Corrective Measures Study Report

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

December 2004

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

REPORT

Corrective Measures Study Report

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

December 2004

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Table of Contents

Tables

Figures

Appendix

1. Introduction

1.1 General

This Corrective Measures Study (CMS) Report (the "Report") presents the results of a CMS that was conducted to identify and evaluate potential corrective measure alternatives to address the presence of chemical constituents in onsite soils and groundwater at and hydraulically downgradient from the former TRW Aeronautical Systems facility located at 211 Seward Avenue in Utica, New York (the "Site").

As set forth in the *RCRA (Resource Conservation and Recovery Act) Facility Investigation Report* prepared by Blasland, Bouck & Lee, Inc. (BBL) in April 2004 [the "RFI Report"], concentrations of inorganic constituents (cyanide and select metals) identified in soils within six areas of concern (AOCs) at the Site are above the RFI screening criteria, as developed using the soil guidance values presented in the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum titled *Determination of Soil Cleanup Objectives and Cleanup Levels*, HWR-94-4046, dated January 24, 1994 (TAGM 4046). In addition, polychlorinated biphenyl (PCB) concentrations identified in five AOCs and semi-volatile organic compound (SVOC) concentrations identified in four AOCs are above the TAGM 4046 soil guidance values.

As also provided in the RFI Report, volatile organic compound (VOC) and PCB concentrations in groundwater were identified above the groundwater quality standards presented in the NYSDEC Division of Water, Technical and Operational Guidance Series document titled *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, (TOGS 1.1.1), dated June 1998, last updated April 2000.

This CMS Report presents relevant background information, summarizes current site conditions, identifies corrective measure objectives, identifies and screens various potential remedial technologies, presents a detailed and comparative analysis of retained technologies to address the corrective measure objectives, and recommends a site-wide corrective measure alternative.

This CMS Report has been prepared by BBL in accordance with the following:

- The United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Directive 9902.3-2A - RCRA Corrective Action Plan, dated May 1994;
- The New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) titled *Selection of Remedial Actions at Inactive Hazardous Waste Sites* HWR-90-4030, dated May 15, 1990 (TAGM 4030); and
- An August 10, 2004 CMS Work Plan letter and a November 9, 2004 letter to the NYSDEC presenting modifications to the CMS Work Plan in response to NYSDEC comments, which were approved in a December 9, 2004 letter from the NYSDEC.

The corrective measure objectives presented in this CMS Report have been developed considering the findings of the previous investigation activities and results obtained from an exposure assessment completed as part of the RFI. The corrective measure objectives are as presented in the NYSDEC-approved CMS Work Plan letter, and further set forth in Section 4 of this Report.

Following NYSDEC approval of this CMS Report, a Statement of Basis will be developed that will identify the preferred corrective measure alternative, summarize the alternatives considered, and provide the reasons for proposing the preferred alternative.

1.2 Purpose and Objective

The purpose of this CMS Report is to identify and evaluate corrective measure alternatives that are appropriate for site-specific conditions, protective of human health and the environment, and consistent with applicable laws, regulations, and guidance documents. The overall objective of this CMS Report is to recommend a corrective measure alternative for soil and groundwater that adequately mitigates potential threats to human health and the environment arising from chemical constituents detected in soil and groundwater at the Site and is consistent with the corrective measure objectives for the Site.

1.3 Report Organization

The CMS Report is organized into the following sections:

Section	Purpose
Section 1 – Introduction	Presents a brief overview of the project, describes the purpose of the document, and presents background information relevant to the development of the CMS Report, including past investigation and remedial activities.
Section 2 – Current Conditions	Presents a summary of the AOCs included in the CMS and discusses the results of soil sampling activities performed in support of the CMS.
Section 3 – Standards, Criteria, and Guidance	Identifies the standards, criteria, and guidance (SCGs) referred to in the development and selection of remedial alternatives.
Section 4 – Corrective Measure Objectives	Develops and presents corrective measure objectives for the Site that are protective of human health and the environment.
Section 5 – Technology Screening and Development of Corrective Measures Alternatives	Presents the results of the identification and screening of remedial technologies and the development of remedial alternatives that have the potential to meet the corrective measure objectives.
Section 6 – Evaluation of Corrective Measure Alternatives	Presents an evaluation of proposed corrective measure alternatives against evaluation criteria presented in NYSDEC TAGM 4030.
Section 7 – Comparative Analysis of Alternatives	Presents a comparative analysis of the alternatives and identifies the selected corrective measure alternative and the rationale used for selection.
Section 8 – References	Provides references used to prepare this Report.

1.4 Background information

This section presents relevant background information used to develop the CMS. A description of the Site is presented below, followed by a presentation of topography and drainage in the vicinity of the Site, discussion of the geologic and hydrogeologic setting of the Site, and a summary of historical Site information. This section

also summarizes results obtained from previous investigation activities and remedial activities, and the results of a qualitative exposure assessment for potential human receptors.

1.4.1 Site Description

The Site consists of a 22-acre parcel located at 211 Seward Avenue in the City of Utica, New York. The Site is bordered to the north by two industrial properties and an automobile service station, to the south by residential properties, to the east by railroad tracks owned by New York Susquehanna and Western Railway Corporation, and to the west by commercial and residential properties. A Site location map is included as Figure 1. The Site formerly included the following main buildings/features (as shown on Figure 2):

- The Main Production Building, which was a two-story manufacturing/office building located in the northern portion of the Site with approximately 115,000 square feet (SF) per floor;
- The Test Building, which was an approximately 30,000-SF single-story building located in the southeastern portion of the Site;
- An approximately 3,900-SF single-story building located south of the Main Production Building that formerly served as a chemical storage building; and
- Three parking lots, including one to the northeast of the Main Production Building (Lot No. 1) and two to the south of the Main Production Building (Lot Nos. 2 and 3). The three parking lots remain.

Between June 2003 and February 2004, all above-grade structures at the Site were demolished in accordance with the *Demolition Work Plan* (BBL, March 2003). With the exception noted below, all above-grade structures and concrete slabs were removed and disposed of, or crushed and reused as onsite backfill, in accordance with applicable regulations. In addition, all foundation structures located within the first foot of soil were removed and disposed of, or crushed and reused as onsite backfill, in accordance with applicable regulations. The demolition activities performed between June 2003 and February 2004 are detailed in the *Demolition Summary Report* (BBL, August 2004). A small section of previously characterized, non-hazardous Main Production Building floor slab (polychlorinated biphenyl [PCB] concentrations less than 1 part per million [ppm]) and the underlying steam condensate return line wrapped with asbestos-containing material were removed between August and September 2004. These final demolition activities are detailed in a letter report to the NYSDEC dated December 6, 2004.

1.4.2 Site Topography and Drainage

The Site is located on relatively level land at an elevation of approximately 515 to 530 feet above mean sea level (MSL). Ground surface elevations within approximately one mile south of the Site rise to approximately 550 to 800 feet above MSL. Storm water is conveyed offsite via overland sheet flow. Storm water was formerly conveyed offsite via storm sewer piping that discharged to the municipal storm sewer system. Onsite storm sewer piping was removed as an Interim Corrective Measure (ICM), as detailed in the *Interim Corrective Measure Storm Sewer Removal Certification Report* (BBL, March 2004), and further discussed in Section 1.4.7.3 of this Report.

1.4.3 Geologic/Hydrogeologic Setting

Regional surface geology in the area is generally characterized as glacial till, glacial outwash, and lacustrine sand, silt, and gravel deposits. Based on the subsurface characteristics observed during the previous investigation activities at the Site, the overburden material across the majority of the area appears to be brown fine to coarse gravel and fine to coarse sand. There appears to be a slight shift from the gravel/sand encountered across most of the Site to a few silt/silty layers toward the east. In addition, there appears to be a predominance of silt layers with a few sandy layers toward the west of the Site. The bedrock encountered beneath the overburden at the Site generally consists of alternating beds of black shale and lighter gray shale.

The water table is encountered approximately 10 to 15 feet below the ground surface (bgs) within the unconsolidated deposits and is perched above the glacial till layer. Groundwater beneath the Site generally flows toward the north/northwest.

1.4.4 Environmental Setting

Land use adjacent to the Site is commercial/industrial to the north/northwest and residential to the west. Future use of the Site is anticipated to include redevelopment for commercial/industrial purposes. The Site is currently enclosed by a chain-link fence with a locked gate.

The area surrounding the Site is served with potable water by the Upper Mohawk Valley Regional Water Board (the Water Board). The source of potable water supplied by the Water Board is surface water from the Hinckley Reservoir and Upper West Canada Creek. Based on conversations with personnel at the Oneida County Health Department (OCHD) during February 2003, there are no registered private or public wells in the vicinity of the Site. In addition, the OCHD is not aware of any unregistered wells in the vicinity of the Site. Moreover, New York law prohibits the installation of private wells where public water supply is available, unless approval is expressly granted by the public water authority. *See* 10 NYCRR 5-1.31(b).

Based on a search of an electronic database maintained by Environmental Data Resources, Inc. (EDR), three wells suspected of being former United States Geological Survey (USGS) observation wells were identified within a 1.5 mile radius of the Site on a map output by the database search. These wells were also identified on mapping by the U.S. Department of the Interior, but that map (in contradiction to the EDR information) identifies the wells as domestic wells supplying individual residences. BBL searched for the wells in the field using: (1) a hand-held global positioning system (GPS) device (with the USGS well positioning coordinates input into the device) to identify the approximate location of each well; and (2) a metal detector to screen the area around the coordinates of each well for metal potentially associated with the wells. The well coordinates coincided with: one location approximately 50 feet southeast of an "Old Stone House" at the Site; a second location beneath an addition to a supermarket northwest of the Site; and a third location approximately 0.8 miles southwest of the Site. None of the three wells were located within a 20-foot square area around the reported coordinate locations. Therefore, it is likely that these wells are no longer present.

1.4.5 Historic Site Operations

The Site was originally developed by the Continental Can Company in 1946 for the production of cans for the food industry. From the early 1950s until 2002, the Site was owned/operated by various companies, including divisions and/or subsidiaries of Bendix Corporation, Allied Corporation, Allied-Signal, Lucas Varity, and TRW, for the design, manufacturing, and testing of components for the aviation and aerospace industry. More

recently, from mid-1999 to the fall 2002, the Site was operated by Lucas Western, doing business as TRW Aeronautical Systems. Manufacturing activities previously conducted at the Site include metal cutting, electrochemical milling, plating, welding, painting, and cleaning. Site operations were discontinued during 2002 and were relocated to a new facility in Rome, New York.

1.4.6 Overview of Previous Investigation Activities

Based on available information, Site environmental investigations began in 1984 when Stearns & Wheler, on behalf of Allied Bendix Aerospace, conducted soil and groundwater investigations, focusing on Former Cyanide Waste Pit No. 2. Since then, a number of environmental investigations have been conducted at the Site by site owners, NYSDEC and USEPA, including but not limited to: a 1987 Preliminary Soils Investigation; a 1990 Preliminary Site Assessment; a 1993 Preliminary Site Assessment; a 2001 RCRA Facility Assessment (RFA); and, most recently, a 2003-2004 RCRA Facility Investigation (RFI). Environmental investigations conducted prior to the RFI are summarized in the *RCRA Facility Assessment* (ERM, March 2001) (the "RFA Report"). RFA and RFI activities are summarized below.

Lucas Western initiated RCRA Corrective Action Program activities in response to a request from the NYSDEC, dated December 13, 2000. In 2001, Lucas Western completed a RFA which identified 25 AOCs at the Site. Based on the evaluation of existing information and the potential for environmental releases, each AOC was either designated for additional evaluation as part of the RFI or eliminated from further consideration. Findings of the RFA are detailed in the *RFA Report*. In a May 2001 letter granting conditional approval of the *RFA Report*, the NYSDEC requested preparation of a *RCRA Facility Investigation Work Plan* to address the 12 AOCs identified in the *RFA Report* for additional evaluation.

In response, the *RCRA Facility Investigation Work Plan* (ERM, September 2001) [the "*RFI Work Plan*"] was submitted to the NYSDEC in September 2001. The *RFI Work Plan* included: (1) a summary of the results of an expedited groundwater investigation conducted during July/August 2001; (2) a description of soil investigation activities to establish background inorganic constituent concentrations; (3) a description of soil investigation activities to evaluate conditions within the AOCs that had been designated for further evaluation; and (4) a description of additional groundwater investigation activities to further evaluate groundwater quality at and hydraulically downgradient from the Site. The NYSDEC submitted comments on the *RFI Work Plan* during early December 2001.

Expedited RFI soil investigation activities were conducted during mid-December 2001 with the approval of NYSDEC (for details refer to a December 12, 2001 letter from the NYSDEC granting conditional approval and a December 14, 2001 *Expedited Soil Investigation Work Plan* letter prepared by Environmental Resources Management, Inc. [ERM] that described the expedited activities). The expedited soil investigation included the collection of background soil samples and collection of surface/subsurface soil samples from three AOCs: AOC No. 4 – Former Plating Area Wastewater Treatment Equipment, AOC No. 8.1 – Former Cyanide Waste Pit No. 1, and AOC No. 14 – Former Plating Area , which at the time, were located within/beneath existing buildings.

In response to NYSDEC comments on the *RFI Work Plan*, ERM prepared the *RCRA Facility Investigation Work Plan Addendum* (ERM, May 2002) [the "*RFI Work Plan Addendum*"]. NYSDEC comments on the *RFI Work Plan Addendum* were received on August 20, 2002.

BBL prepared the *Supplemental RCRA Facility Investigation Work Plan* (BBL, March 2003), which addressed NYSDEC comments on the *RFI Work Plan Addendum* and proposed additional activities to further evaluate the potential presence and extent of PCBs in onsite soil and groundwater at and hydraulically downgradient from

the Site. NYSDEC approval to implement the RFI activities described in these plans was provided in an April 8, 2003 letter.

RFI field activities were implemented by BBL in three phases between April 2003 and February 2004 and included sampling in the following AOCs:

- AOC No. 1 - Former Chemical Storage Area;
- AOC No. 4 - Former Plating Area Wastewater Treatment Equipment Area;
- AOC No. 7.1 - Former 15,000-Gallon Fuel Oil USTs;
- AOC No. 7.3 - Former 550-Gallon Diesel Fuel AST;
- AOC No. 7.4 - Former 295-Gallon Gasoline AST;
- AOC No. 7.5 - Former 600-Gallon 1,1,1-TCA AST;
- AOC No. 8.1 - Former Cyanide Waste Pit No. 1;
- AOC No. 8.2 - Former Cyanide Waste Pit No. 2;
- AOC No. 13 - Former VOC-Impacted Soils;
- AOC No. 14 - Former Plating Area;
- AOC No. 17.1 - Electrical Transformer Substation No. 1;
- AOC No. 17.2 - Electrical Transformer Substation No. 2;
- AOC No. 17.3 - Electrical Transformer Substation No. 3;
- AOC No. 18 - Former Drum Storage Area;
- AOC No. 20 - Former Main Production Building Footprint;
- AOC No. 21 - Former Test Building Footprint and Vicinity;
- AOC No. 22 - Grass-Covered Area West of the Former Main Production Building;
- AOC No. 23 - Grass-Covered Area East of the Former Enclosed Passageway; and
- AOC No. 24 - South Storm Sewer Line Catch Basin Area.

AOC Nos. 20 through 24 were not part of the RFA. These AOCs were added during the course of the RFI field investigation activities. Soil sampling locations are shown on Figure 4 and monitoring well locations are shown on Figure 5. Detailed information regarding RFI activities and results are presented in the *RCRA Facility Investigation Report* (BBL, April 2004) [the "*RFI Report*"], and summarized later in this Report (Subsections 1.4.7 and 1.4.8).

1.4.7 Summary of Previous Remedial Activities

In response to the findings of Site environmental investigations, a number of remedial activities have been completed at the Site since 1986, including:

- Former Cyanide Waste Pit No. 2 removal activities, which were conducted during 1986 [this area was subsequently identified as AOC No. 8.2];

- VOC-Impacted Soils removal activities, which were conducted during 1998 [this area was subsequently identified as AOC No. 13];

- Storm Sewer ICM removal activities, which were conducted during 2003 and 2004;

- AOC No. 19 – Former Sanitary Sewer Line from the Former Plating Area AOCs (AOC Nos. 4 and 14) removal activities, which were conducted during 2003 and 2004;

- AOC No. 7.1 – Former 15,000-Gallon No. 6 Fuel Oil UST removal activities, which were conducted during 2003 and 2004;

- PCB-Impacted Soil ICM removal activities within AOC No. 21 - Former Test Building Footprint and Vicinity, which were conducted during 2004; and

- Chromium-impacted soil removal activities in AOC No. 14 - Former Plating Area, which were also conducted during 2004.

These activities are summarized in the subsections that follow. Limits of previous remedial activities are shown on Figure 3.

1.4.7.1 Former Cyanide Waste Pit No. 2 Removal Activities

ERM of Woodbury, NY coordinated the removal of Former Cyanide Waste Pit No. 2 and associated impacted soils, which was conducted between May and July, 1986. A comprehensive discussion of these removal activities is provided in the *Closure of Former Waste Treatment Pit, Allied-Bendix Aerospace, Utica, New York* (ERM, September 1986). A brief summary of these activities is presented below.

Initially, the area designated as Former Cyanide Water Pit No. 2 (reported to have measured 8 feet wide by 8 feet long by 12 feet deep) and one foot of surrounding soil was excavated. Post-excavation confirmatory samples were collected from the four sides and the bottom of the excavation. Based on the results of this initial round of post-excavation sampling, an additional foot of soil was excavated from the south wall and bottom of the excavation. Additional confirmatory samples were collected from the south wall and bottom of the expanded excavation. The excavation was then backfilled with clean material. Approximately 64 cubic yards (CY) of excavated soil was transported for offsite disposal. Final confirmatory samples collected in 1986 exhibited chromium and copper at concentrations above TAGM 4046 soil guidance values (though it should be noted that TAGM 4046 had not been published at the time). Additional samples were collected within this AOC during the RFI, and the results of the RFI sampling indicated that concentrations of select inorganic constituents were above TAGM 4046 soil guidance values, but were generally consistent with typical background levels. Remaining impacts in the Former Cyanide Waste Pit No. 2 (identified as AOC No. 8.2) will be addressed by this CMS, as discussed later in this Report.

1.4.7.2 VOC-Impacted Soil Removal Activities

ERM coordinated the excavation of VOC-impacted soils, which was conducted from January through September, 1998. A comprehensive discussion of these removal activities is provided in the *Soil Remediation and Completion of a Soil Closure Report, Seward Avenue Facility, Utica, New York* (ERM, January 1999). A brief summary of these activities is presented below.

Initially, between January 30 and February 13, 1998, approximately 330 tons of soil were excavated from two separate excavation areas. Post-excavation confirmatory samples were collected from the four sides and the bottom of each excavation area. Based on the results of the confirmatory sampling, additional excavation was conducted in one of these areas. This occurred concurrently with excavation in a third excavation area, between September 1 and September 4, 1998. An additional 40 tons of soil were excavated and transported for offsite disposal during the September 1998 activities, bringing the total amount of soil excavated from AOC No. 13 and

transported for offsite disposal to 370 tons. Post-excavation samples did not exhibit VOCs at concentrations above Project Cleanup Objectives (which were TAGM 4046 soil guidance values), except for the following:

- Acetone was detected at a concentration of 2.6 ppm in the soil sample collected from the north wall of excavation Area 3, which is slightly above the Project Cleanup Goal of 2.0 ppm; and

- 1,2-dichlorethane was detected at a concentration of 0.30 ppm in the soil sample collected from the north wall of excavation Area 1, which is slightly above the Project Cleanup Goal of 0.25 ppm.

Additional soil removal was not performed. The *Soil Remediation and Completion of a Soil Closure Report* concluded that "[i]n view of the minimal exceedance of the Project Cleanup Objectives, and the fact that in both instances, it would be necessary to dig below the foundation walls to reach the impacted soils, no further action is recommended."

Additional samples were collected within this AOC during the RFI. Based on the results of the RFI sampling, additional excavation was conducted in this general area in connection with the Storm Sewer ICM removal activities that are discussed in the next subsection. Impacted soil in this area that was not excavated during Storm Sewer ICM removal activities will be addressed by the CMS, as discussed later in this Report.

1.4.7.3 Storm Sewer ICM Removal Activities

BBL coordinated the Storm Sewer ICM removal activities, which were conducted from September 2003 to February 2004. A comprehensive discussion of these removal activities is presented in the *Interim Corrective Measure Storm Sewer Removal Certification Report* (BBL, March 2004). A brief summary of these activities is presented below.

Based on information available at the time, onsite storm sewers were not identified as an AOC in the RFA. However, information relating to the potential for PCB impacts to the onsite storm sewers was subsequently discovered (for a detailed discussion of this information, see the *RCRA Facility Investigation Work Plan Addendum* (ERM, May 2002)). Based on the additional information, Lucas Western proceeded to remove the onsite storm sewers as an interim corrective measure (ICM) under the RCRA Corrective Action Program. The removal activities were conducted pursuant to an Administrative Consent Order entered into between Lucas Western and NYSDEC, effective April 24, 2003 (File Number R6200220130-21), and in accordance with the *Interim Corrective Measure Storm Sewer Removal Work Plan* (BBL, April 2003).

The Storm Sewer ICM removal activities included the removal of onsite, below-grade storm sewer piping and drainage structures, pipe bedding material, and associated impacted soil. The scope of the Storm Sewer ICM removal activities was expanded to include the removal of impacted surface and subsurface soil within a drainage area immediately south of the Main Production Building, referred to as the "South Line Drainage Area".

ICM delineation sampling was completed prior to beginning excavation in the South Line Drainage Area to further define the horizontal and vertical limits of soil excavation in this area. The ICM delineation sampling was conducted in accordance with the NYSDEC-approved plan, developed in letters from The Dextra Group, LLC to the NYSDEC, dated August 7, 2003 and September 8, 2003. ICM delineation soil sampling locations are shown on Figure 4.

Final excavation limits were determined from field screening results and laboratory analytical results. Upon receipt of acceptable field screening results, verification samples were collected from selected field screening locations in accordance with the NYSDEC-approved work plans. Verification samples for the storm sewer removal and the excavation in the South Line Drainage Area were collected from the locations shown on Figure 4.

