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TRIAD ENGINEERING, INC.

Libbey Owens Ford Plant
Charleston, Kanawha County, West Virginia
CERCLIS WVD005008412

SITE INSPECTION

Submitted to:

West Virginia Department of Environmental Protection
Office of Environmental Remediation
601 57th Street
Charleston, West Virginia 25304

Submitted by:

Triad Engineering, Inc.
4980 Teays Valley Road
Scott Depot, West Virginia 25560

March 2011

March 30, 2011

Mr. James Hargett
Site Assessment Manager
USEPA, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

SUBJECT: ***SITE INSPECTION - Rev.0***
Libbey Owens Ford Plant CERCLIS Site
CERCLIS No. WVD005008412
Triad Project No. 04-10-0052

Dear Mr. Hargett,

Triad Engineering, Inc. is pleased to submit the *Site Inspection - Rev.0* for the Libbey Owens Ford Plant CERCLIS Site, prepared under Task 3 of the approved Work Plan. We have forwarded a copy of the report to Ms. Pamela Hayes, WVDEP, OER Project Manager under separate cover.

If you have any questions or desire additional information, please feel free to contact us.

Sincerely,
Triad Engineering, Inc.

Nonresponsive Based on Revised Scope
[redacted]

Project Manager/Environmental Scientist

Nonresponsive Based on Revised Scope
[redacted]

Senior Geologist/Regional Manager

Cc: Pamela Hayes (WVDEP, OER Project Manager)

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ACRONYM GLOSSERY

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bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CLP	Contract Laboratory Program
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CRQL	Contract Required Quantitation Limit
DQO	Data Quality Objective
ECOS	Environmental Conservation Online System
FORMS II Lite	Field Operations and Records Management System
FSP	Field Sampling Plan
HASP	Health and Safety Plan
MS/DUP	Inorganic Matrix Spike/Matrix Duplicate
MS/MSD	Organic Matrix Spike/Matrix Spike Duplicate
NFRAP	No Further Remedial Action Planned
NPL	National Priority List
NWI	National Wetland Inventory
OER	Office of Environmental Remediation
PRP	Potentially Responsible Party
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAGS	Risk-Assessment Guidance for Superfund
RAS	Routine Analytical Services Program
RBC	Risk Based Concentration
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SDG	Sample Delivery Group
SI	Site Inspection

ACRONYM GLOSSERY

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SOW	Statement of Work
SVOC	Semivolatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
Triad	Triad Engineering, Inc.
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	US Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compounds
VRRDA	West Virginia Voluntary Remediation and Redevelopment Act
WVDEP	West Virginia Department of Environmental Protection
WVDNR	West Virginia Department of Natural Resources

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1.0 INTRODUCTION

Triad Engineering, Inc. (Triad) has prepared this *Site Inspection* report (*SI*) for the United States Environmental Protection Agency, Region III (USEPA) and the West Virginia Department of Environmental Protection (WVDEP), Office of Environmental Remediation (OER). This report has been prepared under authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1988 (SARA) under a Pre-Remedial Cooperative Agreement between the USEPA and the WVDEP.

The Libbey Owens Ford Plant CERCLIS Site (the Site) has the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) site designation WVD005008412. The Site is not on the National Priorities List (NPL), and the current CERCLIS status is Active with a "Site Reassessment Start Needed" status. The USEPA and WVDEP, OER determined a Site Inspection (SI) was warranted to assess potential risk associated with the Site and determined the Site should undergo further investigation under CERCLA. This *SI* has been prepared under Task 3 of the approved Work Plan, WVDEP, OER Contract DEP14980.

Prior to preparing this *SI* report, Triad performed various work tasks under the approved Work Plan relative to the Libbey Owens Ford Plant CERCLIS Site, including preparing the following deliverables for the USEPA and WVDEP, OER:

- *Conflict of Interest* disclosure as per the requirements of 40 CFR Part 35.6550 (Subpart O), submitted March 11, 2010.
- *Sampling and Analysis Plan* (*SAP*), which included a *Field Sampling Plan* (*FSP*) and a *Quality Assurance Project Plan* (*QAPP*), submitted July 28, 2010.
- *Health and Safety Plan* (*HASP*), submitted July 28, 2010.

In addition to these deliverables, OER requested that Triad perform a preliminary screening-level risk assessment to assess potential risk associated with the Libbey Owens Ford Plant CERCLIS Site. This preliminary screening-level assessment includes the following work tasks:

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- Identifying contaminants of potential concern (COPCs) and then selecting contaminants of concern (COCs);
- Identifying areas of potential environmental concern, contaminant migration pathways, and potential human health and ecological receptors; and
- Preparing this *SI* report.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Location

The Libbey Owens Ford Plant CERCLIS Site is located at 57th Street and MacCorkle Avenue in Charleston, Kanawha County, West Virginia. Coordinates for the approximate center of the Site are 38° 18' 43.9''north latitude and 81° 34' 5.48''west longitude. The Site is depicted on the 1976 *Charleston East W.VA. United States Geological Survey* (USGS) 7.5-minute topographic quadrangle map and is presented on the attached **Figure 1, *Site Location Map.***

2.2 Site Description

The Libbey Owens Ford Plant (LOF) was a window glass manufacturing plant that operated from 1917 to 1980 on approximately 35 acres on the southwestern side of MacCorkle Avenue. This area is now occupied by the Kanawha Mall, Kroger, two banks (Chase and BB&T), several restaurants (including Burger King, Applebee's, Taco Bell, and La Caretta), and several retail stores (including a hair salon, movie store, and smoker friendly.

