WORK PLAN

BARKER CHEMICAL SITE

Prepared for
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,
ENVIRONMENTAL RESPONSE TEAM CENTER (ERTC)

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Work Assignment No.:	0-153

Approval

REAC Program Manager _____ Date _____

REAC Group Leader _____ Date _____
(Cost Model Review)

REAC Task Leader _____ Date _____

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Work Assignment Number:	**0-153**
Work Assignment Title:	**Barker Chemical Site**
Work Assignment Manager:	**Andre Zownir**
Lockheed Martin REAC Task Leader:	**Robert Evangelista**
Duration:	**June 7, 2000 to May 31, 2004**
Contract Number	**68-C99-223**

1.0 OBJECTIVE

1.1 Purpose. The United States Environmental Protection Agency (U.S. EPA) Region II office requested the assistance of the U.S. EPA Environmental Response Team Center (ERTC) to perform sampling at the Barker Chemical Site, a former agricultural chemical blending facility, and associated areas. The purposes of this work assignment are: 1) to determine the extent of contamination of Target Analyte List (TAL) metals, sulfur, boron, Toxicity Characteristic Leaching Procedure (TCLP) metals, selected herbicides, pesticides, polychlorinated biphenyls (PCBs) and other compounds at the site, and 2) to obtain chemical, physical, and environmental data to fill out a Generator's Waste Profile Sheet for potential off-site disposal.

1.2 Background. The source of the background information was an undated draft memo from Michael J. O'Toole, Jr., Director, Division of Environmental Remediation, New York State Department of Environmental Conservation (NYSDEC).

The Barker Chemical Site is the location of the former Barker Chemical facility located at 8473 West Somerset Road, Village of Barker, Town of Somerset, NY. At this site, Barker Chemical formulated, warehoused, and distributed a wide variety of agricultural chemicals for local wholesale and retail sales, including: herbicides, fungicides, insecticides, and rodenticides. The company ceased operations in the early 1970s.

The products potentially handled at Barker Chemical were:

- Phosalone <acaricide, insecticide; fish toxicity>
- Bromoxynil (3,5-dibromo-4-hydroxybenzonitrile; 3,5-dibromo-4-hydroxyphenyl cyanide) <herbicide>
- Butyric acid
- 2,4-D (2,4-dichlorophenoxyacetic acid) <herbicide>
- Sodium chlorate ($NaClO_3$) <herbicide, defoliant>
- Sodium arsenate <insecticide>
- Asulam (methyl sulfanilyl carbamate; methyl 4-aminobenzenesulphonylcarbamate) <herbicide>
- Sodium metaborate <added to sodium chlorate herbicides and defoliants>
- 2,4,5-T (2,4,5-trichlorophenoxyacetic acid) <herbicide>
- Sevin (Carbaryl; 1-naphthyl methylcarbamate) <insecticide>
- Silvex (Fenoprop; 2,4,5-TP; 2-(2,4,5-trichlorophenoxy)proprionic acid) <herbicide>
- Proprionic acid (2-(2,4-dichlorophenoxy)) [note: correct spelling is propionic acid]
- Sulfur (sulphur) <fungicide, acaricide>
- Dimethyl 4,4'-o-phenylenebis (3-thioallophanate) <pesticide>
- Alkylaryl polyoxy ethylene <surface active agent>

- Thiram (Thirame; Thiuram; tetramethylthiuram disulfide; bis(dimethylthiocarbamoyl)disulfide) <fungicide; seed protectant; animal repellent>

[Sources: Site inspections and interviews by the Niagara County Health Department (NCHD) on July 20, 1970 and July 1, 1972; *Farm Chemicals Handbook 2000*, Meister Publishing Company; The Agrochemicals Handbook, Second Edition, The Royal Society of Chemistry, June 1990].