PCBs were not detected at concentrations above TAGM 4046 soil guidance values at any final verification soil sampling locations, except for TV-5. Sample TV-5 was collected just above the water table (at a depth of 11.5 feet bgs), and thus, additional excavation was not practical at this location. SVOC and inorganic concentrations identified at a few final verification soil sampling locations were slightly above TAGM 4046 soil guidance values. After discussing these results with the NYSDEC, the area was backfilled.

Except clean overburden material, all piping, debris, soils, and other materials removed by the Storm Sewer ICM activities were characterized and transported for offsite disposal. In total, approximately 4,100 tons of material were excavated and transported for offsite disposal as a Toxic Substances Control Act- (TSCA-) regulated/New York State (NYS) hazardous waste, approximately 375 tons of material were excavated and transported for offsite disposal as a non-hazardous PCB-impacted waste, and approximately 400 tons of material were excavated and transported for offsite disposal as a non-hazardous waste, in accordance with applicable rules and regulations. Overburden material (visually clean, odor-free material from approximately 6 inches above the top of pipe to grade level) removed to access the storm sewers was stockpiled separately, characterized, and reused onsite as backfill if characterization results supported reuse.

Remaining impacts in this area will be addressed by this CMS, as discussed later in this Report.

1.4.7.4 AOC No. 19 - Former Sanitary Sewer Line Removal Activities

BBL coordinated the AOC No. 19 - Former Sanitary Sewer Line removal activities, which were conducted during January and February, 2004. During building demolition activities, the sanitary sewer line located between the north boundary of AOC No. 14 (Former Plating Area) and the north wall of the former Main Production Building was removed (AOC No. 19), pursuant to a proposed *Interim Corrective Measure Plating Area Soil and Sanitary Sewer Removal Work Plan* (BBL, November 2003). This ICM Work Plan was subsequently withdrawn by Lucas Western, and the remainder of the scope of the ICM Work Plan was not completed.

Two verification samples (V-SAN-1 and V-SAN-2) were collected following removal of the pipe. Analytical results obtained from laboratory analysis of the verification samples for inorganic constituents of interest indicate that inorganic constituents are below TAGM 4046 soil guidance values, except for copper in sample V-SAN-1. However, the copper concentration (57.4 ppm) is generally consistent with regional background values. Based on these analytical results, NYSDEC approval to backfill the excavation was sought in e-mail correspondence dated February 12, 2004 and received in e-mail correspondence received from the NYSDEC the same day. Piping and debris removed during the sanitary sewer removal were characterized and transported for offsite disposal in accordance with applicable rules and regulations. Remaining impacts in the two plating area AOCs (AOC Nos. 4 and 14) will be addressed in this CMS, as discussed later in this Report.

1.4.7.5 AOC No. 7.1 - Former 15,000-Gallon No. 6 Fuel Oil UST Removal Activities

BBL coordinated the AOC No. 7.1 - Former 15,000-Gallon No. 6 Fuel Oil UST removal activities, which were conducted between November 2003 and January 2004. A comprehensive discussion of the UST removal activities is presented in the "UST Closure Summary Letter Report" submitted to the NYSDEC on March 25, 2004. A brief summary of the removal activities is presented below.

The fuel oil USTs were planned for permanent closure via removal in accordance with 6 NYCRR Part 613.9 as part of demolition activities. Upon excavating overburden soil and lifting the first UST from the ground, field personnel observed oil-stained soil at the excavation limits and free product (non-aqueous phase liquid [NAPL]) on water encountered in the excavation area. Groundwater was encountered within the tank excavation at a depth of approximately 12 feet bgs. No water or NAPL was observed inside the tanks.

On November 25, 2003, BBL contacted the NYSDEC Spills Hotline to report the observations, and obtained NYSDEC Spill No. 0310011. Measures subsequently undertaken to cleanup the fuel oil include:

- Removing approximately 329 CY of visibly oil-stained soil from the sidewalls and bottom of the tank excavation. The oil-stained soil was transferred to a lined material staging area constructed north of the excavation for temporary staging and characterization prior to offsite disposal;

- Removing NAPL encountered on the water surface within the excavation area using a vacuum truck and oil absorbent booms/pads. The NAPL-water mixture removed from the excavation (approximately 1,200 gallons total) was transferred to three separate portable onsite storage tanks for temporary storage prior to offsite treatment/disposal; and

- Collecting a sample of the NAPL removed from the excavation for laboratory analysis for PCBs. Laboratory analytical results indicated the presence of PCBs in the NAPL but at low levels (0.034 ppm).

Due to the presence of groundwater in the UST excavation, two temporary wells were installed hydraulically downgradient of the excavation, and samples collected from these wells were submitted for laboratory analysis for PCBs and the VOCs and SVOCs identified in Table 2 of Appendix B to the NYSDEC Spill Technology and Remediation Series memorandum titled *Petroleum-Contaminated Soil Guidance Policy*, dated August 1992 (STARS Memo #1). Results of the laboratory analysis are discussed in the "UST Closure Summary Letter Report" submitted to the NYSDEC on March 25, 2004. No VOCs or SVOCs were detected at concentrations above TOGS 1.1.1 groundwater quality standards/guidance values in samples collected from these temporary wells. PCBs were detected in samples collected from both wells at concentrations of 0.12 parts per billion (ppb) and 0.19 ppb, which were slightly above the TOGS 1.1.1 groundwater quality standard. It is suspected that these results were an indication of particulates (suspended solids) within the groundwater samples and not a representation of actual groundwater quality in the area. PCBs were not identified in any of the permanent wells at the Site during subsequent (annual) groundwater monitoring activities.

The visibly oil-stained soil and the NAPL-water mixture removed from the tank excavation were transported offsite for treatment/disposal in accordance with applicable rules and regulations. Overburden soil removed from above the USTs was stockpiled to the north and south of the UST excavation area and was also sampled for PCBs. Overburden stockpiles with PCB concentrations above 10 ppm were transported for offsite disposal in accordance with applicable rules and regulations. Overburden stockpiles with PCB concentrations less than 10 ppm were either re-used as subsurface backfill within the UST excavation area or shipped offsite for disposal in accordance with applicable rules and regulations.

RFI sampling locations within AOC No. 7.1 and adjacent AOC No. 17.2 (Former Electrical Substation No. 2) were within the excavation limits for the UST activities, and soils in this area were removed after the RFI samples had been collected. Remaining impacts in this area will be addressed by this CMS, as discussed later in this Report.

1.4.7.6 ICM PCB-Impacted Soil Removal Activities

BBL coordinated ICM PCB-Impacted Soil removal activities, which were conducted from May through September, 2004. A comprehensive discussion of these removal activities is presented in the *Interim Corrective Measure PCB Soil Removal Certification Report* (BBL, December 2004). A brief summary of these activities is presented below.

The ICM PCB-Impacted Soil removal activities included the removal of soils exhibiting PCB concentrations above 50 ppm. The scope of the ICM PCB-Impacted Soil removal activities was determined by the results of four rounds of PCB delineation/verification soil sampling conducted between May and July 2004. The sampling was conducted in accordance with the NYSDEC-approved *Interim Corrective Measure Additional PCB Soil Removal Work Plan* (BBL, March 2004), letters from the Dextra Group LLC to the NYSDEC dated June 8, 2004 and June 25, 2004, and e-mail correspondence dated April 16, May 4, May 14, June 24, July 19, and July 20, 2004.

Soil excavation activities were conducted during August and September 2004. In total, 2,434 tons of soil were excavated and transported for offsite disposal as a TSCA-regulated/NYS hazardous waste, in accordance with applicable rules and regulations. Details of the excavation activities, including final sample results, are presented in the *Interim Corrective Measure PCB Soil Removal Certification Report* (BBL, December 2004). Remaining impacts in the vicinity of the ICM excavations will be addressed by this CMS, as discussed later in this Report.

1.4.7.7 Chromium-Impacted Soil Removal Activities

BBL coordinated chromium-impacted soil removal activities, which were conducted during September 2004. A comprehensive discussion of these removal activities is presented in the *Interim Corrective Measure PCB Soil Removal Certification Report* (BBL, December 2004). A brief summary of these activities is presented below.

Based on RFI sampling, the ICM PCB-Impacted Soil removal activities were expanded to include the removal of chromium-impacted soil from AOC No. 14. Specifically, as indicated in the NYSDEC-approved *RFI Report*, leachate generated via Synthetic Precipitation Leaching Procedure (SPLP) extraction of RFI soil sample 14-1 (0-1') exhibited chromium at a concentration of 7.5 ppm. While not directly comparable, this value was above the 5 ppm regulatory limit presented in Title 40 of the Code of Federal Regulations, Part 261.24 (40 CFR 261.24) for the Toxicity Characteristic Leaching Procedure (TCLP) test, prompting Lucas Western to propose removal of this soil as a precautionary measure.

Soil excavation was conducted in accordance with the NYSDEC-approved plan, developed in a letter from the Dextra Group LLC to the NYSDEC dated August 20, 2004 and follow-up e-mail correspondence dated August 27, August 31, and September 8, 2004. Soil was excavated to a depth of approximately 1-foot bgs within an approximately 45-foot-long by 20-foot-wide area centered around sampling locations 14-1 and 14-4. Soil was excavated an additional 1-foot (to a total depth of approximately 2-feet bgs) within a 10-foot by 10-foot area

centered around sampling location 14-1. A total of approximately 92 tons of soil were excavated and transported offsite for disposal as a non-hazardous waste, in accordance with applicable rules and regulations.

Following the excavation, one soil sample (sample "AOC14-VERIFICATION 14-1") collected from the bottom of the 2 foot excavation was submitted for laboratory analysis of Target Analyte List (TAL) inorganic constituents using USEPA SW-846 Method 6010. Concentrations of inorganic constituents detected in the verification soil sample are above TAGM 4046 soil guidance values and background concentrations but generally consistent with the concentrations detected in nearby soils. These remaining soils will be addressed in this CMS.

1.4.8 RFI Soil Investigation Summary

This section summarizes work activities performed and results obtained for RFI soil investigation activities, conducted between April 2003 and February 2004, which included the following:

- Collecting surface soil samples from 111 sampling locations for field screening and laboratory analysis; and
- Completing soil borings at 110 sampling locations to facilitate collection of subsurface soil samples for field screening and laboratory analysis.

Details of RFI activities and results are presented in the *RFI Report*. Field screening and analytical results for soil samples collected during RFI activities [excluding locations where soil was subsequently excavated as identified in Section 1.4.7 of this Report] are summarized below.

- PCBs were detected at concentrations above the 1 ppm surface soil guidance value presented in the NYSDEC TAGM 4046, in surface soil samples collected at the following sampling locations: location 17.3-4 in AOC No. 17.3, location MB-6 in AOC No. 20, locations TB-11, TB-13, TB-14, TB-15, TB-20, TB-22, and TB-26 in AOC No. 21, and locations EP-1, EP-4, EP-5, EP-6, and EP-7 in AOC No. 23.
- PCBs were detected at a concentration above the 10 ppm TAGM 4046 subsurface soil guidance value in a subsurface soil sample collected from location TB-26 in AOC No. 21.
- VOCs were not detected in any soil samples at concentrations above TAGM 4046 soil guidance values.
- SVOCs were detected at concentrations above the TAGM 4046 soil guidance values in soil samples collected within the following areas: locations 1-5, 1-6, 1-7 and 1-8 in AOC No. 1, locations 7.3-1, 7.3-2, 7.3-3, and 7.3-4 in AOC No. 7.3, location 13-5 and 13-9 in AOC No. 13, and location CB-4N in AOC No. 24. However, concentrations in soil samples collected from AOC Nos. 1, 13, and 24 were only slightly above the TAGM 4046 soil guidance values.
- TAL inorganics were detected at concentrations that appear to be consistent with TAGM 4046 soil guidance values, taking into consideration typical background concentrations, with the following exceptions: cadmium, total and hexavalent chromium, copper, cyanide, and nickel were detected at elevated concentrations in several samples collected from AOC Nos. 4 and 14; and chromium, cobalt, copper, mercury, nickel, and zinc were detected at elevated concentration in several samples collected from AOC No. 18. In general, the concentrations of the above-identified constituents of interest detected in SPLP leachate derived from the soil samples are relatively low (e.g., identified below the laboratory reporting limit in most instances) and do not indicate the potential for impacts to groundwater quality.

Additional soil sampling was performed for delineation and verification purposes in connection with ICM activities to address onsite soils and storm sewer piping. These sampling activities are summarized in the *RFI Report*, the *Interim Corrective Measure Storm Sewer Removal Certification Report*, and the *Interim Corrective Measure PCB Soil Removal Certification Report*. Following completion of these soil sampling activities and the remedial activities discussed in Subsection 1.4.7, it was determined that additional soil sampling was needed in support of the CMS to better delineate the extent of soils exhibiting PCBs and inorganic constituents at concentrations exceeding TAGM 4046 soil guidance values. Work activities performed and results obtained for the CMS soil sampling activities are summarized below.

1.4.9 CMS Soil Investigation Summary

This section summarizes work activities performed and results obtained for CMS soil investigation activities that were conducted during September 2004, in accordance with e-mail correspondence to the NYSDEC dated September 17, 2004 and follow-up e-mail correspondence dated September 21, 2004 (included in Appendix A).

CMS soil investigation activities included collecting surface soil samples from 25 locations (sampling locations SB-1 through SB-25) and subsurface soil samples from 21 locations (sampling locations SB-5 through SB-25). All samples collected during CMS soil investigation activities were submitted to Severn Trent Laboratories, Inc. (STL) located in North Canton, Ohio. Samples collected at six locations (sampling locations SB-10, SB-11, SB-15, SB-16, SB-21, and SB-22) were submitted to the laboratory and archived for potential analysis, pending the results of adjacent sample analysis. All other samples were submitted for laboratory analysis of PCBs using USEPA SW-846 Method 8082. Additionally, the surface and subsurface soil samples collected at location SB-23 were submitted for laboratory analysis for TAL inorganic constituents using USEPA SW-846 Method 6010. Following the first round of analyses, the samples collected from locations SB-10, SB-11, SB-15, SB-21, and SB-22 were submitted for laboratory analysis of PCBs using USEPA SW-846 Method 8082. Analytical results for soil samples collected in support of the CMS are summarized below.

- PCBs were detected at concentrations above the 1 ppm TAGM 4046 surface soil guidance value in surface soil samples collected at locations SB-4, SB-6, SB-7, SB-9, SB-10, SB-11, SB-12, SB-17, SB-18, SB-20, SB-23, SB-24, and SB-25. PCBs were not detected at concentrations above the 10 ppm TAGM 4046 subsurface soil guidance value in any of the subsurface soil samples collected.

- TAL inorganic constituents were detected at concentrations that appear to be generally consistent with TAGM 4046 soil guidance values, taking into consideration typical background concentrations, with the following exceptions: copper, mercury, nickel, and zinc.

Analytical results of soil sampling conducted in support of the CMS are presented in Tables 2 and 3. Laboratory analytical data reports are included on the attached compact disc (CD) in Portable Document Format (PDF). Validated analytical results will be provided under separate cover.

A summary of current Site conditions, based on the results of soil sampling performed in support of the CMS, the RFI, and the ICM activities to address onsite soils and storm sewer piping is presented in Section 2 of this Report.

1.4.10 Groundwater Investigation Summary

This section summarizes work activities performed and results obtained for groundwater investigations implemented at the Site. A total of 24 permanent and 29 temporary groundwater monitoring wells were installed as part of onsite and offsite groundwater investigation activities between 1984 and 2004. The permanent and temporary monitoring well locations are summarized below and shown on Figure 5:

- Four permanent wells were installed during 1984 in the vicinity of AOC No. 8.2 – Former Cyanide Waste Pit No. 2 (wells B84-1 through B84-4) [refer to Figure 4 for AOC locations referenced herein];

- Six permanent wells were installed during 1985, including one hydraulically upgradient from the Site (well B85-1), two in the northern portion of the Site (wells B85-2 and B85-3), and three hydraulically downgradient from AOC No. 8.2 (wells B85-4, B85-5, and B85-6);

- Four permanent wells were installed during 1994, including three along the northern property boundary (wells B94-1, B94-2, and B94-6) and one adjacent to AOC No. 7.5 – Former 600 Gallon 1,1,1-TCA Aboveground Storage Tank (well B94-4). One temporary well (well 94-5) was installed during 1994 at an onsite location north of AOC No. 7.1. The temporary well was used as a piezometer to further evaluate the groundwater flow pattern beneath the Site;

- Two permanent wells were installed during 1995, including one southeast of AOC No. 1 – Former Chemical Storage Building (well B95-1) and one west/northwest of AOC No. 7.5 (well B95-2);

- Eighteen temporary wells were installed at onsite and offsite locations as part of Expedited Groundwater Investigation Activities in July 2001 (temporary wells GP-1 through GP-18). These temporary wells were installed and sampled to further evaluate geologic/hydrogeologic conditions and to obtain screening level VOC data for use in identifying additional permanent monitoring well locations;

- Eight permanent wells (5 onsite wells and 3 offsite wells) were installed as part of RFI activities during 2003, including two hydraulically upgradient from former Site operations (wells MW03-1 and MW03-2), one in the vicinity of the former Test Building (well MW03-3), one to the west of the former Main Production Building (well MW03-4), one adjacent to MW94-1 (well MW03-5), and three on a New York State Department of Transportation (NYSDOT) right-of-way hydraulically downgradient from the Site (wells MW03-6, MW03-7, and MW03-8);

- Eight temporary wells were installed as part of the RFI during 2003 (temporary wells TW-2 through TW-9) to determine locations for the permanent monitoring wells installed on the NYSDOT right-of-way; and

- Two temporary wells were installed hydraulically downgradient from AOC No. 7.1 – Former 15,000 Gallon Fuel Oil Underground Storage Tanks (USTs) (wells TW04-1 and TW04-2) as part of UST closure activities during 2004.

Details of groundwater investigations performed prior to the RFI are presented in the RFI Work Plan, RFI Work Plan Addendum, and the Supplemental RFI Work Plan. Details of the RFI groundwater investigation are presented in the RFI Report. Details of the groundwater investigation performed following completion of the RFI are presented in the *2004 Annual Groundwater Monitoring Letter Report* (BBL, September 9, 2004). Based on the results of these activities, the water table is generally encountered approximately 10 to 15 feet bgs and

groundwater beneath the Site generally flows toward the north/northwest. Groundwater analytical results for the previous investigation activities are summarized below, by time period (pre-RFI, RFI, and post-RFI).

Pre-RFI Groundwater Investigation Summary

Analytical results for groundwater samples collected between June 1984 and July 2001 are summarized below.

- Six chlorinated VOCs/degradation daughter products [namely 1,1,1-TCA, TCE, tetrachlorethene (PCE), 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), and 1,2-dichloroethene (1,2-DCE)] were detected in groundwater samples collected from permanent monitoring wells, primarily in the northern portion of the Site, at concentrations above TOGS 1.1.1 groundwater quality standards/guidance values. In addition to the above-mentioned VOCs, chloroform was historically detected above TOGS 1.1.1 groundwater quality standards/guidance values in wells at the Site and hydraulically upgradient from the Site. However, as discussed in the NYSDEC-approved *Groundwater Monitoring Plan* (BBL, April 2004), chloroform is not attributed to former Site activities and data suggest there is a chloroform source upgradient of the Site, unrelated to the Site.

- Historically, select inorganic constituents were identified in unfiltered groundwater samples collected from the permanent wells at the Site at concentrations above the TOGS 1.1.1 groundwater quality standards/guidance values. However, the presence of inorganic constituents above standards/guidance values was attributed to suspended particulates in the samples (as evidenced by elevated turbidity readings). In subsequent sampling events, efforts were utilized to minimize sediment disturbance to achieve lower sample turbidity readings and filtered duplicate samples were analyzed for comparison. In each case, detected inorganic constituent concentrations dramatically dropped and were below TOGS 1.1.1 groundwater quality standards/guidance values, indicating that inorganic constituents detected in groundwater at the Site were associated with suspended particulates and were not representative of dissolved inorganic groundwater quality. Aside from typical mineral constituents, TAL inorganic constituents were not detected in low-turbidity or filtered samples above the TOGS 1.1.1 groundwater quality standards/guidance values.

- PCBs were not detected in any groundwater samples at concentrations above laboratory detection limits (laboratory detection limits ranged between 0.5 and 2 ppb).

- Pesticides and SVOCs were not detected in any groundwater samples at concentrations above laboratory detection limits. Based on these historical analytical results, pesticides and SVOCs were determined not to be constituents of interest in groundwater at the Site.

RFI Groundwater Investigation Summary

Analytical results for groundwater samples collected during the RFI activities (May and August 2003) are summarized below.

- Six VOCs (including chloroform, ethylbenzene, isopropylbenzene, 1,1,1-TCA, TCE, and xylenes[total]) were detected in groundwater samples at concentrations above the TOGS 1.1.1 groundwater quality standards/guidance values. Generally, when detected, these constituents (excluding chloroform) were identified at levels between 7 and 14 ppb. However, xylenes (total) were detected in one sample collected onsite (sample MW03-3) at a concentration of 130 ppb. Ethylbenzene, isopropylbenzene, and xylenes were only identified in one onsite well (not in any offsite wells). 1,1,1-TCA and TCE were identified in both onsite and offsite wells, and the offsite concentrations were lower than onsite.

- Aside from three typical mineral constituents (iron, manganese, and sodium), TAL inorganic constituents were not detected in any samples above the TOGS 1.1.1 groundwater quality standards/guidance values.

- PCBs were not detected above laboratory detection limits in the groundwater samples collected from 23 of the 24 monitoring wells. PCBs were detected at a concentration of 1.3 ppb in the groundwater sample collected from monitoring well MW03-3 in May 2003, which is above the groundwater quality standard presented in TOGS 1.1.1.

Post-RFI Annual Groundwater Monitoring

In accordance with NYSDEC-approved annual groundwater monitoring activities, a first round of annual groundwater monitoring activities following completion of the RFI was performed from June 14 through 16, 2004. The annual groundwater monitoring activities included the collection of groundwater samples from select monitoring wells, as listed below (shown on Figure 5):

- One offsite upgradient monitoring well (MW03-1);

- Seven onsite monitoring wells (B85-2, B94-6, B95-1, B95-2, and MW03-3 through MW03-5); and

- Three offsite downgradient monitoring wells (MW03-6 through MW03-8).

Analytical results for groundwater samples collected during the June 2004 monitoring event are summarized below.