LOF also had an easement from the plant area to the Kanawha River along the Owens Illinois (OI) glass container plant. The easement allowed access to a natural gas metering facility, river water intake and wastewater outfall. The Owens Illinois glass container plant operated from the early 1920's to the 1960's on approximately 40 acres on the northeastern side of MacCorkle Avenue. This area is now occupied by Lowes, several restaurants (including Cracker Barrel, Arby's, Pizza Hut), a large warehouse, and Montgomery Equipment. The West Virginia Housing Development Fund has entered 2.08 acres at the 57th Street/MacCorkle Avenue corner of the area into the West Virginia Voluntary Remediation Program (WVVRP). It has also been reported that the 4.04 acre parcel where a restaurant is under construction, currently owned by

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Emerald Coast Hospitality on the southern portion of the area will also be entered into the WVVRP.

General Site and surrounding area conditions are depicted on the Google 2009 aerial photograph on the attached **Figure 2, *Aerial Photograph***. The Site is bound to the immediate north, northeast by the Kanawha River. The Site is bound to the immediate southwest by a CSX railway. The Site is bound to the immediate northwest by 57th Street, further west are residential and commercial properties. The Site is bound to the immediate southeast by Interstate 77.

2.3 Ownership Information

The LOF Site, located on the southwestern side of MacCorkle Avenue encompasses approximately 25 acres identified on the Kanawha County Charleston South Annex 9, Tax Map 67, as Parcels 1, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, and 72 included in the attached **Figure 3, *Charleston South Annex 9, Tax Map 67***. Current ownership information is summarized as follows:

<u>Tax Map 67</u>

- Parcel 1 – K M Associates, LLC
- Parcel 1.1 – Commercial Testing
- Parcel 1.2 – Kanawha Valley Bank
- Parcel 1.3 – Kroger Limited Partnership
- Parcel 1.4 – Arjay Company
- Parcel 1.5 – Taco Bell of America Inc.
- Parcel 1.6 – Burger King Corporation
- Parcel 1.7 – K M Associates, LLC
- Parcel 1.8 – Yeager Glenroy
- Parcel 1.9 – John D. Smallridge, Jr., et al.
- Parcel 1.10 – Charleston National Bank
- Parcel 72 – Sarah and Pauline Maier

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The OI property and the LOF easement located on the northeastern side of MacCorkle Avenue encompasses approximately 37 acres identified on the Kanawha County Charleston South Annex 9, Tax Map 65, as Parcels 1, 1.1, 1.2, 1.3, 1.4, and 1.5 and Kanawha County Charleston South Annex 9, Tax Map 66, as Parcels 2, 3, and 4 included in the attached **Figure 4, *Charleston South Annex 9, Tax Map 65*** and **Figure 5, *Charleston South Annex 9, Tax Map 66*.** Current ownership information is summarized as follows:

Tax Map 65

- Parcel 1 – Sarah and Pauline Maier
- Parcel 1.2 – Sarah and Pauline Maier
- Parcel 1.2 – Cartee Land Development, Inc.
- Parcel 1.3 – Sarah and Pauline Maier
- Parcel 1.4 – Emerald Coast Hospitality
- Parcel 1.5 – West Virginia Housing

Tax Map 66

- Parcel 2 – Sclavi Realty Company
- Parcel 3 – Sclavi Realty Company
- Parcel 4 – Sclavi Realty Company

2.4 Historical Site Investigations and Remedial Activities

Based on information in the WVDEP, OER and USEPA project files, site investigations and remedial activities have been performed at the Libbey Owens Ford Plant Site. The following is a summary, in chronological order, of pertinent information obtained from the project file:

September 26, 1986 – NUS Corporation Superfund Division. Preliminary Assessment. The following information was reported:

- The LOF site consists of a 25 acre inactive window glass manufacturing facility;
- The plant operated between 1917 and 1980;
- Three sites were used to dispose of waste batch material from 1917 to 1980.

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- Area #1 is a one acre area located behind one of the glass furnaces in the rear of the manufacturing plant. This area is now a driveway and parking area behind the shopping center.
- Area #2 is a five acre area on the opposite side of MacCorkle Avenue. Waste glass material remains visible on the surface. This area is currently inactive.
- Area #3 is approximately ten acres in size across from MacCorkle Avenue. This area is beneath the cloverleaf intersection onto I-77.
- In 1973, the WVDNR performed a site inspection of Area #2, which had leachate flowing into the Kanawha River. Analytical results from the Kanawha River revealed arsenic at 267,000 mg/L where the discharge entered the river. A later inspection revealed arsenic in soil at concentrations of 45 to 7,000 mg/Kg. As a result, LOF placed soil stabilizing plates onto the Kanawha River bank near Area #2 to stop the leachate flow.

August 20, 2008 – Environmental Resources and Consulting. Executive Summary Report. The following recommendations were made with regard to the LOF Site:

- A site investigation is warranted to determine the nature and extent of contaminants of concern in groundwater, soil, and surface water, since past data are limited and do not adequately characterize the Site or risk to potential receptors;
- Re-score the Site based on the investigation results; and
- Evaluate the need for removal and/or engineering and institutional controls to address the waste material remaining on the property.