The approximately 10 acre site presently consists of several abandoned and decaying buildings, two larger lagoons/ponds, an above-ground tank, areas of bare soil, areas of heavy brush, and shallow water north of the buildings. Investigations by the NYSDEC also revealed a third lagoon, suspected to be filled with a lime-sulfur slurry, generated by a fungicide blending process. The site appears to have been unused and fallow for many years. The Niagara County Brownfields Committee included the site in its inventory of potential brownfield sites.

NYSDEC staff conducted reconnaissance inspections, collected several soil/sediment samples, and conducted in-field pH measurements during December 1999 and January 2000. Results from NYSDEC reconnaissance inspections indicated that low pH conditions existed in the surface waters. The lagoons (pH range 2.2 - 3.0) and surface water adjacent to the site building (pH range 1.7 - 2.5) exhibited the lowest pH measurements found.

The NCHD and the New York State Department of Health (NYSDOH) have determined that a public health risk exists through direct contact with the low pH waters at the site. In January 2000, the county issued a public health advisory to nearby residents cautioning against entry onto the site.

1.3 Work Assignment Objective. The objectives of this work assignment were to provide technical support to the ERTC Work Assignment Manager (WAM) and the Region II On Scene Coordinator (OSC) by evaluating the extent of contamination at the Barker Chemical Site and surrounding environs and to determine off-site disposal requirements for site materials.

2.0 PROJECT SCOPE

2.1 Scope of Work. The scope of work is divided into 2 phases: 1) a preliminary reconnaissance phase and 2) a sampling, analysis and requirements of disposal phase. The preliminary reconnaissance phase consists of a site inspection by the ERTC WAM, the Region II OSC, and the Lockheed Martin Response Engineering and Analytical Contract (REAC) Task Leader (TL) to assist in the development of a work plan. The second phase of the project includes an evaluation of the extent of contamination via subsurface soil and sediment borings, soil, sediment and surface water sampling, and chemical analyses. The analytical results are to be evaluated by the WAM, the TL and the REAC geologist. Based on the evaluation, archived samples may be sent for additional analyses. Furthermore, the determination of off-site disposal requirements for site materials is part of the second phase.

2.2 General Assumption. The objective of this work assignment is to provide technical support to the ERTC and Region II by evaluating the extent of pesticide contamination at the Barker Chemical Site and environs. The WAM and the Region II OSC will be the liaisons to the public during all field activities. If the scope of work changes due to additional areas of contamination found or suspected in the course of this work assignment, the need for additional analytical data, or for any other reason, a supplement amendment of this work plan will be developed, the final report will be amended and/or altered, and a Field Change Form will be completed.

3.0 TECHNICAL APPROACH

3.1 Preliminary Reconnaissance Phase Activities. The preliminary phase involved a site reconnaissance visit by a 3-person team consisting of the OSC, the WAM and the TL on June 6, 2000.

The reconnaissance team walked around the perimeters of both the North and the South Lagoons, the Waste Pile (southeast of the lagoons), the above ground Horizontal (fuel) Tank, the Trough Area, the Wet Area (on the west side of the site), the Chip Area (north of the North Lagoon), and the woodlands in the eastern and northern portions of the site.

The team also walked through the East and West Warehouses, the Office Building, and the Process Building. The East and West Warehouses did not contain any pesticide materials; the East Warehouse contained a stack of wood pallets. The Office Building contained pieces of abandoned office furniture and strewn papers. The shipping and receiving area of the Process Building contained a stack of pallets and a pallet of empty bags for product. The process area of the Process Building contained only the cement foundations where process equipment once resided. The roof of the process area was partly caved in.

The team took samples from four areas: the bottom sediment from both lagoons, the Waste Pile, and the Chip Area, and visually observed the samples.

The team examined the surface waters of the site. The team walked by the creek on the eastern boundary of the site as well as the larger stream, Golden Hill Creek, approximately one-half mile north of the site. The team took pH readings from the surface waters of both lagoons, the Trough, and the East Boundary Creek both upstream and downstream of the confluence with the Trough. The pH readings ranged between 2 and 3, except for the surface water in the East Boundary Creek upstream of the confluence with the Trough which had pH of approximately 6.

