-South-2: 19 ppm
- Ex-3-East-3: 18 ppm
- EX-3-West(2-3.5'): 12 ppm

Additional soils were excavated from the vicinity of the samples identified above and disposed of as hazardous waste to the CWM facility.

It should be noted that soil sample EX-3-Floor-10 was collected for analytical testing; however, the laboratory apparently never completed the analysis. Of the other 9 floor samples analyzed from Excavation 3 and 24 total floor samples collected and tested from all the IRM excavations, none exceeded the PCB value of 10 ppm. The 24 sample results ranged from non-detect (8 sample locations) to 8.8 ppm (EX-1-FL-9) with an average concentration of 0.90 ppm. This excavation extended into the native soils. Based on the results of the other 24 floor samples, it was concluded by GZA that the PCB concentration in the soil in the vicinity of the EX-3-Floor-10 sample would not exceed 10 ppm.

VOCs, SVOCs and/or metals identified in the six samples tested from Excavation 3 (identified as EX-3-North-5, EX-3-North-6, EX-3-West-1, EX-3-West-3, EX-3-Floor and EX-3-Floor-2) did not exceed their respective Part 375 ISCO concentrations with the exception of arsenic at two locations. Specifically, soil samples EX-3-North-6 and EX-3-Floor had a detected concentration of arsenic of 21.9 ppm and 16.2 ppm, respectively. These detected concentrations slightly exceed the arsenic ISCO criteria of 16.0 ppm. Arsenic was also detected in two samples analyzed as part of the RI (see Section 5) at 19.5 ppm and 20.6 ppm, also slightly above the ISCO criteria. The arsenic concentrations are not considered to be significant threat to human health or the environment because Excavation 3 has been backfilled with clean soils, minimizing the potential for exposure and the detected concentrations are only slightly above the ISCO and present throughout the SMC facility.

2.1.4 Excavation 4

Excavation 4 was done to the south of IRM Excavation 3. Figure 9 shows the approximate limits of the excavation and provides the confirmatory sample locations along with the PCB results. This excavation addressed the PCB impacted soil identified during the SWI and had a foot print of about 600 square feet and an average depth of about 2 feet bgs (see Photograph 14).

Table 1 includes a summary of the analytical samples collected from Excavation 4 and Table 5 is a summary of the analytical data from the confirmatory soil samples. One of the five confirmatory samples collected was also tested for VOCs, SVOCs and metals in addition to PCBs. The results of the confirmatory sample analysis indicated that the soils at the limits of Excavation 4 have PCB concentrations which were detected below 10 ppm. VOCs, SVOCs and/or metals identified in sample EX-4-North did not exceed their respective Part 375 ISCO criteria.

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2.1.5 Excavation 5

Excavation 5 was done in the drainage swale located along Willowbrook Avenue just east of the SMC facility entrance (see Photograph 15). Figure 10 shows the approximate limits of the excavation and provides the confirmatory sample location along with the PCB results. This excavation addressed the PCB impacted soil identified during SWI. A sediment sample (SS-1) collected had a total PCB concentration of 12 ppm. GZA also collected a sediment sample from a storm water catch basin located on the west side of the SMC driveway, approximately 50 feet from SS-1. The analytical results indicated that PCBs were present at a concentration of 0.23 ppm (data was provided to NYSDEC by GZA in a letter dated May 4, 2007). Therefore the extent of the excavation did not extend further to the east, beyond the SMC driveway.

Excavation 5 had an approximate footprint under about 100 square feet and a depth of about 4-inches. This excavation removed sediment present in the bottom and sides of the drainage swale. One samples, EX-SS, was collected as part of the IRM and analyzed for PCBs only. The results were non-detect. Two sediment samples were also collected from the drainage swale as part of the RI. These samples, SS-6 and SS-7, were collected from approximately 50 feet east and 160 feet east, respectively, from Excavation 5. The results of these samples were also non-detect for PCBs.

2.1.6 Excavation 6

Excavation 6 was done in the southwestern portion of the Site adjacent to the western property boundary line and within a paved parking lot area. Figure 11 shows the approximate limits of the excavation and provides the confirmatory sample locations along with the PCB results. This excavation was done to address PCB impacted soils identified during RI activities. Excavation 6 had a foot print of about 6,700 square feet and an average depth of about 1.5 to 2 feet bgs (see Photographs 16 through 18).

Table 1 includes a summary of the analytical samples collected from Excavation 6 and Table 6 is a summary of the analytical data from confirmatory soil samples. Five of the 23 confirmatory samples collected were also tested for VOCs, SVOCs and metals. The results of the confirmatory sample analysis indicated that the soils at the limits of Excavation 6 have PCB concentrations which were detected below 10 ppm with five exceptions. These exceptions are as follows.

- EX-6-North-1: 170 ppm
- EX-6-West-1: 1,900 ppm
- EX-6-West-2: 11,000 ppm
- EX-6-West-6: 31 ppm
- EX-6-East-3: 44 ppm

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Samples EX-6-North-1, EX-West-1, Ex-West-2 and EX-6-West-6 were collected from along the western property boundary and EX-6-East-3 was collected from the base of the guard house. Therefore, no additional soils were removed from the vicinity of these sample locations.

During the excavation activities, two (2) samples, EX-6-South-1 at 420 ppm and EX-6-South-3 at 42 ppm that were collected and analyzed had PCB concentrations that required further excavation. Additional soils were excavated from the vicinity of the samples identified above and disposed of as a hazardous waste to the CWM facility. Additional confirmatory samples were collected which were below the 10 ppm criteria.

VOCs, SVOCs and/or metals identified in the five samples (identified as EX-6-Floor-1, EX-6-Floor-2, EX-6-South-3, EX-6-South-4 and EX-6-East-1) did not exceed their respective Part 375 ISCO criteria.

2.2 EXCAVATION WATER ACCUMULATION AND DISPOSAL

During work within the deep portion of Excavation #1, approximately 100 gallons of water accumulated in the bottom and was pumped into a polyethylene storage tank until it could be disposed. GZA provided the groundwater monitoring well sampling results for wells MW-4 and MW-8, located north and south of the excavation area respectively, to the City of Dunkirk POTW for review. Upon review of the groundwater analytical data, Mr. Michael Norman of the City of Dunkirk gave verbal approval to discharge the water into the sanitary sewer on-Site.

2.3 EQUIPMENT DECONTAMINATION

The need for equipment decontamination activities were kept to a minimum by limiting the amount of equipment that came in contact with PCB impacted soils. A dedicated bucket was used on the excavator during the excavations activities, within generally contaminated soil, and a second dedicated bucket was used for the placement of clean backfill. Equipment that was in contact with PCB impacted soils were decontaminated by physically removing (scrapping) the soil that had adhered to the equipment, then washing with an alconox detergent solution and allowed to air dry.

2.4 DUST MONITORING

GZA monitored for excavation generated dust via visual observations and with airborne particulate monitors (TSI DustTrack Aerosol Monitor Model 8520). No visible dust clouds were observed during the IRM excavation and/or soil loading activities. An airborne particulate threshold value of 150 microgram per cubic meter (ug/m^3) was established for the monitoring equipment. If the threshold value was exceeded, dust control measures would be needed. The threshold value of 150 ug/m^3 value was exceeded four times on March 3, 2007 at downwind particulate monitor (Downwind #1), located in the vicinity of the excavation. These exceedances which ranged up to 157 ug/m^3 were likely due to Site vehicles and/or site delivery trucks driving within close proximity to the particulate monitoring location and raising small amounts of dust from the access road. This exceedance was considered negligible as the second downwind particulate monitor (Downwind #2), located further down wind near the property line did not register any exceedances for that day. No

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additional exceedances were identified at the downwind particulate monitoring locations during the remaining IRM excavations. See Appendix C for the graphs of the particulate air monitoring data.

2.5 COMMUNITY AIR MONITORING

Throughout the IRM soil excavation and loading, GZA used an OVM equipped with a PID to monitor for total volatile organics generally at the perimeter of the work areas. Monitoring events did not have an occurrence of an OVM reading exceeding 1 ppm during the excavation activities.

3.0 REMEDIAL INVESTIGATION FIELD EXPLORATIONS

RI field explorations were completed at the SMC facility in general accordance with the Field Activities Plan (FAP) to evaluate the subsurface conditions within and around the AOC. The RI work was done between May 10 and May 17, 2007. Descriptions of the field explorations conducted during this RI are presented in this section.

3.1 TEST BORINGS

To investigate the soil and groundwater conditions in and around the AOC, GZA subcontracted Nature's Way Environmental Consultants and Contractors, Inc. (Nature's Way) to complete overburden test borings and monitoring well installations. The locations of borings are shown on Figure 4. A total of 15 locations were explored/sampled. Eight (8) test borings were completed and converted to 2-inch diameter groundwater monitoring wells (identified as MW-1 through MW-8). Seven (7) shallow test borings were sampled to a 4 to 6 foot depth at the southwest portion of the property (see Section 3.4). Boring logs prepared by GZA that document the observations made related to MW-1 through MW-8 are included in Appendix B.

3.1.1 Overburden Sampling

Boreholes were advanced through the overburden soil using a truck-mounted rotary drill rig and 4-1/4 inch inside diameter (I.D.) hollow stem augers (HSA). Overburden samples from ahead of the HSA were collected continuously by driving a 1-3/8 inch I.D. by 24-inch long split spoon sampler 24 inches with a 140-pound hammer falling 30 inches. Test borings were advanced with the HSAs until auger refusal (suspected to be the top of bedrock) at MW-1 through MW-8. Auger cuttings from the borings were containerized for disposal by SMC. During drilling and sampling, the split spoon samplers were cleaned by washing with a solution of laboratory grade detergent, a potable water rinse and allowing the sampler to air dry.

Soil samples collected from the test boring split spoon samplers were classified in the field by visual examination in accordance with a modified Burmeister Classification System. Boring logs for MW-1 through MW-8 that identify appropriate stratification lines, blow counts, sample identification, sample depth interval, recovery, and date are included in Appendix B.

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Typically, two soil samples were collected from each test boring for analytical testing which included VOCs, SVOC, PCBs and metals. These samples were typically collected from contaminated soils or material (based on visual, olfactory, field screening and engineering judgment) that warranted further analysis and from the upper two feet of native soils encountered at each boring location. Due to the depth of the fill material encountered at MW-2 (approximately 11 feet) three soil samples were collected.

3.1.2 Headspace Screening

Representative portions of the overburden samples collected were placed in new plastic jars with a screw top lid for headspace screening. Headspace screening was done using an OVM equipped with a 10.6 eV bulb (MiniRae 2000). The OVM was calibrated daily during its use, in accordance to manufacturer's requirements, using a standard gas (i.e., isobutylene). Prior to screening, the samples were allowed to equilibrate to room temperature. A hole was made in the lid of the sample jar and the tip of the probe was placed inside to screen the air inside the jar. Organic vapor readings were not detected during headspace screening.

3.2 MONITORING WELL INSTALLATION

A groundwater monitoring well was installed at test boring MW-1 through MW-8 as part of the RI activities. The monitoring wells were constructed of 2-inch I.D. flush-coupled polyvinyl chloride (PVC) riser and screen. Following placement of the screen (approximate 5-foot length) and riser within the borehole, the annular space around the screen was backfilled with sand extending to approximately 2 feet above the PVC screened portion of the well. Bentonite pellets were placed approximately 2 feet thick above the sand pack and were allowed to hydrate to form a seal. The remainder of the boring was then filled with a cement bentonite grout to about 6-inches from the ground surface. Two of the monitoring wells (i.e., MW-2 and MW-4) were completed with a flush mounted steel protective casing and the remaining 6 wells were equipped with a stick-up, locking protective casing. Concrete was placed around the casing to form a surface seal.

Following installation, the monitoring wells were developed to establish the sand filter pack and to check that the wells were functioning properly. The wells were bailed of approximately five to seven well volumes and allowed to recharge. Monitoring well development water was containerized for disposal by SMC.

3.2.1 Elevation and Location Measurements

GZA measured the monitoring points (i.e., top of PVC well riser) for each of the wells installed as part of the RI. Elevations were measured relative to a designated elevation value of 100.00 feet (the southeast corner of the concrete curb of the transformer pad on the south side of the building). Monitoring wells were located horizontally using a tape measure referenced to nearby Site features including property line fencing and existing building features. Elevation measurements for the eight (8) monitoring wells are included on Table 10.

3.3 GROUNDWATER LEVEL MEASUREMENTS

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Three rounds of groundwater level measurements were collected as part of the RI. Groundwater levels were measured using an electronic water level indicator after the monitoring wells were allowed to stabilize. The measurements, collected on March 16 and 22, 2007 and February 23, 2008, are summarized on Table 10. The groundwater level measurements collected on March 22, 2007 and February 23, 2008 are depicted on the groundwater contour maps shown in Figures 12 and 13, respectively.

3.4 SOIL PROBES

GZA's drilling subcontractor, Nature's Way, completed seven soil probes (SPR-1 through SPR-7) in the southwestern portion of the SMC facility on May 15, 2007. These soil probes were done to further delineate the extent of PCB impacted soils previously identified in the vicinity of the southern trench excavation. The general locations for these soil probes are shown on Figure 4. The probes were completed by driving a 1-3/8 inch I.D. by 24-inch long split spoon sampler, into the subsurface to a depth of 4 feet below ground surface and into the native soils.

Soil samples collected from the soil probes were classified in the field by visual examination in accordance with a modified Burmeister Classification System. Boring logs that identify appropriate stratification lines, blow counts, sample identification, sample depth interval and recovery, and date are included in Appendix B.

Select soil samples were collected from the soil probes for analytical testing which included VOCs, SVOC, PCBs and metals.

3.5 HEALTH AND SAFETY AND COMMUNITY AIR MONITORING

A Site-specific HASP was prepared by GZA for the field activities at the SMC facility. The Site safety officer and/or field representative provided health and safety oversight during field activities completed at the site. The health and safety monitoring equipment was maintained according to the HASP. Fieldwork was performed in Level D protection (e.g., hard hats, steel toe boots, work clothing, latex gloves, etc.). GZA did not detect elevated levels of VOCs (greater than 1 ppm) in the work zone or down wind of the work zone during intrusive activities. Therefore, additional protective measures were not required. Additionally, dust/particulates were not generated during the intrusive work at a level that warranted particulate monitoring.

3.6 ENVIRONMENTAL SAMPLING

Various soil, water and groundwater samples were collected as part of the RI work. The samples collected from RI activities were submitted for testing to Severn Trent Laboratories in Buffalo, New York. The analytical results were then submitted to DATAVAL, Inc. for preparation of a DUSR.

A general description of the soil and groundwater samples collected and analyzed is provided below with the sample series designations. A summary of the samples collected and their respective analysis is presented as Table 1.

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- Test boring soil samples were collected from the eight (8) borings done to install the groundwater monitoring wells (designated MW-1 through MW-8). The soil samples collected ranged in depth from 0 to 13 feet bgs at select locations. Soil samples are designated by the location and the depth from which the sample was collected (e.g., MW-2 (0'-2').

- Two rounds of groundwater samples were collected as part of the RI. The groundwater samples were designated by the well location from which they were collected (e.g., MW-1). Samples were collected from the eight monitoring wells installed during the first sample round (May 2007) and three downgradient wells (MW-5, -6 and -7) during the second sample round (April 2008).

- Soil samples collected from the seven (7) soil probes (designated SPR-1 through SPR-7) done in the southwestern portion of the SMC facility were collected from soil depths ranging from 0.5 to 6 feet bgs at select locations. Soil samples are designated by the location and the depth from which the sample was collected (e.g., SPR-5 (0.5'-2').

- Two sediment soil samples (designated SS-6 and SS-7) were collected from the drainage swale along Willowbrook Avenue from a depth of around 0 to 4-inches below ground surface.

- One water sample was collected from the sump located in the basement of the SMC facility. This sample was designated GFM Sump.

Sampling procedures were done in general accordance with RI work plans. The analytical results for the various samples collected are discussed in Section 5.0.

3.6.1 RI Subsurface Soil Samples

Twenty-three subsurface soil samples were collected as part of the RI work. Fourteen of which were collected from the monitoring well test borings and nine were collected from the soil probes done in the southwestern portion of the property in the vicinity of the southern trench excavation. Subsurface soil samples collected as part of the RI were tested for parameters including TCL VOCs, TCL SVOCs, PCBs and TAL metals. The analytical results are presented in Tables 7 and 8 and the sample locations are shown on Figure 4.

