

FINAL INVESTIGATION REPORT
(Revised and Amended)
ULTRALIFE BATTERIES, INC.
2000 TECHNOLOGY PARKWAY
NEWARK, NEW YORK
ID# V00178-8
Volume No. 1

Prepared for:
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1.0 INTRODUCTION AND SUMMARY

This Final Investigation Report has been prepared as part of the investigation process at Ultralife Batteries, Inc. (ULBI) facility pursuant to a Voluntary Agreement between Ultralife Batteries, Inc. and the NYSDEC. GeoQuest Environmental, Inc. (GeoQuest) was retained by ULBI to conduct an additional investigation, in accordance with the work plan dated October 7, 2005, for the evaluation of subsurface soil and groundwater conditions at the ULBI study area, 2000 Technology Parkway, Newark, New York (Site), see Figure 1 – Vicinity Map.

GeoQuest also reviewed a subsurface investigation entitled Final Voluntary Investigation Report for a Subsurface Investigation at Ultralife Batteries, Incorporated, 1350 Route 88 South, Newark, New York, (dated October 2001) and a subsurface investigation entitled Voluntary Cleanup Project Report for the Soil Remediation Project at Ultralife Batteries, Incorporated, 2000 Technology Parkway, Newark New York, (dated April 2004) prior to developing the scope of work detailed in the approved work plan. A summary of the previous investigations and the soil remediation project work completed is provided in Section 2; refer to the above noted reports for complete documentation.

A revised Final Investigation Report was submitted to NYSDEC in June 2006. Upon review, the NYSDEC requested revisions and additional investigation of the site. In April 2007, the NYSDEC approved a phased work plan to fulfill these requirements. Phase I of the work plan was implemented in May 2007 and submitted to the NYSDEC for review. Phase 2 of the work plan was implemented in December 2007 and submitted to the NYSDEC for review. This report has been revised based on data results from further investigation in accordance with NYSDEC approved work plans.

2.0 PREVIOUS INVESTIGATIONS

The previous investigation reports from Lu Engineering and ULBI, that gathered site-specific data, are collectively referred to as “previous investigations” for the purpose of this document (Refer to Final Voluntary Investigation Report 2001 and Voluntary Cleanup Project Report 2004).

Final Voluntary Investigation Report for Subsurface Investigation (Lu Engineers, October 2001)

A summary of the report completed by Lu Engineers for the Site during October 2001 is presented below. The investigation performed by Lu Engineering included the installation of fourteen geoprobe soil borings, five of which were completed as groundwater monitoring wells. Samples of storm water and storm sewer sediment and surface soils were also collected for laboratory analysis.

The subsurface investigation identified a source of contamination from an underground wastewater vault that was constructed of cinder blocks. This vault structure accepted drainage from hazardous material operations conducted in building 4000. The subsurface investigation was conducted under the NYS Voluntary Cleanup Program and was intended to determine the



nature and extent of contamination from previous investigations. The investigation indicated a general decrease in the detected levels of contaminants of concern (COC) for the site including acetone, 2-butanone and arsenic. However, semi-volatile organic compounds were identified in a storm sewer outfall located near the northern site perimeter; an area not previously investigated.

Voluntary Cleanup Project Report for the Soil Remediation Project (ULBI, April 2004)

The Voluntary Cleanup Project Report (2004) was prepared by Ultralife Batteries, Inc (Refer to Voluntary Cleanup Project Report 2004). ULBI implemented a soil remediation project in response to the contamination identified in the area of the cinder block drainage vault adjacent to building 4000. In addition, ULBI conducted sampling and investigation that included the collection of groundwater from each of the seven monitoring wells, sediment samples from the storm sewer outfall near the northern site perimeter, and soil samples from the trench drains inside building 4000 and the vault excavation area.

MARCOR Remediation, Inc. conducted the soil remediation project work during October through December 2003. During the remedial action, approximately 35-cubic yards of impacted soil and 550-gallons of water were removed and disposed of off-site. Twelve confirmatory soil samples were collected from the sidewalls and bottom of the source area soil excavation.

The approximate locations of the confirmatory soil samples are presented on Figure 1A – Location of Confirmatory Soil Samples Building 4000 Excavation Area and the laboratory soil results are presented in Table 1A – Confirmatory Soil Samples Analytical Summary. The laboratory soil sample results from the confirmatory soil samples were submitted to the NYSDEC with sediment samples from the outfall sampling locations. Elevated levels of semi-volatile organic compounds (SVOCs) were detected in the sediment samples and ash and coal were observed along the outfall opening. The ash and coal may be the source of these elevated SVOCs. (Note: Figure 1A and Table 1A have been revised and are part of this Final Investigation Report.)

3.0 SITE DESCRIPTION AND BACKGROUND

The Ultralife Batteries, Inc. facility is located to the north of Silver Hill Road at 2000 Technology Parkway in Newark, New York. The approximately 67-acre property contains four buildings (Building 2000, Building 3000, Building 4000 and Building 5000) totaling approximately 271,800 square feet. The buildings are equipped with a security system that is monitored 24 hours a day, 7 days per week. In addition to the buildings, property improvements include several employee parking lots, paved access roads, and paved loading/unloading areas. The remainder of the property consists of grass and landscaped areas, in addition to some undeveloped vegetated and wooded land.

The facility is located in a zoned industrial park (the Stuart Park Complex) situated in a primarily agricultural/rural and residential area. Adjacent properties include:

- To the North: vacant/undeveloped land, beyond which are residences.
- To the South: Silver Hill Road, beyond which are rural land and residences.
- To the East: vacant/undeveloped land, beyond which is Vienna Road.
- To the West: Route 88, beyond which are residences and rural land.

Operations at the facility include the manufacturing of primary and rechargeable lithium batteries, which is conducted in Building 3000, in addition to the assembly of military communication components, which is conducted in Building 2000. Building 4000 is used for raw material storage, and Building 5000 contains work-in-progress (WIP) items, as well as the 90-day hazardous waste storage area. Support operations conducted at the facility include office activities, warehousing/storage, waste management and maintenance operations.

Storm water runoff from the property discharges to two outfalls; Outfall #1 is located on the northern portion of the property, Outfall #2 is located on the eastern portion of the property. Runoff is directed to the outfalls via a series of on-site catch basins with associated underground conduits, and or surface channels located on the property. Flow from the two outfalls is directed to a wetland area, which eventually joins Marbletown Creek. Outfall #1 also discharges non-contact cooling water from the facility. The project site location and surrounding vicinity are presented on Figure 1.

Prior to 1968, the site consisted of undeveloped farm land. From approximately 1968 until the early 1980's, the site was owned and developed by Sarah Coventry as its corporate headquarters and distribution center; including the construction of what is now called Building 2000 and Building 3000. At this time, the facility came under the ownership of Eastman Kodak, which began a battery manufacturing operation. In 1991, the battery manufacturing operations were purchased by Ultralife Batteries, Inc., with Eastman Kodak retaining ownership of the facility. In 1998, the facility was purchased by the Wayne County Industrial Development Agency (IDA) with Ultralife Batteries, Inc. continuing operations as a tenant.

4.0 OBJECTIVES OF INVESTIGATION

The overall objective of the Voluntary Clean-up Investigation was to evaluate the nature and extent of contaminants of concern so that the appropriate remediation recommendations could be made. These objectives were initially presented in the October 2005 revised work plan for this project and are outlined below. The objectives were further modified based on subsequent work plans approved by the NYSDEC.

The methods and procedures for the Limited Subsurface Investigation are presented in the Revised Work Plan for Revisions to Draft Voluntary Cleanup Project Report (dated October 7, 2005). These project objectives include:

- Revise the Final Investigation Report to include 2004 Voluntary Cleanup Project Report data, results from subsequent field investigations and comments received from NYSDEC and NYSDOH reviewers;
- Evaluate the potential for soil vapor intrusion impacts;
- Conduct a Fish and Wildlife Impact Analysis (See Appendix A – Fish and Wildlife Impact Analysis Report);
- Implement soil, sediment, surface water, and groundwater sampling;
- Determine if the results of GeoQuest's Limited Subsurface Investigation and previous investigations (Lu Engineering and ULBI) constitute a complete investigation for the Voluntary Cleanup Investigation at the Site;

- Evaluate the data to determine if the distribution of the contaminant(s) of concern indicate a source area(s) that may require remedial action such as a soil excavation and removal action; and
- Provide recommendations for remedial alternatives that may include soil removal, based on the results of the proposed additional investigation and previous Site investigations.