The team discussed the general technical approach of the sampling and analysis phase (section 3.2) and discussed the level of QA and the need for data validation (Section 5.0 and Table 5.2).

3.2 Sampling And Analysis Phase

3.2.1 Investigative strategy. The following components comprise the basic approach to the sampling portion of the second (sampling and analytical) phase:

- create a map of the results of the December 1999 and January 2000 NYSDEC reconnaissance inspections,
- create a site map or maps from the aerial photos,
- divide the site into areas for sampling,
- apply a sampling strategy for each of the media in each of the areas,
- apply an archival strategy for the samples,
- determine the analytical parameters for each particular sample, and
- evaluate the results and compare results to NYSDEC and U.S. EPA site cleanup criteria and to Resource Conservation and Recovery Act (RCRA) regulations for characteristic wastes.

3.2.2 Site contamination map The TL and the REAC GIS/CAD Specialist, will create a map titled *Figure 1, Results of the NYSDEC Reconnaissance Inspections 12/99 & 1/00* (the site contamination map) for the site. The site contamination map will be based on the September 2, 1958 aerial photo (PIC200023015). All the NYSDEC soil, sediment, and surface water sampling locations will be placed on the map. Concentrations, in parts per million, of selected indicator metals—arsenic, chromium, copper, and lead—will be placed on the map for all NYSDEC samples. These metals are indicator compounds for contamination in the site media based on the pesticide products produced at the site. The concentrations were obtained from the tables of the NYSDEC analyses titled:

- *Summary of Surface Water Analytical Results for the Former Barker Chemical Site,*
- *Summary of Sediment Analytical Results for the Former Barker Chemical Site,* and
- *Summary of Waste Sample Analytical Results for the Former Barker Chemical Site.*

3.2.3 Site Map The process for creating *Figure 2, Site Map, Barker Chemical* will be a multi-step process. First, four preliminary site maps will be created from the following four aerial photos of the site: September 2, 1958 (PIC 20002301S); April 17, 1968 (PIC 20002301S); May 17, 1972 (PIC 20002301S); and April 13, 2000 (PIC 20002301S). Then the four preliminary site maps and the four aerial photographs will be placed side-to-side to observe the changes in the site over the 42 year time period. The TL and the REAC GIS/CAD Specialist will determine which aerial photograph should be used as the working site map. The selection criteria will be based on which aerial photograph, and hence which corresponding preliminary site map, will best show the features of the operating Barker Chemical facility. Please note that the site has not operated since the 1970s. Lastly, the GIS/CAD Specialist will add final details to the site map, such as the sampling areas.

3.2.4 Sampling areas The site will be divided into several sampling areas : North Lagoon, South Lagoon, Filled Lagoon and Waste Pile, Operations Area, and Surface Water Drainage Area. Because of the difference in the areas, different sampling strategies will be selected.

3.2.4.1 *North Lagoon and the South Lagoon* The sampling strategy will be identical at both the North Lagoon and the South Lagoon. Two types of samples will be obtained from each lagoon: sediment and surface water samples. One composite sediment sample will be removed from each lagoon. The rationale for this sediment sampling strategy is the assumption that the sediment in each lagoon is relatively homogeneous. Additional sediment material will be taken for archival purposes.

One composite surface water sample will be taken from each lagoon. The assumption is that the water in each lagoon is horizontally homogeneous.

3.2.4.2 *Surface Water Drainage Area.* The Surface Water Drainage Areas consists of five discrete locations: the Trough, the Drainage Ditch, the East Boundary Creek, the Railroad Drainage Creek, and Golden Hill Creek. The surface waters of the Trough and the Drainage Ditch each flow east into the East Boundary Creek. The East Boundary Creek flows northward. The Railroad Drainage Creek is located north of the site, and Golden Hill Creek is located north of the Railroad Drainage Creek.