3.6.2 RI Groundwater Sampling

Twelve groundwater samples (including a duplicate sample) were collected during this RI as part of the two sampling rounds conducted. The first round was done between May 16th and 17th 2007 and included monitoring wells MW-1 through MW-8. The second round was conducted on April 16, 2008 and consisted of monitoring wells MW-5, -6 and -7. The analytical results are presented in Table 9 and the sampling locations are shown on Figure 4. Groundwater samples were tested for TCL VOCs, TCL SVOCs, PCBs and TAL metals during the first round and VOCs only during the second round.

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3.6.3 RI Sediment Samples

Two sediment samples were collected from the drainage swale running along the north side of Willowbrook Avenue. These samples, identified as SS-6 and SS-7, were collected using a stainless steel spoon from a depth of approximately 0 to 4-inches bgs from the centerline of the swale. The samples were tested for PCBs. The analytical results are presented on Table 7 and the sample locations are shown on Figure 4.

3.6.4 RI Sump Water Sample

One sump sample was collected from a sump located in the basement of the SMC facility. The sump collects water from the former sub-basement which was filled in as part of the building expansion and rotoforge installation. The sump sample was tested for VOCs. The analytical results are discussed in Section 5.5 and the sample location is shown on Figure 15.

4.0 PHYSICAL CHARACTERISTICS OF SITE

4.1 SURFACE FEATURES

The ground surface in the vicinity of the AOC and the SMC facility is generally level. The SMC facility consists of approximately 8-acres of which approximately 2 acres is occupied by the building footprint. The remaining portions of the Site consist of asphalt pavement, gravel driveways, storage and/or parking areas and grass vegetation/landscaping.

Two drainage swales are present on Site; one in the southeastern portion of the property, orientated in a northwest-southeast direction that diverts surface water runoff into the second drainage swale that is orientated in an east-west direction along the northern side of Willowbrook Avenue. This swale drains to the west, see Figure 2.

A beautification berm is located in the south-central portion of the property (see Figure 4). The berm is constructed from soil generated from the excavation done as part of the rotoforge press installation and building expansion and was created to reduce visibility of the Site from Willowbrook Avenue.

4.2 METEOROLOGY

The SMC facility is located in the north central portion of Chautauqua County, approximately 1.2 miles southeast of Lake Erie which primarily bounds the County to the west and northwest. Erie County is located to the north. A small portion of the State of Pennsylvania is located to the west and also makes up the entire southern boundary. Cattaraugus County is located to the east. The proximity to Lake Erie has a significant effect on the temperature and precipitation in Chautauqua County.

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Chautauqua County is typified by moderately warm summers and cold winters with an average annual precipitation of 39 inches and an average seasonal snowfall of about 101-inches. The yearly average daily temperature is about 49ºF with an average maximum temperature of 59ºF and an average low temperature of 39ºF. Data regarding average annual precipitation and temperature were obtained from the Soil Survey for Chautauqua County, New York dated August 1994 and was from data obtained from 1951 through 1960.

4.3 SURFACE WATER HYDROLOGY

4.3.1 Regional Surface Water Hydrology

Chautauqua County contains two distinct river basins divided mainly by a relatively narrow and steep Lake Escarpment Moraine, which has a southwest-northeast trend. An escarpment is defined as a long continuous cliff or relatively steep slope facing in one direction, separating two level or gently sloping surfaces. A moraine is defined as mound or ridge of unstratified glacial drift or till deposited by direct action of glacial ice.

The St. Lawrence River Basin is located in the northern portion of the county, north of the escarpment in the Lake Erie Plain. The Allegheny River Basin, the larger of the two, is located south of the escarpment. Surface waters in the St. Lawrence River Basin, which is where the SMC facility is located, flow to the north towards Lake Erie and eventually on to the St. Lawrence River via Lake Erie and Lake Ontario. Surface water south of the escarpment flows in a southerly direction, to the Allegheny River and eventually on to the Ohio and Mississippi Rivers.

Chautauqua County has a moderate relief and rolling landscape. The maximum relief is around 1,500 feet, ranging from around 570 feet, elevation at Lake Erie, to about 2,150 feet in the southeastern corner of the county.

Regional surface water generally flows either towards tributaries, stormwater detention basins and/or through the numerous stormwater drainage systems located throughout Chautauqua County and the City of Dunkirk. The nearest surface water feature to the SMC facility is the Willowbrook Pond (a man-made pond) located adjacent to the west on the Al-Tech property. The regional tributaries located east and west of the Site generally flow in a northerly direction towards Lake Erie.

4.3.2 Site Surface Water Hydrology

The majority of the surface water flow at the SMC facility is diverted to manholes (pipe flow), a drainage swale (southeastern portion) or sheet flow to the drainage swale along the northern side of Willowbrook Avenue. The Willowbrook Avenue drainage swale transports water westward to an unnamed tributary which then flows northwest to Crooked Brook and on to Lake Erie.

A small portion of surface water in the northwest corner and along the western property line may flow via sheet flow to the northwest and westerly, respectively, onto the All-Tech property.

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4.4 REGIONAL GEOLOGY

The topography in the vicinity of the SMC facility, which is located on the Lake Erie Plain, is generally flat and slightly sloping downward to the north towards Lake Erie. The primary surface relief in the area is the Lake Escarpment Moraine, which is located approximately 6 miles south of the SMC facility. There is an approximate 600 to 700-foot difference in elevation from the top to bottom of this escarpment.

Chautauqua County mainly consists of glacially derived soils which overlie Upper Devonian (360 to 380 million years ago) bedrock that is predominantly marine shales, siltstones and conglomerates. The bedrock has been divided into five formations, some containing several members. The major bedrock units, in ascending order are, the Hanover, Canadaway, Chadakoin, Cattaraugus, and Knapp. These units are dipping gently to the south, usually less than 3 degrees. Bedrock in Western New York dips to the south to southwest at about 40 feet per mile. The rock bedding is considered essentially flat over short distances. High angle to vertical joints are common to the rock.

The upper-most bedrock formation in the vicinity of the SMC facility is the Canadaway Formation, which contains the Northeast Shale Member, Shumla Siltstone Member, Westfield Shale Member, Laona Siltstone Member, Gowanda Member, South Wales Member and Dunkirk Shale Member. In and around the City of Dunkirk, the Dunkirk Shale Member, is represented by about 40 feet of massive medium gray to grayish-black shale.

4.5 SITE GEOLOGY

4.5.1 Fill Material

The Soil Survey of Chautauqua County, New York[5] classified the majority of the soil at the SMC facility and surrounding Al Tech site as Udorthents (Ud). This soil type is used to describe soil that have been cut and filled, exhibit little or no evidence of profile development and its texture and drainage class can vary considerably from one area to another.

During the IRM and RI, fill material was encountered at most of the excavation and investigation locations in the form of topsoil (grassy areas), sand, gravel, silt and clay or crushed stone (parking lot and roadways). Fill typically appeared to be less than 3 feet thick, with the exception of the following locations.

- MW-2 where fill extended to a depth of approximately 11 feet bgs in the vicinity of the building foundation in the northwestern portion of the property; and
- The deep portion of Excavation 1, which was completed to approximately 10 feet bgs when a polyethylene pipe was encountered in the center of the east-west orientated excavation.

[5] "Soil Survey of Chautauqua County, New York" dated 1988. Prepared by the United States Department of Agriculture Soil Conservation Services, in cooperation with Cornell University Agricultural Experiment Station.

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During the deep portion of Excavation 1, the following observations were made.

- The PCB contaminated soil that was being removed for disposal was a different color (dark brown to olive) from the surrounding native soils (light brown/tan/yellowish brown (see Photograph 32).
- The excavator operator from Pinto commented that the soil to be removed for disposal was "easier" to excavate then the native soil which is likely a glacial till.

The limits of the PCB contaminated soil that was removed appeared to follow the limits of former excavation benching. This former excavation was likely to install the polyethylene pipe which was encountered in the bottom of the deep portion of Excavation 1 at about 10 feet bgs (see Photograph 33 and 34). This pipe is believed to have been present since Allegheny conveyed the Al-Tech site in 1976 because the deed indicates the reservation of an easement over the SMC facility parcel that was retained by Allegheny until 1983.

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During the completion of Excavations 3, 4 and 6, a horizontal black and/or purple layer was encountered within these excavations (see Photographs 19 through 31 in Appendix H and Figure 17 for the locations of those photographs). This layer was present at a depth of 1 to 3 feet beneath the existing asphalt parking lot and road way in the southwestern portion of the SMC facility. Due to the size of the area (about 1 acre) where the horizontal "purple" layer was encountered, its thickness (about 1 to 3 inches) and its location beneath the existing asphalt parking lot and road way, it is our opinion that this layer is the result of historical operations (e.g., fill material placement or dust suppression activities prior to the area being paved) when Allegheny owned both the Al-Tech site and the SMC facility.

Appendix I contain some aerial photographs obtained from the Chautauqua County Soil and Water Conservation for the following years 1938, 1956, 1961, 1966, 1971, 1977, 1983, 1989 and 1995. The approximate limits of the SMC facility have been placed on the aerial photographs for ease of locating the facility. A description of observations made for the SMC facility based on review of the aerial photographs is also included in Appendix I. It appeared that the SMC facility layout (building location, parking lot and road ways) has been relatively consistent since 1983, when title to the SMC facility was conveyed to SMC. In preparing the Records Search Report, SMC did not find any indication that it historically used PCBs[6] in its manufacturing process and the O'Brien & Gere investigation that was conducted in 1988 did not find any indication that the facility used PCBs (Copies of the letter reports to SMC counsel in 1988 are included as Appendix M).

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4.5.2 Overburden

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Native overburden soil consists primarily of fine grained silts and clays, with a relatively small percentage of sand and gravel (less than 20%) overlying the bedrock in the area of

[6] "…PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979…" See http://www.epa.gov/epawaste/hazard/tsd/pcbs/pub/about.htm

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investigation. Typically, the first native soil encountered was a light brown, yellowish brown and/or tan clayey silt. At the top of rock, the clay and silt materials contain a higher percentage of shale fragments (20% to 40%). The overburden soil thickness ranges from approximately 15 to 17 feet thick.

4.5.3 Bedrock

Bedrock underlying the SMC facility is shale from the Canadaway Group[7]. No bedrock investigations were done as part of the investigation. Soil borings for monitoring well installations were advanced to auger refusal, assumed to be top of bedrock. The excavation done as part of the building expansion in 2006 was dug to the top of bedrock, approximately 17 to 18 feet bgs. The bedrock exposed within the excavation was a grayish black shale, consistent with the geology in the area.

4.6 REGIONAL HYDROGEOLOGY

Based on regional topography, the general flow of groundwater in the Dunkirk area is expected to be in a northerly direction towards Lake Erie, located approximately 1.2 miles north of the Site.

4.7 SITE HYDROGEOLOGY

Groundwater was not encountered in the overburden soil during the test borings for monitoring well installation, but rather at the overburden soil and bedrock interface. Wet weathered to severely weathered shale was encountered at the eight test borings completed (MW-1 through MW-8). Water levels measured as part of the RI, ranged in depth from 6.4 feet (MW-2) to 15.5 feet bgs (MW-6) and indicate a southerly groundwater flow direction.

Groundwater elevation measurements made in the eight wells on May 16 and 22, 2007 and February 23, 2008 are summarized on Table 10. A representative groundwater contour plot, based on measurements collected on May 22, 2007 and February 23, 2008 are included as Figure 12 and Figure 13, respectively.

Based on the groundwater elevation measurements, groundwater flow at the SMC facility appears to be in a southerly direction. Groundwater velocities for the SMC facility were based on hydraulic conductivities measured from six of eight monitoring wells. No data was generated from monitoring wells MW-6 or MW-7. The water column in MW-6 was too small to create enough drawdown and measure the rising head with a pressure transducer. MW-7 was damaged (hit by a snow plow) and the testing equipment could not be placed down the well. GZA utilized rising head test methodologies via a centrifugal pump to create drawdown and a pressure transducer to measure the recovery. The groundwater velocities ranged from 15 feet per year (MW-2 and MW-4) to 175 feet per year (MW-8). See Appendix D for groundwater calculations. Using the hydraulic conductivities of 4 of the 6 measured wells (MW-2, MW-3, MW-4 and MW-5), which have similar values, groundwater at the SMC facility is anticipated to move at a rate of roughly 20 feet per year.

[7] University of the State of New York, The State Education Department, Geologic Map of New York, Niagara Sheet, dated 1970.

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Fill material was encountered at most of the investigation locations in the form of topsoil (grassy areas), sand, gravel, silt and clay (near building foundation) or crushed stone (parking lot and roadways). Fill was typically less than 2 feet thick, with the exception at MW-2 where fill extended to a depth of approximately 11 feet bgs. This location was completed in the vicinity of the building foundation in the northwestern portion of the property. ¶

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A groundwater potentiometric surface contour map (prepared by Environmental Strategies Corporation (ESC) dated March 1997) made for the adjacent Al Tech site was provided to GZA. This groundwater contour map indicated groundwater mounding occurring north of the SMC facility with radial groundwater flows away from the mound resulting in a southerly groundwater flow direction in the vicinity of the SMC facility area (see Appendix D for Figure 3-5 from ESC).

4.8 LAND USE AND DEMOGRAPHY

The SMC facility is located in the southern portion of the City of Dunkirk, which is located in Chautauqua County, New York. The City of Dunkirk is bordered by Lake Erie to the north, the Town of Pomfret to the southwest, the City of Fredonia to the south, and the Town of Dunkirk to the west and east. The Locus Plan (Figure 1) shows the approximate location of the SMC facility and the surrounding areas.

The SMC facility is located in an area of mixed residential and industrial use along Willowbrook Avenue. The industrial properties (including Al Tech) are located along the northern side of Willowbrook Avenue and the residential properties are located to the south and east. Some residential dwellings are located further to the west. The SMC facility was formerly part of a single steel facility (Allegheny), which utilized the SMC and Al-Tech properties for the manufacturing of steel products. Agricultural farms and wooded lands are located further south and west of the Site.

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4.9 HABITAT ASSESSMENT

SMC Facility: A habitat assessment was not conducted as part of the RI because the Site does not generally include wildlife or wetland resources. A small stormwater drainage swale is located along the southeastern portion of the property which drains to the drainage swale along Willowbrook Avenue. Considering that the on-Site swale and associated drainage swale were observed to be intermittent (dry during periods of low precipitation in June through August), no significant aquatic organisms are expected, nor were any observed.

Adjacent Property: GZA was able to review the available fish and wildlife impact assessment (FWIA) report[8] completed for the adjacent Al Tech site facility located adjacent to the SMC Site on the north, west and east. A review of this assessment indicated a historic PCB release that occurred on the Al Tech site that impacted the Willowbrook Pond and the unnamed tributary which flows in a northwesterly direction towards Crooked Brook. Fish and wildlife in the area were identified as significant and productive and that protected species and communities were located near the Al Tech site and associated streams impacted by PCBs. The report made the following conclusions.

- The area of concern beyond the Al Tech site has considerable capability to support fish and wildlife.

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8 "Former Al Tech Specialty Steel Corp. Area of Concern #9, Fish and Wildlife Resource Impact Assessment of the Unnamed Tributary #1 of the Crooked Brook and REALCO Incorporated RCRA Site, 90 Willowbrook Road, Dunkirk, Chautauqua County, New York" Prepared by Kleinfelder East, Inc. of Windsor, CT, dated May 2007

- Although located on the edge of an urban area, the Al Tech site and nearby streams appear ecologically productive and diverse.
- No direct observable or obvious impacts are apparent.
- The potential exists for adverse impacts, considering the concentration levels in stream sediments observed and the linear length of elevated concentrations of PCBs.

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Based on these findings, Environmental Risk Group indicated a potential for adverse ecological risk effects and that a more thorough assessment was warranted for the Al Tech site.

5.0 NATURE AND EXTENT OF CONTAMINATION

This section discusses the nature and extent of contamination at the Site. Detected chemical compounds in the various media sampled and the analytical results are presented in Tables 2 through 9. Severn Trent Laboratories (STL) of Buffalo, New York provided the analytical laboratory services for this project. DATAVAL Inc., of Endwell, New York, provided independent data validation services for this project and prepared a DUSR. The validated data was used in the preparation of the analytical summary tables.

