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Bloody Brook Sediment Sampling and Analysis Work Plan: Phase II

Lockheed Martin Corporation
Syracuse, New York

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BBL
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1. Introduction

1.1 General

This document presents a Work Plan to conduct sampling and analysis of sediment within the West and Middle Branches of Bloody Brook at select locations upstream and downstream of the Lockheed Martin Corporation (LMC) Electronics Park facility (the facility) located in Syracuse, New York. This Work Plan has been prepared in accordance with discussions between LMC and the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH).

As determined in cooperation with the NYSDEC and NYSDOH during a June 12, 1996 reconnaissance of the West and Middle Branches of Bloody Brook, LMC will conduct a limited sampling and analysis program of sediment within Bloody Brook at locations upstream and downstream of the facility. The sampling and analysis will be conducted to evaluate the presence of polychlorinated biphenyls (PCBs) and mercury, copper and cadmium in the sediment. Relevant project background information and the objectives and scope of this Work Plan are summarized below.

1.2 Background Information

This section presents a summary of the existing information used to develop the basis for the proposed sampling and analysis program presented in this Work Plan. A description of the pertinent location and physical setting information and a summary of recent sampling and analysis of surface water and sediment within Bloody Brook completed by LMC at and near the facility is presented below.

1.2.1 Location and Physical Setting

The facility is located on Electronics Parkway in the Town of Salina, New York. The approximate 183-acre facility is bounded by the New York State Thruway to the southwest, Vine Street to the northwest and Henry Clay Boulevard/Electronics Parkway to the northeast and southeast. The location of the facility is shown on the Site Location Map (Figure 1).

A portion of two separate branches of Bloody Brook, known as the West Branch and Middle Branch of Bloody Brook, flow through the facility. The West and Middle Branches of Bloody Brook are identified as the receiving waters on LMC's State Pollutant Discharge Elimination System (SPDES) Discharge Permit (No. NY-0002101; effective date: May 1, 1994; expiration date: May 1, 1999; modification date: November 30, 1994).

The Middle Branch of Bloody Brook enters the facility at the southeastern perimeter and flows through a pond at the southeastern portion of the facility; flow from the pond is discharged at the southern property boundary. The West Branch of Bloody Brook enters the facility at the northwest perimeter and flows south along the western portion of the facility through a series of underground culvert pipes; the West Branch is discharged at the southwest property boundary.

1.2.2 Previous Bloody Brook Sampling and Analysis

In response to a request by the NYSDEC, LMC completed a sampling and analysis program of surface water and sediment in select locations at and near the facility. The previous sampling and analysis program (hereinafter referred to as the Phase I sampling and analysis program) was completed in accordance with the Bloody Brook Sampling and Analysis Work Plan prepared by Blasland, Bouck & Lee, Inc. (BBL), dated May 1996. The overall

objective of the Phase I sampling and analysis program was to provide data which could be used to assess the presence or absence of PCBs, mercury, copper and cadmium in surface water and sediment within Bloody Brook at or near the facility. The surface water and sediment sampling was completed on May 31, 1996 in accordance with the Work Plan.

The analytical data indicate the following:

- PCBs are not present in the surface water (detection limit range: 0.062 parts per billion (ppb) to 0.064 ppb);
- PCBs are present in the sediment within the on-site pond (concentration range: 0.075 parts per million (ppm) to 0.40 ppm), the Middle Branch of Bloody Brook (at a concentration of 2.7 ppm) and the West Branch of Bloody Brook (concentration range: 2.58 ppm to 4.4 ppm);
- Mercury and cadmium are not present in the surface water in the on-site pond, the West or the Middle Branch of Bloody Brook; copper is present in the on-site pond surface water (at a concentration of 2.2 ppb) and in the West Branch of Bloody Brook surface water (concentration range: 5.3 ppb to 6.6 ppb); and
- Mercury, copper and cadmium are present in sediment within the on-site pond (concentration ranges: mercury, 0.19 ppm to 0.24 ppm; copper, 25 ppm to 161 ppm; and cadmium, 1.3 ppm to 2.6 ppm), the Middle Branch of Bloody Brook (concentrations: mercury at 0.36 ppm; copper at 107 ppm; and cadmium at 1.6 ppm) and the West Branch of Bloody Brook (concentration ranges: mercury, <0.06 ppm to 0.17 ppm; copper, 42.9 ppm to 68.9 ppm; and cadmium, 104 ppm to 267 ppm).