- Three VOCs (chloroform, 1,1,1-TCA and TCE) were detected in groundwater samples at concentrations above the TOGS 1.1.1 groundwater quality standards/guidance values. Generally, when detected, these constituents (excluding chloroform) were identified at concentrations between 5.5 and 15 ppb.

- PCBs were not detected above laboratory detection limits.

Based on the results of the June 2004 sampling event, the NYSDEC approved the continuation of annual groundwater monitoring to further evaluate possible changes in groundwater quality at and downgradient from the Site.

Groundwater Analytical Data Trends/Conclusions

Data trends evident from review of the Pre-RFI, RFI, and Post-RFI groundwater analytical results are summarized below.

- Concentrations of 1,1,1-TCA, TCE, and PCE detected in the wells decreased significantly over time from the mid-1990s to the latest sampling event in 2004.

- The most significant decrease in the concentration of these constituents occurred at monitoring well B94-4, located adjacent to a former 600-gallon 1,1,1-TCA aboveground storage tank (AOC No. 7.5). The historical maximum concentration of 1,1,1-TCA in well B94-4 is 260 ppb, and the most recent sample (collected during the RFI) measured 4.4 ppb. The historical maximum concentration of TCE in well B94-4 is 22 ppb, and the most recent sample (collected during the RFI) measured 2.7 ppb. The historical maximum concentration of PCE in well B94-4 is 39 ppb, and the most recent sample (collected during the RFI) measured 1.6 ppb. The PCE concentrations identified in groundwater over the past four sampling events

(including the 2004 annual groundwater monitoring event) were below the TOGS 1.1.1 groundwater quality standards/guidance values.

Well B94-4 is the closest monitoring well to the area believed to be the primary source(s) of VOC impacts, AOC No. 7.5 (Former 600-Gallon 1,1,1-TCA Aboveground Storage Tank) and AOC No. 13 (Former VOC-Impacted Soils Area). The significant decrease in concentrations of 1,1,1-TCA, TCE, and PCE at this well suggests that removal of the 1,1,1-TCA storage tank and the previous soil excavation activities in the area were successful in removing VOC source material.

Based on available groundwater analytical data, the following conclusions are made:

- The extent of the VOCs of interest in groundwater beneath the Site and offsite has been delineated.
- VOCs of interest have been identified at concentrations slightly above the TOGS 1.1.1 groundwater quality standards/guidance values in only one permanent offsite monitoring well (well MW03-7, with a maximum of 8.7 ppb TCE, and the TOGS 1.1.1 standard is 5 ppb).
- Based on the previous removal of VOC source material, VOC concentrations in groundwater are expected to continue to decline.

As previously discussed, groundwater at and in the vicinity of the Site is not used for potable water. The area surrounding the Site is served with potable water (obtained from regional surface water sources) by the Upper Mohawk Valley Regional Water Board, and NYS groundwater use restrictions [10 NYCRR 5-1.31(b)] prohibit the installation of private wells where public supply is available (unless approval is expressly granted by the public water authority). Accordingly, the low VOC concentrations in groundwater beneath and downgradient from the Site are not anticipated to result in a potentially complete exposure pathway.

1.4.11 Human Exposure Evaluation

Based on results of the RFI, a qualitative human health exposure evaluation was conducted to identify potentially complete exposure pathways for the Site. Details of the human health exposure evaluation are presented in the RFI Report. Results are summarized below.

The qualitative human health exposure evaluation identified the following potentially complete exposure pathways:

- *Potential Trespasser* - While the Site is surrounded by a locked chain-link fence, the potential exists for trespassers. Exposure of trespassers would be infrequent and of relatively short duration. Possible exposure routes may include dermal contact, incidental ingestion of surface soil, and inhalation of wind-blown particles.
- *Future Commercial/Industrial Worker* - The Site is expected to be redeveloped for future commercial/ industrial use. Under existing conditions, future workers have the potential for exposure to constituents of interest in surface soil via dermal contact, incidental ingestion, and inhalation of wind-blown particles. Inhalation of VOCs from soil is unlikely because VOCs were only identified in subsurface soils and were only detected at concentrations below TAGM 4046 soil guidance values. However, worker exposure to other constituents of interest in subsurface soil could potentially occur during future construction activities. In addition, if a building were to be constructed in the future, a potentially complete exposure

pathway could be associated with intrusion of VOCs from groundwater into indoor air. Further analysis of this pathway (as summarized in a memorandum from BBL attached to a June 10, 2004 letter from the Dextra Group LLC to the NYSDEC) indicated that risks would not be significant. The NYSDEC and NYSDOH reviewed the memorandum, and responded that '*we do not endorse the exclusive use of the Johnson Ettinger model for evaluating potential off-site vapor intrusion impacts if soil gas sampling is possible.*' [*See* July 29, 2004 letter from NYSDEC]. In response to the NYSDEC July 29, 2004 letter, Lucas Western agreed to further evaluate the potential vapor intrusion pathway via collection of soil gas samples, and prepared a Soil Gas Investigation Work Plan that was submitted to the NYSDEC in a letter dated August 23, 2004. Conditional approval of the Work Plan was received on December 14, 2004. Further evaluation of the pathway will be performed using the results of the Soil Gas Investigation.

- *Potential Offsite Exposure* - Residential and commercial properties currently exist west and north of the Site, respectively. Potential exposure to individuals in these areas could occur in the unlikely event of onsite dust generation and wind-blown transport of particulates. The Site was re-graded following completion of ICM PCB Soil Removal activities and hydroseeded to promote a vegetative cover to further mitigate potential dust migration. As summarized in the BBL memorandum attached to the June 10, 2004 Dextra Group letter, existing data suggests that the offsite vapor intrusion pathway is not a potentially complete exposure pathway. Further evaluation of this pathway will be performed using the results of the Soil Gas Investigation.

The alternatives evaluated in this CMS will address these potentially complete exposure pathways.

2. Current Conditions

2.1 General

This section presents a brief summary of the AOCs included in this CMS and provides a discussion of soil sampling conducted in support of the CMS.

2.2 Summary of AOCs Included in the CMS

As summarized in Section 1, a considerable amount of remedial work has already been performed at the Site. An extensive quantity of soils exhibiting constituents at concentrations above the TAGM 4046 soil guidance values has been removed. However, based on the soil sampling conducted as part of the RFI, Storm Sewer ICM, ICM PCB Soil Removal, and CMS, constituents of interest remain in soils within 13 AOCs at concentrations above the soil guidance values. Sampling locations within these AOCs where constituents remain at concentrations above TAGM 4046 soil guidance values (excluding typical mineral constituents – aluminum, calcium, iron, magnesium, manganese, potassium, and sodium) are summarized below.

AOC No.	Description	Findings	Location(s) with Constituents at Concentrations Above TAGM 4046 Soil Guidance Values
1	Former Chemical Storage Building	Soil at four RFI soil sampling locations directly beneath an asphalt pavement surface exhibits SVOCs at concentrations slightly above TAGM 4046 soil guidance values.	1-5 (0-0.5'), 1-6 (0-0.5'), 1-7 (0-0.5'), and 1-8 (0-0.5').
4	Former Plating Area Wastewater Treatment Equipment	Soil at two RFI soil sampling locations exhibits select inorganics (chromium, copper, mercury, nickel, and selenium) at concentrations above TAGM 4046 soil guidance values.	4-1 (0-1') & (1-2') and 4-2 (0-1').
7.3	Former 550-Gallon Diesel Fuel Aboveground Storage Tank (AST)	Soil at four RFI soil sampling locations exhibits select SVOCs at concentrations above TAGM 4046 soil guidance values.	7.3-1 (0-0.5') & (0.5-1.5'), 7.3-2 (0-0.5'), 7.3-3 (0-0.5'), and 7.3-4 (0-0.5') & (0.5-1.5').
8.1	Former Cyanide Waste Pit No. 1	Soil at six RFI soil sampling locations exhibits select inorganics (arsenic, cadmium, copper, mercury, nickel, and/or zinc) at concentrations slightly above TAGM 4046 soil guidance values.	8.1-2 (5-6'), 8.1-5 (14-15.5'), 8.1-6 (5-6') & (8-9'), 8.1-7 (8-9') & (11-12'), and 8.1-9 (5-6') & (14-15').

AOC No.	Description	Findings	Location(s) of TAGM 4046 Exceedence(s)
8.2	Former Cyanide Waste Pit No. 2	Soil at five RFI soil sampling locations exhibits select inorganics (arsenic, cadmium, copper, and/or zinc) at concentrations slightly above TAGM 4046 soil guidance values.	8.2-1 (11-12'), 8.2-2 (5-6') & (8-9'), 8.2-3 (5-6'), 8.2-4 (8-9') and 8.2-5 (5-6').
13	Former VOC-Impacted Soils Area	PCB-, VOC-, and SVOC-impacted soil was removed during the South Line Drainage Area Excavation completed as part of the Storm Sewer ICM. PCBs and VOCs were not detected in verification soil samples at concentrations above TAGM 4046 soil guidance values. Soil at two RFI subsurface soil sampling locations below the limits of previous removal activities exhibits SVOCs and/or zinc at concentrations slightly above TAGM 4046 soil guidance values.	13-5 (2-4') and 13-6 (2-4').
14	Former Plating Area	Soil was removed from this AOC as part of the chromium-impacted soil removal activities. Soil at four RFI soil sampling locations outside the limits of previous removal activities exhibits select inorganics (arsenic, cadmium, chromium, copper, cyanide, mercury, nickel, selenium, and/or zinc) at concentrations above TAGM 4046 soil guidance values.	14-2 (1-2'), 14-3 (0-1') & (1-2'), 14-4 (1-2'), (2-3') & (3-4'), and 14-5 (0-1') & (1-2').
17.3	Former Electrical Transformer Substation No. 3	Soil was removed from this AOC as part of the ICM PCB Soil Removal activities. Soil at one RFI soil sampling location outside the limits of previous removal activities exhibits PCBs at a concentration slightly above the 1 ppm TAGM 4046 surface soil guidance value.	17.3-4 (0-0.5').

AOC No.	Description	Findings	Location(s) of TAGM 4046 Exceedence(s)
18	Former Drum Storage Area	Soil at fourteen RFI soil sampling locations exhibits metals concentrations above TAGM 4046 soil guidance values.	18-1 (0-0.5'), 18-2 (0-0.5'), 18-3 (0-0.5'), (0.5-1.5') & (2-4'), 18-4 (0-0.5'), 18-5 (0-0.5'), (0.5-1.5') & (2-4'), 18-6 (0-0.5'), 18-7 (0-0.5'), 18-8 (0-0.5'), (0.5-1.5') & (2-4'), 18-9 (0-0.5'), (0.5-1.5') & (2-4'), 18-10 (0-0.5'), 18-11 (0-0.5'), 18-12 (0-0.5'), 18-13 (0-0.5') & (0.5-1.5'), and 18-14 (0-0.5') & (0.5-1.5').
20	Former Main Production Building Footprint	Soil at one RFI and three CMS soil sampling locations exhibits PCB concentrations slightly above the 1 ppm TAGM 4046 soil guidance value.	MB-6 (0-0.5'), SB-4 (0-0.2'), SB-6 (0-0.2'), and SB-7 (0-0.2').
21	Former Test Building Footprint and Vicinity	Surface and subsurface soils were removed from this AOC as part of the ICM PCB Soil Removal activities. Soil at seven RFI soil sampling locations exhibits PCB concentrations above TAGM 4046 soil guidance values. Soil at one Storm Sewer ICM verification sampling location exhibits PCBs at concentrations above the 10 ppm TAGM 4046 subsurface soil guidance value. Soil at forty-six ICM PCB Soil Removal delineation/verification soil sampling locations exhibits PCBs at concentrations above the TAGM 4046 surface/ subsurface soil guidance values. Soil at ten CMS soil sampling locations exhibit PCBs at concentrations above the TAGM 4046 surface soil guidance value. Soil at one CMS soil sampling location exhibits metals concentrations above TAGM 4046 soil guidance values.	*RFI and Storm Sewer ICM Soil Sampling:* TB-11 (0-0.5'), TB-13 (0-0.5'), TB-14 (0-0.5'), TB-15 (0-0.5'), TB-20 (0-0.5'), TB-22 (0-0.5'), TB-26 (0-0.5') & (0.5-1.5'), and TV-5 (11.5'). *PCB-Impacted Soil Removal Soil Sampling:* DS1-2 (0.5-1.5') & (2-3'), DS1-2A (1-1.5'), DS1-3 (0-0.2'), DS1-4 (0-0.2'), (0.5-1.5') & (2-3'), DS1-6 (0-0.2'), DS1-8 (3-4'), DS1-9 (0-0.2'), VS1-2 (0-0.2'), VS1-3 (0.5-1.5'), VS1-3A (0-0.2'), VS1-5A (0-0.2'), VS1-6 (0-0.2'), DS2-1 (0.5-1.5'), DS2-2 (0.5-1.5'), VS2-1 (0-0.2'), VS2-3 (0-0.2'), VS3-1 (0-0.2'), VS3-2 (0-0.2'), VS3-3 (0-0.2'), VS3-4 (0-0.2'), DS4-2 (0-0.2'), DS4-2A (0-0.2'), DS4-3 (0-0.2'), DS4-4 (0.5-1.5'), DS4-6 (0-0.2'), DS4-7 (2-3'), DS4-9 (0.5-1.5'), DS4-11 (0-0.2'), VS4-1 (0-0.2'), VS4-2 (0-0.2'), VS4-3 (0-0.2'), VS4-5 (0-0.2'), VS4-7A (0-0.2'), VS4-7B (0-0.2'), VS4-7C (0-0.2'), VS4-8 (0-0.2') VS4-9 (0-0.2'), DS5-1 (0-0.2'), DS5-1A (0-0.2'), DS5-1B (0-0.2'), DS5-3 (0.5-1.5'), DS5-6 (0-0.2'), DS5-6 (0.5-1.5'), DS5-7 (0-0.2'), VS5-3 (0-0.2'), and VS5-4 (0-0.2') & (0.5-1.5'). *CMS Soil Sampling:* SB-9 (0-0.2'), SB-10 (0-0.2'), SB-11 (0-0.2'), SB-12 (0-0.2'), SB-17 (0-0.2'), SB-18 (0-0.2'), SB-20 (0-0.2'), SB-23 (0-0.2') & (0.5-1.5'), SB-24 (0-0.2'), and SB-25 (0-0.2').

AOC No.	Description	Findings	Location(s) of TAGM 4046 Exceedence(s)
23	Grass-Covered Area East of Enclosed Passageway	Soil was removed from this AOC as part of the ICM PCB Soil Removal activities. Soil at five RFI soil sampling locations exhibits PCB concentrations above TAGM 4046 soil guidance values.	EP-1 (0-0.5'), EP-4 (0-0.5'), EP-5 (0-0.5'), EP-6 (0-0.5'), and EP-7 (0-0.5').
24	South Storm Sewer Line Catch Basin Area	Soil was removed from this AOC as part of the Storm Sewer ICM. Soil at one RFI soil sampling location (CB-4N) exhibits SVOCs and metals at concentrations slightly above TAGM 4046 soil guidance values. Soil at seven Storm Sewer ICM verification soil sampling locations exhibits SVOCs above the TAGM 4046 soil guidance values. Soil at five Storm Sewer ICM verification soil sampling locations exhibits inorganics (arsenic, cadmium, copper, and zinc) at concentrations above the TAGM 4046 soil guidance values.	CB-4N (3-4'), BV-3 (4'), BV-4 (4'), CV-1 (4'), SV-1 (4'), SV-5 (4.5'), SV-7B (7'), SV-9 (7'), SV-12B (5'), SV-13 (4'), and SV-14A (5.5').

The specific chemical constituents that were identified at concentrations above TAGM 4046 soil guidance values at each of the RFI, ICM, and CMS soil sampling locations identified above are listed in Table 1.

3. Standards, Criteria & Guidance

3.1 General

This section of the Report discusses potential standards, criteria, and guidance (SCGs) that may apply to the Site or apply to certain remedial alternatives evaluated for the Site. The identification of SCGs was conducted as set forth in NYSDEC TAGM 4030. The potential SCGs are also used to aid in the identification of corrective measure objectives but do not dictate a particular alternative and do not establish remedial cleanup levels.

3.1.1 Definition of SCGs

Definitions of the SCGs are presented below.

- *Standards and Criteria* – are New York State regulations or statutes. They are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations which are generally applicable, consistently applied, and officially promulgated under federal or State law that are either directly applicable to a contaminant, remedial action, location, or other circumstance, or that are not directly applicable but are relevant and appropriate.

- *Guidance* – includes non-promulgated criteria and guidance that are not legal requirements; however, those responsible for investigation and/or remediation of the site should consider guidance that, based on professional judgment, are determined to be applicable to the site.

3.1.2 Types of SCGs

The NYSDEC guidance on the application of SCGs in the Remedial Investigation/Feasibility Study (RI/FS) process was used in preparation of this CMS. The potential SCGs considered for the remedial alternatives identified in this CMS were categorized into the following NYSDEC-recommended classifications:

- *Chemical-Specific SCGs* – These SCGs are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical values for each constituent of concern. These values establish the acceptable amount or concentration of constituents that may be found in, or discharged to, the ambient environment.

- *Action-Specific SCGs* – These SCGs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous waste management and site cleanup.

- *Location-Specific SCGs* – These SCGs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in specific locations.

Potential SCGs identified for the Site are summarized below.

3.2 SCGs

The identification of federal and state SCGs for the evaluation of remedial alternatives at the Site was a multi-step process that included a review of conditions identified from sampling activities performed as part of the

RFI and ICMs at the Site. The SCGs that have been identified for this CMS Report are presented in Table 4 and summarized below.

3.2.1 Chemical-Specific SCGs

One set of chemical-specific SCGs that potentially apply to site soil if the soil were to be excavated (and then considered under RCRA to be a "waste" that is generated) are the RCRA-regulated levels for TCLP constituents, as outlined in 40 CFR Part 261 and 6 NYCRR Part 371. The TCLP constituent levels are a set of numerical criteria at which a solid waste is considered a hazardous waste by the characteristic of toxicity. In addition, the hazardous waste characteristics of ignitability, corrosivity, and reactivity may also apply depending on the results of waste characterization activities. However, based on the extensive RFI and ICM soil sampling activities performed to date, it is assumed that soil removed as part of an excavation alternative would be characterized as a non-hazardous waste.

Groundwater beneath the site is classified as Class GA and, as such, the New York State Groundwater Quality Standards (6 NYCRR Parts 700-705) are potentially-applicable chemical-specific standards even though groundwater at and in the vicinity of the Site is not currently, and will not likely in the future, be used as a potable water supply. These standards identify acceptable levels of constituents in groundwater based on potable use.

The soil guidance values presented in NYSDEC TAGM 4046 are another set of chemical-specific SCGs that are potentially applicable to the Site. These guidance values are considered in developing corrective measure performance goals for soil at the site.

3.2.2 Action-Specific SCGs

The general health and safety requirements established by OSHA for general industry under 29 CFR Part 1910, and for construction under 29 CFR Part 1926, are action-specific SCGs that may be potentially applicable to each active remedial alternative evaluated in this Report.

6 NYCRR Parts 364, 370, and 372 regulations for the collection and transportation of regulated waste within New York State are applicable action-specific SCGs for alternatives that involve the offsite transportation of regulated wastes.

3.2.3 Location-Specific SCGs

Location-specific SCGs for the Site include local requirements such as local building permit conditions for permanent or semi-permanent facilities constructed during the remedial activities (if any), and influent requirements of publicly owned treatment works (POTW) if water is treated at the Site and discharged to a POTW. No floodplains or wetlands were identified at the Site. Therefore location specific SCGs pertaining to floodplains and wetlands are not applicable to the potential remedial alternatives.

4. Corrective Measure Objectives

4.1 General

This section of the CMS Report presents the objectives which are intended to mitigate potential risks to human health and the environment associated the presence of chemical constituents in onsite soils and groundwater. The corrective measure objectives are based on potentially applicable SCGs and the results of RFI and ICM sampling activities. The corrective measure objectives will be used as a basis for determining the anticipated effectiveness of each corrective measure alternative.

4.2 Corrective Measure Objective Development

Corrective measure objectives have been developed for the CMS considering the results of the qualitative human exposure evaluation, potentially-applicable standards/criteria/guidance, and intended future site use. Consideration of site use in the development of the corrective measure objectives is consistent with the new NYS Superfund Refinancing and Reform Legislation (NYS Assembly Bill 9120 [June 20, 2003]), passed in October 2003, that endorses future site use as a relevant factor in remediation decision-making. Specifically, the Legislation states, in the discussion of Remedial Program Requirements to be enacted pursuant to Section 27-1415, Paragraph 6 titled "Soil Cleanup Objectives", that "the regulations shall include three generic tables of contaminant-specific remedial action objectives for soil *based on a site's current, intended or reasonably anticipated future use*, including: (I) unrestricted, (II) commercial and (III) industrial. (emphasis added)." [refer to http://assembly.state.ny.us/leg/?bn=A09120&sh=t].

4.2.1 Soil and Groundwater Corrective Measure Objectives

The following qualitative corrective measure objectives have been established for the Site:

- Prevent/mitigate potential future exposure of commercial/industrial workers at the Site to soil containing elevated levels of constituents of interest and exposure to offsite residents via wind-blown dust;
- Prevent potential human exposure to chemical constituents in groundwater at and in the vicinity of the Site at concentrations exceeding groundwater quality standards/guidance values; and
- Prevent exposure to VOCs potentially migrating through soil vapor at the Site as a precautionary measure, although preliminary evaluation indicates that this exposure pathway is not an issue.

These corrective measure objectives were used as the basis for identifying remedial technologies and for developing corrective measure alternatives to address constituents of interest. In support of the corrective measure objectives, numerical corrective measure performance goals have been established to determine the extent of soil to be addressed under each proposed corrective measure. Additionally, specific corrective measure performance goals have been established for groundwater. The development of corrective measure performance goals for onsite soil and groundwater at and in the vicinity of the Site is presented in the subsections that follow.