The DUSR rejected five pieces of data from the IRM sampling. The following data was rejected:

- EX-1-Fl-2: Hexavalent chromium results only
- EX-1-SW-16: Hexavalent chromium results only
- EX-6-East-1: Manganese results only
- EX-6-Floor-1: Manganese results only
- EX-6-Floor-3: Manganese results only
- EX-6-South-3: Manganese results only

The data for the above mentioned samples is provided on their respective data summary table, but noted with an "R" qualifier identifying it as rejected. The hexavalent chromium data EX-1-FL-2 and EX-1-SW-16 were rejected because the linearity of their Method of Standard Additions curves were too poor to be considered usable. The manganese data from EX-6-East-1, EX-6-Floor-1, EX-6-Floor-3 and EX-6-South-3 were rejected due to the poor performance of the matrix spike recoveries. These rejected data are not considered relevant to the RI work because hexavalent chromium and manganese are not considered contaminants of concern at the Site.

Data qualifiers and their definitions, as defined by STL, are included in Appendix E. The presentation of results, within this text, does not include data qualifiers. The DUSR and raw laboratory data are not included with the hard copy of this report, but have been provided as an electronic data submittal.

5.1 CONTAMINANT TYPES

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Discussions of laboratory analytical results for the various identified environmental media are presented by the chemical classes including PCBs, VOCs, SVOCs and inorganics that were analyzed for and detected as part of the IRM and RI. Some compounds of these chemical classes were identified at concentrations exceeding associated New York State criteria at sporadic locations around the Site. These exceedances are presented in the associated analytical tables. However, the principal contaminant identified in the soil at the Site is PCB.

The IRM soil samples collected were primarily tested for PCBs since the remediation in the specific areas were directed towards PCB impacted soils. Testing for additional compounds, including VOCs, SVOCs and metals, were completed on about 20% of the IRM samples collected (about 1 in every 5 samples). However, each soil and groundwater sample collected as part of the RI work were tested for VOCs, SVOCs, PCBs and metals.

Compounds detected in the soil and groundwater tested were compared to the following New York State guidance documents and standards.

Soil: NYSDEC, 6 NYCRR, Subpart 375-6, Industrial Soil Cleanup Objectives, effective December 14, 2006.

Groundwater: NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations dated October 1993; Revised June 1998; ERRATA Sheet dated January 1999; and Addendum dated April 2000 (NYSDEC Class GA).

5.2 SOURCE AREAS

No specific source areas of contamination were identified; however, based on previous studies conducted at the SMC facility, and this IRM and RI, several areas involving PCB contaminated fill material were identified. The PCB contamination appeared to be in the subsurface unsaturated fill material zone at depths ranging from 0.3 to 10 feet bgs. Excavation 1 was the only excavation that extended to the depth of 10 feet bgs. This was due to impacted fill material being encountered in the vicinity of a pipeline corridor which ran from Willowbrook Pond onto the SMC property and along the south side of the SMC building (see ESC Figure 3-6 in Appendix F). The other five excavations completed had PCB contaminated soils located within the fill material at depths ranging from about 0.3 to 4 feet bgs.

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Soils within the six areas were excavated and disposed as a hazardous waste as part of the IRM work. The remaining contamination identified at the SMC facility is located at the property line or is located beneath a structure and is considered to be residual or of minimal concern.

5.2.1 Other Potential Source Areas

VOC impacted groundwater (specifically chlorinated compounds, trichloroethene and cis-1,2-dichloroethene) was detected at MW-1, MW-3 and MW-5 at concentrations above their

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respective Class GA criteria. Two monitoring locations (MW-1 and MW-3) are at upgradient groundwater locations relative to the SCM facility, considering a southerly flow direction. Additionally, both of these wells are located within approximately 2 to 3 feet of the northern (MW-1) and western (MW-3) property lines. Contaminants identified in these wells appear to originate from an upgradient source, likely the adjacent Al Tech site. Chlorinated solvents have been detected in groundwater samples collected from monitoring wells located on the Al-Tech site upgradient of the SMC facility (ESC Report[9]). The detected concentration of cis-1,2-dichloroethene at MW-5 (located in the central portion of the SMC facility) is likely due to being in a downgradient groundwater flow direction from MW-1. The total chlorinated solvent concentrations detected, decrease with the groundwater flow direction from MW-1 to MW-5.

Low concentrations of petroleum compounds were detected in the groundwater sample collected from MW-5 (located south of the SMC building). This data indicates a potential upgradient source of petroleum contamination. The source of this low level contamination is likely associated with the historic industrial activities at the SMC facility. Petroleum products were encountered during the building expansion and rotoforge press installation. Petroleum product and impacted soil encountered were removed and properly disposed of during the expansion work. This is documented in the NYSDEC Spill Closure Report[10] submitted to NYSDEC in November 2006.

This following sections discuss the nature and extent of contamination identified at the SMC facility. The analytical results from the soil and groundwater samples collected as part of the IRM and RI are presented.

5.3 SOIL ANALYTICAL RESULTS

A total of 127 soil samples (subsurface and sediment) were collected (excluding duplicates) during the IRM (103 samples) and RI (23 samples) as discussed in Sections 2.1 and 3.6.1, respectively. Detected compounds were compared to 6 NYCRR Part 375 Industrial Soil Cleanup Objectives (ISCO) found on Table 375-6.8(b). Confirmatory soil analytical results completed as part of the IRM are presented in Tables 2 through 6 and subsurface soil analytical results done as part of the RI work are presented on Tables 7 and 8. Confirmatory soil sample locations completed for the IRM are presented on Figures 6 through 11 and subsurface soil samples collected for the RI work are shown on Figure 4. A summary of the analytic results from both IRM confirmatory and RI soil samples is presented below.

Six soil samples collected as part of the IRM had data rejected as discussed in Section 5.0.

5.3.1 Volatile Organic Compounds

IRM - A total of 18 samples (not including duplicate samples) were tested for VOCs as part of the IRM work. VOCs were not detected above their respective method detection limits (MDL) in

9 "Phase I RCRA Facility Investigation Report, AL Tech Specialty Steel Corporation, Dunkirk, New York, Volume 1 to 6 Text, Tables and Figures" dated October 22, 1998 by Environmental Strategies Corporation.

10 "Closure Report, NYSDEC Spill # 0650719, Special Metals Corporation, Dunkirk, New York" dated November 27, 2006, prepared by GZA GeoEnvironmental of New York.

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six of the 18 samples collected. A total of eight VOCs were detected above their respective MDLs in the remaining 12 samples, which include: carbon disulfide, 2-butanone, toluene, benzene, total xylenes acetone, methylene chloride and 1,2,4-trichlorobenzene. None of the VOCs were detected at concentrations exceeding their respective ISCOs (see Tables 2 through 6). Additionally, excavated soil field screened with an OVM were non-detect for organic vapors.

RI - A total of 22 samples were tested for VOCs as part of the RI work. VOCs were detected above their respective MDL in the 22 samples collected. A total of five compounds, acetone, carbon disulfide, methylene chloride, toluene and 2-butannone, were identified above their respective MDLs. However these detected VOCs do not exceed their respective ISCOs as shown on Tables 7 and 8.

As a result of these findings, VOCs are not considered to be of concern at the SMC facility.

5.3.2 Semi-Volatile Organic Compounds

IRM - A total of 18 samples (not including duplicate samples) were tested for SVOCs as part of the IRM activities. SVOCs were not detected above their respective MDL in five of the 18 samples collected. A total of 23 compounds were detected above their respective MDL in the remaining 13 samples. None of the SVOCs were detected at concentrations above their respective ISCOs (see Tables 2 through 6).

RI - A total of 23 samples (not including duplicate samples) were tested for SVOCs as part of the RI activities. Of the samples tested, SVOCs were detected above their respective MDL in nine of the 23 samples. A total of 19 compounds were detected in the remaining nine samples. One sample, MW-2 (0-2), was identified with four SVOCs; benzo(a)anthracene (15 ppm), benzo(b)fluoranthene (15 ppm), benzo(a)pyrene (12 ppm) and dibenzo(a,h)anthracene (1.6 ppm) slightly exceeding their respective ISCOs as shown on Tables 7 and 8. Soil from this location (see Figure 12) is fill material likely from historic backfill placed during construction of the western wall foundation of the SMC building.

Due to the limited area of SVOCs at levels above their respective ISCOs (one location), the detected location (historic fill material) and detected concentrations, SVOCs are not considered to be a concern at the SMC facility.

5.3.3 Polychlorinated Biphenyls

IRM - A total of 104 samples (not including duplicate samples) were tested for PCBs as part of the IRM activities. Specific compound detections were limited to Aroclor 1242 and Aroclor 1248. During the excavation work, confirmatory sampling analysis identified 14 samples exceeding the total PCB ISCO value of 25 ppm. Of these exceedances, soil from seven of those locations was able to be removed by further excavation and proper disposal. Of the seven remaining locations two could not be removed due to the presence of structures (SMC building and guard house) and five were collected from the western property line. The following is a list of sampling locations with their detected concentrations that could not be further excavated.

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- EX-1-SW-2 (2-9'): 28 ppm – This confirmatory soil sample was collected from the western side wall of Excavation 1 located at the western property line as shown on Figure 6. The soil excavation was extended to the SMC facility western property line; therefore, no additional soil could be excavated.
- EX-2-NORTH (0.5 – 4'): 32 ppm – This confirmatory soil sample was collected from residual soil remaining along the north side wall of Excavation 2. Further excavation could not be completed due to the presence of the building's southern foundation wall as shown on Figure 7.
- EX-6-NORTH-1 (0-1.5'): 170 ppm – This confirmatory soil sample was collected from a northern wall of Excavation 6, along the western property line as shown on Figure 11. The excavation was extended to the SMC facility property line; therefore, no additional soil could be excavated.
- EX-6-WEST-1 (0 – 1.5'): 1,900 ppm: This confirmatory soil sample was collected from the western side wall of Excavation 6, along the western property line as shown on Figure 11. The excavation was extended to the SMC facility property line; therefore, no additional soil could be excavated.
- EX-6-WEST-2 (0 – 1.5'): 11,000 ppm: This confirmatory soil sample was collected from the western side wall of Excavation 6, along the western property line as shown on Figure 11. The excavation was extended to the SMC facility property line; therefore, no additional soil could be excavated.
- EX-6-EAST-3 (0 – 2'): 44 ppm: This confirmatory soil sample was collected from the eastern side wall of Excavation 6, adjacent to the existing guard house as shown on Figure 6. Additional excavation in this area would require the removal of the guard house.

It should be noted that three sampling locations EX-1-SW-17 (10.2 ppm), EX-3-West (2-3.5') (12 ppm) and EX-3-North-7 (12 ppm) had detected concentrations above the 10 ppm cleanup criteria established in the IRM Work Plan. Because these samples slightly exceeded the cleanup criteria and samples in their vicinity had achieved the cleanup criteria, no additional soil was removed from these areas.

Approximately 6,736 tons of PCB impacted soil was excavated and disposed of as hazardous waste from the Site as part of the IRM. The PCBs remaining on the SMC facility are limited, in locations covered by buildings and are anticipated to be below the hazardous waste threshold of 50 ppm. PCBs that were identified at concentrations above the hazardous waste threshold of 50 ppm are located along the western property line. PCB impacted soil excavation, as part of the IRM, was limited to on-Site soils only.

In sum, PCB impacted soil is limited to fill material and extends across the western property boundaries with the Al Tech site. The PCB impacted soil that was encountered and removed was likely due to the fill material that was placed during the development of the SMC facility when it and that the adjacent Al Tech site were owned and operated by Allegheny as a single entity.

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RI- A total of 25 samples (not including duplicate samples) were tested for PCBs as part of the RI. Of these 25 samples, eleven (11) were identified as non-detect for PCBs. The remaining 14 samples (collected from soil probes and test boring samples) were identified with PCB detections of Aroclor 1242 and/or Aroclor 1248 exceeding their respective MDLs. Of these samples, three (3) were identified with total PCB concentrations exceeding the ISCO value of 25 ppm. Specifically, soil samples from SPR-2, SPR-6 and SPR-7 (see Figure 12 and Table 7) were identified at total PCB concentrations of 1,200 ppm, 170 ppm and 2,600 ppm, respectively. These soil locations were excavated for disposal as part of the IRM Excavation 6.

The highest concentration of PCBs detected in the soil samples collected for the monitoring well installations was around 0.9 ppm (MW-3 2 to 4 feet bgs, se Table 8), which is well below the ISCO value of 25 ppm and did not require remedial action.

5.3.4 Inorganic Compounds

IRM- A total of 18 samples (not including duplicate samples) were tested for inorganics (including hexavalent chromium) as part of the IRM activities. Several metals were detected above their respective MDLs; however, only two samples were identified with metal concentrations exceeding their respective ISCO. Specifically, soil samples EX-3-North-6 and EX-3-Floor (3') were identified with arsenic concentrations of 21.9 ppm and 16.2 ppm respectively which exceeds the ISCO value of 16 ppm (see Table 4).

RI - A total of 19 samples were tested for inorganics. The RI samples were not tested for hexavalent chromium due to the lack of significant detections in the IRM samples tested. Hexavalent chromium was detected at three (3) locations with detections ranging from 1.4 to 3 ppm, which is considerably lower than its ISCO criteria of 800 ppm.

Several metals were detected above their respective MDLs; however, only two samples were identified with metal concentrations exceeding their respective ISCOs. Specifically, soil samples identified as MW-1 (0-2') and MW-6 (0-2') were identified with arsenic concentrations of 20.6 ppm and 19.5 ppm respectively that exceed the ISCO value of 16 ppm.

The analyses for inorganic metals were done on select subsurface soil samples. Although, arsenic was detected at a concentration exceeding its respective ISCO, its detection is not considered to be a significant concern at the SMC facility. It should be noted that metals are naturally occurring in soil and slight exceedances may be due to natural and/or historic conditions such as historic agricultural practices.

5.4 GROUNDWATER ANALYTICAL RESULTS

Analytical testing results of twelve groundwater samples collected from overburden monitoring wells installed as part of the RI activities indicate the presence of VOCs, SVOCs and metals. PCBs were not identified in any of the eight wells sampled. No groundwater sampling was done as part of the IRM work.

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The groundwater at the SMC facility appears to flow in a southerly direction as shown on the groundwater contour maps (see Figure 12 and Figure 13). Thus monitoring wells MW-1, MW-2 and MW-3 are considered upgradient wells and wells MW-4, MW-5, MW-6, MW-7 and MW-8 are generally considered downgradient wells. A summary of the groundwater sample results is presented below.

5.4.1 Volatile Organic Compounds

Of the eight wells sampled, only well MW-8 was identified as non-detect for VOCs. A total of twelve (12) VOCs were identified above their respective MDL in seven of the eight wells. Five compounds were identified exceeding their respecting NYSDEC Class GA groundwater criteria. These VOC exceedances include the following.

- cis-1,2–Dichloroethene was identified exceeding its Class GA criteria of 5 ppb in monitoring wells MW-1, -3 and -5 with respective concentrations of 220 ppb, 49 ppb and 8.7 ppb in the May 2007 sample round. The concentration is decreasing in the downgradient direction which suggests the contaminant likely originates from an upgradient source (MW-1 is on the northern property line with the Al Tech site and has the highest concentration). During the April 2008 sample round, cis-1,2-dichloroethene was detected at MW-5 at a concentration of 5.5 ppb.
- Trichloroethene was identified exceeding the Class GA criteria of 5 ppb in monitoring well MW-1 with a concentration of 92 ppb. Its concentration decreased to under 1 ppb at MW-3 and it was not detected at the down gradient monitoring wells which suggests the contaminant likely originates at an off-site source, potentially from the adjacent property to the north.
- Benzene was detected at a concentration of 5.1 ppb, exceeding its Class GA criteria of 1 ppb in monitoring well MW-5 in the sample results from April 2007. Benzene was not detected above method detection limits in the sample results from the April 2008 sample round.
- Toluene was identified exceeding its Class GA criteria of 5 ppb in monitoring well MW-5 with a concentration of 8.2 ppb. Toluene was not detected above method detection limits in the sample results from t he April 2008 sample round.
- Total Xylene was identified exceeding its Class GA criteria of 5 ppb in monitoring well MW-5 with a concentration of 23 ppb in the May 2007 sample round. Xylenes were not detected above method detection limits in the April 2008 sample round.

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Generally, the identified chlorinated VOCs appear to be originating from a potential upgradient source, as the concentrations are highest at MW-1 which is located on the northern most portion of the SMC facility property. Petroleum related compounds were identified in well MW-5 which could be associated with historic on-site activities. The petroleum related compounds were not detected in the groundwater sample collected from downgradient monitoring well MW-6, suggesting that these compounds are not migrating and natural attenuation may be occurring. Additionally, due to the low concentrations (below Class GA criteria) of VOCs observed in the down gradient wells, VOCs are not considered a concern to potential off-Site receptors, nor are they considered to be a contaminant of concern in the groundwater at the SMC facility.