3.0 ENVIRONMENTAL SETTING

3.1 Soils

Based on the United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) web soil survey, the Site area is classified as Urban land (Ue). These are areas where more than 85 percent of the surface is covered by asphalt, concrete, buildings, or other impervious materials. These areas are typically along the flood plains and terraces of the Kanawha River

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3.2 Geology

Based on the West Virginia Geological and Economic Survey Geologic Map and the West Virginia Geologic Survey, Kanawha County Report, the Site is underlain by Cenozoic Quaternary Alluvium. This alluvium is comprised of a fining upward sequence of sand, gravel silt and clay. Underlying the alluvium is Pennsylvanian System bedrock of the Kanawha Formation. This Formation consists predominantly of sandstone (approximately 50%), shale, siltstone and coal.

3.3 Groundwater

The Site is located along the alluvial plain of the Kanawha River. Groundwater in the area is expected to be encountered at depths ranging from 30 to 40 feet below ground surface (bgs). Localized perched water bearing zones may be present in areas which have been disturbed by previous construction. Groundwater at the Site is likely to flow toward the Kanawha River, generally dipping to the north to northeast.

3.4 Surface Water

The Kanawha River bounds the Site to the immediate north, northeast. The Kanawha River flows generally west, northwest with an average flow of approximately 15,200 cubic feet per second. The Kanawha River receives surface water runoff from the Site.

3.5 Demographics

Based on information obtained from the U.S. Census Bureau Land View ® 5 version 1.0 Custom Census CD (2000 census data), population surrounding the Site is as follows:

Radius of Site	Estimated Population
4 miles	28,794
3 miles	17,068
2 miles	9,191
1 mile	4,010
0.75 mile	2,385

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Radius of Site	Estimated Population
0.5 mile	1,329
0.25 mile	218
0.1 mile	0

3.6 Sensitive Environments

According to the United States Fish and Wildlife Service (USFWS), National Wetland Inventory, there are no wetlands present at the Site. The Kanawha River, located to the immediate northeast of the Site is a mapped riverine, unknown perennial, unconsolidated bottom, permanently flooded (R5UBH) wetland. A 0.34 acre palustrine, forested, broad-leaved deciduous (PF01C) wetland is mapped approximately 3.7 miles downstream of the Site along the Kanawha River. A 2.3 acre palustrine, forested, broad-leaved deciduous, temporary flooded (PF01A) wetland is mapped approximately 7.1 miles downstream of the Site along the Kanawha River.

3.7 Climate

Climate information for Charleston, Kanawha County West Virginia is available at the World Climate website (www.worldclimate.com). Average maximum temperatures in the summer months range from 66.7 to 85.6 degrees Fahrenheit and the average minimum temperatures range from 42.8 to 64.4 degrees Fahrenheit. The average maximum temperatures in the winter months range from 41.2 to 68.2 degrees Fahrenheit and the average minimum temperatures range from 23 to 44.1 degrees Fahrenheit. The average annual precipitation is 43 inches and the average monthly precipitation is 3.58 inches. The average two year 24 hour rainfall is 3.25 inches.

4.0 FIELD SAMPLING

As described in the approved *SAP* dated July 28, 2010, Triad collected a total of 36 soil samples and 10 aqueous samples during the site assessment activities. The locations of these samples are depicted on **Figure 6, *Sample Location Map***. All analyses were performed in accordance with the current USEPA Region III Contract Laboratory Program (CLP) Statements of Work (SOW).

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The locations of the CLP sample identification numbers are depicted on **Figure 7, *CLP Sample Location Map*.**

4.1 Pre-Sampling Activities

Triad performed the following pre-sampling activities under Tasks 1 and 2 of the approved Work Plan prior to performing the field sampling activities:

July 9, 2010 – Triad received a signed ROE agreement from Mr. Ed Maier with the Maier Foundation. A copy of the agreement is included in the attached **Appendix 1, *Right of Entry Agreements*.**

July 28, 2010 – Triad submitted the SAP, which included a *Quality Assurance Project Plan* (*QAPP*), a *Field Sampling Plan* (*FSP*), and a *Health and Safety Plan* (*HASP*) to WVDEP, OER. The SAP was subsequently approved by the WVDEP, OER.

August 2, 2010 – Using USEPA supplied forms, Triad e-mailed the request for USEPA CLP services to the USEPA. Triad requested a 14 day analytical and 21 day data validation turnaround time. A copy of the USEPA Region III Sample Scheduling Request Form is included in the attached **Appendix 2, *CLP Request Form*.**

August 5, 2010 – Triad received a signed ROE agreement from Mr. Donald Cattania with Sclavi Realty Company. A copy of the agreement is included in the attached **Appendix 1, *Right of Entry Agreements*.**

August 27, 2010 – Triad ordered sample preservatives and sample containers from Quality Environmental Containers (QEC). Copies of the containers Certificates of Analysis are provided in **Appendix 3, *Certificates of Analysis*.**

August 31, 2010 – USEPA Region III supplied the Case Number 40489 and lab assignments for A4 Scientific, Inc. (A4) for the inorganic analysis and Mitkem Corporation (MITKEM) for the organic analysis.