Based on a review of the Phase I data, the NYSDEC and NYSDOH have requested that additional sampling and analysis be completed to evaluate the extent of PCBs and metals in sediments within the West and Middle Branches of Bloody Brook downstream of the facility (hereinafter referred to as the Phase II sampling and analysis program).

1.2.3 Bloody Brook Dischargers

Based on a NYSDEC/NYSDOH/LMC joint reconnaissance of Bloody Brook (conducted on June 12, 1996) and an LMC document review, a number of industrial and commercial facilities other than LMC may be potential dischargers to Bloody Brook. Industrial and commercial facilities are located both upstream and downstream of the facility and include but are not limited to: a paint manufacturer; a marine and recreational vehicle supplier and service center; and a manufacturer of hydraulic valves and actuators. To the best of LMC's knowledge, the historical usage and potential discharge of contaminants from the identified commercial and industrial properties have not been determined by the NYSDEC. Based on LMC's document review and discussions with the NYSDEC, LMC is the only industrial discharger to Bloody Brook that maintains a SPDES permit. Therefore, the quality of current and past water discharges to Bloody Brook by facilities other than LMC is unknown.

To the best of LMC'S knowledge, no other industrial dischargers to Bloody Brook have received requests for information similar to the Joint Request for Information (Request) made to LMC by the NYSDEC and the United States Environmental Protection Agency (USEPA) pursuant to Section 104(e) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. Section 9604(e) and New York State Environmental Conservation Law, concerning Onondaga Lake. Without investigating all potential industrial and commercial dischargers to Bloody Brook, the NYSDEC and USEPA cannot conclusively determine the source(s) of PCBs, mercury, copper and cadmium identified by the NYSDEC in biota, of PCBs identified in surface water (through semiquantitative PISCES sampling) by NYSDEC, and of PCBs, mercury, copper and cadmium identified in sediment by LMC within Bloody Brook. All industrial and commercial dischargers to Bloody Brook should be considered potential sources of the parameters identified in Bloody Brook.

1.3 Objectives

The overall objective of this sampling and analysis program is to provide data which can be used to assess the extent of PCBs, mercury, copper and cadmium in sediments within Bloody Brook at specific locations upstream and downstream of the facility and evaluate whether their presence is related to the facility or an upstream source. The following specific objectives have been established:

1. Determine the presence or absence of PCBs, mercury, copper and cadmium in samples collected from sediment within the West and Middle Branches of Bloody Brook at specific locations downstream of the facility boundary;

2. Determine the presence or absence of PCBs, mercury, copper and cadmium in samples collected from sediment within the West Branch of Bloody Brook upstream of the facility boundary; and

3. Determine, based on the analytical results of this and previous investigations, whether additional sampling and analysis (possibly including biota sampling) by LMC is warranted.

Based on the information that is currently available, no conclusive determination regarding the source(s) of PCBs, mercury, copper and cadmium in biota and sediment and PCBs in surface water within Bloody Brook can be made. If data from the proposed upstream sampling locations indicate that PCBs, mercury, copper and cadmium are present, LMC will conclude that other dischargers to Bloody Brook are the source of the identified parameters and, based on this data, it is possible that no further evaluations of Bloody Brook will be conducted by LMC.

A screening level of 1 part per million (ppm) total PCBs will be used to define the extent of PCB-impacted sediment within Bloody Brook. The highest upstream concentration (i.e., background concentration) of mercury, copper and cadmium will be used as a screening level to define the extent of metals-impacted sediment. Once the extent of impacted sediment is defined a site-specific evaluation procedure must be employed to determine the level of risk, and, if necessary, establish remediation goals and determine appropriate risk management actions. This evaluation will be performed following the completion of sampling and analysis within Bloody Brook.

Since the Phase I data (see Section 1.2.2) has determined that the surface water in Bloody Brook (including the on-site pond) does not contain PCBs and contains only low levels of copper (up to 6.6 ppb), no additional surface water sampling (including grab samples and/or PISCES sampling) will be conducted. The results of the sediment sampling program proposed herein and the results of LMC's Phase I sampling and analysis program (conducted on May 31, 1996) will be evaluated to determine if additional sampling (i.e., sediment and/or biota sampling) is warranted.