One sediment sample will be taken the from each of the Trough and the Drainage Ditch. For the two sediment samples that will be taken from the East Boundary Creek: one sediment sample will be obtained approximately fifty feet downstream from its confluence with the Trough, and another sample will be taken from the East Boundary Creek just upstream from its confluence with the Trough. If there is a hydraulic connection, another sediment sample will be taken from each of the Railroad Drainage Creek and Golden Hill Creek at locations to be determined on site.

One surface water sample will be taken from the Trough at a location determined on site.

3.2.4.3 *Filled Lagoon and Waste Pile* The sampling locations of the Filled Lagoon and Waste Pile are located north of the Operations Area to the southern boundary of the North Lagoon.

The sampling locations of the Filled Lagoon and the Waste Pile will be determined by the WAM and the REAC hydrogeologist. A track-mounted Geoprobe will be used to take core samples (i.e., direct push samples) in acetate sleeves at the various sampling locations. Based on field observations, certain waste/soil samples will be selected for analysis. Therefore, not all core samples will be subject to chemical analyses. Geographic Positioning System (GPS) measurements will be taken at each of these sampling locations.

3.2.4.4 *Operations Area* The Operations Area consists of the Horizontal (fuel) Tank, the Process Building, the Lead Arsenate Area, the office building, and two warehouses. A Geoprobe will be used to take cores in acetate sleeves where the Geoprobe can operate without physical obstructions. Based on the field observations of the WAM and/or the TL and/or the REAC hydrogeologist, certain soil borings will be analyzed. Therefore, analyses will be performed on some, but possibly not all, of the core samples. Sampling points will have GPS taken at each location.

3.2.4.4.1 Horizontal Tank. One sample will be taken from the area under or near the horizontal tank.

3.2.4.4.2 Process Building. One sample will be taken from the Process Building in the area of the cement foundation of the former process equipment. The Geoprobe will not be used inside of the Process Building due to safety concerns.

3.2.4.4.3 Lead Arsenate Area. One sample will be taken from the Lead Arsenate Area.

3.2.4.4.4 Office Building and Two Warehouses. One or more samples will be taken from the area between the office building and the two warehouses.

3.2.5 Site clearing and Grubbing. The site has not been used for nearly thirty years and is extensively overgrown with tall grass, brush and small trees. It was difficult to move around many areas of the site during the preliminary reconnaissance phase trip. Therefore, extensive site clearing and grubbing will be required to make room for the staging area with storage trailer and the Geoprobe's trailer and tractor and to make many sampling locations accessible for a John boat, or the tract Geoprobe. REAC proposes to use a combination of ERTC/REAC supplies to clear and grub, such as: the brush cutter attachment for the Geoprobe, the Hedgehog, and the chain saw. Additional equipment, including another chain saw and an industrial size Weedwacker, may be purchased or rented near the site.

3.2.6 Soil Sampling. Surface soil samples for chemical and physical analyses will be collected with stainless steel trowels and/or stainless steel spoons, following the procedures outlined in the ERTC/REAC standard operating procedure (SOP) #2012, *Soil Sampling*.

Subsurface soil samples will be collected with the Geoprobe with acetate sleeves, following the procedures outlined in the SOP #2050, *Model 5400 Geoprobe Operation*. A hand auger will serve as a backup. A different acetate core will be used for each discrete sample.

3.2.7 Sediment Sampling. Sediment samples will be collected following a modified SOP #2016, *Sediment Sampling*. Sediment samples will be collected using acetate sleeves capable of holding and visually showing a sediment sample. A variety of traditional sediment sampling equipment will be brought to the site and used as a backup. After collection, all sediment samples will be placed into a stainless-steel container and homogenized. After the sample is thoroughly mixed, aliquots for laboratory analyses will be dispensed into appropriate sample containers.

Overlying water depth will be measured at the time of sediment sample collection. The depth of sediment at the sampling point will be measured.