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5.4.2 Semi-Volatile Organic Compounds

Of the eight wells sampled, no SVOCs were detected above MDL in monitoring wells MW-1, -3, -4 and -6. A total of seven (7) SVOCs were identified above their respective MDL in the other four wells sampled. None of the SVOCs identified above MDL exceeded their respective NYSDEC Class GA groundwater criteria as shown on Table 9. Based on these findings, SVOCs are not considered to be a contaminant of concern within the groundwater at the SMC facility.

5.4.3 Polychlorinated Biphenyls

PCBs were not detected above MDL in the eight (8) groundwater samples collected (see Table 9). Generally, PCBs are not considered to be readily mobile and are not expected to readily leach through the upper native till soils into the groundwater at lower elevations. This assumption is also confirmed by the confirmatory soil samples taken from the IRM excavations that showed PCB impacted soils were generally located within the upper 3 to 4 feet of the fill soils and that the native soils beneath the fill were typically not impacted with PCB contamination.

5.4.4 Inorganics

A total of eight (8) metals were identified above their respective MDLs in the eight groundwater samples tested. Of these detected metals, five were identified exceeding their respecting NYSDEC Class GA groundwater criteria and include: barium, iron, magnesium, manganese and sodium (see Table 9). However, these exceedances may be attributed to turbidity of the groundwater samples as well as to natural conditions for the area. These exceedances are not considered to be significant relating to the groundwater at the SMC facility.

5.5 SUMP WATER ANALYTICAL RESULTS

Analytical testing was done on a water sample collected from the sump present in the basement on the western side of the SMC facility for VOCs only. This sample was analyzed to determine if chlorinated VOC (as detected in upgradient wells MW-1 and MW-3) were present in the water accumulating in the sump of the basement and assess if there is a concern for vapor intrusion within the SMC facility.

5.5.1 Volatile Organic Compounds

Three compounds were detected above method detection limits in the water sample from the sump; acetone (35 ppb), chloroform (26 ppb) and cyclohexane (1.3 ppb). These detected concentrations of these compounds do not exceed their respective NYSDEC Class GA groundwater criteria.

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As chlorinated VOCs were not detected above method detection limits nor is there an identified vapor intrusion concern due to the low concentrations of the three VOCs detected. A vapor intrusion assessment is not warranted for the SMC facility.

6.0 CONTAMINANT FATE AND TRANSPORT

This section discusses the mechanisms that may affect migration of contaminants at the Site and the chemical behavioral characteristics of the compounds detected, including persistence of these chemical substances. This information is compared with the Site specific data and observations to assist in assessing the extent of migration that has occurred.

The primary contaminant identified during the SWI, the IRM and RI was PCBs located in fill material. The majority of the PCB impacted soils identified (approximately 6,700 tons) were excavated from six areas as part of the IRM activities. Excavated soils were removed and disposed of at the CWM facility in Model City, New York. Due to limitations/boundaries at the SMC facility (including the western property boundary with the Al Tech site and existing building footprints) some PCB impacted soils remain on the property. Additionally, other chemical compounds including VOCs, SVOCs and metals were detected. These detections were significantly less frequent and at concentrations below their respective 6 NYCRR Part 375 ISCOs with the exception of a couple locations as previously discussed in Section 5.0.

6.1 POTENTIAL ROUTES OF MIGRATION

Primary routes of migration from the Site are expected to be via groundwater and to a lesser degree, volatilization to soil gas/air. The groundwater at the SMC facility in the overburden silty soils, flows in a southerly direction based on current measured conditions.

Surface water and sediment are not considered significant contaminant migration pathways. During rainfall events, some runoff was observed flowing towards the southern portion of the property boundary via a drainage swale located in the eastern portion of the SMC facility which drains into the drainage swale located along Willowbrook Avenue. It is possible for some surficial contamination (if present) to migrate via runoff, but based on the IRM activities at Excavation 5 and the sample analysis from the drainage swale and downgradient catch basin, this route is considered to be a negligible migration pathway.

The potential for VOCs to volatilize to soil vapor is anticipated primarily in the northern portion of the SMC facility where a few compounds were identified in groundwater at concentrations exceeding their respective Class GA criteria. Volatilization and soil gas migration is less understood than groundwater migration. VOC contamination in the soil vapor may migrate laterally or vertically with potential discharge to ground surface or buildings. Subsurface heterogeneities will affect the migration such as utility lines. However, the thickness and characteristics (silt and clay) of the overburden soil above the groundwater table will hinder soil vapor migration. The detected concentration of VOCs in wells MW-1 and MW-3 is considered

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low. The results of the water sample from the sump in the basement of the SMC facility did not indicate the presence of chlorinated VOCs above method detection limits nor is there a vapor intrusion concern associated with the low concentrations of the three VOCs detected. This route of exposure is considered to be a negligible pathway.

The most significant contaminant observed was PCBs in subsurface fill material/soils. Although a majority of the impacted soils were removed during IRM activities, some impacted soil remains under buildings and adjacent to the western property boundary. This material has a high adsorption quality to soils and a low leaching potential to the underlying groundwater (no PCBs were detected in the eight groundwater samples collected). Additionally, PCBs have a low vapor pressure resulting in a low volatilization potential and will not likely impact the soil vapor gas.

6.2 CONTAMINANT PERSISTENCE AND BEHAVIORAL CHARACTERISTICS

Several classes of chemical compounds were detected in the soil and groundwater samples collected from the SMC facility, PCBs being the contaminant of most significance. The other detected classes were at relatively low concentrations and at sporadic locations throughout the SMC facility. These other classes (VOCs, SVOCS and inorganics) are generally not considered significant.

6.2.1 Polychlorinated Biphenyls

PCBs were not detected in groundwater samples collected at the SMC facility. This finding is likely due to the majority of the PCB contamination being located in the upper soils and its low leaching potential. Therefore, PCB contamination via groundwater migration is not expected. The potential future impact to groundwater has been reduced because the main source of PCB contamination (fill material) has been removed during the IRM. Contaminated soils were typically located at shallow depths ranging from 2 to 4 feet bgs. PCB contaminated soils identified at greater depth were observed at Excavation 1 and were excavated for off-site disposal. The remaining PCB contamination unable to be remediated during IRM activities include soil located at the western property boundary and a couple select locations adjacent to buildings.

6.2.2 Volatile Organic Compounds

Groundwater migration, under current conditions, has shown that VOC contamination extends to the south in the direction of groundwater flow. VOC contamination concentrations were observed to significantly decrease to non-detect in the southerly direction of groundwater flow. This decrease in concentration could be due to the dispersion of the contaminants, natural organic carbon in the soil adsorbing the organics, thus slowing the advancement of VOCs or attenuation in the direction of groundwater flow in response to dispersion, volatilization, and degradation, among other factors. Downgradient VOC concentrations were confirmed with additional groundwater sampling of monitoring wells MW-5, -6 and -7 in April 2008. The results of the total VOCs detected indicated a decrease in the total VOCs from the May 2007 sampling.

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An evaluation of vertical groundwater flow was not done as part of this work as the contaminants of concern were PCBs in shallow soils located well above the groundwater table.

6.2.3 Semi-Volatile Organic Compounds

Four of the eight groundwater wells were sampled and identified as non-detect for SVOCs and the remaining four wells were identified with trace (generally above 1 ppb) SVOC detections. None of the detected SVOCs were identified exceeding the Class GA groundwater criteria and therefore do not appear to be of concern in groundwater.

Similarly, some SVOCs were identified in sporadic soil sample locations at the SMC facility. Of the 36 soil sample locations done as part of the IRM/RI, only one soil sample was identified with SVOCs exceeding Part 375 ISCOs. The remaining detections were considered to be low concentrations.

6.2.4 Inorganics

Naturally occurring metals including barium, calcium, magnesium, manganese, potassium and sodium were detected in all eight groundwater samples. Iron and cobalt were also detected in some of the wells. Several of the detected compounds were identified as exceeding the Class GA groundwater criteria; however, these detections generally appear to be within the same order of magnitude and are not believed to be of significant concern.

6.3 OBSERVED MIGRATION

This section combines potential migration pathways with the contaminant trends and distribution based on the IRM and RI analytical data results.

6.3.1 Groundwater

PCBs were not detected in any of the eight monitoring wells sampled. VOCs were detected in several monitoring wells, that is, chlorinated solvents (i.e., cis-1,2 DCE and TCE) in upgradient wells (MW-1 and MW-3) and in MW-5 along with some petroleum compounds within MW-5 at concentrations slightly exceeding groundwater criteria. The chlorinated solvent contamination appears to be located on the northwestern corner of the SMC facility and appears to be the result of an upgradient source. The petroleum compounds may be the result of possible contamination from the historic use of petroleum products on-site. This historic use and impacts to the overburden soil were remediated in connection with the building expansion work (see referenced NYSDEC Spill Closure Report).

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Downgradient monitoring wells (MW-5, -6 and -7) were resampled in April 2008 to assess downgradient VOC contaminant migration. Generally, lower concentrations of VOCs were identified. It does not appear that impacted groundwater is migrating downgradient or off-site at the SMC facility.

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Based on field testing within 6 of the 8 on-site monitoring wells, the calculated average groundwater velocity is approximately 54 feet per year (fpy), with a range of 15 fpy to 175 fpy. However, as noted earlier, the groundwater velocity is likely in the range of about 20 fpy considering four of the six wells (MW-2, MW-3, MW-4 and MW-5) have very similar groundwater velocities ranging from 15 fpy to 26 fpy.

Groundwater velocities were not able to be calculated from wells MW-6 and MW-7 due to a low water column in MW-6 and damage to well MW-7 by a snow plow. VOCs in groundwater are anticipated to have a retarded velocity due to the sorption onto the organic carbon in the soil. VOCs were not identified at concentrations exceeding groundwater criteria in the downgradient wells on the property (MW-6 and MW-7).

6.3.2 Volatilization and Soil Vapor Migration

VOCs within the soil and groundwater have the potential to volatilize, to some extent, into the vadose zone. However, detected concentrations of VOCs in both the soil and groundwater are in the low part per billion range. The thickness of the vadose zone, based on the explorations, averages approximately 11 to 12 feet. Migration of soil vapors (gases) occurs through the void spaces between the soil grains in the overburden. Soil vapors discharge to the atmosphere and subsurface structures such as basements, manholes, or sumps. In addition, volatilization of VOCs in groundwater may occur at groundwater discharge locations, such as sumps and/or surface water features. A water sample was collected for VOC analysis from a sump in the basement of the SMC facility which collects water and/or groundwater that accumulates in a former sub-basement which was filled in as part of the building expansion. Due to the low detected concentrations of VOCs in the soil, groundwater and water from the sump at the SMC facility, this is an unlikely migration pathway and not a concern.

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7.0 QUALITATIVE EXPOSURE ASSESSMENT

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A qualitative human health baseline exposure assessment was completed based on the information presented in Sections 1.0 through 5.0. Generally, the human health evaluation involves an exposure assessment, an evaluation of site occurrence, hazard identification and comparison to USEPA and State risk-based criteria.

7.1 HUMAN HEALTH EVALUATION

This section discusses the exposure assessment, an evaluation of site occurrence and a comparison to USEPA and State criteria related to potential impacts to human health. It should be noted that several conservative assumptions were used in completing this assessment; and thus, the risks are expected to be "worst case scenarios".

7.1.1 Exposure Assessment

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This exposure assessment discusses potential migration routes by which chemicals in the environment may be able to reach human receptors. This discussion is based on current and hypothetical future Site conditions and the extrapolation of Site conditions to off-site areas.

Currently, the SMC facility and surrounding properties are used for mixed industrial and residential purposes. It is assumed for the purpose of this evaluation, that the SMC facility and surrounding area use will remain unchanged. The facility has approximately 74 employees who work generally no more than 8 hours a day, or 40 hours per week. The facility operates 24 hours per day, seven days per week. It is estimated that full-time employees work approximately 40 hours per week.

The hypothetical future conditions include: development and/or intrusive work in areas near the SMC facility; the possibility for the facility to be abandoned and left unattended; and workers completing subsurface work at the facility, unaware of potential contamination.

A complete exposure pathway must exist for a population to be impacted by the chemicals at the SMC facility. A complete exposure pathway consists of four components:

1. a source and mechanism of chemical release;
2. a transport medium;
3. a point of potential human contact with the contaminated medium; and
4. an exposure route at the contact point.

Section 5.2 discussed remaining PCB contamination at the Site. Section 6.1 discussed potential routes of migration of chemical substances from source areas, and Section 6.3 discussed observed migration. This section focuses primarily on identifying points of human contact with contaminated media.

The sections below discuss exposure pathways identified for the SMC facility. The exposure pathways are also summarized on Table 11.

7.1.1.1 Surface Soils

Because previously identified PCB contamination within surface soil (drainage swale along Willowbrook Avenue) has been remediated during IRM activities, PCB contamination is not anticipated to be present in surface soils. Therefore, exposure to chemical substances within surface soils is not considered part of the exposure assessment. Additionally, a majority of the SMC facility is covered by either facility buildings or structures and/or asphalt paved surfaces. The remaining grassy areas are generally located in the south and southeastern portion of the facility away from the remediated areas. With the exception of the SMC employees, access to the SMC facility from the residential area located south is restricted by a gated chain link fence that surrounds the facility and a 24 hour security attendant at the guard house. The possibility does exist for the facility to be abandoned and unrestricted access to occur, though unlikely.

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7.1.1.2 Subsurface Soils

Exposure to chemical substances within subsurface soils may occur via dermal contact, inhalation or ingestion under the hypothetical future scenario where intrusive work is performed and workers are unaware or not properly trained to work with potentially hazardous materials. If these materials are brought to the surface and not adequately secured, there is a potential exposure to particulates. Due to the relatively low concentrations of VOCs detected, low vapor pressure of SVOCs, PCBs and inorganics, it is unlikely that vapors could significantly impact receptors on nearby properties. It is unlikely for dermal contact or ingestion to occur to off-site residents/workers as the SMC facility is secured by a gated fence and security attendant.

Future intrusive or subsurface work involving soil excavation or dewatering shall be completed under the guidance of a site management plan (SMP), as previously done as part of the building expansion work. This plan will generally dictate procedures and methods for handling, managing and working with potentially contaminated materials encountered. This plan will be implemented for the purposes of minimizing exposure to potential PCB contaminated soils at the SMC facility. Therefore, the likelihood of this potential exposure is considered to be low.

Contaminated subsurface soils could also act as a source of continuing groundwater contamination. However, PCB impacted soils (which were typically identified at shallow depths typically not exceeding 4 feet bgs) of which the majority where removed are generally not expected to impact groundwater due to its chemical and physical characteristics which result in low leaching potential. Minimal VOC, SVOC and inorganic contaminants were identified and are not considered to be a source of groundwater contamination.

7.1.1.3 Overburden Groundwater

Exposure to overburden groundwater, if used as a drinking water supply, includes ingestion, dermal contact and inhalation of vapors. Due to the close proximity of Lake Erie, and presence of publicly supplied drinking water in the area, use of the overburden groundwater as a water supply source is unlikely.

Currently, a publicly supplied water system (water from Lake Erie) services the area and thus there are no public water supply wells expected within close proximity of the Site. It is unlikely that the small amount of contaminated groundwater observed at the SMC facility would be consumed under current conditions and thus exposure potential is considered to be low.

Additionally, down gradient monitoring wells (i.e., MW-4, -6, -7 and -8) were not identified with compound exceedances with the exception of a few inorganics identified exceeding Class GA Groundwater criteria. Regardless, these metals are not believed to be of

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significance as they are expected to be the result of natural conditions of the area or possibly the result of turbidity (suspended solids) in the collected groundwater samples.

Future development or utility repair within the SMC facility may require excavation and dewatering, and therefore exposing workers to potentially contaminated groundwater. The likelihood for these exposure scenarios to occur is considered low to moderate depending on location of the potential work. This exposure scenario will be further minimized by the implementation of a site management plan.

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7.1.1.4 Potential Exposure to Volatile Vapors

The apparent groundwater flow direction is in a southerly direction. Potential inhalation exposure from volatilization of chlorinated VOC from groundwater (which were detected in upgradient wells only) may occur under current conditions (e.g., migration of vapors into basements and buildings) and under a future development scenarios where an excavation (e.g., utilities or basement) may be needed. However, VOCs were not detected in monitoring well, MW-2, located adjacent to the northwestern corner of the existing building or in the water sample from the sump present in the basement of the building which would suggest very limited or no potential for vapor migration under the building. Additionally, because VOCs were not detected in downgradient groundwater wells, with the exception of MW-5, at concentrations exceeding groundwater cleanup criteria, excavation work on utilities within the southern portion of the Site or along Willowbrook Avenue is not expected to result in exposure to VOC vapors. The VOC concentrations detected at MW-5 are isolated and the compounds detected naturally attenuate. Therefore, the likelihood of exposures to volatile vapors is considered very low.