2. Sampling and Analysis Work Plan

2.1 General

The preparation of this Sampling and Analysis Work Plan included a joint LMC/NYSDEC/NYSDOH site reconnaissance (conducted on June 12, 1996) of the West and Middle Branches of Bloody Brook. The purpose of the site reconnaissance was to determine appropriate sampling locations and techniques which would satisfy the sampling objectives and were deemed mutually acceptable to LMC, the NYSDEC and the NYSDOH. The Sampling and Analysis Work Plan presented below represents the sampling and analysis approach agreed to by LMC, NYSDEC and NYSDOH.

The sediment sampling locations within Bloody Brook were selected to characterize the extent of PCBs, mercury copper, and cadmium. Although LMC believes that the collection of fewer downstream samples from each branch of Bloody Brook would be sufficient to characterize potential sediment impacts, multiple samples will be collected and analyzed to satisfy the requirements of the NYSDOH.

Based upon the information that is currently available, no conclusive determination regarding the source(s) of PCBs, mercury, copper, and cadmium identified by NYSDEC in biota, of PCBs identified by NYSDEC in surface water (through semiquantitative PISCES sampling) and of PCBs, mercury, copper and cadmium identified by LMC in sediment collected in Bloody Brook can be made. At this time no sampling will be conducted to locate sources at the facility. With respect to potential upstream sources of PCBs, mercury, copper, and cadmium to Bloody Brook, LMC has elected to conduct a limited upstream sampling and analysis program. LMC may conduct further investigations upstream of the facility based on the results of the Phase II sampling and analysis proposed herein or the discovery of additional information related to potential upstream sources.

It is LMC's understanding that the NYSDEC may collect split samples for analysis by a NYSDEC-contracted laboratory. LMC requests that the NYSDEC provide LMC with all analytical data generated by the NYSDEC as part of this program.

2.2 Downstream Sediment Sampling

West Branch of Bloody Brook

Sediment samples will be collected at five locations within the West Branch. The proposed sampling locations agreed to by LMC, the NYSDEC and the NYSDOH are shown on Figure 2. As agreed during the LMC/NYSDEC/NYSDOH reconnaissance, if the depth of available sediments (i.e., sediments which can be collected by manually advancing the core sampler to refusal) is 12 inches or less, a full depth core sample of the sediments will be obtained and submitted for analysis. If the depth of the available sediments is greater than 12 inches, a full depth core sample will be collected and the core will be divided into two samples. The first sample will consist of sediments from 0-12 inches and the second sample will comprise the remainder of the core depth. Both samples will be submitted for analysis. The depth of sediment collected will be recorded. The sediment samples will be collected in accordance with the procedures described in Appendix A.

To satisfy the requirements of the NYSDOH, each of the five sediment samples collected within the West Branch of Bloody Brook will be analyzed for mercury, copper, and cadmium. The sediment samples will be analyzed by Galson Laboratories, Inc. of East Syracuse, New York (NYSDOH Lab No. 10186) in accordance with USEPA SW-846 procedures (mercury - method 7471; copper and cadmium - method 6010) and supported with a Category B deliverable package. Although each of the sediment samples will be analyzed for mercury, copper

and cadmium, the extent of sediment impacts will be defined based on the identification of two sequential sample locations indicating the absence or presence at low levels (i.e., background) of mercury, copper, and cadmium.

The extent of potential PCB impacts to sediment will be defined based on the identification of two sequential sample locations where PCBs are present at concentrations less than or equal to 1 ppm total PCBs. PCB analysis of the sediment samples will be performed sequentially. PCB analysis will be conducted initially on only the first two sediment samples collected downstream closest to the boundary of the facility as part of the Phase II sampling and analysis program. Based on the results of this initial PCB analysis, the need for additional PCB analysis will be evaluated. PCB analysis will be performed by Galson Laboratories, Inc. in accordance with USEPA SW-846 procedures (method 8080) and supported with a Category B deliverable package. Each sediment sample will also be analyzed for total organic carbon (TOC) content.