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August 31, 2010 – Triad assigned CLP sample numbers using the USEPA Forms II Lite computer software program to each sample to be collected, based on location and analytical request. The CLP numbers and their associated sample locations are summarized on **Table 1, *Sampling and Analysis Summary*.**

4.2 Field Sampling Activities

Under Task 2 of the approved Work Plan, Triad performed field sampling activities at the Libbey Owens Ford Plant CERCLIS Site between September 14 and 16, 2010. During the sampling event, a total of 36 soil and 10 aqueous samples were collected at the Site. Samples were placed into laboratory pre-cleaned, Quality Control (QC) sample containers. A sample label and sample tag were placed onto each individual sample container. The sample containers were then placed into sealed, zip-lock bags and placed into the coolers to maintain a temperature range of two to six degrees Centigrade during sample storage and shipment. The coolers were sealed and at least two custody seals were placed on each cooler. Sample custody was maintained by Triad personnel throughout the sampling event.

Triad used the USEPA FORMS II Lite computer program to prepare laboratory Chain of Custody/Traffic Reports at the end of each day prior to sample shipment. The samples were shipped with the appropriate chain of custody forms via Federal Express® Priority Overnight delivery from Charleston, West Virginia to the appropriate CLP laboratory. Copies of the chain of custody and Federal Express® shipping forms are included in **Appendix 4, *Chain of Custody and Shipping Forms*.** The following laboratories performed the analyses:

CLP Inorganic:

A4 Scientific (A4)
1544 Sawdust Rd, Suite 505
The Woodlands, TX 77380

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CLP Organic:

Mitkem Corporation (MITKEM)
175 Metro Center Boulevard
Warwick, RI 02886

The following personnel performed project management, sample collection, preservation, preparation, packaging and shipping tasks in accordance with the approved *SAP*:

- Nonresponsive Based on Revised Scope [redacted] Field Operations Manager (FOM), CLP and Forms II Lite sample management
- Nonresponsive Based on Revised Scope [redacted], Field Sampling Technician
- Nonresponsive Based on Revised Scope [redacted], Field Sampling Technician
- Nonresponsive Based on Revised Scope [redacted], Field Sampling Technician

4.3 Sample Preservation

Liquid TAL total metal samples were field preserved using 1:1 nitric acid (HNO_3). Triad added approximately three milliliters (ml) to each 1 liter plastic sample container at the Site prior to sample collection in order to achieve a sample pH of <2. Also, liquid TAL total cyanide samples were field preserved using 1:1 sodium hydroxide (NaOH). Triad added approximately three ml of NaOH to each 1 liter plastic sample container at the Site prior to sample collection in order to achieve a sample pH of >12. All samples were temperature preserved with ice immediately following sampling and during shipment to the laboratory.

4.4 Quality Control

4.4.1 Field Quality Control

Triad collected field duplicates, blanks, and rinsate samples. These samples are identified on **Table 1, *Sampling and Analysis Summary***.

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4.4.2 Laboratory Quality Control

Triad collected organic and inorganic matrix spike and matrix spike duplicate samples. These samples are identified on **Table 1, *Sampling and Analysis Summary***.

4.5 Sampling and Analysis Plan Deviations

During the field sampling activities, the following deviations from the approved SAP occurred:

- Due to time constrains, surface soil samples SS16, SS18, and SS20, CLP sample numbers C0440/MC0440, C0442/MC0442, C0444/MC0444 were not collected.
- Due to time constraints, subsurface soil samples SB16, SB18, and SB20, CLP sample numbers C0462/MC0462, C0464/MC0464, C0466/MC0466 were not collected.
- The HCl preservative reacted with the groundwater from sample location GW3. Therefore, CLP sample number C0470, tag numbers 1474-1476 for VOC were not analyzed.
- Groundwater sample GW5, CLP sample numbers C0472, MC0472, and MC1472 was deleted due to lack of groundwater. The direct push sampling rig advanced to approximately 45 feet bgs and groundwater was not encountered.
- Groundwater sample GW5, CLP sample number C0472, tag numbers 1490-1492 for VOC was moved to sample location SS15/SB15.
- Groundwater sample GW6, CLP sample numbers MC0473 and MC1473, tag numbers 1504 and 1505 for dissolved metals and cyanide were deleted due to limited sample volume.
- Groundwater sample GW10, CLP sample numbers C0478, MC0478, and MC1478 was deleted due to lack of groundwater. The direct push sampling rig advanced to approximately 45 feet bgs and groundwater was not encountered.

4.6 Field Observations

Latitude and longitude location data were collected using a hand-held Global Positioning System (GPS) unit at each sample collection location. The GPS field data, sample temperature, pH, and specific conductivity (where applicable) are summarized in **Table 2, *Field Data***. Photographs

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were taken at various sample locations throughout the Site and are included in the attached **Appendix 5, *Sample Location Photographs***. General soil descriptions and observations noted from the direct push boring locations are included in the attached **Appendix 6, *Boring Logs***.

5.0 CURRENT SITE INVESTIGATION

Triad performed site investigation activities at the Libbey Owens Ford Plant CERCLIS Site between September 14 and 16, 2010. During the site assessment activities, the following samples were collected:

- 18 surface soil samples, including one field duplicate
- 18 direct push subsurface soil samples, including one field duplicate
- 10 groundwater samples, including one field duplicate

5.1 Surface Soil Sampling

Seventeen surface soil samples and one field duplicate were collected from throughout the Site and identified as SS1-SS15, SS17, SS19 and SS21 (SS21 is a field duplicate of SS14).

5.2 Subsurface Soil Sampling

Seventeen subsurface soil samples and one field duplicate were collected from throughout the Site and identified as SB1-SB15, SB17, SB19 and SB21 (SB21 is a field duplicate of SB17).