4.1 SITE INVESTIGATION METHODS

SOIL SAMPLING AND HEADSPACE MEASUREMENTS

GeoQuest's additional investigation was performed during November 2-3, 2005 for the delineation of pesticides, PCBs, SVOCs, and metals. This project work was completed in general accordance with the approved Revised Work Plan for Revisions to Draft Voluntary Cleanup Project Report. The investigation methods included collection of surface water samples and sediment samples from the outfall structure, test pit excavations with collection of soil samples in the vicinity of the outfall structure, and collection of groundwater samples from existing monitoring wells. The existing monitoring wells are located in the area of the soil remediation at Building 4000 and in the down gradient direction towards outfall structure (north).

This investigation included a total of two surface water samples; one surface water sample from approximately 1-foot from the out-fall structure (SW-1) and one surface water sample approximately 25-feet downstream of the out-fall structure (SW-2). These surface water samples were analyzed for volatile organics (VOCs), semi-volatile organics (SVOCs), TAL metals, total Cyanide, PCBs, and pesticides. This investigation included a total of three sediment samples; one sediment sample was collected from the first (OTF-1), second (OTF-2), and third out-fall (OTF-3) locations. The sampling locations are approximately located as follows; OTF-1 is located at the mouth of the outfall structure, OTF-2 is located 8 ft. from the mouth of the outfall, and OTF-3 is located 18 ft. from the outfall mouth. These sediment samples were analyzed for volatile organics (VOCs), semi-volatile organics (SVOCs), TAL metals, total Cyanide, PCBs, and pesticides. In addition, each sediment sample was analyzed for total organic carbon. The approximate locations of the surface water and sediment samples are presented on Figure 2 – Subsurface Exploration Plan.

This investigation also included the installation of fifteen test pit excavations (test pits) by Terminal Contracting, Inc., of Newark, New York using a Bobcat 341 excavator. The test pits were excavated to visually observe areas along the storm water drains up gradient of the outfall area for potential coal and ash fill. Coal and ash fill soils were observed adjacent to the outfall structure location during previous project work by the NYSDEC project manager. Coal and ash soil fill was not observed in the test pit excavations adjacent to the storm sewer laterals and at test pit excavations along the outfall locations. The test pit subsurface explorations were monitored by a GeoQuest geologist the soils encountered were visually logged for grain size and screened with a photoinization detector for total organic vapors. Total organic vapors were not detected from the soils that were excavated from the test pits. The test pit logs are presented in Appendix B – Test Pit Logs and photographs from the test pit excavations are presented in Appendix C – Photo Log. Ten soil samples were analyzed for volatile organics (VOCs), semi-volatile organics (SVOCs), TAL metals, total Cyanide, PCBs, and pesticides. In addition, each soil sample was analyzed for total organic carbon. The approximate locations of

the test pits are presented on Figure 2.

Groundwater samples were collected from the seven existing monitoring wells. The groundwater samples were analyzed for volatile organics (VOCs), semi-volatile organics (SVOCs), TAL metals, PCBs, total Cyanide, and pesticides

A total of ten soil samples, three sediment samples, two surface water samples, and seven groundwater samples were submitted under chain-of-custody documentation to Columbia Analytical Services, Inc. of Rochester, New York (NYS Certified Laboratory ID# 10145). The soil, sediment, surface water, and groundwater samples were analyzed for VOCs, SVOCs, PCBs, Total Cyanide, and TAL Metals according to protocols described in the June 2000, New York State Analytical Services Program (ASP00). The samples collected for laboratory analysis were analyzed in accordance with Target Compound List (TCL) Volatile Organic Compounds (VOCs) by NYSDEC ASP Method OLMO4.3, TCL Base/Neutral/Acid Organic Compounds (BNAs) by NYSDEC ASP Method OLMO4.3, TAL Metals by NYSDEC ASP Method ILMO4.2, PCBs/ Pesticides by NYSDEC ASP Method OLMO4.3, and Total Cyanide by NYSDEC ASP Method ILMO4.2. The required quality assurance quality control samples were also submitted for laboratory analyses. The laboratory analytical requirements and sample frequency are summarized in Table 1 – Summary of Sample Requirements and Laboratory Analysis.

Additional test pit soil and sediment samples were collected in May and December 2007. The samples were collected and analyzed using the methods comparable to those described above and detailed in work plans approved by the NYSDEC. Analytical results for samples collected are summarized below.

5.0 INVESTIGATIVE FINDINGS SUMMARY

OVERBURDEN GEOLOGY AND GROUNDWATER

Overburden Geology

Five overburden soil deposits were encountered and observed by GeoQuest during test pit explorations that include: Topsoil, a Fill Deposit, a Buried Topsoil Deposit, a Lacustrine deposit, and a Glacial Till deposit. The Topsoil Deposit is approximately 0.5 ft. to 1 foot thick and overlays the Fill Deposit at the majority of the test pit locations. This topsoil was placed over the Fill Deposit during construction of the facility. The description of the topsoil is dark brown SILT, trace medium to fine sand, with root fibers. The Fill Deposit is generally located below the topsoil and generally overlays the Buried Topsoil Deposit. The Fill Deposit generally consists of approximately 3 feet of light brown gravel, some coarse to fine sand, little silt, trace clay, with root fibers. The Fill deposit appears to be regarded native soils from the Site similar to the glacial till in grain size that was revealed in the test pit excavations. Underlying the Fill deposit is a Buried Topsoil Deposit that may represent the original ground surface. The Buried Topsoil Deposit is described as grey to black silt, some fine sand, with root fibers. The buried topsoil is approximately 1 foot thick. Underlying the Buried Topsoil Deposit is a Lacustrine Deposit described as green-grey fine sand, some silt. The lacustrine is approximately 0.5 feet thick. Below the Lacustrine Deposit is the Glacial Till Deposit that is very dense and was difficult to excavate. The Glacial Till Deposit is generally described as light brown gravel, some coarse to

fine sand, little silt, trace clay. The descriptions for the soils encountered are presented on the test pit logs in Appendix B.

Groundwater

The depth to groundwater at the Site ranges from approximately 0.5 ft. to 6.55 ft. below ground surface based on the measurements made by GeoQuest. The groundwater flow direction is generally towards the north, based on the Lu Engineers Groundwater contour map dated July 18, 2001. Refer to Figure 13 that presents the recent groundwater flow direction based on the well survey completed by Parrone Engineering.

5.1 SOIL QUALITY

The investigation included the collection of ten soil samples for laboratory analysis from the test pit locations, TP-1 through TP-15 installed in areas where contaminants of concern were suspected on November 2, 2005. A second test pit investigation, Test Pits TP-16 through TP-25, was performed on May 10, 2007 to evaluate the area near TP-12 where arsenic was detected with an elevated concentration during the November 2, 2005 investigation. The laboratory analytical methods included: Target Compound List (TCL) Volatile Organic Compounds (VOCs) by NYSDEC ASP Method OLMO4.3, TCL Base/Neutral/Acid Organic Compounds (BNAs) by NYSDEC ASP Method OLMO4.3, TAL Metals by NYSDEC ASP Method ILMO4.2, PCBs/ Pesticides by NYSDEC ASP Method OLMO4.3, and Total Cyanide by NYSDEC ASP Method ILMO4.2 and Total Organic Carbon.

Metals – November 2, 2005

The soil sample analytical results for metals indicate that several target compound list metals were detected above the laboratory detection limits. It appears that the concentrations of arsenic, beryllium, magnesium, and zinc in soil samples are elevated and exceed NYSDEC TAGM 4046 recommended soil cleanup objectives or Eastern United States Background values. The laboratory results indicate several types of metals were detected in each soil sample submitted. The soil samples were selected from the Fill Deposit and at depths generally above the groundwater table. The soil samples were analyzed in accordance with NYSDEC ASP Method ILMO4.2. The metals that were detected at concentrations that were elevated are summarized below and the results are presented in Table 2 – Test Pit Soil Analysis Summary Metals, Total Cyanide, and Total Organic Carbon. The Laboratory reports are presented in Appendix D – Laboratory Analytical Reports.

Arsenic was detected in each of the ten soil samples with concentrations ranging from 3.40 to 44.7 ppm. The NYSDEC TAGM 4046 value for Arsenic is 7.5 ppm or site background (SB). Samples from TP-02 (5.5-6.0 ft.), TP-05 (4.0-4.5 ft.), TP-05 (5.5-6.0 ft.), TP-11 (0.5-1.0 ft.), TP-12 (3.0-3.5 ft.), and TP-15 (1.5-2.0 ft.) were above the NYSDEC TAGM 4046 recommended soil cleanup objective.

Beryllium was detected in three soil samples with a concentration ranging from 0.0800 to 0.190 ppm. The NYSDEC Soil TAGM value for Beryllium is 0.16 ppm or site background. The sample from TP-11 (0.5-1.0 ft.) had a concentration of 0.190 ppm was above the recommended cleanup objective of 0.16 ppm.