Middle Branch of Bloody Brook

Sediment samples will be collected at two locations within the Middle Branch of Bloody Brook. The proposed sampling locations agreed to by LMC, the NYSDEC and the NYSDOH are shown on Figure 2. As agreed during the LMC/NYSDEC/NYSDOH reconnaissance, if the depth of available sediments (i.e., sediments which can be collected by manually advancing the core sampler to refusal) is 12 inches or less, a full depth core sample of the sediments will be obtained and submitted to the laboratory for analysis. If the depth of the available sediments is greater than 12 inches, a full depth core sample will be collected and the core will be divided into two samples. The first sample will consist of sediments from 0-12 inches and the second sample will comprise the remainder of the core depth. Both samples will be submitted for analysis. The depth of sediment collected will be recorded. The sediment samples will be collected in accordance with the procedures described in Appendix A.

Both sediment samples collected within the Middle Branch of Bloody Brook will be analyzed for PCBs, mercury, copper, and cadmium. The sediment samples will be analyzed by Galson Laboratories, Inc. in accordance with USEPA SW-846 procedures (PCBs - method 8080; mercury - method 7471; and copper and cadmium - method 6010) and supported with a Category B deliverable package. As agreed by the NYSDEC and NYSDOH, the extent of sediment impacts will be defined based on the identification of two sequential sample locations indicating the absence or presence at low levels (e.g., background) of mercury, copper, and cadmium. The extent of potential PCB impacts to sediment will be defined based on the identification of two sequential sample locations where PCBs are present at concentrations less than or equal to 1 ppm total PCBs. Each sediment sample will also be analyzed for TOC content.

2.3 Upstream Sediment Sampling

West Branch of Bloody Brook

Three upstream sediment samples will be collected from the West Branch of Bloody Brook. Since a potential upstream discharger of the contaminants of concern to Bloody Brook is located adjacent to LMC's upstream property boundary, the upstream sediment would ordinarily be characterized at the property boundary in order to evaluate potential upstream sources of PCBs, mercury, copper, and cadmium to Bloody Brook. However, sediment which would be representative of discharges onto the facility is not available at the property boundary. Thus, LMC will collect a series of sediment samples at and upstream of the facility which will be considered representative of discharges onto the facility. As reviewed during the joint reconnaissance, a quiescent, open area of the West Branch exists on the facility at a location northwest of Building EP-5. The inflow to this quiescent area includes flow from two underground culvert pipes which originate at the northwest property boundary and convey West Branch flow onto the property and one underground culvert pipe which conveys

storm water flow from a portion of the facility's northern parking lot. Based on a review of facility drawings no other sources of water enter this open area. Thus, this area will be considered representative of the upstream sediment conditions. To further evaluate potential upstream discharges onto the facility, a sample location which is upstream of A.C. Lamb & Sons, Inc. (a marine and recreational vehicle supplier and service center) and a location east of Vine St. were selected as representative upstream sample locations (see Figure 2). Based on the results of the Phase II sampling and analysis proposed herein or the discovery of additional information related to potential upstream sources, LMC may conduct additional upstream sampling within the West Branch.

The collected sediment samples will be submitted to Galson Laboratories, Inc. for analysis of PCBs, mercury, copper, and cadmium. Laboratory analysis will be conducted in accordance with USEPA SW-846 procedures (PCBs-method 8080; mercury - method 7471; copper and cadmium - method 6010) and supported with a Category B deliverable package. Each sediment sample will also be analyzed for TOC content.

Middle Branch of Bloody Brook

Based on the results of the Phase I sampling and analysis program, there does not appear to be significant PCB impacts to sediment within the Middle Branch of Bloody Brook. Thus, no upstream sampling will be conducted within the Middle Branch at this time. However, based on the results of the Phase II sampling and analysis proposed herein or the discovery of additional information related to potential upstream sources, LMC may conduct upstream sampling within the Middle Branch.

2.4 Quality Assurance/Quality Control

Both field and laboratory quality assurance/quality control (QA/QC) controls will be performed as part of the sampling and analysis program. These controls will be used to verify the quality of the data. The following QA/QC samples will be collected and analyzed for PCBs, mercury, copper and cadmium as part of this program.