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7.1.2 Evaluation of Site Occurrence

Tables 12 and 13 present the range of concentrations for the chemicals detected in the subsurface soil and groundwater media for the exposure scenarios discussed above. The summary includes the number of times a chemical was detected at the SMC facility, the number of samples analyzed, the maximum/minimum values reported, and the location where the maximum values were reported. For purposes of this qualitative and conservative assessment, the exposure point concentration was set as the maximum reported value, and this value was compared to USEPA and State risk-based criteria.

The chemical concentrations reported for the SMC facility were used for potential off-site exposure points. This is a conservative approach as off-site concentrations should be less due to dispersion, retardation, and other attenuating mechanisms.

In evaluating the SMC facility occurrence, reported analytical results from soil locations that were subsequently excavated during the IRM activities were not included in the contaminant evaluation nor was data from matrix spike and matrix spike duplicate samples.

7.1.3 Hazard Identification and Comparison to USEPA and State Risk-Based Criteria

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The potential hazards due to human exposures were reviewed based on chemical-specific health exposure based criteria. Both State and Federal values believed potentially applicable to the medium or pathway were examined (see Table 12 and 13).

7.1.3.1 Subsurface Soils

The USEPA and State risk-based criteria used for Site surface soils include the following:

- 6 NYCRR Part 375 Industrial Soil Cleanup Objectives (ISCOs), published by NYSDEC, effective dated December, 2006, and

- "Soil Screening Guidance", USEPA, EPA/540/R-95/128, May 1996.

A comparison of soil risk-based criteria and SMC facility occurrence information compiled from analytical testing results of subsurface soil samples collected is included on Table 12.

Although approximately 6,700 tons of PCB contaminated soil has been removed for disposal as part of the IRM activities, some contaminated soil remains in the area of the Site. Subsurface soil samples were identified with compounds exceeding some of the respective risk-based criteria. Four SVOCs, total PCBs and arsenic exceed their respective risk-based criteria.

It should be noted that arsenic was detected at four subsurface soil locations with a maximum concentration of 21.9 ppm, which is above the ISCO value of 16 ppm (without consideration of Site background). A review of published background arsenic levels in surface soils throughout the United States, Eastern United States, and New York State indicated that arsenic levels can vary from 0.1 to 45 ppm and 3 to 12 ppm, respectively (NYSDEC, 1991). Additional sampling completed as part of the SWI identified arsenic at the SMC facility at similar concentrations as those identified by the IRM and RI sampling. It should be noted that more than 50% for the SMC facility property is covered by structures or pavement limiting exposure to the detected arsenic.

7.1.3.2 Groundwater

Human health risks associated with exposure to overburden groundwater were examined by considering both:

- Use of the overburden groundwater as a drinking water source; and

- Potential exposure to overburden groundwater at a point of contact, downgradient of the Site to the south, or by construction/utility workers.

Potential exposure to volatile vapors from overburden groundwater is addressed separately in Section 7.1.3.4.

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The USEPA and State criteria used for human health risks associated with use of overburden groundwater at the Site as a drinking water source include the following.

- NYSDEC Class GA Groundwater Quality Criteria 6NYCRR Part 701-703, dated June 1998.
- USEPA Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Guidelines (MCLGs), dated November 24, 1999.

Groundwater samples from the overburden groundwater contained several compounds exceeding risk-based criteria (Class GA criteria). Five VOCs and three inorganics exceeded risk-based criteria.

Of the detected VOCs, cis 1,2-DCE, a chlorinated solvent, was the more significant detection at 220 ug/L compared to its SCG of 5 ug/L. Cis 1,2-DCE was detected in 5 of 8 groundwater samples tested, three of which exceed Class GA groundwater cleanup criteria. The presence of cis,1,2-DCE appears to be the result of an upgradient off-site source to the north of the SMC facility.

Inorganics including, barium, iron, and manganese exceeded their risk-based criteria. Although low flow sampling techniques were employed, inorganics detected above the risk-based criteria may be attributable to turbidity or may be reflective of natural conditions.

A few SVOCs were detected in groundwater samples but not at concentrations exceeding their respective groundwater cleanup criteria.

PCBs were not detected in the groundwater samples.

7.1.3.4 Volatile Vapors in Site and Downgradient Excavation

Human health risks associated with exposures to volatile vapors via inhalation were assessed using the groundwater and water from the building sump VOC analytical data from the SMC facility. Detected VOCs (including chlorinated solvents; TCE and 1,2-cis-DCE) were identified primarily in upgradient wells and appear to be the result of an upgradient source associated with the Al Tech site adjacent to the north and west.

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Because a basement was installed to the top of bedrock as part of the building expansion and rotoforge press installation, a potential for VOC vapor migration into the building structure via volatilization from impacted groundwater, and the potential for associated human exposures was considered. However, the results of a water sample collected from the sump present in the basement of the SMC facility did not indicate the presence of chlorinated VOCs above method detection limits nor is there a vapor concern due to the low

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concentrations of the three VOCs detected. Therefore, the potential for vapor intrusion of volatile vapors is not a concern.

Downgradient wells at the SMC facility were identified with some minor VOCs; however, the concentrations are below SCGs and are considered negligible. Therefore off-site migration of volatile vapors is not a concern.

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7.2 SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

A qualitative human health exposure assessment was completed for the SMC facility. Generally, the human health evaluation involves an exposure assessment, an evaluation of Site occurrence, hazard identification and comparison to Federal and New York criteria. Three possible exposure scenarios were identified and evaluated based on analytical laboratory results of samples collected from soil and groundwater. A summary of the results of the exposure assessment, listed by media, and a conclusion as to the apparent need to address each of the media during a Feasibility Study is presented below and in Table 11.

7.2.1 Surface Soil

The potential for exposure to chemical substances within surface soils at the SMC facility appears to be low. The ground surface is either grass covered, asphalt paved or covered with existing structures and access is generally restricted. Also, it is unlikely that erosion of soils will occur due to the relatively flat ground surface slope, and the presence of grass cover present in the area that is not covered by structures or asphalt. The possibility does exist for the facility to be abandoned and unrestricted access to occur. However, PCBs were not detected in the three surface soils collected; and therefore, will not be addressed as part of the feasibility study.

7.2.2 Subsurface Soil

The potential for exposure to chemical substances within subsurface soils at the SMC facility is limited to potential uncontrolled access (e.g., excavation by unknowing personnel). If access to subsurface soils did occur in areas where PCB contaminated soils remain (i.e., underneath specific building foundations or at the western adjacent property boundary), contaminant exposure is likely at levels representing a slight health risk. Therefore, remaining contaminated subsurface soils at the Site will need to be addressed as part of the Feasibility Study.

7.2.3 Overburden Groundwater

The potential for exposure to chemical substances within the overburden groundwater at the SMC facility is limited to points of groundwater discharge into a downgradient excavation or sump and potential subsequent inhalation of volatile vapors. The potential for exposure due to use of overburden groundwater as a drinking water source is considered low to non-existent as the facility and surrounding areas are connected to the public water supply system. However, due to the concentration of chlorinated solvent contamination detected in overburden groundwater at the two upgradient wells, exposure could occur if groundwater is used for purposes such as cooling,

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dewatering, or irrigation. Based on the concentrations observed at the two upgradient wells, exposure to VOC impacted groundwater could pose a slight health risk. However, the chlorinated solvent portion of the VOCs in groundwater is apparently associated with an upgradient source on the adjacent Al Tech Site. The contaminated overburden groundwater at the Site will therefore be addressed during the Feasibility Study.

7.2.4 Volatile Vapors Exposure

The potential for exposure to chemical substances within volatile vapors at the Site appears to be low to negligible since the groundwater generally ranges from about 6 to 15 feet bgs, the tight nature of the overburden soil and the detected concentrations are very low. Volatile vapors that may occur are expected to be of minimal volume and concentration due to dilution and/or dispersion factors. A water sample from a sump in the basement of the SMC facility did not have chlorinated VOCs detected above method detection limits nor is there a vapor concern due to the low concentrations of the three VOCs detected. Therefore, vapor intrusion is not a concern.

7.3 QUALITATIVE EXPOSURE ASSESSMENT SUMMARY

The qualitative exposure assessment identified the remaining contamination in subsurface soil and, to a lesser extent, groundwater at levels exceeding applicable criteria. The media and primary issues are shown below.

- Groundwater: PCBs were not detected in any of the groundwater samples tested. Some minor VOCs were detected exceeding Class GA levels (e.g., chlorinated solvents including TCE and cis-1,2-DCE) resulting from an apparent upgradient source. Additionally, one monitoring well identified petroleum compounds as slightly exceeding the Class GA groundwater criteria. The total detected VOC concentrations were considered to be low, as the total concentration for the SMC facility contaminants is less than 0.5 ppm. Downgradient monitoring wells were identified with VOC detections; however, compounds were not detected exceeding Class GA criteria and therefore off-site migration of contamination is not expected.

- Subsurface Soils: Because most of the PCB contaminated soils have been excavated and removed as part of the IRM activities and due to the high sorption quality of PCBs to soils, impact to groundwater via leaching of PCB contamination is not expected. Areas of PCB concentrations in soil exceeding the SCGs may be encountered in areas that the IRM excavations could not remove because of their presence adjacent to existing building foundations.

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8.0 POTENTIALLY APPLICABLE STANDARDS, CRITERIA AND GUIDELINES AND REMEDIAL ACTION OBJECTIVES

8.1 INTRODUCTION

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Standards, Criteria and Guidelines (SCGs) are used to establish the locations where remedial actions are warranted and to establish cleanup goals. SCGs include State and Federal requirements.

8.2 POTENTIALLY APPLICABLE STANDARDS, CRITERIA AND GUIDELINES (SCGs) AND OTHER CRITERIA

- *Applicable Requirements* are legally enforceable standards or regulations which have been promulgated under State and Federal law such as groundwater standards for drinking water.

- *Relevant and Appropriate Requirements* include those requirements which have been promulgated under State and Federal law which may not be "applicable" to the specific contaminant released or the remedial action contemplated, but are sufficiently similar to site conditions to be considered relevant and appropriate. If a relevant and appropriate requirement is well-suited to a site, it carries the same weight as an applicable requirement during the evaluation of remedial alternatives.

- *To Be Considered Criteria* are non-promulgated advisories or guidance issued by State or Federal agencies that may be used to evaluate whether a remedial alternative is protective of human health and the environment in cases where there are no standards or regulations for a particular contaminant or site condition. These criteria may be considered with SCGs in establishing cleanup goals for protection of human health and the environment.

The following subsections present the three categories of SCGs: chemical-specific, location-specific, and action-specific.

8.2.1 Chemical-Specific SCGs

Chemical-specific SCGs are typically technology or health risk based numerical limitations on the contaminant concentrations in the ambient environment. They are used to assess the extent of remedial action required and to establish cleanup goals for a site. Chemical-specific SCGs may be directly used as actual cleanup goals, or as a basis for establishing appropriate cleanup goals for the contaminants of concern at a site. Chemical-specific SCGs for the SMC facility are identified in Tables 12 and 13.

The list of chemical-specific SCGs presented herein is generally consistent with the SCGs presented as part of the qualitative risk assessment for the RI. The USEPA Soil Screening Guidance: Technical Background Document was developed with anticipated future residential land use scenarios. The intended use of the SMC facility is for industrial purposes (not residential); therefore, these requirements were used for “screening” or comparative purposes in developing cleanup goals.

8.2.2 Location-Specific SCGs

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Location-specific SCGs apply to sites that contain features such as wetlands, floodplains, sensitive ecosystems or historic buildings that are located on, or in close proximity to the SMC facility. Based on the RI and previously completed investigations; wetlands, floodplains, sensitive ecosystems or historic buildings are not located on the SMC facility. Thus, location-specific SCGs were not identified.

8.2.3 Action-Specific SCGs

Action-specific SCGs are usually administrative or activity-based limitations that guide how remedial actions are conducted. These may include record keeping and reporting requirements, permitting requirements, design and performance standards for remedial actions, and treatment, storage and disposal practices. Action-specific SCGs are not considered applicable and not further discussed in this report.

8.3 REMEDIAL ACTION OBJECTIVES

This section presents the objectives for remedial actions that may be taken at the SMC facility to protect human health and the environment.

The primary contaminant of concern at the Site is PCBs. The IRM Work Plan established a remedial objective to remove PCB impacted soil with concentrations greater than about 10 ppm (TAGM 4046 RSCO). The IRM activities removed approximately 6,700 tons of PCB impacted soils from the SMC facility and very little PCB contaminated soil is anticipated to remain. The facility is expected to continue to be used for industrial purposes similar to its current use. Based on these factors, an evaluation to restore the Site to unrestricted use soil cleanup objectives as stated in 6 NYCRR Part 375-2.8 (c)(2)(i) was not considered to be feasible due to the volume of soil required to be removed and the presence of soil adjacent/underneath existing structures. By implementing the IRM (6 NYCRR Part 375-2.8 (d)) the remedial goals for the Site have been achieved for accessible soil.

To develop the Remedial Action Objectives (RAOs) for the residual contamination, GZA completed the following as part of the RI and FS.

- Identified contaminants remaining in the environmental media in the AOC.
- Evaluated existing or potential exposure pathways in which the residual contaminants may affect human health and the environment.
- Identified pathways having a moderate to high likelihood for exposure.
- Identified chemical-specific SCGs that apply to the likely exposure routes to establish the contaminants of concern and proposed cleanup goals for purposes of remediation.

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- Established remedial action objectives for the contaminants of concern to reduce the potential for future exposure.

RAOs are presented for the environmental media at the Site.

8.3.1 Contaminants Of Concern and SCG Goals

Tables 12 and 13 list the compounds and analytes detected in samples collected during the investigations and the chemical-specific SCGs (risk-based exposure limits) that apply to the likely exposure routes for the environmental media of interest. Potential exposure pathways are discussed in Subsection 7.1.1. Proposed cleanup goals for each contaminant compound were developed in accordance with the procedures described below.

Proposed cleanup SCGs for organic compounds were selected by comparing the chemical-specific SCGs appropriate to the likely exposure pathways. The cleanup SCG was then selected based on the potential exposure scenarios and contaminated media at issue.

Contaminants of concern were identified for the environmental media by identifying the contaminants that exceeded the proposed cleanup SCGs and then evaluating the frequency that cleanup goals were exceeded and the relative toxicity of the contaminant. In general, contaminants of concern were established based on the following criteria.

- Those contaminants that exceeded the proposed cleanup SCGs in greater than 5 percent (%) of the samples tested within the medium; but

- Excluding select inorganic compounds considered to be essential human nutrients (i.e., iron, magnesium, calcium, potassium and sodium) that are present at elevated levels potentially above natural background concentrations.

It should be noted that due to the limited number of soil samples tested for VOCs, SVOCs and metals (approximately 35), 5% of the soil samples is less than two samples. No VOCs or SVOCs were detected above SCGs at a frequency greater than 5%. Arsenic was the only inorganic that was detected above SCGs. It was detected at four locations at levels slightly exceeding its respective SCG.

As described in the RI Report, the primary contaminants of concern at the Site are PCBs in soil. However, due to the completed IRM at the Site, the majority of the PCB contaminated soils have been remediated by excavation and off-site disposal as hazardous waste. The remaining PCB contaminated soils exceeding respective SCGs at the Site (2 sample locations) are located adjacent to buildings that IRM activities could not remove without impacting the structural integrity of the building. Other remaining locations (5 sample locations) are along the western property boundary, which is an off-site location. PCBs were detected at the SMC facility at a frequency of less that 5% of the soil samples collected.

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Other remaining contaminants of concern include VOCs in groundwater (a portion of which appears to be the result of an upgradient, off-site source area) and arsenic at sporadic locations. SVOCs were not detected above their respective SCGs, and are therefore not considered to be contaminants of concern. No PCBs were detected in the groundwater samples collected and are not considered to be a concern.

Tables 14 and 15 identify the contaminants of concern for the purposes of remediation in the environmental media (i.e., groundwater and subsurface soils), the range of concentrations detected, the proposed cleanup SCG, the number of samples that exceed the cleanup SCG, and the number of samples analyzed.