Chromium was detected in each of the soil samples with concentrations ranging from 4.70 to 12.1 ppm. The NYSDEC TAGM 4046 value for Chromium is 10 ppm or site background. The sample from TP-11 (0.5-1.0 ft.) had a concentration of 12.1 ppm that is above the recommended cleanup objective of 10 ppm.

Magnesium was detected in each of the soil samples with concentrations ranging from 1,550 to 23,400 ppm. The NYSDEC TAGM 4046 value for Magnesium is site background. The Eastern US Site background for Magnesium is 100 - 5,000 ppm. The samples from TP-01 (3.0-3.5 ft.), TP-02 (5.5-6.0 ft.), and TP-04 (6.5-7.0 ft.) had concentrations of 13,800 ppm, 14,300 ppm, and 23,400 ppm, respectively. The concentrations in these samples are elevated above the Eastern US background levels.

Zinc was detected in each of the soil samples with concentrations ranging from 21.7 to 72.8 ppm. The NYSDEC TAGM 4046 value for Zinc is 20 ppm or site background.

Metals – May 10, 2007

A second test pit investigation was performed on May 10, 2007, at locations TP-16 through TP-25, to evaluate the area near TP-12 where arsenic was detected with an elevated concentration during the November 2, 2005 investigation. Soils in these locations were pre-screen using a field XRF detector (results provided in Attachment 1). Five soil samples were collected from test pits TP-16, TP-17, TP-19, and TP-22. The soil samples were analyzed for arsenic. The concentrations detected ranged from 1.3 ppm to 8.3 ppm. Soil sample TP-22 (0.0 ft. – 0.5 ft.) slightly exceeded the TAGM 4046 level of 7.5 ppm.

In general, the soil samples indicate detection of one or more metals above the recommended cleanup objective. However, the exceeded values were relatively slight to moderately above the TAGM 4046 recommended soil cleanup objectives and the distribution of elevated metals in test pit excavations does not indicate a pattern that would suggest the need for a soil remediation program to address metals contamination in the soil media. Therefore, metals are not a contaminant of concern (COC) in the overburden soil. The distribution of metals is presented in Figure 3 – Metals Distribution, also see Figure 2 for Test Pit locations.

Laboratory analytical results for soil samples submitted as part of this investigation are summarized on Table 2. The laboratory analytical reports are presented in Appendix D.

Semi-Volatile Organic Compounds- November 2, 2005

The laboratory analytical results indicate detection of semi-volatile compounds with concentrations above the laboratory detection limits and that exceed TAGM 4046 recommended soil cleanup objectives in soil samples from TP-05 (5.5-6.0 ft.) and TP-11 (0.5-1.0 ft.).

Benzo (a) anthracene was detected in two soil samples TP-05 (5.5-6.0 ft.) and TP-11 (0.5-1.0 ft.) at concentrations ranging from 0.045J (estimated value) and 0.500 ppm, respectively. The NYSDEC Soil TAGM 4046 guidance value for Benzo (a) anthracene is 0.224 ppm.

Benzo (a) pyrene was detected in two soil samples TP-05 (5.5-6.0 ft.) and TP-11 (0.5-1.0 ft.) at concentrations ranging from 0.047J to 0.520 ppm. The soil samples were taken from a depth of 5.5-6.0 ft. (0.045 ppm) in TP-05 and 0.5-1.0 ft. (0.500 ppm) in TP-11. The sample from TP-11 (0.5-1.0 ft.) has a concentration of 0.520 ppm that exceeds the NYSDEC Soil TAGM 4046 guidance value of 0.061 ppm.

Chrysene was detected in two soil samples TP-05 (5.5-6.0 ft.) and TP-11 (0.5-1.0 ft.) with concentrations of 0.055J to 0.530 ppm, respectively. The sample from TP-11 (0.5-1.0 ft.) had a concentration of 0.530 ppm that exceeds the NYSDEC Soil TAGM 4046 guidance value of 0.4 ppm.

Dibenz (a,h) Anthracene was detected on the soil sample from TP-11 (0.5-1.0 ft.) with a concentration of 0.086J ppm that exceeds the TAGM 4046 guidance value of 0.014 ppm.

The following SVOCs were also detected in soil sample TP-5 (5.5-6.0 ft.) at concentrations below TAGM 4046 cleanup objectives: Benzo (a) Anthracene, Benzo (b) Pyrene, Benzo (k) Fluoranthene, Chrysene, Fluoranthene, Phenanthrene, and Pyrene.

The following SVOCs were also detected in soil sample TP-11 (0.5-1.0 ft.) below TAGM 4046 cleanup objectives: Acenaphthene, Anthracene, Benzo (b) Fluoranthene, Benzo (g,h,i) Perylene, Benzo (k) Fluoranthene, Carbazole, Indeno (1,2,3-cd) Pyrene, Dibenzofuran, Fluoranthene, Naphthalene, Phenanthrene, and Pyrene.

Anthracene, Phenanthrene, and Bis (2-ethylhexyl) phthalate were also detected in soil sample TP-14 (1.0-1.5 ft.) at concentrations below TAGM 4046 levels. Bis (2-ethylhexyl) phthalate was also detected in soil sample TP-5 (4.0-4.5 ft.) and TP-15 (1.5-2.0 ft.) at concentrations of 0.051J and 0.055J ppm, respectively; below the TAGM 4046 level for this chemical compound.

SVOCs were not detected above the laboratory detection limit in the soil samples from TP-1 (3.0-3.5 ft.), TP-2 (5.5-6.0 ft.), TP-4 (6.5-7.0 ft.), TP-5 (4.0-4.5 ft.), TP-09 (1.5-2.0 ft.), and TP-12 (3.0-3.5 ft.). Therefore, SVOCs are not a COC in the soil media since the elevated concentrations were detected at two test pit locations (TP-5 and TP-11) and with relatively slight to moderate concentrations that exceed the NYSDEC TAGM 4046 soil cleanup objectives.

The distribution of SVOCs detected in subsurface soils from test pit locations is presented in

Figure 4 – Semi-Volatile Organic Compounds, also see Figure 2 for Test Pit locations.

Laboratory analytical results for soil samples submitted as part of GeoQuest's additional investigation are summarized on Table 2. The laboratory analytical reports are presented in Appendix D.

Volatile Organic Compounds – November 2, 2005

The laboratory analytical results indicate detection of volatile compounds with concentrations above the laboratory detection limits and at concentrations that exceed TAGM 4046 recommended soil cleanup objectives in soil samples from TP-05 (4.0-4.5 ft.).

Acetone was detected in four soil samples with concentrations ranging from 0.011 to 0.460 ppm. Acetone was detected in soil samples TP-04 (6.5-7.0 ft.) with a concentration of 0.011J ppm, in TP-05 (4.0-4.5 ft.) with a concentration of 0.460D ppm, in TP-05 (5.5-6.0 ft.) with a concentration of 0.081 ppm, and in TP-14 (1.0-1.5 ft.) with a concentration of 0.0042J ppm. The sample from TP-05 (4.0-4.5 ft.) with a concentration of 0.460 ppm exceeds the NYSDEC Soil TAGM 4046 guidance value of 0.2 ppm. The VOCs are not COC in the soil media; since the elevated concentrations were detected at one test pit location (TP-5) and with relatively slight to moderate concentrations that exceed the NYSDEC TAGM 4046 soil cleanup objectives. The distribution of Volatile Organic Compounds is presented in Figure 5 – Volatile Organic Distribution, also see Figure 2 for Test Pit locations.

The following VOCs were also detected in soil samples below TAGM 4046 soil cleanup objectives: 2- Butanone (MEK), Carbon Disulfide, and Toluene. VOCs were not detected in soil samples TP-01 (3.0-3.5 ft.), TP-02 (5.5-6.0 ft.), TP-12 (3.0-3.5 ft.), and TP-15 (1.5-2.0 ft.)

Laboratory analytical results for soil samples submitted as part of this investigation are summarized on Table 2. The laboratory analytical reports are presented in Appendix D.

Pesticides and PCBs- November 2, 2005

The laboratory analytical results indicate detection of pesticides in six test pit soil samples with concentrations above the laboratory detection limits and below TAGM 4046 cleanup objectives. The compounds detected were 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. Poly chlorinated bi-phenols (PCBs) were not detected above the laboratory detection limits. Therefore, pesticides and PCBs are not a COC in the soil media. The distribution of pesticides and PCBs is presented in Figure 6 – Pesticide / PCBs Distribution, also see Figure 2 for Test Pit locations.

Laboratory analytical results for soil samples submitted as part of this investigation are summarized on Table 2. The laboratory analytical reports are presented in Appendix D.