4.3 Soil Performance Goal Development

Corrective measure performance goals for soil were developed considering various comparison criteria, the site location/setting, and intended commercial/industrial future site use. As a starting point, the USEPA Region 3 Risk Based Concentrations (RBCs) and the Region 9 Preliminary Remediation Goals (PRGs), developed to be protective of human health in an industrial setting, were considered in developing the corrective measure performance goals. Regional and site-specific background inorganic constituent concentrations were considered next, including the 95% upper confidence limits for the background sample data (calculated values below which inorganics concentrations are predicted to be in 95% of collected background samples). The soil guidance values presented in TAGM 4046, which are generally lower than the other criteria discussed above, were also considered. The TAGM 4046 guidance values for inorganic constituents (excluding mercury) are established as the higher value of either a conservative health-based tabulated criteria presented in the document (where available) or background. TAGM 4046 indicates that New York State or eastern United States background soil values may be used as cleanup criteria for heavy metals (except mercury). The comparison criteria are summarized in Table 5.

Based on review of the various comparison criteria, at this time, the conservative TAGM 4046 soil guidance values have been selected as the corrective measure performance goals for onsite soil. However, per the NYS Superfund Refinancing and Reform Legislation, substantial revisions to the New York State cleanup levels are pending. We understand that these revisions are anticipated to include development of new soil cleanup levels for three different categories of site use (or cleanup tracks), including residential (unrestricted), commercial, and industrial use. We also understand that the revisions are anticipated to allow for calculation of site-specific cleanup levels based on site-specific circumstances. At such time that the new cleanup levels are proposed or promulgated, Lucas Western reserves the right to evaluate the new criteria with regards to the site conditions, and to propose less conservative corrective measure performance goals for the onsite soils.

4.4 Groundwater Performance Goal Development

As discussed in the RFI Report and summarized in Section 1 of this report, potential exposure to VOCs in onsite groundwater will not likely occur because there is no potable use of groundwater at or hydraulically downgradient from the Site, NYS groundwater use restrictions [10 NYCRR 5-1.31(b)] prohibit the installation of private wells where public supply is available (unless approval is expressly granted by the public water authority), and the depth to groundwater (at least 10 feet below ground surface) limits the possibility of direct contact. A comparison of the results of the 2004 annual groundwater sampling with data from previous groundwater sampling activities indicates that the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes. Accordingly, the area where groundwater exhibits VOCs at concentrations above TOGS 1.1.1 groundwater quality standards/guidance values will continue to be monitored in accordance with the NYSDEC-approved *Groundwater Monitoring Plan* (BBL, April 2004). For purposes of this CMS Report, the TOGS 1.1.1 groundwater quality standards/guidance values will be the corrective measure performance goals for groundwater.

5. Technology Screening and Development of Corrective Measures Alternatives

5.1 General

This section presents a detailed description and analysis of corrective measure alternatives developed to address constituents of interest in soil and groundwater related to the Site. The evaluation criteria used for analysis of the corrective measure alternatives are based on criteria specified in NYSDEC TAGM 4030. These criteria encompass statutory requirements and include other gauges of overall feasibility and acceptability of corrective measure options.

The detailed evaluation of each corrective measure alternative presented in this section consists of an assessment of the following seven criteria:

- Compliance with SCGs;
- Overall Protection of Human Health and the Environment;
- Short-Term Effectiveness;
- Long-Term Effectiveness and Permanence;
- Reduction of Toxicity, Mobility, or Volume through Treatment;
- Implementability; and
- Cost.

Pursuant to TAGM 4030, another criterion to be considered when determining appropriate corrective measure alternatives is community acceptance. The community acceptance assessment will be completed by the NYSDEC after community comments on the Statement of Basis are received.

In addition to assessing each potential corrective measure alternative against the seven criteria presented above, the detailed analysis of the corrective measure alternatives presented in this section also includes a detailed technical description of each corrective measure alternative. In addition, unique engineering aspects (if any) of the physical components of the corrective measure alternative are discussed.

5.2 Identification of Remedial Technologies

The identification of remedial technologies involved a focused review of available literature, including the following documents:

- NYSDEC TAGM 4030 titled, *Selection of Remedial Actions at Inactive Hazardous Waste Sites,* (NYSDEC, 1990);
- *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA,* (USEPA, 1988);

- *Presumptive Remedies: Policy and Procedures,* (USEPA, 1993a);
- *Presumptive Remedy for Metals-in-Soil Sites,* (USEPA, 1999);
- *Treatment Technologies,* (USEPA, 1991);
- *Technology Screening Guide for Treatment of CERCLA Soils and Sludges,* (USEPA, 1988b);
- *Technology Briefs – Data Requirements for Selecting Remedial Action Technologies,* (USEPA, 1987); and
- *Remediation Technologies Screening Matrix and Reference Guide, Version 3* (Federal Remedial Technologies Roundtable [FRTR], 1997).

These documents, along with remedial technology vendor information and other available information, were reviewed to identify technologies that are potentially applicable for addressing impacted soil and groundwater at the Site.

5.3 Technology Screening

Potentially applicable technologies and technology processes underwent preliminary and secondary screening to select the technologies that would most-effectively achieve the corrective measure objectives identified for the Site. Technology refers to a general category of technologies, such as capping or immobilization, while the technology process is a specific process within each technology type. A "no-action" general response has been included and retained through the screening evaluation. The no-action response will serve as a baseline for comparing the potential overall effectiveness of the other technologies.

5.3.1 Preliminary Screening

The preliminary screening was performed to reduce the number of potentially applicable technologies and technology processes based on technical implementability. The results of the preliminary screening of soil and groundwater technologies/technology processes are presented in Tables 6 and 7, respectively. The technology processes are briefly described and screened in these tables.

5.3.2 Secondary Screening

A number of potentially applicable technologies and technology processes were retained through the preliminary screening for soil and groundwater. To further reduce the technology processes to be assembled into remedial alternatives, the technology processes retained through the preliminary screening were subjected to a secondary screening. The objective of the secondary screening was to choose, when possible, one representative remedial technology process for each remedial technology category to simplify the subsequent development and evaluation of the remedial alternatives. A description of the screening criteria is presented below.

- *Effectiveness* – This criterion evaluates the extent that the technology will mitigate potential threats to public health and the environment through the reduction in toxicity, mobility, and/or volume of constituents in the impacted soil and groundwater.

- *Implementability* – This criterion evaluates the ability to construct, reliably operate, and meet technical specifications or criteria associated with each technology. This evaluation also considers the operation and maintenance (O&M) required in the future, following completion of remedial construction.

The remedial technologies for soil and groundwater that were retained through secondary screening using the above-listed criteria are summarized in Tables 8 and 9, respectively, and identified below.

Soil

- No Action;
- Deed Restrictions;
- Capping;
- Soil Excavation;
- Stabilization/Solidification; and
- Offsite Disposal (RCRA Subtitle D Landfill).

Groundwater

- No Action;
- Deed Restrictions/Groundwater Use Restrictions
- Capping; and
- Monitored Natural Attenuation.

The potential remedial technologies identified and screened above have been combined, as appropriate, to form comprehensive corrective measure alternatives capable of addressing the corrective measure objectives for the Site. Consistent with the NCP (40 CFR Part 300.430), the following range of alternatives was developed to the extent practical:

- the no-action alternative;

- alternatives that involve little or no treatment but provide protection of human health and the environment by preventing or minimizing exposure to the constituents of interest through the use of containment options and/or institutional controls;

- alternatives that treat the constituents of interest but vary in the degree of treatment employed and long-term management needed; and

- alternatives that remove constituents of interest to the maximum extent possible, thereby eliminating or minimizing the need for long-term management.

The assembly and development of remedial activities is presented below.

5.4 Development of Corrective Measures Alternatives

A total of five alternatives have been assembled for further evaluation in the detailed analysis of remedial alternatives presented in Section 6.0. The five remedial alternatives developed to address the soil and groundwater corrective measure objectives for the Site are as follows:

- Alternative 1 - No Further Action;
- Alternative 2 - Site Controls and Monitoring;
- Alternative 3 - Barrier Layer, Site Controls, and Monitoring;
- Alternative 4 - Stabilization/Solidification, Barrier Layer, Site Controls, and Monitoring; and
- Alternative 5 - Excavation/Offsite Disposal, Site Controls, and Monitoring.

As previously discussed, groundwater at and in the vicinity of the Site is not used for potable water. The area surrounding the Site is served with potable water (obtained from regional surface water sources) by the Upper Mohawk Valley Regional Water Board. NYS groundwater use restrictions [10 NYCRR 5-1.31(b)] prohibit the installation of private wells where public supply is available (unless approval is expressly granted by the public water authority). As summarized in the RFI Report, the low VOC concentrations in groundwater beneath and downgradient from the Site are not anticipated to result in a potentially complete exposure pathway. Based on the significant decrease in concentrations of 1,1,1-TCA, TCE, and PCE at Well B94-4 [the closest monitoring well to the area believed to be the primary source(s) of VOC impacts, AOC No. 7.5 (Former 600-Gallon 1,1,1-TCA Aboveground Storage Tank) and AOC No. 13 (Former VOC-Impacted Soils Area)], it appears that removal of the 1,1,1-TCA storage tank and the previous soil excavation activities were effective in removing VOC source material. Concentrations of VOCs in other nearby wells have also decreased. It is anticipated that these concentrations will continue to decline due to natural attenuation processes. Therefore, the corrective measure alternatives do not include an action component to further address VOC concentrations in groundwater. All corrective measure alternatives (except 'No Further Action') include periodic groundwater monitoring to further evaluate changes in groundwater conditions. Additional appropriate actions for groundwater would be evaluated and implemented, if needed, based on results of future monitoring.

A brief description of each corrective measure alternative developed to address the soil and groundwater corrective measure objectives is presented below.

5.4.1 Alternative 1 - No Further Action

The no-action alternative serves as a baseline for comparison of the overall effectiveness of the other remedial alternatives. The no-action alternative would not involve the implementation of any remedial activities to remove, treat, or contain the constituents of interest in soil and groundwater related to the Site. The alternative relies on natural attenuation processes to reduce the concentrations of constituents of interest in soil and groundwater. This alternative does not include groundwater monitoring.

5.4.2 Alternative 2 - Site Controls and Monitoring

Under this alternative, the following site controls would be implemented:

- The locked chain-link fence around the perimeter of the property would be maintained;

- A deed restriction would be developed to: restrict property use to commercial/industrial only, notify future owners of the presence of PCBs, SVOCs and inorganics in soils, notify future owners of the presence of VOCs in groundwater, and restrict the use of onsite groundwater; and

- A Site Management Plan would be developed to provide for long-term maintenance of the chain-link fence and vegetation, and establish guidelines to be followed for the management of soil material, should future activities disturb Site soils. The Site Management Plan would be referenced in the deed to the property.

In addition, groundwater monitoring would be performed to evaluate changes in groundwater conditions. The need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier) would be evaluated based on the results of soil gas sampling anticipated to be completed during 2005.

5.4.3 Alternative 3 - Barrier Layer, Site Controls, and Monitoring

Under this alternative, a barrier layer (soil cover, asphalt/concrete pavement, concrete building foundation, etc.) would be installed as an active exposure prevention method over areas of soil exhibiting constituents at concentrations above the soil corrective measure performance goals identified above. The following site controls would also be implemented under this alternative:

- A deed restriction would be developed to: restrict property use to commercial/industrial only, notify future owners of the presence of PCBs, SVOCs and inorganics in soils, notify future owners of the presence of VOCs in groundwater, and restrict the use of onsite groundwater; and

- A Site Management Plan would be developed to provide for long-term maintenance of the barrier layer and establish guidelines to be followed for the management of soil material, should future activities disturb the barrier layer. The Site Management Plan would be referenced in the deed to the property.

In addition, groundwater monitoring would be performed to evaluate changes in groundwater conditions. The need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier) would be evaluated based on the results of soil gas sampling anticipated to be completed during 2005.

5.4.4 Alternative 4 - Stabilization/Solidification, Barrier Layer, Site Controls, and Monitoring

Under this alternative, soils exhibiting inorganic constituents at concentrations above the corrective measure performance goals would be stabilized/solidified and a barrier layer (soil cover, asphalt/concrete pavement, concrete building foundation, etc.) would be installed as an active exposure prevention method over areas of soil exhibiting constituents at concentrations above the soil corrective measure performance goals identified above. The following site controls would also be implemented under this alternative:

- A deed restriction would be developed to: restrict property use to commercial/industrial only, notify future owners of the presence of PCBs, SVOCs and inorganics in soils, notify future owners of the presence of VOCs in groundwater, and restrict the use of onsite groundwater;

- A Site Management Plan would be developed to provide for long-term maintenance of the barrier layer and establish guidelines to be followed for management of stabilized soil material and soils beneath the barrier

layer, should the soils be disturbed during future activities. The Site Management Plan would be referenced in the deed to the property.

In addition, groundwater monitoring would be performed to evaluate changes in groundwater conditions. The need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier) would be evaluated based on the results of soil gas sampling anticipated to be completed during 2005.

5.4.5 Alternative 5 - Excavation/Offsite Disposal, Site Controls, and Monitoring

Under this alternative, soils exhibiting constituents at concentrations above the corrective measure performance goals would be excavated and transported for offsite disposal in accordance with applicable rules and regulations. A deed restriction would be imposed to notify future owners of the presence of VOCs in groundwater and restrict the use of onsite groundwater.

In addition, groundwater monitoring would be performed to evaluate changes in groundwater conditions. The need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier) would be evaluated based on the results of soil gas sampling anticipated to be completed during 2005.

If soils at any sampling locations exhibiting chemical constituents at concentrations above the corrective measure soil performance goals were left in place under this alternative (due to significant depth, concentrations only slightly above the performance goals at the vertical limits of previous excavation areas, etc), the following site controls would also be implemented, as appropriate:

- The deed restriction would also notify future owners of the presence of constituents above performance goals in subsurface soil; and

- A Site Management Plan would be developed to provide guidelines to be followed for the management of such soil material, should future activities disturb subsurface Site soils. The Site Management Plan would be referenced in the deed to the property.

6. Evaluation of Corrective Measure Alternatives

6.1 General

This section presents a detailed description and evaluation of the five corrective measure alternatives identified in the previous section of this Report. The evaluation criteria are based on NYSDEC TAGM 4030. The detailed evaluation of each corrective measure alternative presented in this section consists of an assessment of the following seven criteria:

- Compliance with Standards, Criteria, and Guidance Values (SCGs);
- Overall Protection of Human Health and the Environment;
- Short-Term Effectiveness;
- Long-Term Effectiveness and Permanence;
- Reduction of Toxicity, Mobility, or Volume through Treatment;
- Implementability; and
- Cost.

In addition to assessing each potential corrective measure alternative against the seven criteria presented above, the detailed analysis of the corrective measure alternatives presented in this section also includes a detailed technical description of each alternative. In addition, unique engineering aspects (if any) of the physical components of the corrective measure are discussed.

A description of the seven evaluation criteria used is presented below, followed by a detailed evaluation of each corrective measure alternative.

6.2 Description of Evaluation Criteria

A description of each of evaluation criterion used in this CMS is presented below.

6.2.1 Compliance with SCGs

This criterion evaluates the compliance of the remedial alternative with appropriate SCGs. The evaluation is based on compliance with:

- chemical-specific SCGs;
- action-specific SCGs; and
- location-specific SCGs.

6.2.2 Overall Protection of Human Health and the Environment

This criterion evaluates whether the remedial alternative provides adequate protection of human health and the environment. This evaluation relies on the assessment of other evaluation criteria, including long-term and short-term effectiveness and compliance with SCGs.

6.2.3 Short-Term Effectiveness

The short-term effectiveness of the remedial alternative is evaluated relative to its effect on human health and the environment during implementation of the alternative. The evaluation of each remedial alternative with respect to its short-term effectiveness considers the following:

- short-term impacts to which the community may be exposed during implementation of the alternative;
- potential impacts to workers during implementation of the remedial alternative, and the effectiveness and reliability of protective measures;
- potential environmental impacts of the remedial alternative and the effectiveness of mitigative measures to be used during implementation; and
- amount of time until environmental concerns are mitigated.

6.2.4 Long-Term Effectiveness and Permanence

The evaluation of each remedial alternative relative to its long-term effectiveness and permanence is made by considering the risks that may remain following completion of the remedial alternative. The following factors will be assessed in the evaluation of the alternative's long-term effectiveness and permanence:

- potential environmental impacts from untreated waste or treatment residuals remaining at the completion of the remedial alternative;
- the adequacy and reliability of controls (if any) that will be used to manage treatment residuals or untreated waste remaining after the completion of the remedial alternative; and
- the ability of the corrective measure alternative to meet corrective measure objectives established for the Site.

6.2.5 Reduction of Toxicity, Mobility, or Volume through Treatment

This criterion evaluates the degree to which remedial actions will permanently and significantly reduce the toxicity, mobility, or volume of the constituents present in the site media. The evaluation will be based on the:

- treatment process and the volume of materials to be treated;
- anticipated ability of the treatment process to reduce the toxicity, mobility, or volume of chemical constituents of interest;

- nature and quantity of treatment residuals that will remain after treatment;
- relative amount of hazardous substances and/or chemical constituents that will be destroyed, treated, or recycled; and
- degree to which the treatment is irreversible.

6.2.6 Implementability

This criterion evaluates the technical and administrative feasibility of implementing the remedial alternative, including the availability of the various services and materials required for implementation. The evaluation of implementability will be based on two factors, as described below.

- *Technical Feasibility* – This refers to the relative ease of implementing the remedial alternative based on site-specific constraints. In addition, the ease of construction, operational reliability, and ability to monitor the effectiveness of the remedial alternative are considered.
- *Administrative Feasibility* – This refers to the feasibility/time required to obtain necessary permits and approvals to implement the remedial alternative.

6.2.7 Cost

This criterion evaluates the estimated total cost to implement the remedial alternative. The total cost of each alternative represents the sum of the direct capital costs (materials, equipment, and labor), indirect capital costs (engineering, licenses/permits, and contingency allowances), and operation and maintenance (O&M) costs. O&M costs may include operating labor, energy, chemicals, and sampling and analysis. These costs will be estimated with an anticipated accuracy between -30% to +50% in accordance with the USEPA document titled *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA, 1988). A 25% contingency factor is included to cover unforeseen costs incurred during implementation of the remedial alternative. Present-worth costs are calculated for alternatives expected to last more than 2 years. In accordance with USEPA guidance presented in OSWER Directive 9355.3-20 as superseded by OSWER 9355.0-75, a 7% discount rate (before taxes and after inflation) is used to determine the present-worth factor.

6.3 Detailed Evaluation of Corrective Measure Alternatives

This section presents the detailed evaluation of each corrective measure alternative based on the evaluation criteria described in the previous section.

6.3.1 Alternative 1 - No Further Action

Technical Description

The no-action alternative serves as a baseline for comparison of the overall effectiveness of the other remedial alternatives. The no-action alternative would not involve the implementation of any remedial activities to

remove, treat, contain, or monitor PCBs, SVOCs, or inorganics in soil or VOCs in groundwater. The alternative relies on natural attenuation processes to reduce the concentrations of PCBs, SVOCs, and inorganics in soil and VOCs groundwater. The Site would be allowed to remain in its current condition, and no activities would be undertaken to change the current conditions.

Compliance with SCGs

Chemical-Specific SCGs

Chemical-specific guidance to be considered under this alternative are the soil guidance values presented in NYSDEC TAGM 4046. Natural degradation processes would not likely reduce PCB, SVOC, or inorganics concentrations in soil at the Site to below the TAGM 4046 soil guidance values.

The no-action alternative does not include the handling of any materials containing PCBs, SVOCs, or inorganics. Therefore, the chemical-specific SCGs that regulate the subsequent handling and disposal of these materials (and related residuals) are not applicable.

The Class GA groundwater quality standards presented in 6 NYCRR Parts 700-705 and in NYSDEC TOGS 1.1.1 are applicable chemical-specific SCGs for this alternative. This alternative relies on natural attenuation processes to meet these standards. However, this alternative does not include any monitoring to evaluate potential changes in groundwater quality.

Action-Specific SCGs

Action-specific SCGs are not applicable because this alternative does not include any remedial actions.

Location-Specific SCGs

Location-specific SCGs are not applicable because this alternative does not include any remedial actions.

Overall Protection of Human Health and the Environment

Based on the RFI results, the no-action alternative would be ineffective because it would not meet the corrective measure objective of preventing/mitigating potential future exposure of commercial/industrial workers at the Site to soil containing elevated levels of constituents of interest and exposure to offsite residents via windblown dust. The alternative does not remove, treat, or contain PCBs, SVOCs, or inorganics in soil. Long-term environmental risks associated with the presence of these constituents in soil would not likely be reduced under this alternative.

Existing groundwater use laws [10 NYCRR 5-1.31(b)] prohibit the installation of private wells where public supply is available, unless approval is expressly granted by the public water authority. These laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Short-Term Effectiveness

No remedial action would be implemented for the Site. Therefore, there would be no short-term environmental impacts or risks posed to workers (because there would not be any workers) or the community associated with implementation of this alternative.

Long-Term Effectiveness and Permanence

Under the no-action alternative, the PCBs, SVOCs, and inorganics in soil would not be addressed.

The groundwater use controls currently in place in 10 NYCRR 5-1.31(b) would continue to mitigate potential human exposure to VOCs in groundwater at concentrations above the corrective measure groundwater performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Reduction of Toxicity, Mobility, and Volume through Treatment

Under the no-action alternative, impacted soil would not be removed, treated, recycled, contained, or destroyed. Therefore, the toxicity, mobility, and volume of the PCBs, SVOCs, and inorganics in soil would not be reduced. The toxicity, mobility, and volume of VOCs in groundwater would be reduced by natural passive in-situ processes.

Implementability

The no-action alternative does not involve any active remedial response and poses no technical or administrative implementability concerns.

Cost

There are no capital or O&M costs associated with implementation of the no-action alternative.

6.3.2 Alternative 2 - Site Controls and Monitoring

Technical Description

This alternative includes maintenance of the chain-link fence that currently exists around the property boundary, installation of appropriate signage identifying environmental impacts, implementation of a deed restriction, and preparation of a Site Management Plan. In addition, vegetation would be maintained over impacted onsite soils. The location of the current fencing is shown on Figure 2.

The deed restriction would be established to: restrict future use of the Site to commercial/industrial activities; and notify future property owners of the presence of constituents of interest in soil and groundwater at the Site and the applicability of the Site Management Plan. The Site Management Plan would be prepared to address possible future disturbances of Site soils; identify known locations of PCBs, SVOCs, and inorganics in soil at the Site; and set forth the inspection and maintenance activities for the fencing, signage and vegetation. Fence and vegetative cover maintenance activities would be performed, as needed, in accordance with the Site Management Plan.