Field Duplicate

One field duplicate sample of sediment will be collected and analyzed to verify the reproducibility of the sampling methods. The duplicate sample will be collected using methods to maximize the compatibility of the samples. For example, a single core sediment sample will be homogenized and divided between the sample and the duplicate sample container.

Rinse Blank

One rinse blank will be obtained by pouring analyte free water (to be supplied by the laboratory) over decontaminated sampling equipment to confirm that the decontamination procedure has been adequately performed and that cross contamination of samples will not occur due to the equipment. The intent is for the water making up the blank to follow the same path, and therefore, come in contact with the same equipment as the samples.

Matrix Spike/Matrix Spike Duplicate

Triple sample volumes of sediment will be collected from one sample location in order for the laboratory to perform matrix spike/matrix spike duplicate analysis.

Method Blank

A method blank will be analyzed by the laboratory to identify any sources of contamination in the analytical process.

3. Sample Handling and Documentation

3.1 Sample Containers and Preservation

Galson Laboratories, Inc., will supply appropriate sample containers in sealed cartons, as well as sample labels and preservatives. The field personnel will be responsible for properly labeling containers and preserving samples (as appropriate). Sample labeling procedures are described in Appendix B.

3.2 Packing, Handling, and Shipping Requirements

Sample custody seals and packing materials for filled sample containers will also be provided by the laboratory. The filled, labeled, and sealed containers will be placed in a cooler on ice and carefully packed to eliminate the possibility of container breakage.

All samples will be packaged by the field personnel and transported as low-concentration environmental samples. The packaged samples will be hand delivered by sampling personnel to the laboratory within 24 hours of sample collection. General procedures for packing, handling, and shipping environmental samples are included in Appendix B.

3.3 Documentation

Field personnel will provide comprehensive documentation covering all aspects of field sampling, field analysis, chain-of-custody. This documentation constitutes a record which allows reconstruction of all field events to aid in the data review and interpretation process. All documents, records, and information relating to the performance of the field work will be retained in a project file at the Blasland, Bouck & Lee, Inc. office in Syracuse, New York.

3.3.1 Daily Production Documentation

Each field crew will maintain a field notebook consisting of a waterproof, bound notebook which will contain a record of all activities performed at the site. The specific measurements from field testing and sampling will be recorded in the field notebook or on separate documentation forms. At the time of sampling, detailed notes of the exact site of sampling will be recorded in the field notebook.

3.3.2 Sampling Information

During sediment sampling, detailed notes will be made as to the exact site of sampling, physical observations, sample depths, and weather conditions. These notes will be recorded in the field notebook.

3.3.3 Sample Chain-of-Custody

Persons will have custody of samples when the samples are in their physical possession, in their view after being in their possession, or in their physical possession and secured so they cannot be tampered with. In addition, when samples are secured in a restricted area accessible only to authorized personnel, they will be deemed to be in the custody of such authorized personnel.

Chain-of-custody forms will provide the record of responsibility for sample collection, transport, and submittal to the laboratory. The forms will be filled out at each sampling site, at a group of sampling sites, or at the end of each day of sampling by one of the field personnel designated to be responsible for sample custody. In the event that the samples are relinquished by the designated sampling person to other sampling or field personnel, the chain-of-

custody form will be signed and dated by the appropriate personnel to document the sample transfer. The original chain-of-custody form will accompany the samples to the laboratory.

3.4 Management of Investigation-Derived Materials and Wastes

The handling of investigation-derived materials and wastes is discussed below.

3.4.1 Excess Sediment

Any excess sediment not submitted for laboratory analysis will be placed back into the media from which they were obtained.

3.4.2 Disposable Equipment and Debris

Disposable equipment and debris such as health and safety equipment, plastic sheeting, sampling equipment, and other equipment and/or sampling debris not reused in the investigation will be collected in plastic bags during the sampling events and then placed into appropriately labeled containers which will be stored at the facility for characterization and disposal by LMC.

3.4.3 Decontamination Rinsate

Decontamination rinsate (e.g., tap and distilled water container small amount of hexane) will be containerized at each sampling location or group of locations. Upon completion of the field activities, the rinsate will be placed in an appropriately labeled container to be stored at the facility for characterization and disposal by LMC.