5.3 Groundwater Sampling

Nine groundwater samples and one field duplicate were collected from throughout the Site and identified as GW1-GW9, and GW 11 (GW11 is field duplicate of GW4).

5.4 Quality Control Samples

Triad procured quality control (QC) samples during the investigation to assess sampling precision, effectiveness of decontamination procedures, sample temperature preservation, any

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evidence of cross-contamination, and matrix effect of each media. The following QC samples were obtained:

- Field duplicates
- Equipment or rinse blanks
- Temperature blanks
- Inorganic matrix spike and matrix duplicate (MS/DUP)
- Organic matrix spike and matrix spike duplicate (MS/MSD)

The QC samples met the data quality objectives (DQOs) of the site specific *Sampling and Analysis Plan*.

5.5 Analytical Procedures and Data Validation Process

Data obtained during SI activities may be used for a range of purposes by USEPA and the WVDEP. Therefore, based on consultation with the USEPA Region III Site Assessment Officer, data collected were analyzed according to specifications of the current USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for organic and inorganic analytes. Triad utilized the USEPA Field Operations and Records Management System II Lite (FORMS II Lite) computer program to prepare, track, and manage field sampling documentation.

The following is a summary of the analytical procedures and data validation processes:

- Case 40489, Sample Delivery Group (SDG) C0431, consisted of nine (9) soil samples analyzed for volatile organic compounds (VOC) and semivolatile organic compounds (SVOC) and eleven (11) soil samples analyzed for SVOC compounds only. The sample set included one SVOC field duplicate pair. All samples were submitted to Mitkem Laboratories (MITKEM) for analysis. Samples were analyzed in accordance with the CLP SOW SOM01.2 through the Routine Analytical Services (RAS) Program. The data were validated according to Innovative Approaches for Validation of Organic Data, Level M2. The report is included in the attached **Appendix 7, *Organic Data Validation Report*.**

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- Case 40489, SDG C0438, consisted of nine (9) soil samples analyzed for VOC and SVOC and seven (7) soil samples analyzed for SVOC compounds only. The sample set included one field duplicate pair. All samples were submitted to MITKEM for analysis. Samples were analyzed in accordance with the CLP SOW SOM01.2 through the RAS Program. The data were validated according to Innovative Approaches for Validation of Organic Data, Level M2. The report is included in the attached **Appendix 7, *Organic Data Validation Report*.**

- Case 40489, SDG C0475, consisted of eight (8) aqueous samples and one (1) rinsate blank analyzed for trace VOC and SVOC compounds, one (1) aqueous sample for trace VOC, and one (1) aqueous sample for SVOC and three (3) trip blanks analyzed for VOC only. The sample set included one field duplicate pair. All samples were submitted to MITKEM for analysis. Samples were analyzed in accordance with the CLP SOW SOM01.2 through the RAS Program. The data were validated according to Innovative Approaches for Validation of Organic Data, Level M2. The report is included in the attached **Appendix 7, *Organic Data Validation Report*.**

- Case 40489, SDG MC0427, consisted of sixteen (16) soil samples analyzed for total metals and cyanide (CN). The sample set included two field duplicate pairs. All samples were submitted to A4 Scientific (A4) for analysis. Samples were analyzed in accordance with the CLP SOW ISM01.2 through the RAS program. The data were validated according to Innovative Approaches for Validation of Inorganic Data, Level IM1. The report is included in the attached **Appendix 8, *Inorganic Data Validation Report*.**

- Case 40489, SDG MC0431, consisted of twenty (20) soil samples analyzed for total metals by ICP-AES, for mercury (Hg) and for CN. All samples were submitted to A4 for analysis. Samples were analyzed in accordance with the CLP SOW ISM01.2 through the RAS program. The data were validated according to Innovative Approaches for Validation of Inorganic Data, Level IM1. The report is included in the attached **Appendix 8, *Inorganic Data Validation Report*.**

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- Case 40489, SDG MC0475 and MC1475, consisted of nine (9) unfiltered aqueous samples analyzed for total metals and CN, one (1) unfiltered aqueous sample analyzed for total metals and either (8) filtered aqueous samples analyzed for dissolved metals. The sample set included one field duplicate pair for each matrix and one unfiltered rinsate blank. All samples were submitted to A4 for analysis. The samples were analyzed in accordance with CLP SOW ISM01.2 through the RAS program. The data were validated according to Innovative Approaches for Validation of Inorganic Data, Level IM1. The report is included in the attached **Appendix 8, *Inorganic Data Validation Report*.**

5.6 Analytical Discussion

Based on the COPCs evaluated at the Site, Triad has reviewed the laboratory analytical data for the most recent SI investigation to identify and select contaminants of concern (COCs) for the Site. A COPC is defined as any individual compound or analyte that was analyzed under the most recent site assessment activities. COCs were selected based on criteria in the USEPA *Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual (Part A), Interim Final* and the *WV Voluntary Remediation and Redevelopment Act (VRRDA) Guidance Manual*. That criteria requires that to be selected as a COC, a compound or analyte must be detected at least once at a concentration greater than the contract required quantitation limit (CRQL), and at a concentration greater than the applicable *de minimis* value to which it is compared.

The laboratory analytical data were compared by media to the following USEPA environmental criteria and standards to select COCs:

Soil:

- Oak Ridge National Laboratory (Managed by UT Battelle for the Department of Energy) Regional Screening Levels for Chemical Contaminants at Superfund Sites, Industrial Soil Screening Levels, November 2010.