8.3.2 Contaminated Media And Exposure Pathways

This subsection addresses the environmental media and describes the types of contaminants present, the potential exposure pathways, and the proposed remedial action objectives to reduce the potential for future exposure.

8.3.2.1 Overburden Groundwater

Overburden groundwater sampling and laboratory analyses were completed as part of the RI. Table 14 identifies the contaminants of concern detected in the overburden groundwater samples. Based on qualitative exposure assessment presented as part of the RI, the contaminants of concern for groundwater are VOCs, specifically low concentrations of chlorinated solvents (i.e., TCE and cis-1,2-DCE) and petroleum compounds. Chlorinated solvents were detected at their highest concentration in two upgradient wells, this contamination appears to be associated with an upgradient source (i.e., Al Tech property adjacent to the north and west). Remediation efforts for the chlorinated solvent contamination observed during the investigation will not be discussed in the FS portion of this report as it is not associated with SMC operations. Until the upgradient source can be better assessed or remediated, attempts to remediate that portion of contamination on the SMC facility may be ineffective because it is not addressing the source of contamination. The extent of the VOCs identified in groundwater samples is considered to be low with a total concentration of VOCs from all eight (8) monitoring at less than 0.6 ppm.

The primary exposure pathway for the overburden groundwater appears to be via contact with contaminated groundwater at points of possible groundwater discharge such as future excavations near or below the overburden water table. Potential exposure to groundwater may include ingestion, inhalation of vapors, or dermal contact. The potential for exposure via these pathways is considered low as the depth to groundwater ranges from approximately 6 to 15 feet bgs and it is not likely that shallow excavations will encounter groundwater.

Exposure to groundwater in the northwestern portion of the Site could pose a slight risk. However, based on the limited location and relatively low concentrations of VOCs, remediation of groundwater does not appear to be warranted. Groundwater remediation

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involving typical extraction systems may increase the upgradient migration of contamination on to the SMC facility. In-situ remedial technologies could address contamination that is migrating on the SMC property but will not prevent migration from reoccurring.

The remedial action objectives for the overburden groundwater are to reduce the potential exposure to overburden groundwater thereby reducing the potential for inhalation of organic vapors, ingestion and dermal contact with contaminated groundwater.

8.3.2.2 Subsurface Soils

The IRM data indicate that some remaining PCB contamination is present in the subsurface soils at the Site at locations that could not be excavated during IRM activities (i.e., property boundary or adjacent to existing buildings). Table 15 lists the contaminants of concern detected in samples of the subsurface soils. Although some minor VOC, SVOC and metal contaminants were identified, the primary contaminant of concern is PCBs.

Potential exposure pathways for the contaminated subsurface soils include ingestion, dermal contact and to a lesser degree inhalation by maintenance personnel or earthwork construction workers. The PCB contaminated soils (excavated and remaining) do not appear to have leached into the overburden groundwater as noted in the groundwater samples (non-detect). These soils were typically observed at depths not exceeding 4 feet bgs. The likelihood of exposure via these pathways is low. However, if uncontrolled access (e.g., excavation by unknowing personnel) to subsurface soils occurs, contaminant exposure is likely at levels representing a health risk. Therefore, action to control access is warranted.

The RAOs for the subsurface soils are to reduce the potential for direct human or animal contact with the contaminated subsurface soils.

9.0 PRELIMINARY SCREENING OF REMEDIAL ACTIONS

9.1 INTRODUCTION

This section presents the preliminary screening of remedial actions that may be used to control the contaminants of concern and to achieve the remedial action objectives for the Site. Potential remedial actions are evaluated during the preliminary screening on the basis of effectiveness, implementability, and relative cost. The purpose of the preliminary screening is to eliminate remedial actions that may not be effective based on anticipated site conditions, or that cannot be implemented technically at the site; and, to narrow the list of alternatives that will be evaluated in greater detail later in this report.

The remedial actions include general response actions (e.g., containment/management, excavation) that may be accomplished using various remedial technologies. During the preliminary screening,

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the intent is to identify general response actions and remedial technologies that may be appropriate for the SMC facility conditions. The list of general response actions considered herein is intended to include those actions that are most appropriate for the SMC facility (considering that most of the PCB contaminated soils have already been excavated and disposed and that a potential upgradient source of groundwater contamination appears to be migrating onto the northern portion of the property from an off-site location) and, therefore, is not exhaustive. A select, focused group of general response actions and remedial technologies for groundwater and soil is considered.

It should be noted that remedial action to restore the Site to predisposal conditions (unrestricted soil cleanup objectives) was not evaluated. The completion of the IRM achieved Site remedial goals. The continued use of the Site for industrial purposes, the considerable cost associated with achieving predisposal conditions and the presence of an upgradient source of VOC contamination make it unreasonable for SMC to consider the feasibility of restoring the Site to predisposal conditions.

9.2 REMEDIAL ACTION AREAS AND VOLUMES

This subsection presents the estimates of areas and volumes of remaining contaminated groundwater and soils to assist in evaluating remedial alternatives later in this report. The estimates are based on the information presented in the IRM and RI portion of this report. It should be noted that the areas and volumes of PCB contaminated soils have been significantly reduced due to the IRM, which removed approximately 6,700 tons.

The estimated areas of contaminated groundwater at the SMC Site exceeding the SGCs is shown on Figure 14. Considering a total VOC concentration of 0.3 ppm for the area of impacted groundwater associated with the chlorinated solvent VOC contamination; and total VOC concentration of 0.15 ppm for the area around MW-5 (petroleum based contamination); less than 1.5 pounds of total VOCs per 1,000,000 gallons is estimated (see Appendix D for calculations and Figure 14 for area of impacted groundwater).

The estimate of the average saturated aquifer thickness (about 10 foot thick in the northern portion of the Site and about 5 feet thick in the central portion of the property) is based on water level measurements in the monitoring wells. The porosity value (assumed to be 0.40) is based on published values for this type of soil (silts and clays). Contaminated groundwater was not detected at concentrations exceeding SCGs in downgradient wells located at the southern portion of the SMC facility. Petroleum compounds were detected at one location (MW-5) as slightly exceeding SCGs for groundwater.

The estimated volume of contaminated soils remaining on the SMC property is estimated to be approximately 270 cubic yards (cy) at the following locations.

- Guard House: PCBs are present at approximately 1 foot bgs to approximately 4 feet bgs, in an area assumed to be less than 900 sf in extent. The estimated volume of contaminated soil in this area is estimated to be less than 100 cy (see Figure 14).

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- Existing Site Building: PCBs are present from approximately 1 foot bgs to approximately 4 feet bgs, in an area assumed to be less than 1,200 sf in extent. The estimated volume of contaminated soil in this area is estimated to be less than 135 cy (see Figure 14).

These areas of remaining contaminated soil are generally based on the results of IRM confirmatory sample results and visual observations made during IRM excavation. The estimated remaining contamination, which is below existing structures, is less than 7% of the original volume of PCB contaminated soil that was remediated at the SMC facility. PCB impacted soil exceeding the SCG are located along the western property boundary of the Site, which was the IRM excavation limits.

It is our opinion that the presence of PCB contamination is the result of historic operations conducted by Allegheny when it owned both the SMC facility and the Al-Tech site. Allegheny conveyed the title to the Al-Tech site in 1976 and the SMC facility in 1983. See Section 4.5.1 for the discussion on fill material.

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9.3 GENERAL RESPONSE ACTIONS

To satisfy the RAOs for the Site, remedial action will be required for the groundwater and subsurface soils. General response actions that are available to meet the remedial action objectives and under consideration based on the remaining contaminant concentrations present at the Site are identified below.

General response actions for the contaminated groundwater include:

- No Action;
- Continued Monitoring
- Groundwater Extraction Treatment and/or Disposal.

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General response actions for the contaminated subsurface soils include:

- No Action;
- Containment and management through a Site Specific Soil Management Plan;
- Excavation and Off-Site Treatment and/or Disposal.

9.4 SCREENING OF REMEDIAL TECHNOLOGIES

In accordance with guidance documents issued by the NYSDEC (DER-10) and the USEPA (Guidance for Conducting RI/FS Studies under CERCLA, dated October 1988), the criteria used for preliminary screening of general response actions and remedial technologies include the following.

- Effectiveness - The effectiveness evaluation focuses on the degree to which a remedial action is protective of human health and the environment. An assessment is made of the extent to which an action: (1) reduces the mobility, toxicity and volume of contamination at the site; (2) meets the remediation goals identified in the remedial action objectives; (3) effectively handles the estimated areas and volumes of contaminated media; (4) reduces

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impacts to human health and the environment in the short-term during the construction and implementation phase; and (5) how proven or reliable the proposed action may be in the long-term with respect to the contaminants and conditions at the site. Alternatives that do not provide adequate protection of human health and the environment are eliminated from further consideration.

- Implementability - The implementability evaluation focuses on the technical and administrative feasibility of a remedial action. Technical feasibility refers to the ability to construct and operate a remedial action for the specific conditions at the site and the availability of necessary equipment and technical specialists. Technical feasibility also includes the future maintenance, replacement and monitoring that may be required for a remedial action. Administrative feasibility refers to compliance with applicable rules, regulations, statutes and the ability to obtain permits or approvals from other government agencies or offices; and the availability of adequate capacity at permitted treatment, storage and disposal facilities and related services. Remedial actions that do not appear to be technically or administratively feasible, or that would require equipment, specialists or facilities that are not available within a reasonable period of time, are eliminated from further consideration.

- Relative Cost - In the preliminary screening of remedial actions, relative costs are considered rather than detailed cost estimates. The capital costs and operation and maintenance costs of the remedial actions are compared on the basis of engineering judgment, where each action is evaluated as to whether the costs are high, moderate or low relative to other remedial actions based on knowledge of site conditions. A remedial action is eliminated during preliminary screening on the basis of cost if other remedial actions are comparably effective and implementable at a much lower cost.

9.4.1 Groundwater Remedial Technologies

An evaluation of the analytical and field data for groundwater from the RI indicates that VOC contamination above the SCGs is present in groundwater in the northern and central portion of the SMC facility. However, the concentrations for the detected contaminants (i.e., chlorinated solvents and petroleum compounds) were identified at low concentrations totaling less than 0.6 ppm for the sum of the VOCs detected in all eight (8) on-site monitoring wells. In-situ and ex-situ remedial technologies used to treat this contamination is not considered practical as the extent of contamination is considered very low. Therefore, these remedial options will not be discussed in any detail. Additionally, identified VOCs located in the northern portion of the SMC facility appear to be the result of an off-site, upgradient source area and remedial technologies that require pump and treat applications will be ineffective in source remediation and could mobilize or increase contaminant migration onto the property and thus potentially increase the risk to human health and the environment at the SMC facility.

The following subsections discuss the preliminary screening of various general response actions and remedial technologies that were considered for remediation of SMC facility groundwater.

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9.4.1.1 No Action

The No Action alternative involves taking No Action to remedy groundwater conditions at the Site. NYSDEC and USEPA guidance requires that the No Action alternative automatically pass through the preliminary screening and be compared to other alternatives in the detailed analysis of sitewide alternatives. However, due to the low concentrations of contamination detected in the groundwater from an off-site source that is isolated to the northern portion of the SMC facility, No Action may be a practical or cost effective response to the groundwater issue.

9.4.1.2 Limited Groundwater and Vapor Intrusion Monitoring

Because groundwater contamination is present at concentrations exceeding groundwater SCGs in the northwestern portion of the SMC facility, a limited monitoring program could be implemented. A water sample from the sump present in the basement of the rotoforge building and groundwater samples from MW-5, MW-6 and MW-7 were collected and analyzed for VOCs in April 2008.

Chlorinated VOCs were not detected in the sump sample, therefore; vapor intrusion monitoring is not necessary. No VOCs were detected at downgradient well locations (MW-6 and MW-7) above their respectable SCGs, therefore; no additional groundwater monitoring or a vapor intrusion assessment is necessary.

This technology, will not reduce or remediate concentrations in the groundwater, but assess and monitor the mobility of the VOC contaminants.

9.4.1.3 Containment/Treatment

The purpose of groundwater containment is to isolate, or restrict the flow of contaminated groundwater. Containment and treatment of groundwater is generally accomplished by removing water from the ground, such as by pumping from extraction wells. Containment technologies that rely on groundwater extraction are occasionally supplemented with a low permeability subsurface barrier to improve the effectiveness of the extraction system. Also, containment technologies may be used with a low permeability cap of the contaminated area to limit the amount of precipitation that infiltrates downward through potentially contaminated materials and into the groundwater. However, removing groundwater via typical pumping would not address the apparent contaminant source and it could enhance the mobility of upgradient groundwater onto the SMC facility thereby increasing contaminate levels on the property. Because the current concentrations are considered very low and, in an effort to minimize additional contamination migration on to the Site, containment/treatment options will not be discussed in detail as part of this FS.

9.4.2 Soil Remedial Technologies

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An evaluation of the analytical data for subsurface soils from the IRM and RI indicates that some PCB, SVOC and metals contamination above the SCGs remain in select areas at the Site. As shown on Figures 14 and as described in Section 9.2, the remaining contaminated soils are located in areas adjacent to existing structures and at the western property boundary (which is considered to be off the property). Minimal soil contamination has been estimated to be present (235 cy) in the unsaturated soils beneath the buildings, typically at depths ranging from 1 to 4 feet bgs.

Although the soil contamination remaining is considered minimal and of low risk to human health and the environment, the following subsections discuss the preliminary screening of various general response actions and remedial technologies that were considered for remediation of the subsurface soils at the Site.

9.4.2.1 No Action

This alternative involves taking No Action to remedy the condition of remaining contaminated soils. NYSDEC and USEPA guidance requires that the No Action alternative automatically pass through the preliminary screening and be compared to other alternatives in the detailed analysis of sitewide alternatives. However, because the IRM activities have removed the majority of the PCB contamination at the Site and significantly reduced the extent and risk of contamination, the remaining contamination may not warrant additional remedial activities.

9.4.2.2 Containment

The containment action for the Site soils could generally be used to reduce the potential for direct contact with contaminated materials, provide a surface seal and reduce infiltration of precipitation through contaminated soils and potentially into the groundwater. The following subsection presents the preliminary screening of this capping alternative.

9.4.2.2.1 Asphalt Pavement Cover

An asphalt pavement cover includes a layer of base course stone or gravel overlain by an asphalt binder course and a final asphalt wearing course. The layers of the pavement section are graded into place and compacted. This cover system is appropriate in situations where moderate reductions in infiltration of precipitation and a surface seal are desired. Asphalt pavement covers also serves to preserve the use of the property for vehicle parking and traffic, and to limit contact with contaminated soils.

Effectiveness - It appears that an asphalt pavement cover will be effective in helping to achieve the RAOs for groundwater and soil since it would reduce the potential for direct contact with the contaminated soils; reduce infiltration; serve as a surface seal; and, limit erosion and transport of contaminated materials. To maintain the long-term effectiveness of an asphalt cover, periodic maintenance (i.e., crack sealing, seal coating or pavement overlay)

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may be required. An adequately maintained asphalt pavement cover will be protective of human health and the environment.

Implementability - The materials, equipment and labor for construction of an asphalt pavement cover are available and can be readily implemented during the period when the asphalt batching plants are open (generally March to November). It should be noted that most of the IRM excavation areas were covered with asphalt pavement at completion of the IRM activities. The area of the SMC facility that is not covered by asphalt includes grassy areas south of the buildings and north of Willowbrook Avenue.

Cost - Costs for additional asphalt pavement cover are expected to be low as most of the IRM excavation areas are already paved, and areas of remaining contaminated soil are generally located beneath structures or buildings. Capital costs may include materials, labor and equipment to construct the asphalt pavement section. Operation and maintenance costs may include periodic crack sealing, seal coating, and/or repaving with an asphalt overlay.

This application is an effective and implementable technology for helping to meet the RAOs for soil and groundwater. Figure 16 and Photographs 2 through 7 depict the surface covers present in the areas that were remediated as part of the IRM. Approximately, eighty (80) percent of the areas excavated have been covered with an asphalt surface to replace the access roads and parking lot disturbed by the excavations. Additionally, the PCB contamination remaining above SGCs in the AOC are located beneath existing structures which have concrete slab-on-grade surfaces. The twenty (20) percent of the excavated area that is grass covered is going to be maintained by SMC as grass cover. Therefore, asphalt pavement cover will not be evaluated further in the detailed analysis of Sitewide alternatives.