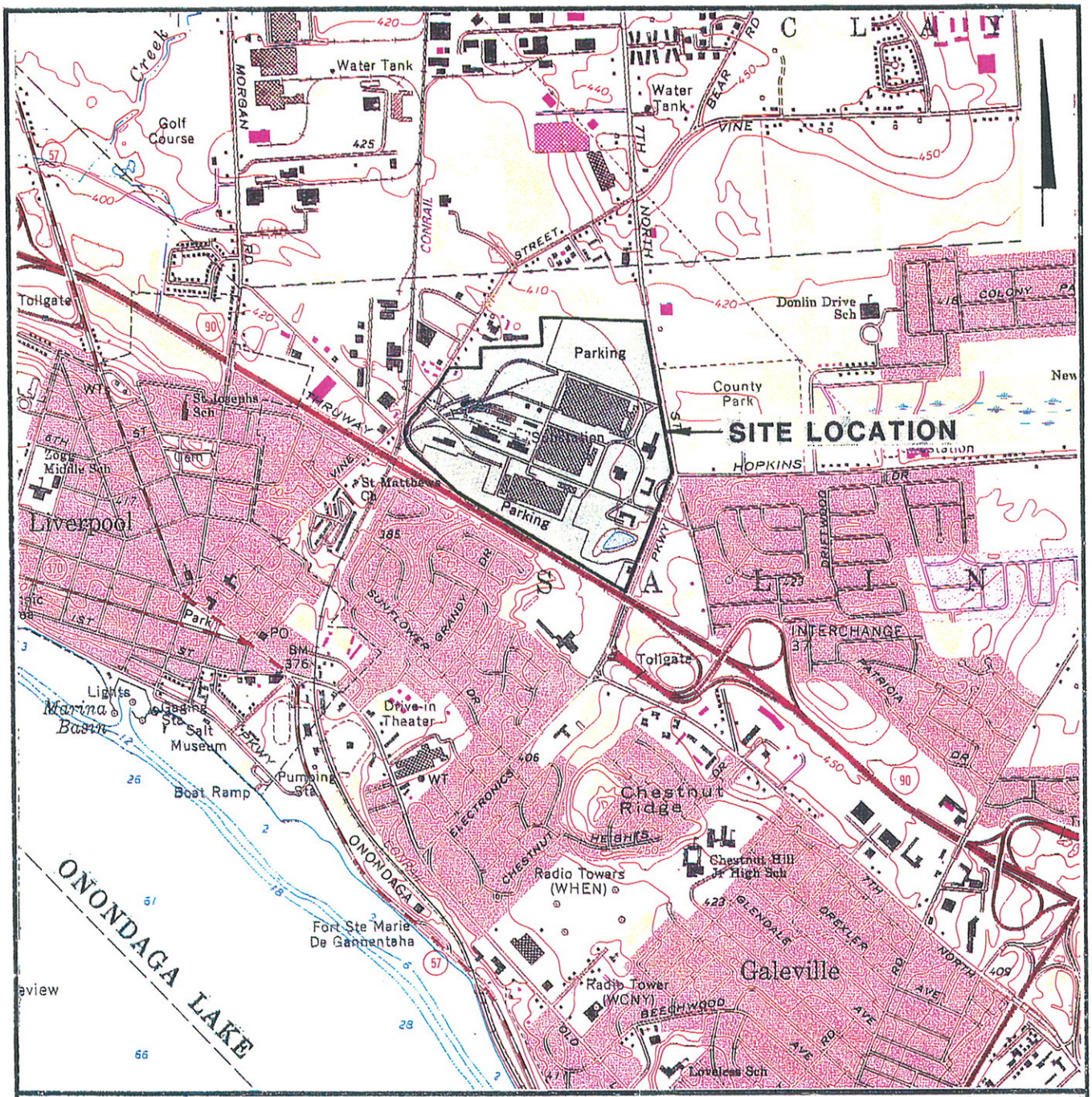
4. Schedule and Reporting

In anticipation of receiving NYSDEC and NYSDOH approval of this work plan during the week of July 1, 1996, the sampling program described herein is scheduled to be performed during the week of July 8, 1996. The sampling will be completed in one field day and is tentatively scheduled for July 10, 1996. All samples will be submitted (hand-delivered) to the laboratory on July 10, 1996 for analysis. Laboratory analysis will be completed on a turnaround time which is consistent with the NYSDEC's contract laboratory turnaround time; at this time it is anticipated that a one-week (7 working day) turnaround time will be provided for the samples. At this time it is anticipated that preliminary data will be made available to LMC during the week of July 22, 1996. Internal laboratory QA/QC will be performed on the analytical data and a Category B deliverable package will be prepared to support the analytical data. It is anticipated that the Category B deliverable package will be available to LMC during the week of August 5, 1996.