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Ground Water:

- Oak Ridge National Laboratory (Managed by UT Battelle for the Department of Energy) Regional Screening Levels for Chemical Contaminants at Superfund Sites, Tap Water Screening Levels, November 2010.

Based on our evaluation, the occurrence and distribution of COPCs, selection of COCs, and the specific *de minimis* risk based value or criteria used for comparison purposes are summarized relative to environmental media in the attached Tables 3 through 5. The frequency of detection and comparison of these data to the applicable environmental *de minimis* Risk Based Concentration (RBC) standards and criteria are presented in the following subsections. The sample locations are depicted on the attached **Figure 6, *Sample Location Map*,** and **Figure 7, *CLP Sample Location Map.*** Site and sample location photographs are also included in the attached **Appendix 5, *Site Photographs*.**

5.6.1 Surface Soil Sample Results

The Contract Laboratory Program (CLP) Target Analyte List (TAL) total metals (inorganics) and Target Compound List (TCL) semivolatiles (SVOC) were analyzed in 17 surface soil samples and one field duplicate collected from various areas throughout the Site.

Arsenic, chromium, benzo(b)fluoranthene, benzo(a)pyrene, and dibenzo(a,h)anthracene were detected at concentrations greater than their respective industrial soil benchmark values and were selected as COCs. All other inorganics and SVOC were either not detected at concentrations greater than the CRQL, or were detected at concentrations less than their respective benchmark values.

The occurrence, distribution and selection of COPCs, selection of COCs, and the specific *de minimis* risk based value or criteria used for comparison are summarized in **Tables 3a and 3b, *Occurrence, Distribution and Selection of COCs – Surface Soil*.**

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5.6.2 Direct Push Subsurface Soil Sample Results

The CLP TAL inorganics and TCL VOC and SVOC were analyzed in 17 subsurface soil samples and one field duplicate collected from various areas throughout the Site.

Arsenic, chromium, lead, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene were detected at concentrations greater than their respective industrial soil benchmark values and were selected as COCs. All other inorganics, VOC, and SVOC were either not detected at concentrations greater than the CRQL, or were detected at concentrations less than their respective benchmark values.

The occurrence, distribution and selection of COPCs, selection of COCs, and the specific *de minimis* risk based value or criteria used for comparison are summarized in **Tables 4a through 4c, *Occurrence, Distribution and Selection of COCs – Direct Push Subsurface Soil*.**

5.6.3 Groundwater Sample Results

The CLP TAL total and dissolved inorganics and TCL VOC, and SVOC were analyzed in nine groundwater samples including one field duplicate collected from various areas throughout the Site.

Dissolved arsenic, cobalt, iron, manganese, chloroform, carbon tetrachloride, trichloroethene, 1,1,2-trichloroethane, tetrachloroethene, naphthalene, bis(2-ethylhexyl)phthalate were detected at concentrations greater than their respective groundwater benchmark values and selected as COCs. All other inorganics, VOC, and SVOC were either not detected at concentrations greater than the CRQL, or were detected at concentrations less than their respective benchmark values.

The occurrence, distribution and selection of COPCs, selection of COCs, and the specific *de minimis* risk based value or criteria used for comparison are summarized in **Tables 5a through 8d, *Occurrence, Distribution and Selection of COCs – Groundwater*.**

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5.7 COC Selection

Triad selected COCs based on the occurrence, distribution, and frequency of detection for COPCs using the rationale summarized in USEPA *Risk Assessment Guidelines for Superfund (RAGS)* and Section 2.6 of the VRRDA Guidance Manual. As stated earlier, to be selected as a COC, a compound or analyte had to be detected at least once at a concentration greater than the CRQL, and at a concentration greater than the applicable *de minimis* value to which it was compared. Based on a review of the data collected during the current site assessment activities, the following table summarizes the COCs, by media that were observed at the Libbey Owens Ford Plant CERCLIS Site:

COC	Surface Soil	Subsurface Soil	Groundwater
INORGANICS			
Arsenic	X	X	X
Chromium	X	X	
Cobalt			X
Iron			X
Lead		X	
Manganese			X
VOC			
Chloroform			X
Carbon Tetrachloride			X
Trichloroethene			X
1,2,3-Trichloroethane			X
Tetrachloroethene			X
SVOC			
Benzo(a)pyrene	X	X	
Benzo(a)anthracene		X	
Benzo(b)fluoranthene	X	X	
Benzo(k)fluoranthene		X	
Indeno(1,2,3-cd)pyrene		X	
Dibenzo(a,h)anthracene	X	X	

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COC	Surface Soil	Subsurface Soil	Groundwater
Naphthalene			X
Bis(2-ethylhexyl)phthalate			X

6.0 SUMMARY AND RECOMMENDATIONS

The Libbey Owens Ford Plant CERCLIS Site is located at 57th Street and MacCorkle Avenue in Charleston, Kanawha County, West Virginia. Coordinates for the approximate center of the Site are 38° 18' 43.9''north latitude and 81° 34' 5.48''west longitude. The Site has CERCLIS site designation WVD005008412. The Site is not on the NPL, and the current CERCLIS status is Active with a "Site Reassessment Start Needed" status.