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9.4.2.2.2 Implementation of Site Management Plan

The purpose of a Site Management Plan (SMP) is to define a program for handling, segregating, testing, reuse, and disposal of soil/material encountered during potential future development and building construction activities planned by SMC. A contractor employed by SMC for potential development/construction would be responsible for implementing the aspects of the plan under guidance/oversight from SMC. The information provided in the plan would include procedures/requirements for materials management during the specific project work and the scope of the plan would relate to the handling and management of at-grade and below-grade soils, groundwater and other materials.

Effectiveness – The use of a SMP would be effective in helping to minimize exposure to remaining soil and groundwater contamination by directing construction/maintenance activities as to proper handling techniques and

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management of potential contaminated soil and groundwater encountered at the Site.

Implementability – A SMP can be readily implemented for potential Site work. However, this plan would not reduce concentration levels of remaining contamination, rather it would provide a reduction in exposure risk to potentially contaminated materials at the SMC facility.

Cost - Costs for a SMP is expected to be low. No operation and maintenance costs would be associated with this option.

In summary, due to the low volume of remaining soil contamination at the SMC facility (approximately less than 235 cy), completion and implementation of a SMP would be a cost effective and easily implemented approach to minimizing potential for future exposure to residual contamination.

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9.4.2.3 Excavation and Off-Site Disposal

Excavation and off-Site disposal is presented below for soils that exceed SCGs. These soils are typically located underneath existing buildings and have been estimated at less than 235 cy of material. Typically, contaminated soils have been identified at depths ranging from 1 to 4 feet bgs and therefore potential excavations are expected to be shallow.

9.4.2.3.1 Excavation and Off-Site Disposal

This action involves the additional excavation of contaminated soils that exceed SCGs. These soils may be excavated and removed for off-Site treatment and/or disposal at a permitted solid waste disposal facility.

Effectiveness - Excavation and disposal of solid waste at a permitted landfill is an effective method of reducing the volume of contaminated material and reducing potential for direct contact with contaminated soils. In addition, this action reduces the potential for future contamination of groundwater, although PCBs have a high sorption to soils and have not been detected in the groundwater at the SMC facility. Placing excavated materials in a permitted solid waste facility reduces the risk to human health and the environment since the materials would be in a secure location with environmental monitoring. The remaining PCB contaminated soil is estimated to be less than 7% of the volume previously remediated at the Site as part of the IRM work. The remaining volume is currently covered by buildings and is of low risk to human health and environment.

Implementability – Contractors and disposal facilities are readily available to implement this technology for the contaminated soil encountered. This option would be limited to the remaining contamination located beneath

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buildings that are currently in use by SMC. Building demolition to some extent would be required to obtain access to this soil contamination. Thus, building demolition could be expected to have a negative impact on the current activities at the SMC facility.

Cost - The cost of implementing excavation is expected to be moderate to high in comparison to the contaminated soil removal in areas of easy access, as those done as part of the IRM. However, access to the remaining contaminant areas would likely require demolition of existing buildings which could impact ongoing operations and thereby increase the cost for this alternative.

In summary, excavation and disposal at a permitted solid waste facility is applicable for removing contaminated soils, but may be an ineffective technology for remediation of contaminated soils due to the required demolition of existing structures or buildings and the overall impact to ongoing operations at the SMC facility.

9.4.2.4 In-Situ Treatment

The analytical data for soils samples collected during the IRM and RI work indicate that soils with PCB contamination are limited to areas beneath existing buildings at two locations in the upper 4 feet of soil, above the groundwater table. As such, in-situ treatment systems are not expected to be effective or cost effective remedial measures for the contaminated soil. These remediation systems typically are better suited for contaminants that can be volatilized or removed from the soil and are located in the water table, which provides a mechanism for delivery. Thus, in-situ treatment of the remaining PCB contaminated soils will not be discussed as part of this FS.

9.5 RESULTS OF PRELIMINARY SCREENING

Based on the preliminary screening of remedial actions, the following have been selected to be further considered in the Detailed Analysis of Sitewide Alternatives (Section 10.0) and Detailed Analysis of Sitewide Alternatives (Section 11.0).

- No Further Action;
- SMP;
- Additional Soil Excavation and Disposal

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10.0 DEVELOPMENT OF SITEWIDE REMEDIAL ALTERNATIVES

10.1 INTRODUCTION

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This section presents a description of the three Sitewide alternatives that have been developed. The Sitewide remedial alternatives chosen were limited due to the low concentration of total VOCs identified in groundwater and the significant reduction of PCB soil contamination by the IRM. Because the groundwater contamination has low concentrations (0.3 ppm, worst case) and the soil remaining above SCGs is identified at two locations beneath existing buildings, many typically evaluated remedial alternatives will not be discussed in great detail. These remedial technologies (i.e., in-situ and ex-situ remedial/treatment technologies) are typically utilized to handle contamination of significant concentrations typical of pre-IRM conditions. These remedial options would likely be cost prohibitive and impractical for treating or remediating the remaining contamination at the SMC facility.

10.2 SITEWIDE ALTERNATIVES

Three sitewide remedial alternatives have been assembled using the general response actions and remedial technologies that passed the preliminary screening. An expanded description of each of the sitewide alternatives is provided below.

10.2.1 Sitewide Alternative No. 1 – No Action

The No Action alternative involves taking no further action to remedy residual contamination at the Site. This alternative allows for natural attenuation of impacted, soil and groundwater. NYSDEC and USEPA guidance requires that the No Action alternative be considered in the detailed analysis of Sitewide alternatives. The No Action alternative is considered an acceptable alternative in this case because of the current and future industrial use of the SMC facility and the completion of the IRM, which removed most of the detected PCB contaminated soil present (approximately 6,700 tons). The amount of remaining PCB contaminated soil is estimated to be less than 7% (about 470 tons) of the PCB remedial action undertaken as an IRM. The remaining contamination is located underneath buildings and is considered to be of minimal threat to human health and the environment.

10.2.2 Sitewide Alternative No. 2 – Implementation of Site Management Plan

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The following is a description of the remedial actions included in Sitewide Alternative No. 2, specific to soil and groundwater.

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Soil Remedial Actions:

A SMP would outline a program designed for handling, segregating, testing, reuse and disposal of potentially contaminated soil/material encountered during possible future development and building construction activities planned by SMC. The information provided in the plan would include procedures and requirements for materials management during work related to at-grade and below-grade soils, groundwater and other materials. This plan would not reduce the concentrations of remaining contamination; however, it would reduce worker and/or contractors risks associated with exposure to contaminated soil and groundwater, if encountered.

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10.2.3 Sitewide Alternative No. 3 – Additional Soil Excavation and Disposal

The following is a description of the remedial actions included in Sitewide Alternative No.3, specific to soil.

Soil Remedial Actions:

Unlike Alternatives No. 1 and 2, this alternative reduces the concentration of the remaining PCB contaminated soil by excavation and disposal. Figure 14 identifies the two areas at the SMC facility where PCB impacted soil remains above the SCGs that requires remedial actions for Sitewide Alternative No. 3.

Soil Remedial Actions:

Excavation of PCB contaminated soils remaining beneath the buildings at the Site would be completed in the same manner as the IRM activities. Soil probes and soil samples would be done at interior portions of the buildings that are suspect to be underlain by PCB soil contamination. Once the PCB contamination underneath the buildings has been delineated, an assessment of whether the building would require demolition (guard house) or if excavation could be completed from interior locations without demolition of the building structure, foundation columns and footers (main building). Excavation of remaining contaminated soils and concrete flooring would be loaded into either a dump truck or a roll off for transportation to a landfill permitted to dispose the waste similar to the previously completed IRM. Excavations would be backfilled with compacted clean fill material. Confirmatory soil sampling and field screening activities similar to those done in the IRM would be done to determine the extent of excavation necessary.

11.0 DETAILED ANALYSIS OF ALTERNATIVES

11.1 INTRODUCTION

The purpose of the detailed analysis of Sitewide alternatives is to present the relevant information to select a remedy. During the detailed analysis, the Sitewide alternatives established in Section 10.0 are compared on the basis of environmental benefits and costs using criteria established by NYSDEC in DER-10. This approach is intended to provide needed information to compare the merits of each alternative and select an appropriate remedy that satisfies the RAOs for this SMC facility.

This section first presents a summary of the seven evaluation criteria (six environmental criteria and cost) in TAGM DER-10 to be used to compare the Sitewide alternatives, plus State and Community Acceptance. In addition, this section includes a comparison of the three Sitewide alternatives, based on the seven evaluation criteria. Comparisons of the alternatives in terms of State and Community

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A limited groundwater and vapor intrusion monitoring program would be performed to evaluate the concentrations of apparent VOC contaminant that appears to be on the SMC property. A water sample from the sump present in the basement of the rotoforge building and groundwater samples from MW-5, MW-6 and MW-7 will be collected and analyzed for VOCs. ¶
¶
If chlorinated VOC concentrations are detected in the sump sample above SGCs, then vapor intrusion monitoring would be conducted; otherwise no additional work would be necessary regarding vapor intrusion. If petroleum VOC concentrations in the groundwater samples at the downgradient well locations (MW-6 and MW-7) are identified to increase above the NYSDEC Class GA criteria (SCGs), then this information would be report to the NYSDEC Spills Division and the matter will be coordinated through that department. Should the concentrations of VOCs remain the same or decrease compared to those identified during the RI, no additional groundwater monitoring would be done. ¶
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The exposure to the groundwater contamination would continue to be considered of low risk and no additional remedial efforts would be warranted. Implementation of the SMP would sufficiently address future exposure to groundwater, if encountered during typical construction/excavation activities. ¶
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This alternative would not reduce the contamination in groundwater. Rather, a limited monitoring program would be completed as discussed in Section 10.2.2, to evaluate the VOC contamination in groundwater at the SMC facility as well as monitoring for potential vapor intrusion. Should no changes or increases of VOCs in groundwater or vapor intrusion be noted, no further monitoring would be warranted and the groundwater contamination would eventually be reduced by natural attenuation processes. ¶
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The following is a description of the remedial actions for soil included in Sitewide Alternative No. 3. The limited groundwater and vapor intrusion monitoring would be conducted as discussed for Alternative No. 2, in Section 10.2.2.¶
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Acceptance are not included, because such evaluations will be performed following review of this report by NYSDEC.

11.2 DESCRIPTION OF EVALUATION CRITERIA

Each remedial alternative is evaluated with respect to the seven criteria outlined in TAGM DER-10, as summarized below. State and Community Acceptance criteria are also described.

1. Short-Term Impacts and Effectiveness: This criterion addresses the impacts of the alternative during the construction and implementation phase until the remedial action objectives are met. Factors to be evaluated include protection of the community during the remedial actions; protection of workers during the remedial actions; and the time required to achieve the remedial action objectives.

2. Long-Term Effectiveness and Permanence: This criterion addresses the long-term protection of human health and the environment after completion of the remedial action. An assessment is made of the effectiveness of the remedial action in managing the risk posed by untreated wastes and the long-term reliability of the remedial action.

3. Reduction of Toxicity, Mobility, and Volume: This criterion addresses NYSDEC's preference for selecting "remedial technologies that permanently and significantly reduce the toxicity, mobility and volume" of the contaminants of concern at a site. This evaluation consists of assessing the extent that the treatment technology destroys toxic contaminants, reduces mobility of the contaminants using irreversible treatment processes, and/or reduces the total volume of contaminated media.

4. Implementability: This criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of services and materials. Technical feasibility refers to the ability to construct and operate a remedial action for the specific conditions at a site and the availability of necessary equipment and technical specialists. Technical feasibility also includes the future operation and maintenance, replacement and monitoring that may be required for a remedial action. Administrative feasibility refers to compliance with applicable rules, regulations, statutes and the ability to obtain permits or approvals from other government agencies or offices; and the availability of adequate capacity at permitted treatment, storage and disposal facilities and related services.

5. Compliance with Applicable or Relevant and Appropriate SCGs and Remediation Goals: This criterion is used to evaluate the extent to which each alternative may achieve the proposed cleanup goals. The cleanup goals were developed based on SCGs developed in Section 8.0.

6. Overall Protection of Human Health and the Environment: This criterion provides an overall assessment of protection with respect to long-term and short-term effectiveness and compliance with cleanup goals.

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7. Cost: The estimated capital costs, long-term operation and maintenance costs, and environmental monitoring costs are evaluated. The comparative cost estimates are intended to reflect actual costs with an accuracy of +50 percent to -30 percent.

8. State Acceptance: This criterion evaluates the technical and administrative issues and concerns of the State regarding the alternatives.

9. Community Acceptance: This criterion evaluates the comments of the public regarding the alternatives.

11.3 DETAILED ANALYSIS OF ALTERNATIVES

Sitewide Alternatives Nos. 1 through 3 are evaluated individually in terms of the seven environmental and cost criteria described above. Descriptions of the alternatives are provided in Section 10.0.

11.3.1 Sitewide Alternative No. 1 – No Action

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1. Short-Term Impacts and Effectiveness: No short-term impacts are anticipated during the implementation of this alternative since there are no construction activities involved.

   This alternative does not include removal or treatment of remaining contamination at the SMC facility, and will not meet the remedial action objectives in a reasonable or predictable timeframe. Though, the risk to human health and the environment are considered to be minimal (due to the limited volume of PCB impacted soil being present beneath buildings and the low levels of VOCs in the groundwater). The duration of natural cleanup for the VOCs in groundwater would depend on the attenuation rate, volatilization of VOCs in groundwater and the extent of continued contribution of VOCs from an apparent upgradient source. There are uncertainties in the rate and interaction of the various natural attenuation processes. PCBs do not readily remediate by natural attenuation processes. Therefore, it is recognized that the length of time required for natural cleanup or attenuation of groundwater or soil contamination is unknown, but expected to be greater than 30 years to reach the remedial action objectives. Consequently, in accordance with USEPA guidance, a duration of 30 years (the maximum time period specified for evaluation) is assumed for this alternative.

2. Long-Term Effectiveness and Permanence: This alternative does not involve removal or treatment of soil or contaminated groundwater. The risks involved with the migration of contaminants and direct contact with soil contaminants is assumed to be low, due to the limited volume of PCB contaminated soil remaining beneath existing structures at two locations. VOC contamination in groundwater from an apparent upgradient source is expected to continue contributing VOC contamination to the SMC property. Given the limited mass of contaminants (0.3 ppm, worst case)

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and the uncertainty of upgradient VOC contaminant source, reduction in risk associated with natural attenuation is not expected in a reasonable or predictable timeframe, although currently no VOC contamination above SCGs was identified in the two downgradient wells at the southern end of the SMC facility. Based on these uncertainties, this alternative is not expected to provide long-term effectiveness to reduce the potential risk to human health and the environment.

3. Reduction of Toxicity, Mobility, and Volume: This alternative does not involve the removal or treatment of the remaining contamination at the SMC facility. Therefore, neither the toxicity, mobility nor volume of contamination is expected to be reduced significantly. Natural attenuation of contaminants may reduce the concentrations in groundwater over time. However, this reduction is not expected to be significant within a reasonable amount of time.

4. Implementability: This alternative is readily implementable on a technical basis, in that it involves no further actions. It is doubtful there would be any administrative difficulties associated with implementing this alternative as a result of community resistance to No Action based on the significant reduction of PCB contaminated soil by the IRM. Also, institutional controls (e.g., deed or environmental easement) would likely be required to preclude contact with remaining contaminated media.

5. Compliance with Applicable or Relevant and Appropriate SCGs and Remediation Goals: This alternative will not comply with the chemical-specific SCGs. Although not significant, the remaining contaminant levels in the groundwater and soil are not expected to decrease appreciably over time.

   No location-specific SCGs were identified. Action-specific SCGs (e.g., OSHA regulations) will be met during sampling activities.

6. Overall Protection of Human Health and the Environment: This alternative does not further reduce the risk or exposure for human health and the environment, since the SMC facility would remain in its present condition with the remaining contamination. Uncontrolled excavations could lead to exposure to impacted soil and groundwater; and vapor migration could potentially impact underground structures, surface structures and future excavations.

7. Cost: No capital costs are anticipated for this alternative.

11.3.2 Sitewide Alternative No. 2 – Implementation of Site Management Plan

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1. Short-Term Impacts and Effectiveness: There are several potential short-term impacts associated with this alternative.

   - Future construction activities at the SMC facility could result in potential exposure to remaining soil and groundwater contamination. There is a potential

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for impacts to human health (workers and construction personnel) due to possible contact with impacted soil, vapor, particulate releases or exposure to contaminated groundwater during excavation activities. Thus, vapor suppression may be required, in addition to dust monitoring, in order to mitigate potential adverse conditions. The SMP would outline requirements for construction personnel including requirements for personal protective equipment during construction/maintenance activities in order to limit health risks due to exposure to remaining contaminants and physical hazards.