5.2 SEDIMENT QUALITY

Outfall #1 - July 2001, April 2004, Nov. 2005, May (Phase 1) & December (Phase 2) 2007

Outfall #2 - May (Phase 1) & December (Phase 2) 2007

Sediment samples were collected from Outfall #1 during July 2001, April 2004, and November 2005. These samples were analyzed for metals, SVOC, VOC, pesticides, and PCB. The investigation included the collection of three sediment samples from three designated locations at and north of the Outfall #1. Sediment sample SED-001 was collected from the mouth of the Outfall #1 structure; sediment sample SED-002 was collected from a location 8 feet north of the Outfall #1 structure, and sediment sample SED-003 was collected from a location 18 feet north of the outfall structure. The sample names for the July 2001 event are SED-01 through SED-03. The sample names for April 2004 are OTF 1 through OTF 3. The results for the July 2001 and April 2004 events are presented in Table 3 – Sediment Analysis Summary. The results for the sediment sample results are presented in the following text sections by date.

Phase 1 sediment sampling was performed on Outfall #1 and #2 on May 8, 2007 based on the project requirements to determine the nature and extent of the impacted sediment media. The Phase 1 and Phase 2 sediment sampling plan was approved by NYSDEC prior to implementation. Sediment samples for Phase 1 named OUT1SED1 through OUT1SED9 were collected on approximate 10 foot centers beginning at a point approximately 20 feet downstream of the mouth of the outfall at 0.0-0.5 ft. and 0.5-1.0 ft. sample depth intervals. Sediment sample OUT1SED10 was collected from a location approximately 50 feet up stream from the culvert passing under a Village of Newark sanitary sewer right-of-way.

Phase 2 sediment sampling was performed on Outfall #1 and #2 on December 27, 2007 based on the results of the Phase 1 sediment data and project requirements to determine the nature and extent of the impacted sediment media. Sediment samples for Phase 2 named OUT1SED11 through OUT1SED15 were collected at a point on the outfall that is approximately 50 feet down stream from OUT1SED 9 location on approximate 25 foot centers from a 0.0-0.5 ft. and 0.5-1.0 ft. sample depth intervals.

The Phase 1 sediment samples were analyzed for Metals, SVOCs, and pesticides.

The Phase 2 sediment samples were analyzed for Metals and SVOCs. The sample results for metals were compared to the Lowest Effect Level and Severe Effect Level in parts per million (Persaud et al. 1992 or Long and Morgan (1990). The results for SVOC detected for individual chemical compounds using site-specific sediment criterion is presented in Table 3. The Total PAH concentration was calculated by adding the total PAH compounds detected from the SVOC analysis and also including concentrations for specific PAHs detected as Tentatively Identified Compounds (TICs). The NYSDEC standard for PAH levels in sediment is 4 ppm and supersedes other Site Specific Sediment Criterion. Therefore, an emphasis on total PAH is provided on the sections describing SVOC results for the Phase 1 and Phase 2 sediment sample results. The results for pesticides were also compared to Site Specific Sediment Criterion.

Metals - November 2, 2005 Outfall #1 Samples SED-001, SED-002, and SED-003

Several metals exceed the NYSDEC low and severe effects levels for sediments that include: Antimony with a concentration of 4.80 ppm, Arsenic with concentrations ranging from 8.60 to 14.0 ppm, Chromium with a concentration of 40.4 ppm, Copper with concentrations ranging from 767 to 966 ppm, Lead with concentrations ranging from 67.0 to 108 ppm, Manganese with concentrations ranging from 1,470 to 8,210 ppm, Nickel with a concentration of 33.3 ppm, and Zinc with concentrations ranging from 598 to 697 ppm. Therefore, metals are a COC in the sediment media. The distribution of metals is presented in Figure 3, also see Figure 2 that presents the location of Outfall #1. Total Cyanide was not detected in the sediment samples.

A Criteria-Specific Analyses for the sediment sample results is presented on pages 7 and 8 of the Fish and Wildlife Impact Analysis (See Appendix A). Laboratory analytical results for soil samples submitted as part of this investigation are summarized on Table 3 – Sediment Analysis Summary. The laboratory analytical reports are presented in Appendix D.

Metals- May 8, 2007 Phase 1 Outfall #1 Samples OUT1SED1 through OUT1SED10

Several individual metals were detected at concentrations that exceed the Lowest Effect Levels and the Severe Effect Level from each sediment sample location and in each sample depth interval. The following metals are of concern and were detected with concentrations that exceed the Lowest Effect Levels: Arsenic ranging from 7.7 ppm to 32.7 ppm, Copper ranging from 28.0 ppm to 81.8 ppm, and Zinc with a concentration of 185 ppm. The following metals of concern were detected with concentrations that exceed the Severe Effect Levels: Copper ranging from 280 ppm to 12,100 ppm and Zinc ranging from 306 ppm to 6,500 ppm. These results indicate that the Outfall #1 sediments are impacted from approximately the Outfall #1 structure to 100 feet down stream. The contaminant distribution for the Phase 1 sediment sample results is presented on Figure 7- Outfall #1 Sediment Sample Summary Metal Concentrations that Exceed Low Effect Levels and Figure 8 –Outfall #1 Sediment Sample Summary Metal Concentrations that Exceed Severe Effect Levels. The location of sediment samples is presented on Figure 2, Figure 7 and Figure 8. A summary of the metals results is presented in Table 3.

Metals- December 27, 2007 Phase 2 Outfall #1 Samples OUT1SED11 through OUT1SED15

Concentrations of several individual metals were detected at concentrations that exceed the Lowest Effect Levels and the Severe Effect Level from sediment sample locations OUT1SED11 through OUT1SED13 and in each sample depth interval. Lowest and Severe Effect levels were not detected in samples OUT1SED14 and OUT1SED15, with the exception of Copper 25.9 ppm that exceeds the Lowest Effect level in sediment sample OUT1SED15 (0.0-0.5 ft.) The following metals are of concern and were detected with concentrations that exceed the Lowest Effect Levels at sediment sample locations OUT1SED11 through OUT1SED13: Arsenic 12.0 ppm in OUT1SED12 (0.0-0.5 ft.), Copper ranging from 26.2 ppm to 40.4 ppm, and Zinc ranging

from 163 ppm to 219 ppm. The following metals of concern were detected with concentrations that exceed the Severe Effect Levels: Copper ranging from 132 ppm to 1,650 ppm and Zinc ranging from 314 ppm to 2,080 ppm. The combined Phase 1 and Phase 2 results indicated that the Outfall #1 sediments are impacted from approximately the Outfall #1 structure to 200 feet down stream. The contaminant distribution for the Phase 2 sediment sample results is presented on Figure 7- Outfall #1 Sediment Sample Summary Metal Concentrations that Exceed Low effect Levels and Figure 8 –Outfall #1 Sediment Sample Summary Metal Concentrations that Exceed Severe Effect Levels. The location of sediment samples is presented on Figure 2, Figure 7 and Figure 8. A summary of the metals results is presented in Table 3.

Semi-Volatile Organic Compounds – November 2, 2005

Concentrations of several semi-volatile organic compounds (SVOCs) exceed the Site Specific Sediment Criterion (Acute Toxicity – Aquatic Life) for the November 2, 2005 sampling event that include: Acenaphthene with concentrations ranging from 60 to 220J ppm, Anthracene with concentrations ranging from 100J to 370J ppm, Benzo (a) Anthracene with concentrations ranging from 16J to 1,100 ppm, Benzo (a) Pyrene with a concentration ranging from 21J to 1,200 ppm, Chrysene with a concentration ranging from 21J to 1,200 ppm, Dibenzo (a,h) Anthracene with concentrations ranging from 3.8J to 180J ppm, Fluoranthene with concentrations ranging from 40 to 3,000 ppm, Fluorene with concentrations ranging from 52J to 160J ppm, Phenanthrene with concentrations ranging from 20J to 2,300 ppm, and Pyrene with concentrations ranging from 890 to 2,600 ppm. Several of the SVOC compounds that exceed the Site Specific Sediment Criterion are several orders of magnitude above the levels. In addition, several of these chemical compounds were detected with elevated concentrations in sediment samples from the July 2001 and April 2004 sampling events.

Therefore, SVOCs are a COC in the sediment media. The sediment in the area of Outfall #1 structure requires remediation due to the overall concentrations of COC and with respect to the risk to ecological receptors. The distribution of SVOCs is presented in Figure 4, also see Figure 2 that presents the location of Outfall #1. Other SVOCs were also detected with concentrations that are below the Site Specific Sediment Criterion. A Criteria-Specific Analyses for the sediment sample results is presented on pages 7 and 8 of the Fish and Wildlife Impact Analysis (See Appendix A). Laboratory analytical results for soil samples submitted as part of the November 2, 2005 investigation are summarized on Table 3. The Sediment Analytical Summary Table 3 also presents the historic data from previous sampling events and includes the total PAH levels that range from 230.3 ppm to 16,020.0 ppm. The NYSDEC standard for PAH levels in sediment is 4 ppm and supersedes other Site Specific Sediment Criterion. The laboratory analytical reports are presented in Appendix D.