LOF was a window glass manufacturing plant that operated from 1917 to 1980 on approximately 35 acres on the southwestern side of MacCorkle Avenue. LOF also had an easement from the plant area to the Kanawha River along the OI glass container plant. The OI glass container plant operated from the early 1920's to the 1960's on approximately 40 acres on the northeastern side of MacCorkle Avenue. LOF also utilized three waste disposal areas from 1917 until 1980.

Inorganics and SVOC were detected in surface soil at concentrations greater than the respective industrial soil benchmark values. The inorganic COCs in surface soil appear to be widespread throughout the Site. The SVOC COCs appear to be primarily limited to the northeastern portion of the Site adjacent to the Kanawha River along the former LOF easement. Surface soil COCs do not appear to represent a significant source of contamination at the Site.

Inorganics and SVOC were detected in subsurface soil at concentrations greater than the respective industrial soil benchmark values. The inorganic COCs in subsurface soil appear to be widespread throughout the Site with the exception of one hot-spot of lead at the northeastern portion of the Site along the former LOF easement. The SVOC COCs appear to be limited to the northeastern portion of the Site along the former LOF easement. Subsurface soil COCs do not appear to represent a significant source of contamination at the Site.

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Dissolved inorganics, VOC, and SVOC were detected in groundwater at concentrations greater than the respective tapwater regional screening level. Inorganic COCs in groundwater appear to be widespread throughout the Site. The SVOC COCs are limited to only one sample location at the parking lot in front of Lowes. The VOC COCs appear to be limited to the northern portion of the Site adjacent to 57th Street.

Based on the current site assessment activities, Triad recommends the following with regard to the Libbey Owens Ford Plant Site:

- Installation of properly constructed monitoring wells to more accurately characterize on-site groundwater;
- Additional groundwater characterization to determine if COCs in groundwater are migrating off-site to the adjacent residential area;
- Additional groundwater characterization to determine if existing VOC groundwater contamination poses a vapor intrusion threat to existing or future on site structures; and
- Consider the Site as a candidate for the West Virginia Voluntary Remediation Program (WVVRP).

7.0 REFERENCES

Charleston East, W.VA, West Virginia 7.5-minute topographic quadrangle map. U.S. Geological Survey, 1976.

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Figure 1

Site Location Map

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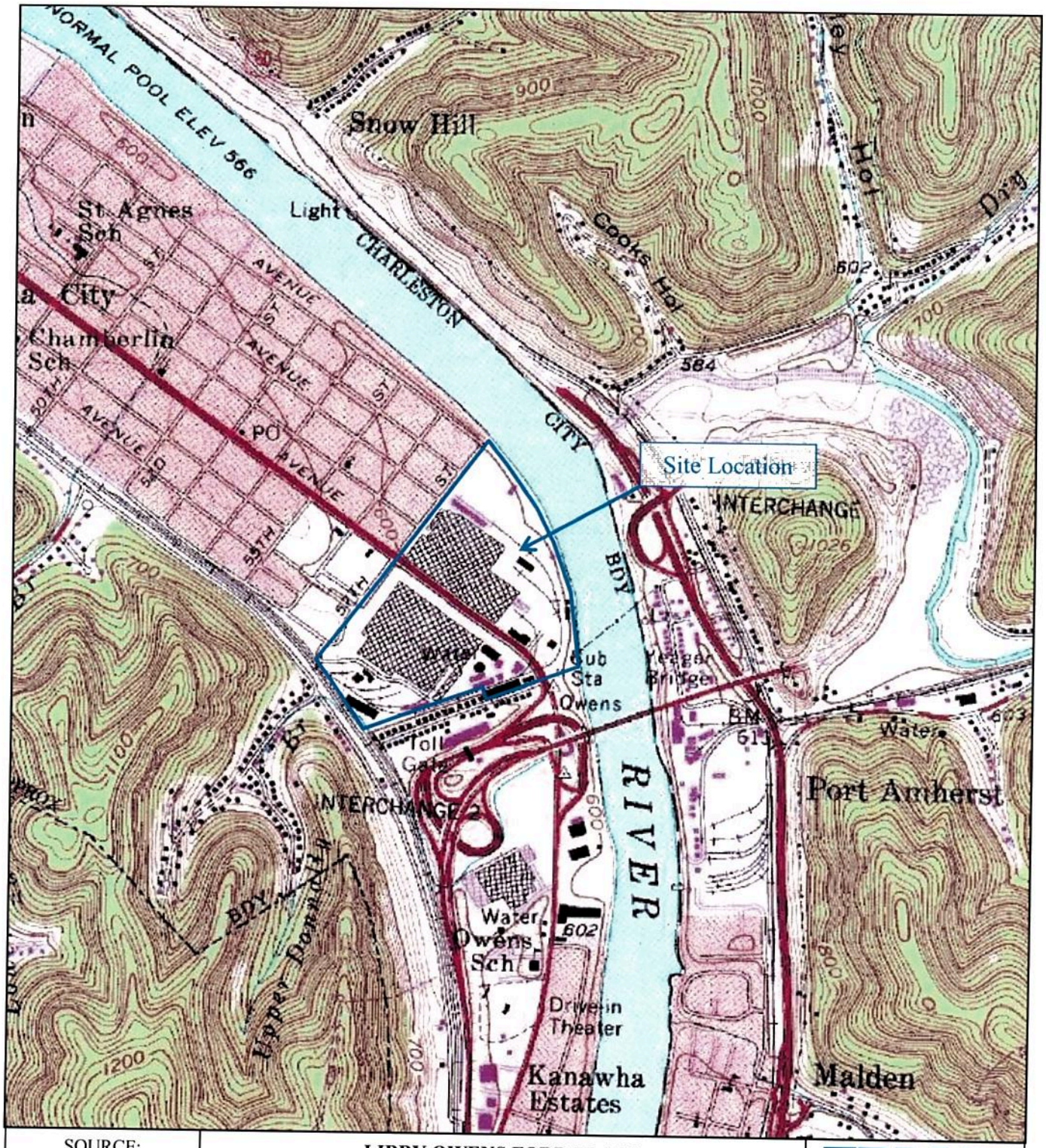