Constituents of interest in groundwater would be addressed by groundwater use restrictions. A deed restriction would be established to notify future property owners of the presence of VOCs in groundwater at the Site, and to restrict the use of onsite groundwater. Existing groundwater use laws [10 NYCRR 5-1.31(b)], which prohibit the installation of private wells where public supply is available (unless approval is expressly granted by the public water authority), would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure performance goals. Groundwater monitoring would be performed to evaluate changes in groundwater conditions.

Compliance with SCGs

Chemical-Specific SCGs

Chemical-specific guidance to be considered under this alternative are the soil guidance values presented in NYSDEC TAGM 4046. The PCB, SVOC, and inorganic concentrations in soil would not be reduced by this alternative. However, access to areas where PCBs, SVOCs, or inorganics are identified in soil at concentrations above TAGM 4046 soil guidance values would be limited because the Site would be vacant and entry onto the Site would be restricted by the chain-link fence and locking gates.

This alternative does not include the excavation or handling of materials containing PCBs, SVOCs, or inorganics. Therefore, the chemical-specific SCGs that regulate the subsequent handling and disposal of these materials (and related residuals) are not applicable.

The Class GA groundwater quality standards presented in 6 NYCRR Parts 700-705 and in NYSDEC TOGS 1.1.1 are applicable chemical-specific SCGs for this alternative. This alternative relies on natural attenuation processes to meet these standards. This alternative includes monitoring to document changes in groundwater quality over time.

Action-Specific SCGs

Action-specific SCGs are not applicable because this alternative does not include remedial actions in areas where PCBs, SVOCs, or inorganics are identified in soil at concentrations above the corrective measure soil performance goals.

Location-Specific SCGs

Activities at the Site would be conducted in accordance with local construction codes and ordinances, as appropriate.

Overall Protection of Human Health and the Environment

Potential exposure to soil at the Site containing constituents of interest at concentrations above the corrective measure soil performance goals would be mitigated by the fencing, signage, and institutional controls, which would physically limit access to the area. Potential exposure to windblown dust would be mitigated by maintaining vegetation, which would physically reduce the likelihood of dust being mobilized by wind. The deed restriction would further mitigate potential exposure by notifying future site owners of the constituents of interest in soil and groundwater and the applicability of the Site Management Plan. The Site Management Plan would mitigate potential exposure to soil at the Site and potential exposure to windblown dust by setting forth the vegetation and fencing inspection and maintenance activities for the Site.

Existing groundwater use laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. In addition, groundwater use restrictions to be included in a deed restriction for the Site would further mitigate potential human exposure to VOCs in groundwater at concentrations exceeding the performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Potential exposure to VOCs migrating through soil vapor (if any) would be evaluated based on the results of soil gas sampling anticipated to be completed during 2005. The need for additional measures (e.g. vapor barrier, deed restriction, venting system) to address potential vapor intrusion would be determined by the findings of the soil gas evaluation.

Short-Term Effectiveness

This alternative does not include active remedial actions in areas where PCBs, SVOCs, or inorganics are identified in soil at concentrations above the corrective measure soil performance goals. Therefore, there would be no short-term environmental impacts or risks posed to onsite workers or the community associated with implementation of this alternative

Long-Term Effectiveness and Permanence

Under this alternative, potential direct contact with soils containing PCBs, SVOCs, and inorganics would be mitigated by the fencing, and potential transport via windblown dust would be mitigated by maintaining vegetation in the area. This alternative involves long-term monitoring and maintenance activities. During the periodic fence maintenance activities, onsite workers would not likely be exposed to chemical constituents in the soil because the fences are located in areas where constituents have not been identified at concentrations above the corrective measure soil performance goals.

The deed restriction and Site Management Plan would be kept in place, unchanged, unless Site conditions or soil guidance values for the intended commercial/industrial site use were to change. The Site Management Plan would set forth actions to be taken to protect the health and safety of site workers and the community and properly handle impacted materials under a wide variety of typical Site development/construction scenarios (site preparation, utility installation, building construction, landscaping, maintenance activities, etc.). If changes were to occur that would require modifications to the deed restriction/Site Management Plan, such modifications would be presented to the NYSDEC for review and approval, as appropriate. Both the deed restriction and Site Management Plan would be apparent to possible future Site owners during comprehensive due diligence activities performed in connection with property transfer. Taken together, these institutional controls could be expected to adequately and reliably provide for the management of impacted material to be left in place.

Groundwater monitoring would continue annually until corrective measure performance goals for Site-related VOCs are achieved, or until the results of monitoring support a different approach. Existing groundwater use laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. The deed restriction would further mitigate potential human exposure to VOCs in groundwater at concentrations above the performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Reduction of Toxicity, Mobility, and Volume through Treatment

Implementation of this alternative would not reduce the toxicity or volume of the PCBs, SVOCs, or inorganics in onsite soil. However, the mobility of onsite soils exhibiting PCBs, SVOCs, and inorganics at concentrations above the corrective measure soil performance goals would be slightly reduced by the vegetation to be maintained over these soils (which would mitigate potential wind-blown transportation). The toxicity, mobility, and volume of VOCs in groundwater would be reduced by natural passive in-situ processes.

Implementability

Fence and vegetation maintenance, implementation of institutional controls, and groundwater monitoring are all technically feasible. The equipment and materials necessary to implement this alternative are available, as are several capable contractors. The Site Management Plan would detail an inspection program to monitor the integrity of the vegetation at and fencing around the Site. The long-term maintenance of the vegetation and fence would likely last for an indefinite period of time. Groundwater monitoring would continue as needed.

Cost

The capital costs associated with this alternative include costs associated with preparing the appropriate documentation for the deed restriction. Annual O&M costs associated with this alternative include costs associated with completing annual groundwater monitoring, and routine inspection and maintenance of the fencing, signage and vegetation. Based on the trends observed in the historical groundwater analytical data, it appears that groundwater VOC concentrations could decrease to the corrective measure groundwater performance goals in a relatively short timeframe. Therefore, a 10-year O&M period has been included for groundwater monitoring. The actual length of the groundwater monitoring period would be based on the results of the monitoring activities and could differ. For purposes of this CMS, a standard 30-year O&M period has been included for maintenance of site fencing and signage. The present worth estimated cost of this alternative is $240,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 10.

6.3.3 Alternative 3 - Barrier Layer, Site Controls and Monitoring

Technical Description

This alternative includes the construction of an engineered barrier layer extending over impacted onsite soils, implementation of a deed restriction, and preparation of a Site Management Plan. It is estimated that the engineered barrier layer would be installed over an approximately 135,000 square foot area of the Site. Potential horizontal limits of the engineered barrier layer are shown on Figure 7.

The barrier layer would consist of a 6-inch thick layer of general fill (run-of-bank gravel) and 6-inches of topsoil to provide a vegetative cover. This barrier approach could be modified in areas where buildings or driveways are constructed as part of future Site redevelopment activities. Specifically, concrete building floor slabs and asphalt/concrete pavement materials could be designed (in consultation with the NYSDEC) to serve as the barrier layer in these areas.

The deed restriction would be established to: restrict future use of the Site to commercial/industrial activities; and notify future property owners of the presence of constituents of interest in soil and groundwater at the Site and the applicability of the Site Management Plan. The Site Management Plan would be prepared to address

possible future disturbances of the barrier layer or site soils; identify known locations of PCBs, SVOCs, and inorganics in soil at the Site; and set forth the inspection and maintenance activities for the barrier layer. Barrier layer maintenance activities would be performed, as needed, in accordance with the Site Management Plan.

AOC Nos. 13 and 24 would be included in the deed restriction, but capping of these areas is not proposed because all locations where constituents were detected at concentrations slightly above the corrective measure soil performance goals are currently covered by a minimum of 1 foot of material that did not exhibit constituents at concentrations above the TAGM 4046 soil guidance values.

Constituents of interest in groundwater would be addressed by groundwater use restrictions. A deed restriction would be established to notify future property owners of the presence of VOCs in groundwater at the Site, and to restrict the use of onsite groundwater. Existing groundwater use laws [10 NYCRR 5-1.31(b)], which prohibit the installation of private wells where public supply is available (unless approval is expressly granted by the public water authority) would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. Groundwater monitoring would be performed to evaluate changes in groundwater conditions.

Compliance with SCGs

Chemical-Specific SCGs

Chemical-specific guidance to be considered under this alternative are the soil guidance values presented in NYSDEC TAGM 4046. The PCB, SVOC, and inorganic concentrations in soil would not be reduced by this alternative. However, areas where PCBs, SVOCs, or inorganics are identified in soil at concentrations above TAGM 4046 soil guidance values would be covered by an engineered barrier layer. Thus, access to these soils would be limited, and the potential for windblown transport of the soils would also be limited.

This alternative does not include the excavation or handling of materials containing PCBs, SVOCs, or inorganics. Therefore, the chemical-specific SCGs that regulate the subsequent handling and disposal of these materials (and related residuals) are not applicable.

The Class GA groundwater quality standards presented in 6 NYCRR Parts 700-705 and in NYSDEC TOGS 1.1.1 are applicable chemical-specific SCGs for this alternative. This alternative relies on natural attenuation processes to meet these standards. This alternative includes monitoring to document changes in groundwater quality over time.

Action-Specific SCGs

Action-specific SCGs that apply to this alternative include the OSHA construction standards and health and safety requirements associated with the construction of the engineered barrier layer. Workers and worker activities that occur during implementation of this alternative must comply with OSHA requirements for training, safety equipment and procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR Parts 1904, 1910, and 1926. Compliance with these action-specific SCGs would be accomplished by following a NYSDEC-approved design and site-specific HASP.

Location-Specific SCGs

Remedial activities at the Site would be conducted in accordance with local construction codes and ordinances, as appropriate.

Overall Protection of Human Health and the Environment

Potential exposure to soil at the Site containing constituents of interest at concentrations above the corrective measure soil performance goals would be mitigated by the barrier layer, which would physically isolate impacted soils from direct contact. Potential exposure to windblown dust would be mitigated by the barrier layer, which would physically isolate impacted soils and prevent them from being mobilized by the wind. The deed restriction would further mitigate potential exposure by notifying future site owners of the constituents of interest in soil and groundwater and the applicability of the Site Management Plan. The Site Management Plan would mitigate potential exposure to soil at the Site and potential exposure to windblown dust by setting forth the barrier layer inspection and maintenance activities for the Site.

Existing groundwater use laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. In addition, groundwater use restrictions to be included in a deed restriction for the Site would further mitigate potential human exposure to VOCs in groundwater at concentrations exceeding the performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Potential exposure to VOCs migrating through soil vapor (if any) would be evaluated based on the results of soil gas sampling anticipated to be completed during 2005. The need for additional measures (e.g. vapor barrier, deed restriction, venting system) to address potential vapor intrusion would be determined by the findings of the soil gas evaluation.

Short-Term Effectiveness

Under this alternative, onsite workers could potentially be exposed to chemical constituents in the soil during surface disturbance associated with barrier layer construction. Exposure routes would be of a relatively short duration and would be addressed via various health and safety precautions as discussed below.

Potential exposure of onsite workers to chemical constituents and operational hazards would be mitigated by the use of PPE as specified in a site-specific health and safety plan (HASP) and through proper equipment and material handling procedures to be specified in the remedy design documents and site work plans. Air monitoring would be performed during soil handling activities to determine the need for additional engineering controls (e.g., using water sprays to suppress dust) and to confirm that dust levels remain within acceptable levels, as specified in the site-specific HASP.

The community would not have access to the Site during barrier layer construction activities because the Site is currently fenced and entry would be controlled through the main gate off French Road. Potential risks to the community during barrier layer construction would also be mitigated by implementing an air monitoring plan and by implementing dust control techniques to mitigate the offsite migration of unacceptable levels of fugitive dust from the Site.

Long-Term Effectiveness and Permanence

Implementation of this alternative would, over the long-term, effectively isolate the surface and subsurface soils containing PCBs, SVOCs, and inorganics from direct contact and potential transport via windblown dust. It is currently anticipated the Site will be redeveloped for commercial/industrial purposes. The barrier layer (general fill and topsoil) could readily be integrated with concrete or asphalt pavement caps where buildings or parking lots will be constructed during site redevelopment. The deed restriction and Site Management Plan would be kept in place, unchanged, unless Site conditions or soil guidance values for the intended commercial/industrial site use were to change. The Site Management Plan would set forth actions to be taken to protect the health and safety of site workers and the community and properly handle impacted materials under a wide variety of typical Site development/construction scenarios (site preparation, utility installation, building construction, landscaping, maintenance activities, etc.). If changes were to occur that would require modifications to the deed restriction/Site Management Plan, such modifications would be presented to the NYSDEC for review and approval, as appropriate. Both the deed restriction and Site Management Plan would be apparent to possible future Site owners during comprehensive due diligence activities performed in connection with property transfer. Taken together, these institutional controls could be expected to adequately and reliably provide for the management of impacted material to be left in place.

Groundwater monitoring would continue annually until corrective measure performance goals for Site-related VOCs are achieved, or until the results of monitoring support a different approach. Existing groundwater use laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. The deed restriction would further mitigate potential human exposure to VOCs in groundwater at concentrations above the performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Reduction of Toxicity, Mobility, and Volume through Treatment

Implementation of this alternative would not reduce the toxicity or volume of the PCBs, SVOCs, or inorganics in onsite soil. However, the mobility of onsite soils exhibiting PCBs, SVOCs, and inorganics at concentrations above the corrective measure performance goals would be reduced because the barrier layer would mitigate the potential for wind-blown transportation. The toxicity, mobility, and volume of VOCs in groundwater would be reduced by natural passive in-situ processes.

Implementability

Construction of a barrier layer, implementation of institutional controls, and groundwater monitoring are all technically feasible. The equipment and materials necessary to implement this alternative are available, as are several capable contractors. The barrier layer system outlined herein (general fill and topsoil) could be readily integrated with a concrete or asphalt barrier layer, as appropriate, during Site redevelopment activities. The Site Management Plan would detail an inspection program to monitor the integrity and effectiveness of the barrier layer.

The time associated with construction of the barrier layer would be approximately 8 weeks, and the long-term O&M of the barrier layer could last for an extended period of time. Groundwater monitoring would continue as needed.

Cost

The capital costs associated with this alternative include costs associated with mobilization, site preparation, barrier layer construction, site restoration, and preparation of documentation necessary for the deed restriction. Annual O&M costs associated with this alternative include costs associated with completing annual groundwater monitoring, and annual monitoring and maintenance of the barrier layer. Based on the trends observed in the historical groundwater analytical data, it appears that groundwater VOC concentrations could decrease to the corrective measure groundwater performance goals in a relatively short timeframe. Therefore, a 10-year O&M period has been included for groundwater monitoring. The actual length of the groundwater monitoring period will be based on the results of the monitoring activities and could differ. For purposes of this CMS, a standard 30-year O&M period has been included for barrier layer inspection and maintenance. The present worth estimated cost of this alternative (based on the proposed barrier layer limits shown on Figure 7) is $680,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 11.

6.3.4 Alternative 4 - Stabilization/Solidification, Barrier Layer, Site Controls and Monitoring

Technical Description

This alternative includes the stabilization/solidification of soils exhibiting inorganic impacts, construction of an engineered barrier layer (covering the same limits as Alternative 3), implementation of a deed restriction, and preparation of a Site Management Plan. Implementation of this alternative would result in the solidification/ stabilization of approximately 3,500 CY of soil and the capping of approximately 135,000 SF of soil. Potential horizontal limits and approximate depth of soil to be solidified/stabilized, and potential horizontal limits of the engineered barrier layer are presented on Figure 8.

Stabilization, which includes solidification and chemical fixation, is a process by which stabilization agents are mixed with soils/sludges to alter the physical and/or chemical state of the constituents in the soil. Stabilization agents used in this process include cement-based, pozzolanic-based, asphalt-based, and/or organic-polymer-based agents. For the purposes of this CMS Report, the solidification/stabilization of impacted soil via grout injection equipment, such as high pressure jet grouting, grout augering, or soil pressure grouting, was evaluated. The stabilization agent and injection technology to be used in implementation of this alternative would be determined by a treatability study.

The barrier layer would consist of a 6-inch thick layer of general fill (run-of-bank gravel) and 6-inches of topsoil to provide a vegetative cover. The deed restriction would be established to: restrict future use of the Site to commercial/industrial activities; notify future property owners of the presence constituents of interest in soil and groundwater at the Site; and identify the applicability of the Site Management Plan. The Site Management Plan would be prepared to address possible future disturbances of the monolith, barrier layer, and/or Site soils; identify known locations of PCBs, SVOCs, and inorganics in soil at the Site; and set forth the required inspection and maintenance activities for the monolith and barrier layer. Monolith and barrier layer maintenance activities would be performed, as needed, in accordance with the Site Management Plan.

AOC Nos. 13 and 24 would be included in the deed restriction, but capping of these areas is not proposed because all locations where SVOCs were detected at concentrations slightly above the corrective measure soil performance goals are currently covered by at least 1 foot of soil that did not exhibit SVOCs at concentrations above the TAGM 4046 soil guidance values.

Constituents of interest in groundwater would be addressed by groundwater use restrictions. A deed restriction would be established to notify future property owners of the presence of VOCs in groundwater at the Site, and to restrict the use of onsite groundwater. Existing groundwater use laws [10 NYCRR 5-1.31(b)], which prohibit the installation of private wells where public supply is available (unless approval is expressly granted by the public water authority), would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. Groundwater monitoring would be performed to evaluate changes in groundwater conditions.

Compliance with SCGs

Chemical-Specific SCGs

Chemical-specific guidance to be considered under this alternative are the soil guidance values presented in NYSDEC TAGM 4046. Solidification/stabilization activities would not likely reduce PCB, SVOC, or inorganic concentrations in soil at the Site to below the TAGM 4046 soil guidance values. However, areas where PCBs, SVOCs, or inorganics are identified in soil at concentrations above TAGM 4046 soil guidance values would be covered by an engineered barrier layer. Thus, access to these soils would be limited and the potential for windblown transport of the soils would also be limited.

Another chemical-specific SCG that may apply to this alternative is associated with infiltration of liquids used in the solidification/stabilization process. An approach would be undertaken to mitigate against potential groundwater quality impacts from the solidification/stabilization process.

This alternative does not include the excavation or handling of materials containing PCBs, SVOCs, or inorganics. Therefore, the chemical-specific SCGs that regulate the subsequent handling and disposal of these materials (and related residuals) are not applicable.

The Class GA groundwater quality standards presented in 6 NYCRR Parts 700-705 and in NYSDEC TOGS 1.1.1 are applicable chemical-specific SCGs for this alternative. This alternative relies on natural attenuation processes to meet these standards. This alternative includes monitoring to document changes in groundwater quality over time.

Action-Specific SCGs

Action-specific SCGs that apply to this alternative include the OSHA health and safety requirements associated with the stabilization of impacted soil and construction of the engineered barrier layer. Workers and worker activities that occur during implementation of this alternative must comply with OSHA requirements for training, safety equipment and procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR Parts 1904, 1910, and 1926. Compliance with action-specific SCGs would be accomplished by following a NYSDEC-approved design and site-specific HASP.

Location-Specific SCGs

Remedial activities at the Site would be conducted in accordance with local construction codes and ordinances, as appropriate.

Overall Protection of Human Health and the Environment

Potential exposure to soil at the Site containing constituents of interest at concentrations above the corrective measure soil performance goals would be mitigated by the barrier layer, which would physically isolate

impacted soils from direct contact. Potential exposure to windblown dust would be mitigated by: the barrier layer, which would physically isolate impacted soils and prevent them from being mobilized by the wind; and the solidified monolith, which would bind the soils together and inhibit the generation of windblown dust. The deed restriction would further mitigate potential exposure by notifying future site owners of the constituents of interest in soil and groundwater and the applicability of the Site Management Plan. The Site Management Plan would mitigate potential exposure to soil at the Site and potential exposure to windblown dust by setting forth the barrier layer and monolith inspection and maintenance activities for the Site.

Existing groundwater use laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. In addition, groundwater use restrictions to be included in a deed restriction for the Site would further mitigate potential human exposure to VOCs in groundwater at concentrations exceeding the performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Potential exposure to VOCs migrating through soil vapor (if any) would be evaluated based on the results of soil gas sampling anticipated to be completed during 2005. The need for additional measures (e.g. vapor barrier, deed restriction, venting system) to address potential vapor intrusion would be determined by the findings of the soil gas evaluation.

Short-Term Effectiveness

Implementation of this alternative would be somewhat delayed because treatability studies would first need to be conducted to evaluate the viability of stabilization/solidification, and the appropriate stabilization agent(s) and injection technology.

During implementation of this alternative, onsite workers could potentially be exposed to chemical constituents in the soil during surface disturbance associated with stabilization/solidification and barrier construction activities. Workers could also be exposed to the stabilizing agents during implementation of this alternative. Exposure routes would be addressed via various health and safety precautions as discussed below.

Potential exposure of onsite workers to chemical constituents and operational hazards would be mitigated by the use of PPE as specified in a site-specific HASP and through proper equipment and material handling procedures to be specified in the remedy design documents and site work plans. Air monitoring would be performed during soil handling activities to determine the need for additional engineering controls (e.g., using water sprays to suppress dust) and to confirm that dust levels remain within acceptable levels, as specified in the site-specific HASP.

The community would not have access to the Site during stabilization/solidification and barrier layer construction activities because the Site is currently fenced and entry would be controlled through the main gate off French Road. Potential risks to the community during barrier layer construction would also be mitigated by implementing an air monitoring plan and by implementing dust control techniques to mitigate the offsite migration of unacceptable levels of fugitive dust from the Site.

Long-Term Effectiveness and Permanence

Implementation of this alternative would, over the long term, effectively isolate the surface and subsurface soils containing PCBs, SVOCs, and inorganics from direct contact and potential transport via windblown dust. However, following monolith construction, the monolith would require testing to confirm that any large void

spaces and preferential pathways were effectively eliminated through the grouting effort. The success of this effort is typically dependent on the physical characteristics (i.e., porosity) of the subsurface horizon to facilitate the successful implementation of this technology. Verification of the long-term effectiveness and permanence of this alternative would likely require a long-term monitoring plan. Long-term effectiveness of this alternative would be inhibited by the presence of subsurface obstructions (potential foundation walls) that impede or prevent the installation of the grout probe or auger to the required depth. Subsurface obstructions may potentially create "blind" areas within the monolith where constituents of interest may not be immobilized. This is a particular problem if the areas of refusal are located above areas requiring stabilization/solidification.