Semi Volatile Organic Compounds- May 8, 2007 Phase 1 Outfall #1 Samples OUT1SED1 through OUT1SED10

Concentrations of several individual semi-volatile chemical compounds (SVOC) were detected that significantly exceed the Site Specific Sediment Criterion and the PAH level of 4 ppm for Phase 1 sediment samples OUT1SED1 through OUT1SED9 in each sample depth interval. The Total PAH levels ranged from 5.582 ppm to 8,314.00 ppm in sediment samples OUTSED1 through OUT1SED9 in each sample depth interval, with the exception of OUT1SED5 (0.5-1.0ft.) at a concentration of 3.167 ppm that is below the NYSDEC standard for PAH of 4 ppm. Total PAH concentrations detected in sediment samples OUT1SED10 (0.0-0.5 ft.) and OUT1SED10 (0.5-1.0 ft.) are 3.311 ppm and 0.047 ppm, respectively. The total PAH concentration was determined by a sum of the 34 PAH chemical compounds listed in EPA's *Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures*.

These results indicate that the Outfall #1 sediments are impacted from approximately the Outfall #1 structure to 100 feet down stream. The contaminant distribution for the Phase 1 sediment sample results is presented on Figure 9 - Outfall #1 Sediment Sample Summary Semi-Volatile Chemical Compounds Total PAH levels. The location of sediment Phase 1 samples is presented on Figure 2 and Figure 9. A summary of the individual SVOC and Total PAH results for each sediment sample is presented in Table 3.

Semi Volatile Organic Compounds- December 27, 2007 Phase 2 Outfall #1 Samples OUT1SED11 through OUT1SED15

Concentrations of several Individual semi volatile chemical compounds (SVOC) were detected that exceed the Site Specific Sediment Criterion and the PAH level of 4 ppm for Phase 2 sediment samples OUT1SED12 (0.0-0.5 ft.), OUT1SED12 (0.5-1.0 ft.) and OUT1SED13 (0.0-0.5 ft.). The Total PAH levels ranged from 9.81 ppm to 120.49 ppm in sediment samples OUTSED12 and OUT1SED13 in the 0.0-0.5 ft. sample depth interval. Total PAH concentrations of 3.728 ppm and 3.944 ppm were detected in sediment samples from the OUT1SED11 location. Total PAH and individual SVOCs were not detected above the laboratory detection limits for the following samples: OUT1SED13 (0.5-1.0 ft.), OUT1SED14 (0.0-0.5ft.), and OUT1SED14 (0.5-1.0 ft.) In addition, the concentrations of 1.61 ppm and 3.908 ppm, respectively for Total PAH in OUT1SED15 (0.0-0.5 ft.) and OUT1SED15 (0.5-1.0 ft.) are below the NYSDEC standard for PAH of 4 ppm.

The Phase 2 results indicate that the Outfall #1 sediments from approximately 125 feet down stream of sediment sample location OUT1SED9 are moderate to slightly elevated with SVOCs. In addition, the overall concentrations of SVOC and Total PAH decrease in the down stream direction (north) towards the OUT1SED10 sediment sample location. The contaminant distribution for the Phase 2 sediment sample results is presented on Figure 9 - Outfall #1 Sediment Sample Summary Semi volatile Chemical Compounds Total PAH levels. The location of sediment Phase 2 samples is presented on Figure 2 and Figure 9. A summary of the



individual SVOC and Total TPH results for each sediment sample is presented in Table 3.

Volatile Organic Compounds – November 2, 2005

The concentrations of volatile organic compounds (VOCs) detected in the sediment samples are below Site Specific Sediment Criterion. Acetone was detected in sediment samples SED-001 through SED-003 with a concentration ranging from 0.030 to 0.210 ppm, 2-Butanone was detected in sediment samples SED-001 through SED-003 with a concentration ranging from 0.0065J to 0.045 ppm. Carbon Disulfide was detected with a concentration of 0.002J ppm in SED-002 and a concentration of 0.0024J ppm in SED-003. Ethylbenzene was detected with a concentration of 0.0062J ppm in sediment sample SED-003. The other VOCs were not detected above the laboratory detection limits. Therefore, VOCs are not a COC in the sediment media and were not evaluated during the Phase 1 and Phase 2 sediment sampling events. The distribution of VOCs is presented in Figure 5, also see Figure 2 that presents the location of Outfall #1.

A Criteria-Specific Analyses for the sediment sample results is presented on pages 7 and 8 of the Fish and Wildlife Impact Analysis (See Appendix A). Laboratory analytical results for sediment samples submitted as part of this investigation are summarized on Table 3. The laboratory analytical reports are presented in Appendix D.

Pesticides and PCBs – November 2, 2005

The pesticides Endrin Aldehyde with a concentration of 0.730 ppm and Endrin Ketone with a concentration of 0.760 ppm are below the sediment Screening Guidelines- Effects Range Moderate value of 45 ppm for these pesticides (Long 1990). PCBs were not detected above the laboratory detection limits. Therefore, pesticides and PCBs do not appear to be COC in the sediment media based on this data. The distribution of pesticides and PCBs is presented in Figure 6, also see Figure 2 that presents the location of Outfall #1.

A Criteria-Specific Analyses for the sediment sample results is presented on pages 7 and 8 of the Fish and Wildlife Impact Analysis (See Appendix A). Laboratory analytical results for soil samples submitted as part of this investigation are summarized on Table 3. The laboratory analytical reports are presented in Appendix D.

Pesticides- May 8, 2007 Phase 1 Outfall #1 Samples OUT1SED1 through OUT1SED10

Slightly elevated concentrations of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were detected with concentrations ranging from 0.016P ppm to 1.700E ppm in the 0.5-1.0 ft. sample depth interval in OUT1SED3 through OUT1SED10. In general, detection of pesticides in the 0.0-0.5 ft. sample depth interval was non-detection or at lower concentrations. Pesticides may have been introduced to the site when the land or surrounding lands were originally used for agricultural uses. The majority of Wayne County is used for agricultural uses and these concentrations may represent area background levels. Laboratory testing was not performed on Phase 2 Outfall #1

Metals- May 8, 2007 Phase 1 Outfall #2 Samples OUT2SED1 through OUT2SED6

Several individual metals were detected at concentrations that exceed the Lowest Effect Levels and at each sediment sample location and for each sample depth interval. The following metals are of concern and were detected with concentrations that exceed the Lowest Effect Levels: Arsenic 6.8 ppm in OUT2SED1 (0.0-0.5 ft.), Copper ranging from 16.2 ppm to 89.9 ppm, and Zinc ranging from 120 ppm to 156 ppm. The following metal of concern was detected with concentrations that exceed the Severe Effect Levels: Zinc ranging from 318 ppm to 3,830 ppm in OUT2SED1, OUT2SED4, and OUT2SED6. These results indicate that the Outfall #2 sediments are impacted from approximately the Outfall #2 structure to 60 feet down stream. In general, the concentrations decreased from the Outfall # 2 structure in the down stream direction. The contaminate distribution for the Phase 1 sediment sample results is presented on Figure 10 - Outfall #2 Sediment Sample Summary Metal Concentrations that Exceed Low effect Levels and Figure 11 - Outfall #2 Sediment Sample Summary Metal Concentrations that Exceed Severe Effect Levels. The location of Outfall #2 sediment samples is also presented on Figure 2. The surface water in Outfall #2 merges with the surface water from Outfall #1 at appoint near the culvert that allows the surface water to flow northward below the sanitary sewer line, see Figure 2. A summary of the metal sediment sample results is presented in Table 3.

Metals- December 27, 2007 Phase 2 Outfall #2 Samples OUT2SED7 through OUT2SED9

Several individual metals were detected at concentrations that exceed the Lowest Effect Levels and at each sediment sample location and for each sample depth interval. The following metals are of concern and were detected with concentrations that exceed the Lowest Effect Levels: Arsenic 7.6 ppm in OUT2SED7 (0.5-1.0 ft.), Copper 25.3 ppm and 31.5 ppm in OUT2SED9 0.0-0.5 ft. and in the duplicate sample at this location, respectively. Zinc 172 ppm in OUT2SED7. The following metal of concern was detected with concentrations that exceed the Severe Effect Levels: Zinc ranging at 366 ppm and 473 ppm in OUT2SED9 0.0-0.5 ft. and in the duplicate sample at this location, respectively. These results indicate that the Outfall #2 sediments are moderately impacted from approximately OUT2SED6 sediment sample location to 110 feet down stream at the OUT2SED9 sediment sample location. In general, the concentrations decreased from the Outfall # 2 structure in the down stream direction, with the exception of elevated detection of metals at the OUT2SED9 location. The contaminant distribution for the Phase 2 sediment sample results is presented on Figure 10 - Outfall #2 Sediment Sample Summary Metal Concentrations that Exceed Low effect Levels and Figure 11-Outfall #2 Sediment Sample Summary Metal Concentrations that Exceed Severe Effect Levels. The location of Outfall #2 sediment samples is also presented on Figure 2.