3.2.8 Surface water sampling. Surface water samples will be taken using the procedures outlined in SOP #2013, *Surface Water Sampling*.

3.2.9 Sampling equipment decontamination. The following equipment decontamination procedures will be employed prior and/or subsequent to sampling each location in the following sequence:

1. Physical removal
2. Nonphosphate detergent wash (Liquinox)
3. Potable water rinse
4. Distilled/deionized water rinse
5. Alcohol rinse for organics, or acid rinse for inorganics
6. Distilled water rinse
7. Air dry

3.2.10 Sample Analyses. The types of analytes will depend on the type and location of the sample:

3.2.10.1 *North Lagoon and the South Lagoon.*

3.2.10.1.1 Surface Water.

- TAL metals, sulfur, boron
- Herbicides 8151A
- Sulfate
- Chloride
- Nitrate
- Ignitability, corrosivity, reactivity
- PCB/pesticides and BNAs may be performed

3.2.10.1.2 Sediment.

- TAL metals, sulfur, boron
- Herbicides 8151A
- TCLP metals; 2,4-D; and 2,4,5-TP
- Ignitability, corrosivity, reactivity
- Paint Filter
- PCB/pesticides and BNAs may be performed

3.2.10.2 *Filled Lagoon and Waste Pile.*

- TAL metals, sulfur, boron
- Herbicides 8151A
- TCLP: metals; 2,4-D; 2,4,5-TP
- Ignitability, corrosivity, reactivity
- PCB/pesticides, TPH, and BNAs may be performed

3.2.10.3 *Surface Water Drainage Area.*

3.2.10.3.1 Sediment.

- TAL metals, sulfur, boron
- Herbicides 8151A
- TCLP: metals; 2,4-D; 2,4,5-TP
- Corrosivity and paint filter for Trough sample

3.2.10.3.2 Surface Water.

- TAL metals, Sulfur, Boron
- Herbicides 8151A
- Sulfate
- Chloride
- Nitrate
- Ignitability, corrosivity, reactivity

3.2.10.4 *Operations Area.*

- TAL metals, Sulfur, Boron
- Herbicides 8151A
- TCLP: metals; 2,4-D; 2,4,5; other compounds possible
- Ignitability, corrosivity, reactivity
- PCB/pesticides, TPH, BNAs, VOAs and paint filter analyses may be performed

3.2.11 Sample documentation, packaging and shipping. Sample documentation will be completed per the following SOPs:

- #2002, *Sample Documentation*
- #4005, *Chain of Custody*
- #2004, *Sample Packaging and Shipment*

3.2.12 Sample archival. All archival samples will be managed by REAC Sample Receiving and will be stored at REAC.

3.2.13 GPS. A REAC Field Technician will perform GPS of soil sample locations where applicable. GPS will also be performed on four discernable features at the site.

3.2.14 Waste disposal. All wastes will be left on site at an area designated by the OSC. Archived samples will be disposed by Lockheed Martin REAC.

4.0 STAFFING PLAN AND SCHEDULE

4.1 Staffing Plan. The REAC Task Leader will maintain contact with the U.S. EPA/ERTC Work Assignment Manager to provide information on the technical and financial progress of this project. This communication will commence with the issuance of the work assignment and project scoping meeting. Activities under this project will be reported in status or trip reports and other deliverables identified in the Schedule of Activities section. Activities will also be summarized in the appropriate format for inclusion in REAC Monthly and Annual Reports.

In accordance with the terms and conditions of U.S. EPA Contract Number 68-C99-223, Lockheed Martin has conducted a conflict of interest search and certifies that to the best of Lockheed Martin's knowledge and belief, no actual or potential organizational conflict of interest exists.