It is currently anticipated the Site will be redeveloped for commercial/industrial purposes. The presence of the monolith onsite, and the soil bulking (increased soil volume) that would result from the stabilization/solidification activities may limit potential site redevelopment plans due to difficulties associated with conducting construction activities in areas where the monoliths are present.

The deed restriction and Site Management Plan would be kept in place, unchanged, unless Site conditions or soil guidance values for the intended commercial/industrial site use were to change. The Site Management Plan would set forth actions to be taken to protect the health and safety of site workers and the community and properly handle impacted materials under a wide variety of typical Site development/construction scenarios (site preparation, utility installation, building construction, landscaping, maintenance activities, etc.). If changes were to occur that would require modifications to the deed restriction/Site Management Plan, such modifications would be presented to the NYSDEC for review and approval, as appropriate. Both the deed restriction and Site Management Plan would be apparent to possible future Site owners during comprehensive due diligence activities performed in connection with property transfer. Taken together, these institutional controls could be expected to adequately and reliably provide for the management of impacted material to be left in place.

Groundwater monitoring would continue annually until corrective measure performance goals for Site-related VOCs are achieved, or until the results of monitoring support a different approach. Existing groundwater use laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. The deed restriction would further mitigate potential human exposure to VOCs in groundwater at concentrations above the performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Reduction of Toxicity, Mobility, and Volume through Treatment

Implementation of this alternative would reduce the mobility of constituents in impacted soil through the stabilization of these constituents. The toxicity of the immobilized soil would also be reduced since the constituents of interest would be encapsulated within the grout monolith. The volume of constituents would not change with the stabilization/solidification activities. However, the volume of soils within the solidified/ stabilized area would increase due to the introduction of stabilizing agents and mixing of soils. The toxicity, mobility, and volume of VOCs in groundwater would be reduced by natural passive in-situ processes.

Implementability

Soil solidification/stabilization is technically feasible and a proven technology. Remedial contractors that perform this technology are available. However, this type of equipment and skilled labor is usually provided by "specialty-type" contractors. The major difficulty associated with this technology is the presence of subsurface obstructions (potential foundation walls) that impede or prevent the installation of the grout probe or auger to the required depth. Subsurface obstructions may potentially create "blind" areas within the monolith where

constituents of interest may not be immobilized. This is a particular problem if the areas of refusal are located above areas requiring stabilization/solidification.

Implementing the stabilization/solidification aspect of this alternative would require treatability studies that have not yet been conducted. This would delay implementation of this alternative, and there is a chance these treatability studies may show this technology is not viable at the Site.

Additionally, stabilization/solidification would typically result in the bulking of the subsurface horizon as a result of the addition of the grout mixture. This soil bulking can result in an increase in the in-place volume of the treated material by as much as 20 to 30% depending on the characteristics of the subsurface horizon and must be accounted for when developing a final site grading plan.

The time associated with stabilization/solidification activities may be approximately 10 weeks, and long term monitoring of the monolith may be required. Groundwater monitoring would also continue as needed.

Cost

The capital costs associated with this alternative include costs associated with mobilization, site preparation, solidification/stabilization activities, barrier layer construction, site restoration, and preparation of documentation necessary for the deed restriction. Annual O&M costs associated with this alternative include costs associated with completing annual groundwater monitoring, and annual monitoring and maintenance of the barrier layer and stabilized/solidfied soils. Based on the trends observed in the historical groundwater analytical data, it appears that groundwater VOC concentrations could decrease to the corrective measure groundwater performance goals in a relatively short timeframe. Therefore, a 10-year O&M period has been included for groundwater monitoring. The actual length of the groundwater monitoring period will be based on the results of the monitoring activities and could differ. For purposes of this CMS, a standard 30-year O&M period has been included for annual inspection and maintenance of the barrier layer and stabilized/solidified soils. The present worth estimated cost of this alternative (based on the stabilization/solidification of approximately 3,500 CY of soil and a barrier layer over-top approximately 135,000 SF of soil) is $2,150,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 12.

6.3.5 Alternative 5 - Excavation/Offsite Disposal, Site Controls and Monitoring

Technical Description

This alternative includes the excavation and offsite transportation and disposal of approximately 14,500 CY of impacted soils from the Site. Excavation would be performed in areas where soil exhibits chemical constituents at concentrations above the corrective measure soil performance goals, except for select locations where excavation was previously conducted and clean backfill has been placed. Approximate horizontal and vertical limits of the proposed excavation areas, based on current Site characterization information, are shown on Figure 9.

Excavation of impacted soils would generally be conducted using conventional construction equipment, such as excavators, front-end loaders, dump trucks, etc. The excavated soil would be stockpiled in lined material staging areas for waste characterization purposes and/or direct-loaded for offsite disposal. Specifics of the handling approach would be determined during the remedial design. In general, soil excavated from areas where previous sampling identified inorganics at concentrations significantly above the corrective measure performance goals would be placed in separate stockpiles for approximately every 500 CY. Waste

characterization samples would be collected from each stockpile to evaluate constituent concentrations and determine appropriate methods of handling and offsite disposal. For cost estimation and alternative evaluation purposes in this CMS Report, it is assumed that all excavated soils (estimated 22,000 tons) would be characterized as non-hazardous PCB-impacted waste and transported to the Waste Management (WM) High Acres Subtitle D landfill located in Fairport, New York for disposal as a non-hazardous waste.

Airborne monitoring for particulate (dust) and volatile organic vapors would be conducted during the excavation activities in accordance with the NYSDOH's Community Air Monitoring Plan, dated June 2000. Measures would be provided to mitigate dust generation during the project. Appropriate actions would be taken, if needed, based on air monitoring results.

Following completion of the excavation activities, the Site would be restored by backfilling the excavated area with imported clean fill material and hydroseeding the area.

If soils at any sampling locations exhibiting chemical constituents at concentrations above the corrective measure soil performance goals were left in place (due to significant depth, concentrations only slightly above the soil performance goals at the vertical limits of previous excavation areas, etc.), a deed restriction would be established to notify future property owners of the presence of these constituents in subsurface soil and the applicability of a Site Management Plan. The Site Management Plan would be prepared to identify known locations of such constituents in subsurface soil at the Site and address possible future disturbances of subsurface Site soils.

Constituents of interest in groundwater would be addressed by groundwater use restrictions. A deed restriction would be established to notify future property owners of the presence of VOCs in groundwater at the Site, and to restrict the use of onsite groundwater. Existing groundwater use laws [10 NYCRR 5-1.31(b)], which prohibit the installation of private wells where public supply is available (unless approval is expressly granted by the public water authority) would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. Groundwater monitoring would be performed to evaluate changes in groundwater conditions.

Compliance with SCGs

Chemical-Specific SCGs

Chemical-specific guidance to be considered under this alternative are the soil guidance values presented in NYSDEC TAGM 4046. Soils exhibiting PCBs, SVOCs, and inorganics at concentrations above TAGM 4046 soil guidance values would be removed. It is anticipated that the excavated soils would be characterized as a nonhazardous waste. Chemical-specific SCGs that regulate the subsequent handling and disposal of these materials (and related residuals) would be applicable.

The Class GA groundwater quality standards presented in 6 NYCRR Parts 700-705 and in NYSDEC TOGS 1.1.1 are applicable chemical-specific SCGs for this alternative. This alternative relies on natural attenuation processes to meet these standards. This alternative includes monitoring to document changes in groundwater quality over time.

Action-Specific SCGs

Action-specific SCGs that apply to this alternative are the OSHA construction standards and health and safety requirements associated with the soil excavation. Workers and worker activities that occur during implementation of this alternative must comply with OSHA requirements for training, safety equipment and

procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR Parts 1904, 1910, and 1926. Compliance with action-specific SCGs would be accomplished by following a NYSDEC-approved design and site-specific HASP.

Wastes generated during the implementation of this alternative (soil removed from the excavation area) would be characterized to determine appropriate offsite disposal requirements. If any of the materials are characterized as a hazardous waste (although this is not anticipated based on the completion of the ICM PCB-Impacted Soil removal activities and the chromium-impacted soil removal activities in AOC No. 14), then the RCRA, UTS/LDR, and USDOT requirements for the packaging, labeling, transportation, and disposal of hazardous or regulated materials may be applicable. Compliance with these requirements would be achieved by utilizing licensed waste transporters and properly permitted disposal facilities.

Location-Specific SCGs

Remedial activities at the Site would be conducted in accordance with local construction codes and ordinances, as appropriate, including those requirements at offsite disposal locations.

Overall Protection of Human Health and the Environment

Potential exposure to soil at the Site and windblown dust containing constituents of interest at concentrations above the corrective measure soil performance goals would be mitigated because such soils would be removed from the Site and transported for offsite disposal. If any soils exhibiting constituents at concentrations above the soil performance goals were to remain in place (for reasons cited above), the soils would be beneath clean fill and not susceptible to windblown transport or direct contact. In the event that these subsurface soils were to remain in place, a deed restriction would be established to further mitigate potential exposure by notifying future site owners of the constituents of interest in soil and the applicability of a Site Management Plan. The Site Management Plan would mitigate potential exposure to soil at the Site by identifying known locations of constituents above the performance goals in subsurface soil at the Site and setting forth actions to address possible future disturbances of subsurface Site soils.

Existing groundwater use laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. In addition, groundwater use restrictions to be included in a deed restriction for the Site would further mitigate potential human exposure to VOCs in groundwater at concentrations exceeding the performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Potential exposure to VOCs migrating through soil vapor (if any) would be evaluated based on the results of soil gas sampling anticipated to be completed during 2005. The need for additional measures (e.g. vapor barrier, deed restriction, venting system) to address potential vapor intrusion would be determined by the findings of the soil gas evaluation.

Short-Term Effectiveness

The excavation and subsequent handling of soil containing PCBs, SVOCs, and inorganics at concentrations above the corrective measure soil performance goals could result in potentially significant short-term risks to public health and the environment. Excavation activities may generate dust, offsite soil transportation would increase the risk of in-traffic accidents, and prolonged periods of emissions (exhaust) from diesel-powered equipment could disturb the local community.

Under this alternative, onsite workers could be exposed to chemical constituents in soil during the excavation/ handling activities. Exposure routes would be of a modest duration and would be addressed via various health and safety precautions as discussed below.

Potential exposure of onsite workers to chemical constituents and operational hazards would be mitigated by the use of PPE as specified in a site-specific HASP and through proper equipment and material handling procedures to be specified in the remedy design documents and site work plans. Air monitoring would be performed during soil excavation/handling activities to determine the need for additional engineering controls (e.g., using water sprays to suppress dust, modifying the excavation rate, etc.) and to confirm that dust levels remain within acceptable levels, as specified in the site-specific HASP.

The community would not have access to the Site during the excavation activities because the Site is currently fenced and entry would be controlled through the main gate off French Road. Potential risks to the community during excavation would also be mitigated by implementing an air monitoring plan and by implementing dust control techniques (e.g. water sprays to suppress dust, modifying the excavation rate, etc.) to mitigate the offsite migration of unacceptable levels of fugitive dust from the Site.

Long-Term Effectiveness and Permanence

Implementation of this alternative would permanently remove surface and subsurface soil containing PCBs, SVOCs, or inorganics at concentrations above the corrective measure performance goals. The soil corrective measure performance goals could potentially be achieved in a modest time frame (several months).

The deed restriction and Site Management Plan (if necessary after completing excavation activities) would be kept in place, unchanged, unless Site conditions or soil guidance values for the intended commercial/industrial site use were to change. The Site Management Plan would set forth actions to be taken to protect the health and safety of site workers and the community and properly handle impacted materials under a wide variety of typical Site development/construction scenarios (site preparation, utility installation, building construction, landscaping, maintenance activities, etc.). If changes were to occur that would require modifications to the deed restriction/ Site Management Plan, such modifications would be presented to the NYSDEC for review and approval, as appropriate. Both the deed restriction and Site Management Plan would be apparent to possible future Site owners during comprehensive due diligence activities performed in connection with property transfer. Taken together, these institutional controls could be expected to adequately and reliably provide for the management of impacted material to be left in place (if any).

Groundwater monitoring would continue annually until corrective measure performance goals for Site-related VOCs are achieved, or until the results of monitoring support a different approach. Existing groundwater use laws would continue to minimize potential human exposure to VOCs in onsite and offsite groundwater at concentrations exceeding the corrective measure groundwater performance goals. The deed restriction on groundwater use would further mitigate potential human exposure to VOCs in groundwater at concentrations above the performance goals and would be apparent to possible future Site owners during comprehensive due diligence activities performed in connection with property transfer. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

Reduction of Toxicity, Mobility, and Volume through Treatment

The soil excavation activities would reduce the toxicity, mobility, and volume of PCBs, SVOCs, and inorganics in the surface and subsurface soil at the Site as the soil would be permanently removed and replaced with clean backfill material. The toxicity, mobility, and volume of VOCs in groundwater would be reduced by natural passive in-situ processes.

Implementability

Excavation and offsite transportation of soils are commonly employed in remedial activities and are technically feasible. Based on existing information, it is anticipated that the excavated soils would be characterized as non-hazardous waste. These soils could readily be transported to a RCRA Subtitle D landfill for disposal. The time associated with excavation of impacted soils would be several months. Groundwater monitoring would continue as needed.

Cost

The capital costs associated with this alternative include costs associated with mobilization, site preparation, excavation, transportation, disposal, and preparation of documentation necessary for the deed restriction. Annual O&M costs associated with this alternative include costs associated with completing annual groundwater monitoring. Based on the trends observed in the historical groundwater analytical data, it appears that groundwater VOC concentrations could decrease to the corrective measure groundwater performance goals in a relatively short timeframe. Therefore, a 10-year O&M period has been included for groundwater monitoring. The actual length of the groundwater monitoring period will be based on the results of the monitoring activities and could differ. For purposes of this CMS, the present worth estimated cost of this alternative (based on the excavation and offsite disposal of 14,500 CY of soils) is $4,000,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 13.

7. Selection of Final Corrective Measure Alternative

7.1 General

This section presents a comparative analysis of the alternatives to each other with respect to the seven evaluation criteria identified in Section 6. This comparative analysis identifies the advantages and disadvantages of each alternative relative to each other and in consideration of the seven evaluation criteria. The results of the comparative analysis are used as a basis for recommending a remedial alternative to address Site conditions. The comparative analysis of corrective measure alternatives is presented below.

7.1.1 Compliance with SCGs

Chemical Specific SCGs

Chemical-specific guidance to be considered under each alternative are the soil guidance values presented in NYSDEC TAGM 4046. Alternative 1 (No Further Action) would rely on natural attenuation processes that would not likely reduce constituent concentrations in soil at the Site to levels below the TAGM 4046 soil guidance values. Alternatives 2 (Site Controls and Monitoring), 3 (Barrier Layer, Site Controls and Monitoring), and 4 (Stabilization/Solidification, Barrier Layer, Site Controls and Monitoring) would not reduce constituent concentrations in soil, but would reduce the potential for human contact with impacted soils. Alternatives 3 and 4 would minimize potential exposure to soils exhibiting constituents at concentrations above TAGM 4046 soil guidance values. Under Alternative 5 (Excavation/Offsite Disposal, Site Controls and Monitoring) soils exhibiting constituents at concentrations above TAGM 4046 soil guidance values would be removed, satisfying the Chemical Specific SCGs, for most areas at the Site.

The Class GA groundwater quality standards presented in NYSDEC TOGS 1.1.1 are applicable chemical-specific SCGs for each alternative. Alternative 1 relies on natural attenuation processes to achieve the TOGS 1.1.1 groundwater quality standards/guidance values (which historical monitoring data suggests is likely to occur in a relatively short time frame) but it does not provide a means to monitor the location and movement of Site groundwater that may exceed these standards. Alternatives 2 through 5 rely on natural attenuation processes to achieve the TOGS 1.1.1 groundwater quality standards/guidance values and provide for groundwater monitoring until corrective measure performance goals for Site-related VOCs are achieved or until the results of monitoring support a different approach.

Action-Specific SCGs

Action-specific SCGs are not applicable under Alternatives 1 and 2. OSHA regulations (229 CFR Parts 1904, 1910, and 1926) would apply to the construction/installation and excavation activities included under Alternatives 3 through 5. SCGs relating to packaging, labeling, transportation, and disposal of hazardous materials (including RCRA, UTS/LDR, and USDOT requirements) would apply to the removal activities under Alternative 5.

All of the remedial activities could be designed and implemented to meet action-specific SCGs.

Location-Specific SCGs

Remedial activities under Alternatives 2 through 5 would be conducted in accordance with local construction codes and ordinances, as appropriate.

7.1.2 Overall Protection of Human Health and the Environment

Alternative 1 would be ineffective and would not meet the soil corrective measure objectives for the Site. The fencing and vegetation maintenance activities under Alternative 2 would reduce potential human exposure and potential migration of soil containing chemical constituents at concentrations above the corrective measure soil performance goals. The barrier layer and stabilization/solidification under Alternatives 3 and 4 would provide a higher level of protection for site occupants than the measures under Alternative 2. Potential future human exposure to soil at the Site containing constituents at concentrations above the corrective measure soil performance goals would be significantly less likely with construction of the barrier layer, as opposed to simply a vegetative cover. The barrier layer would also further mitigate potential migration of chemical constituents in onsite soils. Alternative 5 would remove most soils exhibiting constituents at concentrations above the corrective measure soil performance goals from the Site, thereby mitigating potential exposure and migration of these constituents. Soils to remain in place under Alternative 5 that exhibit constituents at concentrations above the corrective measure soil performance goals (if any) would be beneath clean fill and not susceptible to windblown transport or direct contact.

Under each alternative, existing groundwater use laws [10 NYCRR 5-1.31(b)] would continue to minimize potential human exposure to VOCs in groundwater at concentrations exceeding the corrective measure groundwater performance goals. The deed restriction under Alternatives 2 through 5 would further mitigate potential human exposure to VOCs in groundwater at concentrations exceeding the performance goals.

7.1.3 Short-Term Effectiveness

There are no short-term negative impacts associated with Alternatives 1 and 2. Potential short-term impacts under Alternatives 3 and 4 are associated with worker exposure to soil containing PCBs, SVOCs, or inorganics due to soil disturbance that may occur during barrier layer installation and/or stabilization/solidification activities. Alternative 5 involves significant excavation activities and, as such, presents a greater potential for short-term risks to onsite workers and the community during implementation. Under Alternatives 3 through 5, appropriate measures would be implemented to mitigate these risks including, but not limited to, implementing a HASP that includes an air monitoring program, using PPE, and instituting engineering controls to suppress dust.

Alternatives 2 and 3 could potentially achieve the corrective measure objectives pertaining to soils in the least amount of time of the alternatives. Considering that these alternatives may achieve the corrective measure objectives quicker than the others under consideration, there would be inherently less onsite labor hours and, thereby, a reduced probability of site accidents/worker injury.

7.1.4 Long-Term Effectiveness and Permanence

The no-action alternative would provide limited means to achieve and no method to monitor long-term effectiveness. Alternative 2 would reduce potential direct contact with soils containing PCBs, SVOCs, and inorganics and potential transport via windblown dust. However, Alternatives 3 and 4 would be significantly

more effective than Alternative 2, because these alternatives include a more significant barrier that would isolate the surface and subsurface soils containing PCBs, SVOCs, and inorganics from direct contact and potential transport via windblown dust. Long-term maintenance and monitoring activities would be required under these three alternatives. Under Alternative 5, soil containing PCBs, SVOCs, or inorganics would be permanently removed and transported for offsite disposal. Alternatives 3 and 5 are most conducive to the currently envisioned Site redevelopment for commercial/industrial purposes. The lack of a barrier layer under Alternative 2 might not support future redevelopment in certain areas because constituents of interest would be allowed to remain at elevated levels near the ground surface. The soil bulking anticipated from the stabilization/solidification under Alternative 4 could present an obstacle to construction activities during future redevelopment.

Under Alternatives 2 through 5, the deed restriction and Site Management Plan would be kept in place, unchanged, unless Site conditions or soil guidance values for the intended commercial/industrial site use were to change. The Site Management Plan would set forth actions to be taken to protect the health and safety of site workers and the community and properly handle impacted materials under a wide variety of typical Site development/construction scenarios (site preparation, utility installation, building construction, landscaping, maintenance activities, etc.). If changes were to occur that would require modifications to the deed restriction/Site Management Plan, such modifications would be presented to the NYSDEC for review and approval, as appropriate. Both the deed restriction and Site Management Plan would be apparent to possible future Site owners during comprehensive due diligence activities performed in connection with property transfer. Taken together, these institutional controls could be expected to adequately and reliably provide for the management of impacted material to be left in place.

Groundwater monitoring would continue annually under Alternatives 2 through 5 until the corrective measure groundwater performance goals for Site-related VOCs are achieved, or until the results of monitoring support a different approach. The groundwater use laws currently in place in 10 NYCRR 5-1.31(b) would continue to mitigate potential human exposure to VOCs in groundwater at concentrations above the corrective measure groundwater performance goals. The deed restriction would further mitigate potential human exposure to VOCs in groundwater at concentrations above the performance goals. Based on groundwater sampling activities to date, the concentrations of VOCs in onsite groundwater have, in general, significantly declined over the past several years (following the source removal activities completed at the Site) and are anticipated to continue to decline due to natural attenuation processes.

7.1.5 Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 does not include implementation of active treatment processes to reduce the toxicity, mobility, or volume of PCBs, SVOCs, or inorganics in soil. Alternative 2 would slightly reduce the mobility of PCBs, SVOCs, and inorganics in onsite soil, while Alternatives 3 and 4 would more significantly reduce the mobility of PCBs, SVOCs, and inorganics in onsite soil. Alternative 4 would also reduce the toxicity of the immobilized soil because the constituents of interest would be encapsulated within the resulting monolith. However, Alternatives 2 through 4 would not reduce the volume of PCBs, SVOCs, or inorganics in soil. Alternative 5 would reduce the toxicity, mobility, and volume of PCBs, SVOCs, and inorganics in soil at the Site, as the soil would be transported for proper offsite disposal and imported clean backfill would be provided to restore the excavated areas.

Under each of the five alternatives, the toxicity, mobility and volume of VOCs in groundwater would be reduced by natural passive in-situ processes.