Semi Volatile Organic Compounds- May 8, 2007 Phase 1 Outfall #2 Samples OUT2SED1 through OUT2SED6

Concentrations of several individual semi-volatile chemical compounds (SVOC) were detected that slightly to moderately exceed the Site Specific Sediment Criterion and the PAH level of 4 ppm for Phase 1 sediment samples OUT2SED1, OUT2SED2, and OUT2SED4 in each sample depth interval, with the exception of the 0.5-1.0 ft. sample depth interval at OUT2SED2.

The Total PAH levels ranged from 5.160 ppm to 42.05 ppm at these sediment sample locations and exceed NYSDEC standard for PAH of 4 ppm. Total PAH concentrations detected in sediment samples OUT2SED2 (0.5-1.0 ft.), OUT2SED3, OUT2SED5, and OUT2SED6 (0.5-1.0 ft.) ranged from 0.018 ppm to 3.070 ppm. The concentration of Total PAH detected in OUT2SED6 (0.0-0.5 ft.) was 4.030 and very slightly exceeds the NYSDEC 4 ppm standard.

These results indicate that the Outfall #2 sediments are impacted from approximately the Outfall #2 structure to approximately 50 feet down stream. The contaminant distribution for the Phase 1 sediment Outfall # 2 sample results is presented on Figure 12 - Outfall #2 Sediment Sample Summary Semi volatile Chemical Compounds Total PAH levels. The location of sediment Phase 1 samples is presented on Figure 2. A summary of the individual SVOC and Total PAH results for each sediment sample is presented in Table 3.

Semi Volatile Organic Compounds- December 27, 2007 Phase 2 Outfall #2 Samples OUT2SED7 through OUT2SED9

Concentrations of several individual semi-volatile chemical compounds (SVOC) were detected that slightly to moderately exceed the Site Specific Sediment Criterion for Phase 2 sediment samples OUT2SED7, OUT2SED8, and OUT2SED9 in each sample depth interval, with the exception of the 0.5-1.0 ft. sample depth interval at OUT2SED7. The Total PAH concentration detected in OUT2SED9 (0.0-0.5 ft.) was 61.12 ppm. Total PAH concentrations detected in sediment samples OUT2SED7, OUT2SED8, and OUT2SED9 (0.5-1.0 ft.) ranged from 0.0 ppm to 2.493 ppm.

These results indicate that the Outfall #2 sediments generally impacted from approximately the Outfall #2 structure to approximately 50 feet down stream, with the exception of the elevated concentrations of PAHs at the OUT2SED9 location. The contaminate distribution for the Phase 2 sediment Outfall # 2 sample results is presented on Figure 12 - Outfall #2 Sediment Sample Summary Semi volatile Chemical Compounds Total PAH levels. The location of sediment Phase 1 samples is presented on Figure 2. A summary of the individual SVOC and Total PAH results for each sediment sample is presented in Table 3.

Pesticides- May 8, 2007 Phase 1 Outfall #2 Samples OUT2SED1 through OUT2SED6

Slightly elevated concentrations of 4,4'-DDE were detected with concentrations ranging from 0.0078P ppm to 0.170E ppm in OUT2SED1 through OUT2SED6. Slightly elevated levels of 4,4'-DDD and 4,4'-DDT were also detected with concentrations ranging from 0.0063 ppm to

0.080 ppm. Pesticides may have been introduced to the site when the land or surrounding lands were originally used for agricultural uses. The majority of Wayne County is used for agricultural uses and these concentrations may represent area background levels. Laboratory testing was not performed on Phase 2 Outfall #2 sediment samples.

5.3 TOXICITY TESTING

Toxicity testing of sediment samples was performed as part of the Phase 2 sediment sampling event. Three samples named GEO-1, GEO-2, and GEO-3 were collected at the locations presented on Figure 2. Toxicity sediment sample GEO-1 was collected next to and up stream of OUT1SED10 at Outfall #1. This location was selected to evaluate the potential toxicity of the sediment on the benthic organisms that live in the sediment. This location is up stream of the wetlands that appear to be located north of the sanitary sewer line. Toxicity sediment sample GEO-2 was collected next to and up stream of OUT2SED7 to evaluate the potential toxicity of the benthonic organisms that live in the sediment in this area of Outfall #2. Toxicity sediment sample GEO-3 is a background sediment sample collected approximately 160 feet south of the Outfall #2 structure. A control sediment sample was also provide and analyzed by Cosper Environmental Services, Inc. The results of the toxicity tests indicate that the sediment is non-toxic at the locations sampled at each Outfall and the background location. The toxicity results are presented in Attachment 2 – Bioassay Toxicity Testing of Ultralife Sediment.

6.0 SURFACE WATER QUALITY

The November 2, 2005 investigation included the collection of two surface water samples for laboratory analysis from locations down stream of Outfall #1 structure where contaminants of concern were suspected in the surface water media. The laboratory analytical methods included: Target Compound List (TCL) Volatile Organic Compounds (VOCs) by NYSDEC ASP Method OLMO4.3, TCL Base/Neutral/Acid Organic Compounds (BNAs) by NYSDEC ASP Method OLMO4.3, TAL Metals by NYSDEC ASP Method ILMO4.2, PCBs/ Pesticides by NYSDEC ASP Method OLMO4.3, and Total Cyanide by NYSDEC ASP Method ILMO4.2. In addition, the surface water field sample parameters are presented in Table 4 – Groundwater and Surface Water Field Sample Parameters.

Metals – November 2, 2005

The Outfall #1 surface water sample analytical results indicate that Aluminum, Iron, Lead, Manganese, Mercury, and Sodium were detected at concentrations that exceed NYSDEC Part 703 Water Quality Standards. Two surface water samples named SW-1, collected 1 foot north of Outfall #1 structure, and SW-2 that was collected 25 feet north (down stream) from Outfall #1 structure. The surface water samples were analyzed in accordance with NYSDEC ASP Method ILMO4.2.

Aluminum was detected in one surface water sample with a concentration of 0.143 ppm in SW-2. The NYSDEC Part 703 Water Quality Standards for Aluminum is 0.100 ppm.

Iron was detected in two surface water samples with concentrations of 2.650 ppm in SW-1 and 5.650 ppm in SW-2. The NYSDEC Part 703 Water Quality Standards for Iron is 0.300 ppm.

Lead was detected in one surface water sample with a concentration of 0.0272 ppm in SW-2. The NYSDEC Part 703 Water Quality Standards for Lead is 0.008 ppm.

Manganese was detected in two surface water samples with concentrations of 0.343 ppm in SW-1 and 1.070 ppm in SW-2. The NYSDEC Part 703 Water Quality Standards for Manganese is 0.300 ppm.

Mercury was detected in one surface water sample with a concentration of 0.0000400 ppm in SW-2. The NYSDEC Part 703 Water Quality Standards for Mercury is 0.0000026 ppm.

Sodium was detected in two surface water samples with concentrations of 39.9 ppm in SW-1 and 40.5 ppm in SW-2. The NYSDEC Part 703 Water Quality Standards for Sodium is 20.0 ppm.

The following Metals were also detected in surface water samples below NYSDEC Part 703 Water Quality Standards: Arsenic, Barium, Calcium, Chromium, Cobalt, Copper, Magnesium, Potassium, Vanadium, and Zinc. Metals are a COC in the surface water media. The distribution of metals is presented in Figure 3, also see Figure 2 that presents the location of Outfall #1.

Laboratory analytical results for surface water samples submitted as part of this investigation are summarized on Table 5 – Surface Water Analysis Summary. The laboratory analytical reports are presented in Appendix D.

Semi-Volatile Organic Compounds- November 2, 2005

Laboratory analysis indicated detection of the following compounds in each sample: Butyl Benzyl Phthalate, Di-N-Butylphthalate, and Bis (2-Ethylhexyl) Phthalate. The sample from SW-2 contained Bis (2-Ethylhexyl) Phthalate, 0.0098 ppm, exceeding the NYSDEC Part 703 Water Quality Standards of 0.005 ppm. Therefore, SVOCs are not a COC in the surface water media. The distribution of SVOCs is presented in Figure 4, also see Figure 2 that presents the location of Outfall #1.