- The SMP would address the methods and practices when dealing with site contamination, if encountered, and the decontamination of equipment used for construction purposes that could carry contamination off-site.

- Disruptions to current SMC facility operations are not expected to occur during the implementation of this alternative, with the exception of typical construction/maintenance activities that would have to be scheduled. Implementation of a SMP would identify management and handling procedures of on-site contamination, if encountered.

This alternative does not change the current risk and exposure to human health and the environment. However, it will assist in reducing the potential risk of exposure to contaminants in the soil and groundwater to workers and construction personnel. This alternative is not expected to meet the remedial action objectives for the unsaturated soils or groundwater.

The VOC concentrations are considered low and pose a low risk to human health and environment. Chlorinated VOC concentrations were not detected in the sump sample above SGCs, therefore no additional work is necessary regarding vapor intrusion.

VOC concentrations were not detected in the groundwater samples at the downgradient well locations (MW-6 and MW-7) above the SCGs, therefore; no groundwater monitoring is necessary.

2. Long-Term Effectiveness and Permanence: This alternative is considered an adequate and reliable remedy for the remaining unsaturated impacted soil and groundwater. The risks associated with direct contact with soil and groundwater contaminants would be managed though implementation of the SMP.

3. Reduction of Toxicity, Mobility, and Volume: This alternative does not involve the removal and/or treatment of the remaining soil contamination. However, the toxicity, mobility and volume of the contamination has already been significantly reduced by the IRM and the remaining contaminates are considered to be of minimal and low risk.

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The toxicity, mobility and volume of groundwater contamination are not expected to be reduced; although, the few contaminants observed have generally been identified as totaling less than 0.6 ppm (MW-1, worst case for all of the eight on-site monitoring wells).

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If construction or excavation activities are conducted; any soil, groundwater or material generated will be managed and disposed in accordance with the SMP.

4. Implementability: This alternative is readily implementable on a technical basis. Groundwater and vapor intrusion sampling can be performed without sophisticated equipment, and the necessary services and equipment are readily available.

Institutional controls (e.g., deed or environmental easement) may be required to preclude contact with contaminated media.

5. Compliance with Applicable or Relevant and Appropriate SCGs and Remediation Goals:

This alternative is not expected to meet the chemical-specific SCGs for the identified soil and groundwater contamination, unless these materials are removed for disposal due to planned maintenance or construction activities. These would be managed in accordance with the SMC.

No location-specific SCGs were identified. Action-specific SCGs (e.g., OSHA regulations) will be met during construction activities.

6. Overall Protection of Human Health and the Environment: This alternative does not further reduce the risk or exposure for human health and the environment, since the SMC facility would remain in its present condition. Implementation of this alternative would result in a reduced exposure to contaminants during construction or excavation activities. Although the alternative will not meet the chemical SCGs, the contamination is considered to be minimal based on the results following the on-site IRM. Any additional soil, groundwater or material generated will be contained and/or managed and handled in accordance with the SMP.

Deleted: Additionally, this alternative will assess the extent of groundwater contamination and whether additional investigation/remediation efforts are required to reduce contaminant migration, including vapor intrusion in to the SMC facility.

7. Cost: Total capital costs for this alternative are estimated to total approximately $10,000 as shown in Appendix G for the preparation and implementation of a SMP.

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11.3.3 Sitewide Alternative No. 3 – Additional Soil Excavation and Disposal

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1. Short-Term Impacts and Effectiveness: There are several potential short-term impacts associated with this alternative.

- There is potential for impacts to human health (workers and construction personnel) due to direct contact, potential vapor and particulate releases. Thus,

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worker skin protection dust monitoring would be required in order to mitigate potential adverse conditions.

- Contamination of equipment used for excavation purposes could carry contamination off-site. Therefore, equipment will be decontaminated prior to leaving, as necessary, in order to avoid the transport of contaminants.

- Disruptions to current SMC facility operations are expected to occur during the implementation of this alternative, due to the excavation activities, potential relocation and/or partial demolition of existing buildings.

- Field personnel would wear appropriate personal protective equipment during excavation in order to limit health risks due to exposure to contaminants and physical hazards.

Human health and the environment would be protected under this alternative for soils but not for groundwater. This alternative is expected to meet the RAOs for the unsaturated soils at completion of the excavation, because the remaining PCB impacted soil will be removed from the Site. Confirmatory soil sampling would be performed to verify the alternatives effectiveness.

2. Long-Term Effectiveness and Permanence: This alternative is considered an adequate, reliable and permanent remedy for unsaturated soil and, as such, the risks involved with the migration of contaminants and direct contact with soil contaminants would be reduced. Remediation of PCB contaminated soils could be completed in about 12 months time.

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3. Reduction of Toxicity, Mobility, and Volume: This alternative involves the removal and treatment of the unsaturated PCB contamination. The toxicity, mobility and volume of this contamination will be reduced by excavation of shallow PCB impacted soils. Also, the alternative will remove the unsaturated soils as a potential source of groundwater contamination, although PCBs are not expected to nor have they impacted groundwater at the SMC facility.

The toxicity, mobility and volume of groundwater contamination will not be reduced. However, based on additional groundwater sampling done in April 2008, downgradient and off-site migration of groundwater contamination is not a concern.

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4. Implementability: This alternative is readily implementable on a technical basis as similar actions have been done to complete the IRM with standard construction methods and equipment. Materials and services necessary for construction are readily available. Confirmatory soil sampling would be performed at excavations sidewall and floor to verify the effectiveness of this remedial alternative.

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Implementation of this alternative may require coordination and approval by City of Dunkirk agencies (i.e., Building Department), as well as coordination with the SMC facility operations. However, there are no anticipated, specific problems associated with obtaining permits or approvals from the various agencies and other concerns. Disruption of current Site operations is expected to be a concern.

Institutional controls (e.g., deed or environmental easement) would be required to preclude contact with the remaining contaminated media, if identified.

5. Compliance with Applicable or Relevant and Appropriate SCGs and Remediation Goals:

   This alternative is expected to meet the chemical-specific SCGs for the unsaturated soils within the excavations.

   This alternative will not meet the chemical-specific SCGs for groundwater with the exception of the potential for natural attenuation to decrease existing concentrations.

   No location-specific SCGs were identified. Action-specific SCGs (e.g., OSHA regulations) will be met during construction activities.

6. Overall Protection of Human Health and the Environment: This alternative is considered to be protective of human health and the environment with respect to soil. Implementation of this alternative would result in remediation of unsaturated soil but not for groundwater. Although there is a potential for natural attenuation to further decrease existing VOC concentrations.

7. Cost: Total capital costs for this alternative are estimated to total approximately $182,000 as shown in Appendix G. The quantities, unit costs, and subtotal costs and associated assumptions for this Alternative, estimated for comparative purposes, are presented in Appendix G.

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12.0 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

The Sitewide Alternatives are compared on the basis of the six environmental and one cost criteria, based on the detailed analysis provided above. Sitewide Alternative Nos. 1 through 3 are compared in the following subsections.

12.1 SHORT-TERM IMPACTS AND EFFECTIVENESS

Alternative No. 3 involves excavation work, which could possibly cause exposure to contamination during remediation. Alternative 3 would likely pose disruptions to current SMC facility operations as soil contamination would require removal or partial demolition of existing structures. Alternative

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2 would not cause disruption to the facility, and would be implemented with the scheduled or planned construction and/or maintenance work. Alternative 2 would manage excavation and construction work done at the SMC facility, would reduce potential exposures and properly manage materials generated from scheduled maintenance or construction activities. Alternative No. 1 is not expected to cause potential exposure or disruption to SMC facility operations.

Alternatives 3 is expected to achieve the RAOs for soil, although partial or complete building demolition would be required as the soil contamination is located beneath the buildings. Alternatives 1 and 2 are not expected to achieve these objectives; however, the volume of remaining contamination has significantly been reduced by the IRM.

12.2 LONG-TERM EFFECTIVENESS AND PERMANENCE

Alternatives No. 2 and 3 are considered to be adequate, reliable remedies for the management and/or remediation of soil contamination. The risks involved with the exposure to contaminants or direct contact with soil contaminants, although considered to be low, would be reduced. Alternative No. 1 is not considered to be an adequate, reliable remedy for the management and/or remediation of contaminant soils; and, as such, the risks involved with the exposure or migration of contaminants and direct contact with soil contaminants, although considered to be of relatively low concentrations, would not be reduced .

Due to the low VOC and non-detect PCB concentrations in groundwater, Alternatives No. 1, 2 and 3 are considered to be adequate and reliable actions for the on-Site groundwater. Alternative No. 1 would not address or monitor groundwater or vapor intrusion and is not considered an adequate, reliable, or permanent long-term remedy for groundwater.

12.3 REDUCTION OF TOXICITY, MOBILITY AND VOLUME

Alternative No. 3 provides for the greatest reduction of toxicity, mobility and volume of soil contamination.

Alternative No. 2 will not reduce the toxicity, mobility and volume of the soil contamination; however, it will reduce the risk of exposure to contaminants should they be encountered during scheduled or planned maintenance or construction activities done at the SMC facility. Should contaminants be encountered, the prepared SMP would identify management, handling and disposal procedures.

Alternative No. 1 will not reduce the toxicity, mobility and volume of the soil or groundwater contaminants, except what may occur through possible natural attenuation processes.

Because the groundwater contaminants are considered to be of low concentrations and low risk of exposure, a remedial alternative for groundwater is not presented that will reduce the toxicity, mobility and volume of the limited contaminants. The implementation of typical groundwater remedial technologies that include conventional well pumping or extraction wells may not be effective because the apparent off-site source would still be present. Groundwater extraction could

Deleted: The limited groundwater and vapor intrusion monitoring activities (Alternatives 2 and 3) would not reduce the contamination in groundwater but would be used to assess the extent that VOC contamination migrating from the SMC facility and if vapor intrusion is a concern with the building. Should an increase of VOC contamination be observed at the downgradient well locations, the NYSDEC Spills Department would be notified and discussions for addressing the migrating contamination would be conducted.¶
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result in the increased mobilization and volume of the apparent upgradient VOC contamination onto the SMC facility resulting in potentially greater contamination than currently observed. Based on the additional groundwater and sump sampling groundwater monitoring and vapor intrusion are not a concern.

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12.4 IMPLEMENTABILITY

Alternatives No. 1, 2 and 3 are technically implementable with readily available methods, equipment, materials and services. Alternative 3 would require removal or partial demolition of existing buildings at the SMC facility in an effort to gain access to the remaining contaminated soils as well as causing interruptions or impacting daily operations at the facility.

Alternatives No. 1, 2 and 3 are also administratively implementable.

12.5 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE SCGS AND REMEDIATION GOALS

Of the three alternatives, Alternatives No. 3 is expected to achieve compliance with the chemical-specific SCGs for soil but not for groundwater. Alternatives No. 1 and 2 will not achieve compliance with chemical SCGs for soil. Natural attenuation may overtime result in compliance with groundwater chemical specific SCGs for Alternatives 1, 2 and 3.

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Deleted: Alternatives No. 1 will not achieve compliance with the chemical-specific SCGs for soil or groundwater.

Each of the alternatives evaluated is considered to be in compliance with action-specific SCGs; permits (e.g., building permits) and approvals necessary for implementing these alternatives will be obtained prior to initiating the remedial action. No location-specific SCGs were identified.

However, due to the low concentrations of VOCs detected in groundwater and the PCB impacted soil being present beneath the building, limiting exposure, the risk associated with the contamination present are considered to be low.

12.6 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Alternatives No. 2 and 3 will be protective of human health and the environment. The primary difference between the two alternatives lies in the removal of contaminated soil as part of Alternative 3. Alternative No. 2 provides the methodology and practices for handling, managing and disposal of remaining contamination encountered via a SMP to reduce the risk to human health and environment as part of future construction and/or maintenance work at the SMC facility.

Although the contamination is limited to low concentrations of VOCs in groundwater and two locations of contaminants in soils, Alternative No. 1 does not provide protection of human health and the environment with regard to contaminated environmental media.

12.7 COST

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Alternative No. 3, which includes excavation of remaining contaminated soils has the highest capital cost estimated at approximately $182,000. There are no long term O&M costs; however, a large portion of the remediation costs would be due to the partial or complete demolition costs and facility/production interference that may occur.

Alternative No. 2, which includes implementation of a SMP has the second highest capital cost of approximately $10,000.

Alternative No. 1 does not include remedial actions for either on-Site soil or groundwater; and therefore no costs are associated with this Alternative.

12.8 SELECTED REMEDIAL ALTERNATIVE

SMC has achieved the goals of the project to reduce the volume of contaminated soil present at the facility and reduce potential impact to human health and the environment. Any remaining on-site soil contamination, is located beneath existing structures. The low level VOC contamination identified in the groundwater does not pose a significant threat to human health or the environment. Therefore it is GZA's opinion that implementing Sitewide Alternative No. 2 would be a sufficient and cost effective alternative. The development of a SMP would address impacted soil and/or groundwater, if encountered during construction or excavation activities.

Because residual levels of PCB contamination in subsurface soil remains at the site above unrestricted residential SCOs, proper precautions and management of the residuals are required through implementation of Engineering and Institutional Controls. A SMP has been developed for the SMC facility and is included in Appendix J. Section 13 contains a summary discussion of the requirements of the SMP that addresses engineering controls and institutional controls. Additionally, an Environmental Easement has been filed with NYSDEC, pursuant to the Order on Consent (# B9-0737-07-02) and is included as Appendix K.

13.0 SITE MANAGEMENT PLAN AND ENVIRONMENTAL EASEMENT

Need a brief description of EC's (security fencing, asphalt cover, and turf cover), and ICs (Env Easement)

The SMP has been prepared to manage remaining contamination within the AOC at the SMC facility in perpetuity or until extinguishment of the Environmental Easement (see Appendix K) in accordance with ECL Article 71, Title 36. Additionally, the SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the Environmental Easement for the AOC. The SMP was developed using a template which was provided by NYSDEC.

An Environmental Easement has been granted to the NYSDEC, and recorded with the Chautauqua County Clerk, that provides an enforceable legal instrument to ensure compliance with the SMP and

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Deleted: and would also address the assessment of groundwater or vapor intrusion at the SMC property, if identified as a concern.

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ECs and ICs placed on the AOC. The ICs place restrictions on site use, and mandate reporting measures for the applicable ECs and ICs. The SMP specifies the methods necessary to ensure compliance with the ECs and ICs required by the Environmental Easement for contamination that remains in the AOC. The SMP (see Appendix J) has been approved by the NYSDEC. Compliance with the SMP is required by the grantor (SMC) of the Environmental Easement and the grantor's successors and assigns. The SMP may only be revised with the approval of the NYSDEC.

The SMP provides a detailed description of procedures required to manage contamination remaining in the AOC after the completion of the IRM. The SMP includes two plans:

(1) Engineering and Institutional Control Plan for implementation and management of EC/ICs, which includes a reporting plan for the submittal of data, information, recommendations, and certifications to NYSDEC; and
(2) Monitoring Plan for implementation of Site Monitoring.

14.0 FINAL ENGINEERING REPORT CERTIFICATION

This Final Engineering Report (FER) has been prepared, stamped and signed by an individual licensed or otherwise authorized in accordance with article 145 of the education law to practice the profession of engineering in the State of New York.

I, Ernest R. Hanna, certify[11] that the Interim Remedial Measures Work Plan was implemented and that construction activities were completed in substantial conformance with the NYSDEC approved Interim Remedial Measures Work Plan and were personally witnessed by me or a person under my direct supervision. In addition, it is my opinion and belief that:

- The data submitted to the NYSDEC demonstrate that the remediation requirements set forth in the remedial work plan and other relevant provisions of ECL 27-1419 have been achieved in accordance with the time frames established in the work plan;

- The use restrictions, institutional controls (ICs), engineering controls (ECs) and/or operation and maintenance requirements applicable to the site are contained and/or refererenced in an environmental easement created and recorded pursuant to ECL 71-3605 and that any affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded; and

- A Site Management Plan has been submitted by the applicant for the continual and proper operation, maintenance and monitoring of the engineering controls employed at the site including the proper maintenance of the remaining on-site monitoring wells, and that such plan has been, or will be, approved by the NYSDEC.

[11] Certify is defined herein to mean a statement of a professional opinion based upon investigation, analysis, knowledge and belief that is stated to be true and accurate.

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Ernest R. Hanna, P.E.
Principal
GZA GeoEnvironmental of New York

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