7.1.6 Implementability

Each of the alternatives could be implemented at the Site. Alternatives 2 and 3 would be the most straightforward to implement. Alternative 4 would require a treatability study to determine the appropriate stabilization agent and injection technology. Alternative 5 would require the handling and transportation of a substantial quantity of waste. Additionally, considering that the Site will likely be redeveloped for commercial/industrial purposes, Alternative 3 is more adaptable than Alternatives 2 or 4 to different redevelopment scenarios.

7.1.7 Cost

The five corrective measure alternatives under consideration for the Site cover a wide range of costs. No capital or O&M costs are associated with the implementation of Alternative 1. The total costs to implement Alternatives 1 through 5 are summarized in the table below.

Remedial Alternative	Estimated Capital Costs	Estimated O&M Costs	Total Costs (Rounded)
Alternative 1 - No Further Action	$0	$0	$0
Alternative 2 - Site Controls and Monitoring	$27,000	$206,612	$240,000
Alternative 3 - Barrier Layer, Site Controls and Monitoring	$422,550	$253,146	$680,000
Alternative 4 - Stabilization/Solidification, Barrier Layer, Site Controls and Monitoring	$1,895,400	$253,146	$2,150,000
Alternative 5 - Excavation/Offsite Disposal, Site Controls and Monitoring	$3,817,125	$175,590	$4,000,000

7.2 Recommended Corrective Measure Alternative

Based on the results of the comparative analysis presented above, Alternative 3 - Barrier Layer, Site Controls and Monitoring - is the most effective corrective measure alternative. This alternative will achieve the CMS objectives. Specifically, Alternative 3 would mitigate potential human exposure to soils containing PCBs, SVOCs, or inorganics at concentrations above the corrective measure soil performance goals. In addition, this alternative will be protective of the environment, have minimal potential short-term negative impacts, be effective over the long-term, be conducive to Site redevelopment, reduce the mobility of PCBs, SVOCs, and inorganics in soils at the Site, and be implemented for a cost significantly lower than Alternatives 4 and 5. Alternative 3 is more costly than Alternative 2, but offers a significantly higher level of protection. The key advantages of Alternative 3 over the other alternatives evaluated in this CMS Report are summarized below.

- Alternative 2 is not as effective at reducing potential direct human exposure and potential windblown transportation of soils containing PCBs, SVOCs, or inorganics at concentrations above the corrective measure soil performance goals, nor is Alternative 2 as adaptable to different redevelopment scenarios.

- Alternative 4 would require pre-design treatability testing (thus delaying implementation of the corrective measure), is significantly more expensive, would not be substantially different from Alternative 3 in its ultimate effectiveness, and is not as conducive or adaptable to different potential redevelopment scenarios.

- Alternative 5 would create potential exposure scenarios during the excavation and subsequent aboveground onsite handling of significant quantities of impacted soils, would present potential hazardous associated with offsite transportation for disposal, and is significantly more expensive than Alternative 3.

The additional costs for Alternatives 4 and 5 (3 to 5 times greater than Alternative 3) are not justified considering that Alternative 3 can meet the corrective measure objectives, is appropriate for the intended future commercial/industrial site use, and can be readily implemented.

Tables

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
RFI, ICM, and CMS Soil Sampling - Summary of Exceedences

Sample Location	Constituent(s) Identified at Concentrations Above TAGM 4046 Soil Guidance Values, Maximum Site Background, and NY Region Background
AOC No. 1 - Former Chemical Storage Building	
1-5 (0-0.5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene]
1-6 (0-0.5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene]
1-7 (0-0.5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Chrysene, Dibenz(a,h)anthracene]
1-8 (0-0.5')	SVOCs [Benzo(a)pyrene, Chrysene]
AOC No. 4 - Former Plating Area Wastewater Treatment Equipment	
4-1 (0-1')	Inorganics [Mercury]
4-1 (1-2')	Inorganics [Nickel]
4-2 (0-1')	Inorganics [Chromium, Copper, Selenium]
AOC No. 7.3 - Former 550-Gallon Diesel Fuel AST	
7.3-1 (0-0.5')	SVOCs [Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Dibenzofuran, Fluoranthene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene]
7.3-1 (0.5-1.5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Dibenzofuran, Fluoranthene,
7.3-2 (0-0.5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, Pyrene]
7.3-3 (0-0.5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Dibenz(a,h)anthracene]
7.3-4 (0-0.5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Dibenz(a,h)anthracene]
7.3-4 (0.5-1.5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Chrysene, Dibenz(a,h)anthracene]
AOC No. 8.1 - Former Cyanide Waste Pit No. 1	
8.1-2 (5-6')	Inorganics [Arsenic, Zinc]
8.1-5 (14-15.5')	Inorganics [Arsenic, Copper, Zinc]
8.1-6 (5-6')	Inorganics [Mercury]
8.1-6 (8-9')	Inorganics [Cadmium, Mercury, Nickel, Zinc]
8.1-7 (8-9')	Inorganics [Mercury, Zinc]
8.1-7 (11-12')	Inorganics [Copper]
8.1-9 (5-6')	Inorganics [Mercury]
8.1-9 (14-15')	Inorganics [Cadmium, Mercury]
AOC No. 8.2 - Former Cyanide Waste Pit No. 2	
8.2-1 (11-12')	Inorganics [Zinc]
8.2-2 (5-6')	Inorganics [Copper]
8.2-2 (8-9')	Inorganics [Zinc]
8.2-3 (5-6')	Inorganics [Arsenic, Zinc]
8.2-3 (8-9')	Inorganics [Copper]
8.2-4 (8-9')	Inorganics [Arsenic, Zinc]
8.2-5 (5-6')	Inorganics [Cadmium, Copper]
AOC No. 13 - Former VOC-Impacted Soils	
13-5 (2-4')	SVOCs [Benzo(a)pyrene], Inorganics [Copper, Mercury, Nickel]
13-6 (2-4')	Inorganics [Zinc]
AOC No. 14 - Former Plating Area	
14-2 (0-1')	Inorganics [Aluminum, Barium, Sodium]
14-2 (1-2')	Inorganics [Chromium, Copper, Hexavalent Chromium, Mercury, Selenium]

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
RFI, ICM, and CMS Soil Sampling - Summary of Exceedences

Sample Location	Constituent(s) Identified at Concentrations Above TAGM 4046 Soil Guidance Values, Maximum Site Background, and NY Region Background
AOC No. 14 - Former Plating Area (Continued)	
14-3 (0-1')	Inorganics [Chromium, Copper, Mercury, Nickel, Cyanide]
14-3 (1-2')	Inorganics [Mercury, Nickel, Zinc]
14-4 (1-2')	Inorganics [Chromium, Hexavalent Chromium]
14-4 (2-3')	Inorganics [Chromium, Hexavalent Chromium]
14-4 (3-4')	Inorganics [Chromium, Hexavalent Chromium]
14-5 (0-1')	Inorganics [Cadmium, Cyanide]
14-5 (1-2')	Inorganics [Cadmium, Sodium, Cyanide]
AOC No. 17.3 - Former Electrical Transformer Substation No. 3	
17.3-4 (0-0.5')	PCBs
AOC No. 18 - Former Drum Storage Area	
18-1 (0-0.5')	Inorganics [Cobalt, Mercury, Nickel, Zinc]
18-2 (0-0.5')	Inorganics [Chromium, Cobalt, Copper, Mercury, Nickel, Thallium, Zinc]
18-3 (0-0.5')	Inorganics [Cobalt, Copper, Mercury, Nickel, Thallium, Zinc]
18-3 (0.5-1.5')	Inorganics [Copper, Mercury, Nickel]
18-4 (0-0.5')	Inorganics [Mercury, Nickel, Zinc]
18-5 (0-0.5')	Inorganics [Cadmium, Chromium, Cobalt, Copper, Mercury, Nickel, Thallium, Zinc, Cyanide]
18-5 (0.5-1.5')	Inorganics [Cadmium, Chromium, Copper, Mercury, Nickel, Zinc]
18-5 (2-4')	Inorganics [Hexavalent Chromium]
18-6 (0-0.5')	Inorganics [Copper, Mercury, Nickel, Thallium, Zinc]
18-7 (0-0.5')	Inorganics [Mercury, Nickel, Thallium, Zinc, Cyanide]
18-8 (0-0.5')	Inorganics [Cobalt, Copper, Mercury, Nickel, Thallium, Zinc]
18-8 (0.5-1.5')	Inorganics [Arsenic, Mercury]
18-8 (2-4')	Inorganics [Arsenic]
18-9 (0-0.5')	Inorganics [Cadmium, Chromium, Copper, Hexavalent Chromium, Mercury, Thallium, Zinc, Cyanide]
18-9 (0.5-1.5')	Inorganics [Cadmium, Chromium, Copper, Mercury, Zinc]
18-9 (2-4')	Inorganics [Chromium, Hexavalent Chromium]
18-10 (0-0.5')	Inorganics [Mercury, Nickel]
18-11 (0-0.5')	Inorganics [Cadmium, Copper, Mercury, Nickel, Thallium, Zinc]
18-12 (0-0.5')	Inorganics [Cadmium, Copper, Mercury, Thallium, Zinc]
18-13 (0-0.5')	Inorganics [Cadmium, Cobalt, Mercury, Nickel, Zinc]
18-13 (0.5-1.5')	Inorganics [Copper, Zinc]
18-14 (0-0.5')	Inorganics [Cadmium, Copper, Mercury, Zinc]
18-14 (0.5-1.5')	Inorganics [Cadmium, Copper, Mercury, Zinc]
AOC No. 20 - Former Main Production Building Footprint	
MB-6 (0-0.5')	PCBs
SB-4 (0-0.2')	PCBs
SB-6 (0-0.2')	PCBs
SB-7 (0-0.2')	PCBs
AOC No. 21 - Former Test Building Footprint and Vicinity	
TB-11 (0-0.5')	PCBs
TB-13 (0-0.5')	PCBs

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
RFI, ICM, and CMS Soil Sampling - Summary of Exceedences

Sample Location	Constituent(s) Identified at Concentrations Above TAGM 4046 Soil Guidance Values, Maximum Site Background, and NY Region Background
AOC No. 21 - Former Test Building Footprint and Vicinity (Continued)	
TB-14 (0-0.5')	PCBs
TB-15 (0-0.5')	PCBs
TB-20 (0-0.5')	PCBs
TB-22 (0-0.5')	PCBs
TB-26 (0-0.5')	PCBs
TB-26 (0.5-1.5')	PCBs
TV-5 (11.5')	PCBs
DS1-2 (0.5-1.5')	PCBs
DS1-2 (2-3')	PCBs
DS1-2A (1-1.5')	PCBs
DS1-3 (0-0.2')	PCBs
DS1-4 (0-0.2')	PCBs
DS1-4 (0.5-1.5')	PCBs
DS1-4 (2-3')	PCBs
DS1-6 (0-0.2')	PCBs
DS1-8 (3-4')	PCBs
DS1-9 (0-0.2')	PCBs
VS1-2 (0-0.2')	PCBs
VS1-3 (0.5-1.5')	PCBs
VS1-3A (0-0.2')	PCBs
VS1-5A (0-0.2')	PCBs
VS1-6 (0-0.2')	PCBs
DS2-1 (0.5-1.5')	PCBs
DS2-2 (0.5-1.5')	PCBs
VS2-1 (0-0.2')	PCBs
VS2-3 (0-0.2')	PCBs
VS3-1 (0-0.2')	PCBs
VS3-2 (0-0.2')	PCBs
VS3-3 (0-0.2')	PCBs
VS3-4 (0-0.2')	PCBs
DS4-2 (0-0.2')	PCBs
DS4-2A (0-0.2')	PCBs
DS4-3 (0-0.2')	PCBs
DS4-4 (0.5-1.5')	PCBs
DS4-6 (0-0.2')	PCBs
DS4-7 (2-3')	PCBs
DS4-9 (0.5-1.5')	PCBs
DS4-11 (0-0.2')	PCBs
VS4-1 (0-0.2')	PCBs
VS4-2 (0-0.2')	PCBs
VS4-3 (0-0.2')	PCBs
VS4-5 (0-0.2')	PCBs
VS4-7A (0-0.2')	PCBs

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
RFI, ICM, and CMS Soil Sampling - Summary of Exceedences

Sample Location	Constituent(s) Identified at Concentrations Above TAGM 4046 Soil Guidance Values, Maximum Site Background, and NY Region Background
AOC No. 21 - Former Test Building Footprint and Vicinity (Continued)	
VS4-7B (0-0.2')	PCBs
VS4-7C (0-0.2')	PCBs
VS4-8 (0-0.2')	PCBs
VS4-9 (0-0.2')	PCBs
DS5-1 (0-0.2')	PCBs
DS5-1A (0-0.2')	PCBs
DS5-1B (0-0.2')	PCBs
DS5-3 (0.5-1.5')	PCBs
DS5-6 (0-0.2')	PCBs
DS5-6 (0.5-1.5')	PCBs
DS5-7 (0-0.2')	PCBs
VS5-3 (0-0.2')	PCBs
VS5-4 (0-0.2')	PCBs
VS5-4 (0.5-1.5')	PCBs
SB-9 (0-0.2')	PCBs
SB-10 (0-0.2')	PCBs
SB-11 (0-0.2')	PCBs
SB-12 (0-0.2')	PCBs
SB-17 (0-0.2')	PCBs
SB-18 (0-0.2')	PCBs
SB-20 (0-0.2')	PCBs
SB-23 (0-0.2')	PCBs, Inorganics [Cadmium, Copper, Mercury, Nickel, Zinc]
SB-23 (0.5-1.5')	Inorganics [Mercury, Nickel, Zinc]
SB-24 (0-0.2')	PCBs
SB-25 (0-0.2')	PCBs
AOC No. 23 - Grass-Covered Area East of Enclosed Passageway	
EP-1 (0-0.5')	PCBs
EP-4 (0-0.5')	PCBs
EP-5 (0-0.5')	PCBs
EP-6 (0-0.5')	PCBs
EP-7 (0-0.5')	PCBs
AOC No. 24 - South Storm Sewer Line Catch Basin Area	
CB-4N (3-4')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene]
BV-3 (4')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene], Inorganics [Thallium]
BV-4 (4')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene], Inorganics [Thallium]
CV-1 (4')	SVOCs [Benzo(a)pyrene]
SV-1 (4')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Chrysene, Dibenz(a,h)anthracene]
SV-5 (4.5')	SVOCs [Benzo(a)pyrene], Inorganics [Cadmium]
SV-7B (7')	Inorganics [Cadmium, Copper]
SV-9 (7')	Inorganics [Arsenic]
SV-12B (5')	SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Chrysene, Dibenz(a,h)anthracene]
SV-13 (4')	SVOCs [Benzo(a)pyrene, Dibenz(a,h)anthracene], Inorganics [Cadmium]
SV-14A (5.5')	Inorganics [Zinc]

Table 2

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measure Study
CMS Soil Analytical Results for PCBs (ppm)

Sample ID	Aroclor							Total PCBs
	1016	1221	1234	1242	1248	1254	1260	
SB-1 (0-0.2')	< 0.071	< 0.071	< 0.071	< 0.071	< 0.071	0.94	< 0.071	0.94
SB-2 (0-0.2')	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	0.46	< 0.035	0.46
SB-3 (0-0.2')	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	0.54	< 0.035	0.54
SB-4 (0-0.2')	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	3.3	< 0.39	3.3
SB-5 (0-0.2')	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	0.046	< 0.035	0.046
SB-5 (0.5-1.5')	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	0.020 J	< 0.035	0.020 J
SB-6 (0-0.2')	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	1.5	< 0.18	1.5
SB-6 (0.5-1.5')	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	1.6	< 0.19	1.6
SB-7 (0-0.2')	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	2.2	< 0.18	2.2
SB-7 (0.5-1.5')	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	1.3	< 0.18	1.3
SB-8 (0-0.2')	< 0.037	< 0.037	< 0.037	< 0.037	< 0.037	0.24	< 0.037	0.24
SB-8 (0.5-1.5')	< 0.041	< 0.041	< 0.041	< 0.041	< 0.041	0.055	< 0.041	0.055
SB-9 (0-0.2')	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	1.9	< 0.18	1.9
SB-9 (0.5-1.5')	< 0.073	< 0.073	< 0.073	< 0.073	< 0.073	1.3	< 0.073	1.3
SB-10 (0-0.2')	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	1.1	< 0.18	1.1
SB-10 (0.5-1.5')	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	0.62	< 0.036	0.62
SB-11 (0-0.2')	< 0.079	< 0.079	< 0.079	< 0.079	< 0.079	1.1	< 0.079	1.1
SB-11 (0.5-1.5')	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	0.35	< 0.038	0.35
SB-12 (0-0.2')	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	2.8	< 0.34	2.8
SB-12 (0.5-1.5')	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	0.094	< 0.036	0.094
SB-13 (0-0.2')	<0.072	<0.072	<0.072	<0.072	<0.072	0.73	<0.072	0.73
SB-13 (0.5-1.5')	<0.040	<0.040	<0.040	<0.040	<0.040	0.0091 J	<0.040	0.0091 J
SB-14 (0-0.2')	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	0.078	< 0.038	0.078
SB-14 (0.5-1.5')	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	0.013 J	< 0.038	0.013 J
DUP-1 [SB-14 (0.5-1.5')]	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	0.030 J	< 0.040	0.030 J
SB-15 (0-0.2')	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	0.2	< 0.036	0.2
SB-15 (0.5-1.5')	< 0.039	< 0.039	< 0.039	< 0.039	< 0.039	0.052	< 0.039	0.052
SB-16 (0-0.2')	Extract and Hold							
SB-16 (0.5-1.5')	Extract and Hold							
SB-17 (0-0.2')	<0.41	<0.41	<0.41	<0.41	<0.41	4.1	<0.41	4.1
SB-17 (0.5-1.5')	<0.039	<0.039	<0.039	<0.039	<0.039	0.18	<0.039	0.18
SB-18 (0-0.2')	<0.69	<0.69	<0.69	<0.69	<0.69	7.2	<0.69	7.2
SB-18 (0.5-1.5')	<0.039	<0.039	<0.039	<0.039	<0.039	0.25	<0.039	0.25
SB-19 (0-0.2')	<0.035	<0.035	<0.035	<0.035	<0.035	0.034 J	<0.035	0.034 J
SB-19 (0.5-1.5')	<0.037	<0.037	<0.037	<0.037	<0.037	0.011 J	<0.037	0.011 J
SB-20 (0-0.2')	<1.9	<1.9	<1.9	<1.9	<1.9	13.0	<1.9	13.0
SB-20 (0.5-1.5')	<0.73	<0.73	<0.73	<0.73	<0.73	4.9	<0.73	4.9
SB-21 (0-0.2')	< 0.83	< 0.83	< 0.83	< 0.83	< 0.83	0.66 J	< 0.83	0.66 J
SB-21 (0.5-1.5')	< 0.037	< 0.037	< 0.037	< 0.037	< 0.037	0.14	< 0.037	0.14
DUP-3 [SB-21 (0.5-1.5')]	Extract and Hold							
SB-22 (0-0.2')	< 0.037	< 0.037	< 0.037	< 0.037	< 0.037	0.0075 J	< 0.037	0.0075 J
SB-22 (0.5-1.5')	< 0.037	< 0.037	< 0.037	< 0.037	< 0.037	< 0.037	< 0.037	< 0.037
SB-23 (0-0.2')	<0.20	<0.20	<0.20	<0.20	1.7	<0.20	0.36	2.06

Table 2

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measure Study
CMS Soil Analytical Results for PCBs (ppm)

Sample ID	Aroclor							Total PCBs
	1016	1221	1234	1242	1248	1254	1260	
SB-23 (0.5-1.5')	<0.038	<0.038	<0.038	<0.038	<0.038	0.12	<0.038	0.12
SB-24 (0-0.2')	<0.38	<0.38	<0.38	<0.38	<0.38	4.5	<0.38	4.5
SB-24 (0.5-1.5')	<0.19	<0.19	<0.19	<0.19	<0.19	1.1	<0.19	1.1
SB-25 (0-0.2')	<0.41	<0.41	<0.41	<0.41	<0.41	4.5	<0.41	4.5
SB-25 (0.5-1.5')	<0.042	<0.042	<0.042	<0.042	<0.042	0.077	<0.042	0.077
DUP-2 [SB-25 (0.5-1.5')]	<0.041	<0.041	<0.041	<0.041	<0.041	0.096	<0.041	0.096

Notes:

1. Samples were collected by Blasland, Bouck & Lee, Inc. (BBL) on September 28, 2004.
2. Samples were analyzed for polychlorinated biphenyls (PCBs) by Severn Trent Laboratories, Inc. (STL) of North Canton, Ohio using United States Environmental Protection Agency (USEPA) SW-846 Method 8082, as referenced in the New York State Department of Environmental Conservation (NYSDEC) 2000 Analytical Services Protocol (ASP).
3. Concentrations presented in parts per million (ppm), which is equivalent to milligrams per kilogram (mg/kg).
4. J = Estimated result. Result is less than the laboratory detection limit.
5. < = Aroclors were not detected at a concentration exceeding the presented laboratory detection limit.
6. Shaded values indicate that the total PCB concentration exceeds the NYSDEC soil guidance values of 1 ppm for surface soil (0 to 0.2 feet deep) and 10 ppm subsurface soil (greater than 0.5 feet deep) as presented in the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) titled "Determination of Soil Cleanup Objectives and Cleanup Levels", HWR-94-4046 (TAGM 4046) dated January 24, 1994.