Volatile Organic Compounds- November 2, 2005

The laboratory analytical results indicate detection of one volatile compound above the laboratory detection limits in both surface water samples. Laboratory analysis indicated detection of the following compound in each sample: Acetone. The concentrations of Acetone detected did not exceed the NYSDEC Part 703 Water Quality Standards of 50 ppb in either SW-1 or SW-2. Therefore, VOCs are not a COC in the surface water media. The distribution of VOCs is presented in Figure 5, also see Figure 2 that presents the location of Outfall #1.

Pesticides and PCBs- November 2, 2005

The laboratory analytical results indicate non detection of pesticide and PCB chemical compounds above the laboratory detection limits in both surface water samples. Pesticides and PCBs are not COC in the surface water media. The distribution of pesticides and PCBs is presented in Figure 6, also see Figure 2 that presents the location of Outfall #1.

7.0 GROUNDWATER QUALITY

The November 2, 2005 investigation included the collection of groundwater samples for laboratory analysis from the seven existing monitoring wells. The groundwater samples laboratory analysis were analyzed in accordance with Target Compound List (TCL) Volatile Organic Compounds (VOCs) by NYSDEC ASP Method OLMO4.3, TCL Base/Neutral/Acid Organic Compounds (BNAs) by NYSDEC ASP Method OLMO4.3, TAL Metals by NYSDEC ASP Method ILMO4.2, PCBs/ Pesticides by NYSDEC ASP Method OLMO4.3, and Total Cyanide by NYSDEC ASP Method ILMO4.2. Groundwater field sample parameters are presented in Table 4 and 4A. Previous groundwater sample results from July 2001 and April 2004 are presented in Table 6. In addition, a May 2007 groundwater sample event was performed to further evaluate the groundwater quality with respect to metals.

Metals- November 2, 2005

The groundwater sample analytical results for metals indicate that several metals were detected at concentrations that exceed NYSDEC Groundwater Standards including: Arsenic with a concentration of 33 to 135 ppb, Iron with a concentration ranging from 2,530 to 16,400 ppb, Magnesium with a concentration ranging from 57,700 to 194,000 ppb, Manganese with a concentration ranging from 315 to 1,950 ppb, and Sodium with a concentration ranging from 35,900 to 488,000 ppb. The laboratory results indicate that metals were detected in each groundwater sample submitted.

Metals- May 8, 2007

An additional groundwater sampling event was performed to further evaluate the metals concentrations that have been generally decreasing over time. In particular, the focus of this evaluation was on the Arsenic levels that have decreased, see Table 6. A general summary of the decreased Arsenic levels is presented below and the groundwater standard for Arsenic is 25 ppb.

<u>Monitoring Well</u>	<u>Previous High Concentration</u>	<u>May 2007 Concentration</u>
MW-1	25.3 ppb	5.7B ppb
MW-2	14.5 ppb	Non-detection
MW-3	19.6 ppb	Non-detection
MW-4	58.5 ppb	21.4 ppb
MW-5	144 ppb	32.5 ppb
MW-01 (SP)	26.5 ppb	19.5 ppb
MW-02 (SP)	266 ppb	23.9 ppb

A comparison of the historical groundwater data with the recent groundwater data indicates a decrease in the concentration of the majority of metals detected and a significant decrease in the concentrations of arsenic. There were also some increases for some of the metals detected. Overall it appears that seasonal fluctuations in the groundwater table may cause the concentrations for some of the metals to fluctuate in groundwater samples. It appears that the concentration of Arsenic and the other metals have stabilized in the vicinity of the source area soil excavation (cinder block drainage vault removal location) since this action was completed. It should also be noted that the concentrations of metals in down gradient monitoring wells MW-1 and MW-2 has been reduced. Metals are a COC in the groundwater media. However, they do not appear to be a remediation concern based on the May 2007 groundwater sample results. The distribution of Metals is presented in Figure 3, also see Figure 2, that presents the well locations, and Figure 7A that presents the May 2007 distribution of Arsenic at each well location.

Total Cyanide was not detected above the laboratory detection limits in the groundwater samples.

Laboratory analytical results for groundwater samples are summarized in Table 6 – Groundwater Analysis Summary. The historical groundwater data is also presented in Table 6 from previous sample events. The laboratory analytical reports are presented in Appendix D.

Semi-Volatile Organic Compounds- November 2, 2005

The chemical compound Bis (2-ethylhexyl) phthalate was detected at a concentration of 0.0061J ppm in the groundwater sample from monitoring well MW-1SP. This concentration slightly exceeds the groundwater standard of 0.005 ppm. Semi-Volatile Organic Compounds were not detected in the other groundwater samples at concentrations that exceed New York State Groundwater Standards. Therefore, SVOCs are not a COC in the groundwater media. The distribution of SVOCs is presented in Figure 4, also see Figure XX that presents the locations of the monitoring wells. Laboratory analytical results for groundwater samples submitted as part of this November 2, 2005 investigation and previous sample events are summarized on Table 6. The laboratory analytical reports are presented in Appendix D.

Volatile Organic Compounds- November 2, 2005

Volatile Organic Compounds were not detected at concentrations that exceed New York State Groundwater Standards and were non-detection at monitoring wells MW-1 and MW-5. Therefore, VOCs are not a COC in the groundwater media. The lack of detection of elevated VOCs in the groundwater media at this site is significant for evaluation of potential vapor intrusion. When VOC contaminants are present in subsurface soil and groundwater may cause vapor intrusion under buildings at impacted sites. The monitoring wells are located upgradient and down gradient of the Ultralife buildings, See Figure 2. The distribution of VOCs is presented in Figure 5.

Laboratory analytical results for groundwater samples submitted as part of this investigation are summarized on Table 6 – Groundwater Analysis Summary. The historical groundwater data is also presented in Table 6 from previous sample events. The laboratory analytical reports are presented in Appendix D.

Pesticides and PCBs- November 2, 2005

Pesticides and PCBs were not detected above the laboratory detection limits and therefore were not detected at concentrations that exceed New York State Groundwater Standards. Pesticides and PCBs are not a COC in the groundwater media. The distribution of pesticides and PCBs is presented in Figure 6, also see Figure 2 for the locations of monitoring wells.

Laboratory analytical results for groundwater samples submitted as part of this investigation are summarized on Table 6 – Groundwater Analysis Summary. The laboratory analytical reports are presented in Appendix D.

8.0 ENVIRONMENTAL MEDIA AND CONTAMINANT DISTRIBUTION

The previous investigations (by Lu Engineering), source area soil and groundwater removal (by Marcor Remediation, Inc) and additional Investigation (by GeoQuest) involved laboratory analysis for samples collected from the following environmental media encountered with an evaluation of COC for the Site based on contaminant distribution and potential receptors.

- Surface Water media from Outfall #1 in drainage swale with metals identified as a contaminant of concern (COC)
- Sediment media in drainage swale from Outfall #1 and Outfall #2 with Metals and SVOC identified as COC
- Subsurface soil media in the vicinity of the storm water laterals and the drainage swale from the outfall. A COC for this media has not been identified based on the laboratory soil sample results.

- Overburden groundwater media in the vicinity of the former crock (former underground storm water storage vault) and source area soil removal excavation with metals in the groundwater identified as COC.

9.0 POTENTIAL MIGRATION PATHWAYS AND RECEPTORS

Potential Migration Pathway - subsurface soils to overburden groundwater

There does appear to be a potential for cross-media migration of COC detected in the subsurface soil to the overburden groundwater table at the Site based on the laboratory subsurface soil and groundwater sample results. Since, the overburden groundwater is shallow (less than 10 feet) there is potential for a release to the soil to impact the overburden groundwater.

Potential Ecological Receptors and Exposure Pathways

The Fish and Wildlife Impact Analysis report details ecological receptors of special concern with exposure pathways for ecological receptors, see Appendix A. However, the results of the Toxicity Testing indicate that the sediments at the test locations in Outfall # 1 and Outfall # 2 are not toxic to the benthic organisms.

Potential Sources of Contaminants

Based on the environmental project data and site information it appears that the potential sources of contaminants include:

- Accumulation of petroleum based SVOCs and metals typically associated with automobiles from parking lot runoff;
- Leaching of SVOCs from roofing materials into roof drains;
- Transport of particulates (metals & SVOCs) deposited on roof areas prior to the 2005 installation of a dust collection system;
- Runoff from exterior garbage wetting operations, discontinued in 2005; and
- Undetermined past operational practices by previous building owners/tenants.

Potential Human Receptors

Human receptors have not been identified for the impacted media and potential migration pathways evaluated based on the physical site features, COC, and their on-site distribution. However, a site specific health and safety plan should be prepared and implemented during future sediment remediation at the outfall drainage swale location. The health and safety plan should detail procedures so that human contact with impacted sediments is restricted during sediment removal activities.

Potential Vapor Intrusion Issues

As noted in Section 3, prior to 1968, the site consisted of undeveloped farm land. From approximately 1968 until the early 1980's, the site was owned and developed by Sarah Coventry as its corporate headquarters and distribution center; including the construction of what is now called Building 2000 and Building 3000.