It is anticipated that LMC will provide the NYSDEC with the preliminary analytical data during the week of July 22, 1996. This submittal will include a transmission of data only.

LMC understands that NYSDEC will provide LMC with all analytical data generated from split samples analyzed by NYSDECs contract laboratory. Following receipt of the final analytical data (generated by both LMC and NYSDEC), including the Category B deliverable package, LMC will evaluate the Phase I and Phase II data and forward its evaluation to the NYSDEC during the week of August 26, 1996.

FIGURE 1



LOCKHEED MARTIN CORPORATION
ELECTRONICS PARK FACILITY
SYRACUSE, NEW YORK

SITE LOCATION MAP

SCALE:

2000' 0 2000'

SOURCE: USGS 7 1/2 MINUTE TOPOGRAPHIC QUADRANGLE:
SYRACUSE WEST, NY, 1978

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BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

APPENDIX A - SEDIMENT CORE SAMPLING PROCEDURES

I. Introduction

This protocol describes the procedures to collect sediment core samples.

II. Materials

The following materials will be available, as required, during sediment sampling activities.

- Cleaning equipment;
- Boat;
- Aluminum or stainless steel tray;
- Duct tape;
- Lexan^{R} tubing with end caps;
- Brass push rod;
- Hacksaw;
- Stainless steel core driver;
- Vacuum pump;
- Piston sampler;
- 6-foot rule or survey rod;
- Transport container with ice;
- Appropriate sample containers and forms; and
- Field book.

III. Procedures for Sediment Core Sampling

1. Identify the proposed sample location in the field notebook along with other appropriate information collected during the sediment probing activities;

2. Don personal protective equipment;

3. At each sample location, lower a section of Lexan^{R} tube until it just reaches the top of sediment. Measure the depth of water. (Sections of Lexan^{R} tube may need to be spliced together in deep water locations). If sufficient sediment depth is not available to collect a core sample, sediments will be collected with a decontaminated scoop (if scoop is used, go to Step 17);

4. Push the Lexan^{R} tube into the sediment by hand until refusal. Measure the depth of sediment.

5. Drive the tube several more inches using a stainless steel core driver block and measure the distance. This procedure is performed to obtain a "plug" at the bottom of the core and prevent the loose sediment from escaping;

6. Place a vacuum pump on the top end of the Lexan^{R} tube and create a vacuum to prevent the sediments/plug from escaping;

7. Slowly pull the tube from the sediment, twisting it slightly as it is removed (if necessary);

8. Before the tube is fully removed from the water, place a cap on the bottom end of the tube while it is still submerged;

9. Keeping the tube upright, wipe the bottom end dry and seal the cap with duct tape and label. Measure the length of sediment recovered and evaluate the integrity of the core. If the core is not suitably intact, repeat coring procedure within 10 or 15 feet of the first location attempted;

10. While still keeping the core upright, use a hacksaw to make a horizontal cut in the tube approximately one inch above the sediment, if the sediment depth is greater than 1 foot cut the sediment sample into two samples. The first sample will consist of sediments from the 0 to 12 inch interval and the second sample shall comprise the remaining core depth.

11. Re-cap the cut end(s) of the tube, seal the cap with duct tape, and mark the appropriate end(s) as "top";

12. Wipe the tube dry;

13. Place a completed sample label on the tube;

14. Record the following information on both the tube and on the cap: 1) sample number; 2) sampling date; and 3) sampling time;

15. Place the core sample upright in a container with ice;

16. Repeat the above procedures until the appropriate number of core samples are collected (for the sampling event or the sampling day);

17. Extrude the sediment cores from the Lexan^{R} tubing onto an aluminum or stainless steel tray. Describe and record sample description including depths at which sediment characteristics change and visual characteristics.