Lockheed Martin personnel performing work under this work assignment have received the REAC Conflict of Interest Plan and been informed of their obligation to report personal conflicts of interest. Each employee has agreed to this policy by signing a statement related to conflict of interest responsibilities. In addition, Lockheed Martin will conduct searches of corporate conflict of interest data bases in reference to this work assignment. Any actual or potential conflict of interest associated with this work assignment will be brought to the attention of the Contract and Project Officers. Lastly, Lockheed Martin recognizes the continuing obligation to identify and report any actual or potential conflicts of interest arising at any time during performance of this work assignment.

The work assignment for this project was received on 7 June 2000. The Work Plan (WP) was initiated after the site reconnaissance visit. The overall project is expected to close out with the issuance of a Status report, if requested, no later than 31 May 2004.

The REAC TL is the primary point of contact with the WAM and is the Quality Control Coordinator. The TL is responsible for the development, execution and completion of the work assignment, project team organization, and supervision of all project tasks. The Quality Control Coordinator is responsible for the development and completion of the WP, ensuring field adherence to the WP, and recording any deviations from the WP.

The following REAC personnel will work on this project:

Personnel	Responsibilities	Level of Responsibility
Sr. Chemical engineer	TL, field efforts, data eval., report preparation	P3
Hydrogeologist	Field efforts	P3
Geologist	Quality control	P3
Field Technicians	Field efforts, GPS, heavy equip. oper.	T3
GIS/CAD Specialist	GIS/CAD, mapping	T3
Chemists	Analytical subcontracting, lab analyses	P3
Operations Section Chief	Quality control	P4
Manager, Tech. Pub./Ed.	Quality control	P3

Most analytical work for this project will be subcontracted. PCB/pesticides, VOAs, BNAs, corrosivity of solid matrix samples, and paint filter will be done at Lockheed Martin REAC.

4.2 Schedule

4.2.1 Field Activities. One trip for each of the two phases: 1) preliminary reconnaissance phase and 2) sampling and analyses phase of 1.5 and 7 days, respectively.

4.2.2 Activity	Date
Preliminary reconnaissance phase	June 6 and 7, 2000
Sampling phase	June 18 to 26, 2000
Trip report	August 17, 2000
Final Report	As needed, on or before May 31, 2004

All project deliverables are estimated based on the information available at the time of work plan completion. New information, additional tasks, changes in scope, inclement weather, laboratory delays, and events outside the control of the TL may result in revisions to these dates.

5.0 Quality Assurance

QA objectives and protocols are summarized in Tables 5.1 and 5.2.

The following QA Protocols for QA1 data are applicable to all sample matrices:

1. Sample documentation in the form of field logbooks, the appropriate field data sheets, and chain of custody forms will be provided.
2. All instrument calibration and/or performance check procedures/methods will be summarized and documented in the field/personal or instrument log notebook.
3. Detection limit(s) will be determined and recorded, along with the data, where appropriate.

Based on the information obtained from the WAM during the site reconnaissance visit by the 3-person team consisting of the OSC, the WAM, and the TL on June 6, 2000 (Section 3.1), QA2 data quality objectives are not expected and data validation will not be performed at this time by REAC. Therefore all laboratory data and summary tables in the Trip Report and any other report containing data that has not been validated by REAC will contain the stamp "No QC evaluation has been performed. Data validity is unsubstantiated and the data should be used with discretion." The Trip Report and any other report that contains such data will mention that the data has not been subject to the REAC data validation process and must be considered preliminary.

A laboratory blank, a matrix spike, and a matrix spike duplicate will be performed in the laboratory for all analyses, except corrosivity of solids and paint filter. This laboratory QC data will then be archived. Therefore if the WAM would like to perform data validation at a later date, all the analytical information necessary to do so will be available.

Numbers of samples to be collected for this project/event are presented in Table 5.1, Field Sampling Summary, and Table 5.2, QA/QC Analysis and Objectives Summary. These tables identify analytical parameters desired; type, volume and number of containers needed; preservation requirements; number of samples to be collected; and associated number and type of QA/QC samples based on the protocols for QA1.

All project deliverables will receive an internal peer review prior to release, per guidelines established in the REAC Administrative Procedures.