SOURCE: *Charleston East, W.Va* USGS	**LIBBY OWENS FORD PLANT** **CHARLESTON, KANAWHA COUNTY, WEST VIRGINIA** **Site Location Map**	TRIAD ENGINEERING, INC.
DATE: 1976	**TRIAD PROJECT NO: 04-10-0052**	**FIGURE NO: 1**

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Figure 2

Aerial Photograph, Google 2010

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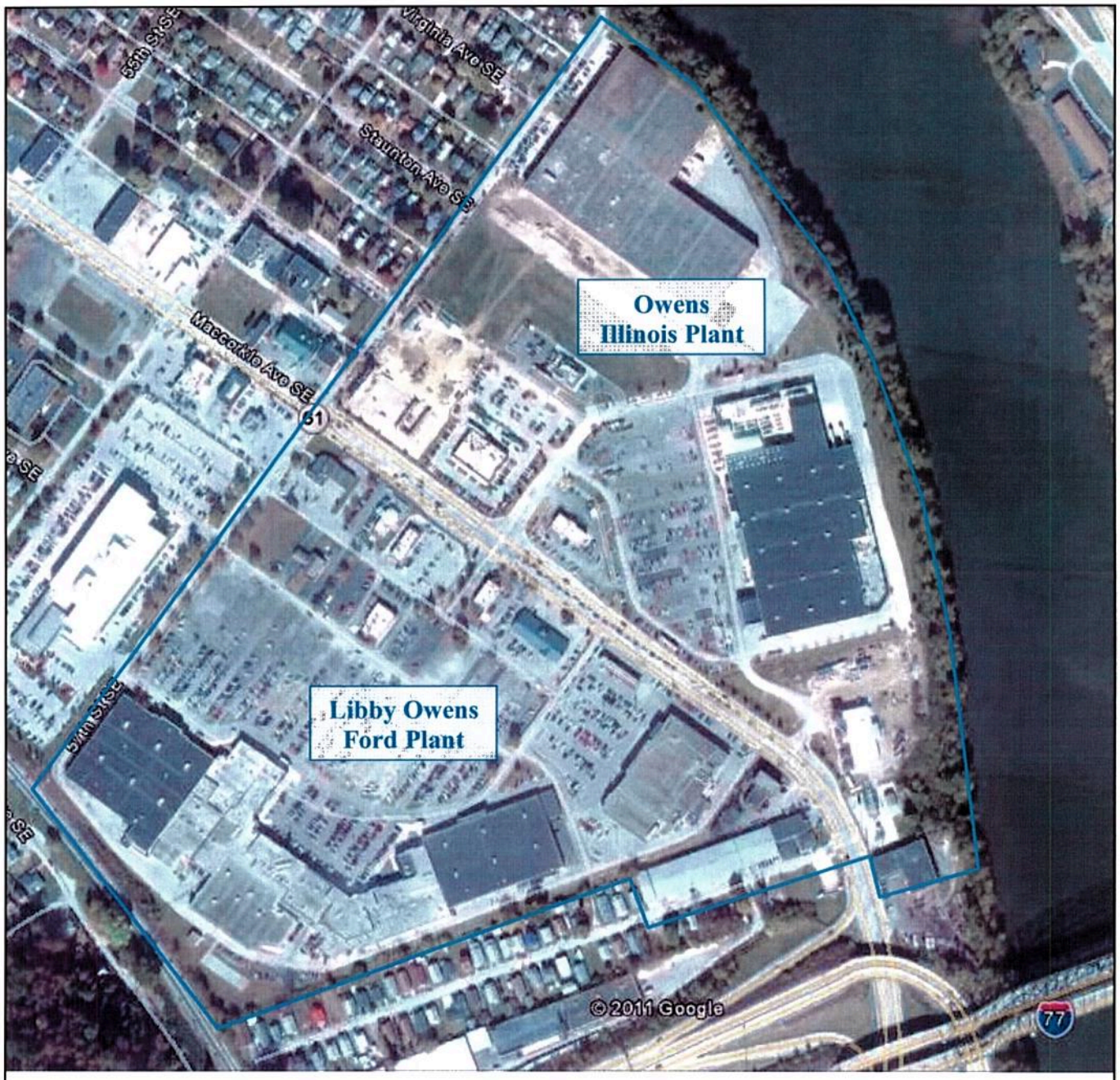

SOURCE: Google	**LIBBY OWENS FORD PLANT** **CHARLESTON, KANAWHA COUNTY, WEST VIRGINIA** **Aerial Photograph**	TRIAD ENGINEERING, INC.
DATE: 2010	**TRIAD PROJECT NO: 04-10-0052**	**FIGURE NO: 2**

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Figure 3

Charleston South Annex 9, Tax Map 67