18. Homogenize the core sample and place into the appropriate sample containers for PCBs, mercury, copper, and cadmium.

19. Label all sample containers according to the procedures in Section 3 and Appendix B; and

20. Handle, pack, and ship the samples using the chain-of-custody procedures in accordance with Section 3 and Appendix B.

IV. Field Cleaning Procedures

A. Materials

- Distilled water (laboratory-supplied)
- Non-phosphate soap; (Alconox^{R}, or equivalent)
- Tap water
- Appropriate cleaning solvent (e.g., pesticide grade hexane)
- Rinse collection plastic containers
- Brushes
- Aluminum foil
- Garbage bags
- Spray bottles for solvent
- Ziploc^{R} type bags

B. Procedures

1. Cleaning of reusable sampling equipment (e.g., trays, spatulas, scoops and core driver) will follow the decontamination procedures presented below:

    a. Alconox^{R} and tap water wash;
    b. Tap water rinse;
    c. Solvent spray rinse (e.g., pesticide grade hexane);
    d. Distilled water rinse; and
    e. Allow to air dry and wrap in aluminum foil.

2. Cleaning will be conducted in plastic containers to collect all decontamination rinsate.

V. Disposal Methods

Materials generated during the sediment sampling activities and disposable equipment will be disposed of as described in Section 3.

APPENDIX B - SAMPLE PACKING, HANDLING, AND SHIPPING PROCEDURES

I. Handling

1. Fill in sample label with:

   a. Sample type (soil, sediment, surface water, ground water);
   b. Project number and site name;
   c. Sample identification code and other sample identification information, if applicable;
   d. Analysis required;
   e. Date;
   f. Time sampled;
   g. Name, affiliation, and contact phone number;
   h. Sample type (composite or grab); and
   I. Preservative added, if applicable.

2. Cover the label with clear packing tape to secure the label onto the container.

3. Check the caps on the sample containers to ensure that they are tightly sealed.

4. Mark the level of the sample in the container using an indelible ink marker or grease pencil.

5. Wrap the sample container with clear packing tape to prevent it from becoming loose.

6. Place a signed custody seal label over the cap such that the cap cannot be removed without breaking the custody seal.

7. Initiate chain-of-custody by designated sampling personnel responsible for sample custody after sampling or prior to sample packing). Note: if the designated sampling person relinquishes the samples to other sampling or field personnel for packing or other purposes, the samplers will complete the chain-of-custody prior to this transfer. The appropriate personnel will sign and date the chain-of-custody form to document the sample custody transfer.

II. Packing

1. Using duct tape, secure the outside and inside of the drain plug at the bottom of the cooler that is used for sample transport.

2. Place each sample container or package in individual polyethylene bags (Ziplock^{R}-type) and seal.

3. Place one to two inches of vermiculite at the bottom of the cooler as a cushioning material.

4. Package the sealed sample containers upright in the cooler.

5. Repackage ice (if required) in small Ziplock^{R}-type plastic bags and place loosely in the cooler. Do not pack ice so tightly that it may prevent addition of sufficient cushioning material.

6. Fill the remaining space in the cooler with vermiculite.

7. Place the completed chain-of-custody forms in a large Ziploc^{R}-type bag and tape the forms to the inside of the cooler lid.

8. Close the lid of the cooler and fasten with duct tape.

9. Wrap strapping tape around both ends of the cooler at least twice.

10. Mark the cooler on the outside with the following information: shipping address, return address, "Fragile" labels on the top and on one side, and arrows indicating "This Side Up" on two adjacent sides.

11. Place custody seal evidence tape over front right and back left of the cooler lid and cover with clear plastic tape.

III. Shipping

1. All samples will be hand delivered or delivered by an express carrier within 48 hours or less from the date of sample collection.

2. The following chain-of-custody procedures will apply to sample shipping:

   a. Relinquish the sample containers to the laboratory via express carrier. The signed and dated forms should be included in the cooler. The express carrier will not be required to sign the chain-of-custody forms. The sampler should retain the express carrier receipt or bill of lading.

   b. When the samples are received by the laboratory, the laboratory personnel shall complete the chain-of-custody forms by recording receipt of samples, measure and record the internal temperature of the shipping container, and then check the sample identification numbers on the containers to the chain-of-custody forms.