In the early 1980's, the facility came under the ownership of Eastman Kodak who began a battery manufacturing operation. In 1985, Eastman Kodak constructed Building 4000 for the primary purpose of developing, mixing and blending electrolytes. In 1991, the battery manufacturing operations were purchased by Ultralife Batteries, Inc., with Eastman Kodak retaining ownership of the facility. In 1998 the facility was purchased by the Wayne County Industrial Development Agency (IDA) with Ultralife Batteries, Inc. continuing operations as a tenant. A moderate level of chemical usage occurs as part of the battery manufacturing process. Over time, the quantities of chemicals used have been reduced. In particular, the amount of chemical handling and processing has been greatly reduced by the cessation of electrolyte mixing and blending operations in Building 4000; being replaced with purchased electrolyte from outside suppliers.

In addition to the cinder block drainage vault described in Section 2, the facility has housed the following underground petroleum storage tanks:

- 5,000 gallon underground storage tank installed near the east side of Building 3000 in May 1974. The tank held unleaded gasoline and was removed in August 1991.
- 300 gallon underground storage tank installed near the northeast side of Building 3000 (date unknown). The tank held waste oil and was removed in February 1993. Trace levels of toluene were detected during the removal.
- 1,000 gallon underground storage tank installed near Building 2000 in June 1976. The tank held diesel fuel and was tightness tested in April 1994. The tank was removed in November 1998. At the time of removal, residual petroleum was noted and Spill Report #9870334 was filed with NYSDEC.

Data from the previous investigations that has been submitted to NYSDEC and the results of GeoQuest investigations detailed in this report support the opinion that a vapor intrusion investigation is not warranted at this time. Elevated concentrations of VOC and SVOC in soil and groundwater at locations adjacent to and below buildings are typical conditions that would suggest the need for a vapor intrusion investigation. This type of contaminant distribution was not encountered during GeoQuest's project work. A vapor intrusion investigation is not required at this time based on the following laboratory analytical results:

- Analytical results of soil samples collected during Geoprobe investigation and installation of groundwater monitoring wells did not identify VOCs and SVOCs that exceeded the NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives.
- Groundwater samples collected in 2001, 2004 and 2005 do not identify VOCs and SVOCs as contaminants of concern.



- Soil samples collected as part of the 2004 removal of the cinder block drainage vault confirm the effective removal of soils contaminated with VOCs and SVOCs.
- Results of Geoprobe samples collected under Building 4000 trench drains indicate that VOC and SVOC contamination is not present. Acetone was detected in two of the samples at concentrations of 6.4 and 7.5 parts per billion (ppb). Bis (2-Ethylhexyl) phthalate was detected in one of the samples at a concentration of 69 ppb. These levels are significantly below the NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives of 200 ppb and 50,000 ppb, respectively. Concentrations of other VOC and SVOC were below laboratory detection limits.

10.0 SUMMARY AND CONCLUSIONS

This summary of the project work for this investigation is based on the field observations, measurements, and laboratory analytical results for Site media investigated. The data from previous investigations and GeoQuest's investigation completes the investigative project work for the study area. The conclusions are based on GeoQuest's options with respect to the Site environmental data obtained during this investigation, see Limitations Appendix E - Limitations.

1. Based on a review of the confirmatory soil sample results, it appears that the source area soil removal at the former underground wastewater storage vault (crock) adjacent to Building 4000 achieved the objectives for reducing COC concentrations in the impacted media by removal of impacted soil and groundwater. This soil remediation is documented in Ultralife Batteries Report Dated, April 2004, see Section 12 of this report. Post remediation groundwater concentrations for the COC at this area have generally decreased. It appears that the COC in the groundwater have stabilized in this area that was excavated. Therefore, the remediation of this area is complete.
2. Five overburden soil deposits were encountered during subsurface explorations at the test pit excavation locations with increasing depths and include: Topsoil, a Fill Deposit, Buried Topsoil Deposit, a Lacustrine Deposit, and a Glacial Till Deposit. The Fill Deposit appears to be regarded native soils that were placed when the facility was constructed. The Fill Deposit was relatively free of debris. The gravel bedding of the storm water lateral was observed in test pit TP-5 and coal and ash was not observed at the test pit locations. Soil type and soil deposits vary at the Site, see Test Pit logs presented in Appendix B.
3. The depth to groundwater at the Site ranges from approximately 0.5 to 6.55 ft. below ground surface based on the observations and measurements made by GeoQuest. The Site groundwater flow direction is generally towards the north, based on the data from previous investigations and the recent groundwater elevation map presents the groundwater flow direction.
4. The results of field headspace soil sample measurements (PID) indicate non-detection of total organic vapors for soil samples collected during this investigation.

5. Two areas of impacted sediment require remediation as identified and the nature and extent of these areas has been evaluated during GeoQuest's Investigations at the Site. The impacted sediments at Outfall #1 extend from the mouth of the outfall structure northward approximately 200 feet. The sediments are impacted with metals and SVOCs at concentrations that exceed NYSDEC PAH levels, Site Specific Sediment Criterion, and Lowest and Severe Effects values. The impacted sediments at Outfall #2 extend from the mouth of the outfall structure eastward to approximately 110 feet in the down stream direction. These sediments are also impacted with SVOC and metals. The sediment in the area at Outfall #1 near sediment sample OUT1SED10 is non toxic to the benthic organisms based and the sediment at Outfall #2 near OUT2SED7 is non toxic.
6. Data Usability Summary Report (DUSR) was prepared based on a review of the Columbia Analytical Services, Inc. laboratory report # R2528681 for the Ultralife Batteries, Inc. Site Voluntary Clean-Up Project in Rochester, New York. This laboratory report included 24 sample results and laboratory QA/QC. The DUSR report was prepared for GeoQuest by Paradigm Environmental Services, Inc. The laboratory data was evaluated for its usability as defined by the Guidance for the Development of DUSRs (NYSDEC), see Appendix F - Data Usability Summary Report.
7. It is our opinion that the combination of data from previous investigations, GeoQuest's revised additional investigation, with the amended Phase 1 and Phase 2 sediment sampling information has provided substantial data for site characterization and to select remedial alternatives for remediation of SVOC and metals in the impacted sediment media at the Outfall areas.

11.0 RECOMMENDATIONS

GeoQuest's recommendations are based on our investigation data, previous investigation data, and our project experience with NYSDEC requirements. Future environmental data may be obtained from the Site or from off-site sources that may modify these recommendations, see limitations Appendix E.

1. The sediments in the drainage swale north of the Outfall #1 structure should be remediated and post remediation sediment samples and surface water samples should be evaluated for the effectiveness of future remediation. The impacted sediments that require remediation are located from the Outfall #1 structure to approximately 200 feet down stream and from Outfall #2 to approximately 110 feet down stream. The lateral extent of remediation should include approximately 2 feet into the east and west banks of the Outfall #1 and Outfall #2 drainage swales. Improvements to the banks of the swales may be required and should also be planned for to maintain the swale width and stability of the drainage swale channel after the removal action is completed. Confirmatory sampling locations should be within the removal area and also at locations north of the removal area. A remedial Action Plan should be prepared that details the selected remedial alternative(s) and submitted to the NYSDEC and New York State

Department of Health for approval. The Storm Water Pollution Prevention Plan (see Appendix G – Storm Water Pollution Prevention Plan) may need to be modified pending future remediation project work. The primary objective of a remedial action should be to reduce the Metal, SVOC, and pesticide concentrations that have been detected in sediment samples from this area to levels that are acceptable to the NYSDEC and in accordance with clean-up objectives that will be established for this Site.

2. Remedial alternatives should be evaluated for remediation of impacted sediment. GeoQuest recommends technically feasible and cost effective remedial alternative(s) that can be implemented while the outfall structures are active. The selected remedial alternative(s) should be presented in a Remedial Action Plan for approval by the NYSDEC, New York State Department of Health, and Wayne County Health Department prior to implementation. Preparation of a soil management plan for the Site, Site deed restriction for land use, and an annual certification of that deed restriction may also be considered during the preparation of the Remedial Action Plan.
3. A wetland delineation survey should be performed in the area of Outfall #1 to determine the margins of the wetlands and the wetland buffer zone. The wetland delineation should be performed prior to future remediation at the Outfall #1 location.

12.0 REFERENCES

PREVIOUS INVESTIGATION REPORT:

Voluntary Cleanup Project Report (2004); Ultralife Batteries, Inc

PREVIOUS INVESTIGATION REPORT:

Final Voluntary Investigation Report (2001); Lu Engineers

STORM WATER POLLUTION PREVENTION PLAN

Ultralife Batteries, Inc. (Revised June 27, 2008)