Table 3

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measure Study
CMS Soil Analytical Results for TAL Inorganics (ppm)

Constituents	TAGM 4046 Guidance Values (Exceedences in Bold)	NY Region Background Values (Exceedences in Italics)	Maximum Site Background (Exceedences Shaded)	SB-23 (0-0.2')	SB-23 (0.5-1.5')
Aluminum	NA	7,000 - 100,000	9,360	9,610	9,330
Antimony	NA	NA	6.9	< 7.0	< 6.9
Arsenic	7.5	3 - 12	11.2	**8.8**	**10.5**
Barium	300	15 - 600	83	97.7	106
Beryllium	0.16	0 - 1.75	0.5	**0.50 B**	**0.51 B**
Cadmium	1	0.1 - 1	0.61	*1.3*	0.78
Calcium	NA	130 - 35,000	167,000	9,250	13,600
Chromium	10	1.5 - 40	23.8	**19.6**	**13.1**
Cobalt	30	2.5 - 60	7.4	*50.2*	13.1
Copper	25	<1 - 50	27.9	*68.9*	*32.4*
Cyanide, Total	NA	NA	< 0.61	0.20 B	< 0.58
Iron	2,000	2,000 - 550,000	27,400	**25,900**	**26,700**
Lead	NA	200 - 500	26.7	*27.2*	22.2
Magnesium	NA	100 - 5,000	21,100	4,130	*5,070*
Manganese	NA	50 - 5,000	1,780	1,570	*1,860*
Mercury	0.1	0.001 - 0.2	0.12	*1.0*	*0.25*
Nickel	13	0.5 - 25	15.7	*130*	*30.6*
Potassium	NA	8,500 - 43,000	759	565 B	527 B
Selenium	2	<0.1 - 3.9	1.2	< 0.59	< 0.58
Silver	NA	NA	1.2	< 1.2	< 1.2
Sodium	NA	<50 - 50,000	82.4	< 587	< 575
Thallium	NA	NA	1.2	0.54 B	< 1.2
Vanadium	150	1 - 300	17.9	19.5	20.3
Zinc	20	9 - 50	92	*109*	*94.8*

Notes:

1. Background samples were collected by Environmental Resources Management, Inc. (ERM) during December 2001 and January 2002. Location SB-23 was sampled by Blasland, Bouck & Lee, Inc. (BBL) on September 28, 2004.
2. TAL = Target Analyte List.
3. Sample analyzed by Severn Trent Laboratories, Inc. (STL) of North Canton, Ohio using United States Environmental Protection Agency (USEPA) SW-846 Method 6010 for TAL Inorganic constituents, USEPA SW-846 Method 7471 for Mercury, and USEPA SW-846 Method 9012 for Total Cyanide, as referenced in the New York State Department of Environmental Conservation (NYSDEC) 2000 Analytical Services Protocol (ASP).
4. Concentrations presented in parts per million (ppm), which is equivalent to milligrams per kilogram (mg/kg).
5. Aluminum, calcium, iron, magnesium, manganese, potassium, and sodium are typical mineral constituents.
6. B = The constituent was detected at a concentration equal to or exceeding the instrument detection limit, but less than the contract required detection limit.
7. < = Constituent was not detected at a concentration exceeding the presented laboratory detection limit.
8. NA = Soil guidance value not listed.
9. Maximum site background represents the highest concentration identified at background soil sampling locations BGD-1 through BGD-5 as part of a background soil sampling program completed during January 2002.
10. Soil Guidance Values are from the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) titled "Determination of Soil Cleanup Objectives and Cleanup Levels", HWR-94-4046 (TAGM 4046) dated January 24, 1994.
11. NY Region background values were obtained from the NYSDEC document titled "Background Concentrations of 20 Elements in Soils with Special Regard for New York State", by E. Carol McGovern, dated 1988.

Table 4

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Potential Chemical, Action, and Location-Specific SCGs

Potential Federal/ State Requirements and Guidance	Citation/Reference	Potential Status	Summary of Requirements/Guidance	Considerations in Remedial Process/Action for Attainment
Chemical-Specific SCGs				
Identification and Listing of Hazardous Wastes	40 CFR Part 261 6 NYCRR Part 371	Applicable	Establishes procedures for identifying solid wastes that are subject to regulation as hazardous wastes under 40 CFR Parts 260-266 and 6 NYCRR Parts 371-376.	Applicable to use for determining if soil that is removed from the Site is a hazardous waste by characteristics or specific listing. These regulations do not set cleanup standards, but are considered when developing remedial alternatives. Based on existing analytical data, it is anticipated that materials to be removed by the remedial alternatives would not be characterized as a hazardous waste.
Groundwater Quality Standards	6 NYCRR Part 703.5	Applicable	Establishes quality standards for groundwater.	These criteria are applicable in evaluating groundwater quality.
NYSDEC Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations	Division of Water Technical and Operational Guidance Series (TOGS 1.1.1, June 1998, revised April 2000)	Applicable	Provides a compilation of ambient water quality standards and guidance values for toxic and non-conventional pollutants for use in the NYSDEC programs.	These standards are applicable in evaluating groundwater quality.
NYSDEC Guidance on Determination of Soil Cleanup Objectives and Cleanup Levels	Technical and Administrative Guidance Memorandum (TAGM) #4046, January 24, 1994	To Be Considered	Provides a basis and a procedure to determine soil cleanup levels, as appropriate, for sites when cleanup to pre-disposal conditions is not possible or feasible. Contains generic soil cleanup objectives.	These guidance values are to be considered in evaluating soil quality.
USEPA Region 3 Risk-Based Concentrations (RBCs) for Commercial/Industrial Soil	USEPA Region 3 www.epa.gov/reg3hwmd/risk/riskmenu.htm	To Be Considered	Provides RBCs for commercial/industrial soil ingestion based on adult occupational exposure, including an assumption that only 50% of total soil ingestion is work-related. Separate carcinogenic and non-carcinogenic risk-based concentrations are calculated for each pathway. The concentration in the USEPA Region 3 RBC table is the lower of the two values.	The RBCs are to be considered in evaluating soil quality.

Table 4
(continued)
Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Potential Chemical, Action, and Location-Specific SCGs

Potential Federal/ State Requirements and Guidance	Citation/Reference	Potential Status	Summary of Requirements/Guidance	Considerations in Remedial Process/Action for Attainment
Chemical-Specific SCGs (Continued)				
USEPA Region 9 Preliminary Remediation Goals (PRGs) for Industrial Soil	USEPA Region 9 www.epa.gov/region09/ waste/sfund/prg/index. com	To Be Considered	Provides PRGs for industrial soil for screening purposes. Each PRG corresponds to an excess lifetime cancer risk of 1×10^{-6} or a non-cancer hazard quotient of 1.	The PRGs are to be considered in evaluating soil quality.
Action-Specific SCGs				
OSHA – General Industry Standards	29 CFR Part 1910	Applicable	These regulations specify the 8-hour time-weighted average concentration for worker exposure to various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is not possible to maintain the work atmosphere below these concentrations.
OSHA – Safety and Health Standards	29 CFR Part 1926	Applicable	These regulations specify the type of safety equipment and procedures to be followed during site remediation.	Appropriate safety equipment will be onsite and appropriate procedures will be followed during any remedial activities.
OSHA – Recordkeeping, Reporting, and Related Regulations	29 CFR Part 1904	Applicable	These regulations outline recordkeeping and reporting requirements for an employer under OSHA.	These regulations apply to the company(s) contracted to install, operate, and maintain remedial actions at hazardous waste sites.
RCRA – General Standards	40 CFR 264	Relevant and Appropriate	General performance standards requiring minimization of need for further maintenance and control; minimization or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products. Also requires decontamination or disposal of contaminated equipment, structures, and soils.	Proper design considerations will be implemented to minimize the need for future maintenance. Decontamination actions and facilities will be included, as appropriate.

Table 4
(continued)
Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Potential Chemical, Action, and Location-Specific SCGs

Potential Federal/ State Requirements and Guidance	Citation/Reference	Potential Status	Summary of Requirements/Guidance	Considerations in Remedial Process/Action for Attainment
Action-Specific SCGs (Continued)				
RCRA – Regulated Levels for Toxic Characteristics Leaching Procedure (TCLP) Constituents	40 CFR Part 261	Applicable	These regulations specify the TCLP constituent levels for identification of hazardous waste that exhibit the characteristic of toxicity.	Excavated soil may be sampled and analyzed for TCLP constituents prior to disposal to determine if the materials are hazardous based on the characteristic of toxicity. However, existing analytical data suggests that materials to be removed by the remedial alternatives would not be characterized as a hazardous waste.
RCRA – Preparedness and Prevention	40 CFR Part 264 Subpart C	Relevant and Appropriate	These regulations outline requirements for safety equipment and spill control.	Safety and communication equipment will be installed at the Site as necessary. Local authorities will be familiarized with the Site.
Land Disposal Facility Notice in Deed	40 CFR Parts 264/265	Applicable	Establishes provisions for a deed notation for closed hazardous waste disposal units to prevent land disturbance by future owners.	The regulations are potentially applicable because closed areas may be similar to closed RCRA units.
RCRA – Contingency Plan and Emergency Procedures	40 CFR Part 264 Subpart D	Relevant and Appropriate	Provides requirements for outlining emergency procedures to be used following explosions, fires, etc.	Plans will be developed and implemented during remedial design, as appropriate. If necessary to develop, copies of the plan will be kept onsite.
Standards Applicable to Transporters of Applicable Hazardous Waste – RCRA Section 3003	40 CFR Parts 262 and 263 40 CFR Parts 170-179	Applicable	Establishes the responsibility of offsite transporters of hazardous waste in the handling, transportation, and management of the waste. Requires manifesting, recordkeeping, and immediate action in the event of a discharge.	These requirements would be applicable to any company(s) contracted to transport hazardous material (if any is generated) from the Site.
USEPA – Administered Permit Program: The Hazardous Waste Permit Program	40 CFR Part 270 RCRA Section 3005	Applicable	Covers the basic permitting, application, monitoring, and reporting requirements for offsite hazardous waste management facilities.	Any offsite facility accepting hazardous waste (if any) from the Site would be properly permitted. Implementation of the Site remedy would include consideration of these requirements.

Table 4
(continued)
Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Potential Chemical, Action, and Location-Specific SCGs

Potential Federal/ State Requirements and Guidance	Citation/Reference	Potential Status	Summary of Requirements/Guidance	Considerations in Remedial Process/Action for Attainment
Action-Specific SCGs (Continued)				
National Pollutant Discharge Elimination System (NPDES)	40 CFR Part 122	Applicable	These regulations detail the specific permit requirements for the discharge of pollutants to the waters of the U.S.	Any water discharged from the Site would be treated (either onsite or offsite), as needed, and discharged in accordance with NPDES permit requirements.
New York State Pollution Discharge Elimination System (SPDES)	6 NYCRR Parts 750-758	Applicable	These regulations detail the specific permit requirements for the discharge of pollutants to the waters of New York State.	Any water discharged from the Site would be treated (either onsite or offsite), as needed, and discharged in accordance with NYSDEC SPDES permit requirements.
New York Hazardous Waste Management System – General	6 NYCRR Part 370	Relevant and Appropriate	Provides definitions of terms and general instructions for the Part 370 series of hazardous waste management.	Hazardous waste, if generated by the remedial activities, would be managed according to this regulation.
New York State - Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	Applicable	Establishes procedures for identifying solid wastes that are subject to regulation as hazardous waste.	Materials excavated/removed from the Site would be handled in accordance with RCRA and New York State hazardous waste regulations, as appropriate.
New York State - Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities	6 NYCRR Part 372	Applicable	Provides requirements relating to the use of the manifest system and its recordkeeping requirements. Also establishes requirements for proper storage of hazardous waste. Applies to hazardous waste generators, transporters, and facilities in New York State.	This regulation will be applicable to the onsite storage of generated hazardous waste (if any) and to any company(s) contracted to do treatment work or to transport hazardous materials (if any) from the Site.
Standards Applicable to Transporters of Applicable Hazardous Waste – RCRA Section 3003	40 CFR Parts 262 and 263 40 CFR Parts 170-179	Applicable	Establishes the responsibility of offsite transporters of hazardous waste in the handling, transportation, and management of the waste. Requires manifesting, recordkeeping, and immediate action in the event of a discharge.	These requirements will be applicable to any company(s) contracted to transport hazardous materials (if any) from the Site.

Table 4
(continued)
Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Potential Chemical, Action, and Location-Specific SCGs

Potential Federal/ State Requirements and Guidance	Citation/Reference	Potential Status	Summary of Requirements/Guidance	Considerations in Remedial Process/Action for Attainment
Action-Specific SCGs (Continued)				
New York State - Waste Transporter Permits	6 NYCRR Part 364	Applicable	Governs the collection, transport, and delivery of regulated waste within New York State.	Properly permitted haulers will be used if any waste materials are transported offsite.
USDOT Rules for Transportation of Hazardous Materials	49 CFR Parts 107, 171.1 – 172.558	Applicable	Outlines procedures for the packaging, labeling, manifesting, and transportation of hazardous materials.	Any company contracted to transport hazardous waste (if any) from the Site will be required to follow these regulations.
New York Regulations for Hazardous Waste Management Facilities	6 NYCRR Parts 373-1.1 – 373-1.8	Applicable	Provides requirements and procedures for obtaining a permit to operate a hazardous waste treatment, storage, and disposal facility (TSDF). Also lists contents and conditions of permit.	Any offsite facility accepting waste from the Site must be properly permitted.
NYSDEC Technical and Administrative Guidance Memorandums (TAGMs)	NYSDEC TAGMs	To be considered	TAGMs are NYSDEC guidance that are to be considered during the remedial process.	Appropriate TAGMs will be considered during the remedial process.
Location-Specific SCGs				
Local Building Permits	Not Available	Applicable	Local authorities may require a building permit for any permanent or semi-permanent structure (e.g., an onsite water treatment system building).	If remedial activities require construction of permanent or semi-permanent structures, necessary permits will be obtained.

Table 5

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Potentially Applicable Criteria for Detected SVOCs, TAL Inorganics, and PCBs in Soil (ppm)

Constituent	USEPA Region 3 RBCs - Industrial Soil	USEPA Region 9 PRGs - Industrial Soil	NY Region Background Values	Minimum Site Background	Maximum Site Background	Upper Limit 95% Confidence Interval of Sample Population	NYSDEC TAGM 4046 Soil Guidance Values	Range of Observed Site Values	Max Detected Value Location
Detected Semi-Volatile Organic Compounds (SVOCs)									
1,1'-Biphenyl	NA	350	NA	NA	NA	NA	NA	0.062 - 2.3	7.3-1 (0-0.5')
3,4-Methylphenol	NA	NA	NA	NA	NA	NA	0.9	0.046 - 0.046	13-5 (2-4')
Acenaphthene	61,000	29,000	NA	NA	NA	NA	50	0.022 - 37	7.3-1 (0-0.5')
Acenaphthylene	NA	NA	NA	NA	NA	NA	41	0.04 - 0.04	13-5 (2-4')
Anthracene	310,000	100,000	NA	NA	NA	NA	50	0.021 - 81	7.3-1 (0-0.5')
Benzo(a)anthracene	3.9	2.1	NA	NA	NA	NA	0.224	0.044 - 130	7.3-1 (0-0.5')
Benzo(a)pyrene	0.39	0.21	NA	NA	NA	NA	0.061	0.039 - 120	7.3-1 (0-0.5')
Benzo(b)fluoranthene	3.9	2.1	NA	NA	NA	NA	1.1	0.046 - 140	7.3-1 (0-0.5')
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	50	0.037 - 46	7.3-1 (0-0.5')
Benzo(k)fluoranthene	39	2.1	NA	NA	NA	NA	1.1	0.027 - 79	7.3-1 (0-0.5')
bis(2-Ethylhexyl) phthalate	200	120	NA	NA	NA	NA	50	0.026 - 0.16	7.3-4 (6-18')
Carbazole	140	86	NA	NA	NA	NA	NA	0.03 - 37	7.3-1 (0-0.5')
Chrysene	390	210	NA	NA	NA	NA	0.4	0.024 - 150	7.3-1 (0-0.5')
Di-n-butyl phthalate	NA	NA	NA	NA	NA	NA	8.1	0.031 - 0.61	BV-3
Dibenz(a,h)anthracene	0.39	0.21	NA	NA	NA	NA	0.014	0.031 - 14	7.3-1 (0-0.5')
Dibenzofuran	2,000	3,100	NA	NA	NA	NA	6.2	0.023 - 22	7.3-1 (0-0.5')
Fluoranthene	41,000	22,000	NA	NA	NA	NA	50	0.029 - 430	7.3-1 (0-0.5')
Fluorene	41,000	26,000	NA	NA	NA	NA	50	0.024 - 42	7.3-1 (0-0.5')
Indeno(1,2,3-cd)pyrene	3.9	2.1	NA	NA	NA	NA	3.2	0.03 - 48	7.3-1 (0-0.5')
Naphthalene	20,000	190	NA	NA	NA	NA	13	0.032 - 14	7.3-1 (0-0.5')
Naphthalene, 2-methyl-	20,000	NA	NA	NA	NA	NA	36.4	0.034 - 5.4	7.3-1 (0-0.5')
Phenanthrene	NA	NA	NA	NA	NA	NA	50	0.029 - 390	7.3-1 (0-0.5')
Pyrene	31,000	29,000	NA	NA	NA	NA	50	0.022 - 310	7.3-1 (0-0.5')
Target Analyte List (TAL) Inorganic Constituents									
Aluminum	1,000,000	100,000	7,000 - 100,000	3,530	9,360	10,961	SB	4,070 - 12,000	18-11 (0-0.5')
Antimony	410	410	NA	6.9	6.9	7.5	SB	0.25 - 1.3	18-5 (6-18')
Arsenic	1.9	260	3 - 12	3.6	11.2	13.1	7.5 or SB	4.8 - 26.6	18-8 (2-4')
Barium	72,000	67,000	15 - 600	22.2	83	97.3	300 or SB	24.6 - 135	8.2-3 (10.5-11.5')
Beryllium	2,000	1,900	0 - 1.75	0.5	0.5	0.62	0.16 or SB	0.14 - 0.74	18-9 (0-0.5')
Cadmium	1,000	450	0.1 - 1	<0.52	< 0.61	0.62	1.0 or SB	0.044 - 61.3	14-5 (0-1')
Calcium	NA	NA	130 - 35,000	374	167,000	181,304	SB	1,230 - 145,000	8.1-3 (4-5')
Chromium	1,500,000	450	1.5 - 40	5.3	23.8	22.4	10 or SB	7.3 - 1,390	14-1 (0-1')
Hexavalent Chromium	3,100	64	NA	0.35	1.4	1.5	NA	0.09 - 401	14-1 (0-1')
Cobalt	20,000	1,900	2.5 - 60	3	7.4	8.6	30 or SB	3.1 - 246	18-3 (0-0.5')
Copper	41,000	41,000	<1 - 50	11.1	27.9	30.2	25 or SB	1.7 - 372	18-9 (0-0.5')
Iron	310,000	100,000	2,000 - 550,000	11,600	27,400	30,866	2,000 or SB	12,200 - 38,700	18-6 (0-0.5')
Lead	NA	750	200 - 500	3.8	26.7	28.1	SB	1.6 - 198	18-5 (0-0.5')
Magnesium	NA	NA	100 - 5,000	2,360	21,100	18,459	SB	2,180 - 33,500	8.1-3 (13-14')
Manganese	140,000	19,000	50 - 5,000	478	1,780	1,890	SB	456 - 2,350	18-3 (2-4')
Mercury	NA	310	0.001 - 0.2	0.0091	0.12	0.125	0.1	0.011 - 5.6	8.1-6 (8-9')
Nickel	20,000	20,000	0.5 - 25	7.6	15.7	17.1	13 or SB	8.7 - 599	18-3 (0-0.5')
Potassium	NA	NA	8,500 - 43,000	457	759	747	SB	357 - 1,200	18-9 (0-0.5')
Selenium	5,100	5,100	<0.1 - 3.9	<0.52	< 1.2	1.2	2.0 or SB	0.35 - 7.9	4-2 (0-1')
Silver	5,100	5,100	NA	<1	< 1.2	1.2	SB	0.092 - 0.87	4-1 (0-1')
Sodium	NA	NA	<50 - 50,000	62.9	82.4	872	SB	26.2 - 1350	14-5 (0-1')
Thallium	72	67	NA	<1	< 1.2	1.2	SB	0.52 - 2.3	18-3 (0-0.5')
Vanadium	310	7,200	1 - 300	5.9	17.9	21.9	150 or SB	6.6 - 26.9	4-1 (1-2')
Zinc	310,000	100,000	9 - 50	35.9	92	95.8	20 or SB	33.5 - 232	18-11 (0-0.5')
Cyanide (total)	NA	NA	NA	<0.52	< 0.61	0.62	Site Specific	0.13 - 1.9	14-5 (0-1')
Cyanide (free)	20,000	12,000	NA	NA	NA	NA	NA	ND	NA
Polychlorinated Biphenyls (PCBs)									
Total PCBs	1.4	0.74	NA	NA	NA	NA	Surface Soil: 1 Subsurface Soil: 10	0.046 - 44, 2,700	TV-5

See notes on Page 2.

Table 5

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Potentially Applicable Criteria for Detected SVOCs, TAL Inorganics, and PCBs in Soil (ppm)

Notes:

1. United States Environmental Protection Agency (USEPA) Region 3 Risk-Based Concentrations (RBCs) were obtained from USEPA Region 3 website (http://www.epa.gov/reg3hwmd/risk/riskmenu.htm) last updated October 15, 2003.
2. USEPA Region 9 Preliminary Remediation Goals (PRGs) were obtained from USEPA Region 9 website (http://www.epa.gov/region09/waste/sfund/prg/index.htm) last updated October 1, 2002.
3. NY Region Background values were obtained from the New York State Department of Environmental Conservation (NYSDEC) document titled "Background Concentrations of 20 Elements in Soils with Special Regard for New York State", by E. Carol McGovern, dated 1988.
4. Maximum site background represents the highest concentration identified at background soil sampling locations BGD-1 through BGD-5 as part of a background soil sampling program completed during January 2002.
5. The upper limit of the 95% confidence interval was calculated using the background sample population.
6. NYSDEC TAGM 4046 Soil Guidance Values were obtained from the NYSDEC TAGM titled, "Determination of Soil Cleanup Objectives and Cleanup Levels," HWR-94-4046 (TAGM 4046), dated January 24, 1994, revised December 20, 2000.
7. Concentrations presented in parts per million (ppm), which are equivalent to milligrams per kilogram (mg/kg).
8. NA = Not Available.
9. SB = Site background.
10. Site Specific = TAGM 4046 indicates the soil cleanup objective for cyanide is site-specific.
11. < = not detected above the reported laboratory detection limit.

Table 6

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Preliminary Remedial Technology Screening Evaluation for Soil

General Response Action	Remedial Technology	Technology Process	Description	Screening Comments
No Action	No Action	No Action	Alternative would not include any remedial action.	Technically feasible.
Institutional Controls	Access Restrictions	Deed Restrictions	Deeds for the property would include restrictions on future site use and excavation of subsurface soils.	Potentially applicable.
In-Situ Containment/Control	Capping	Clay/Soil Cap	Placing and compacting clay material or soil material over areas containing constituents of concern.	Technically feasible.
		Asphalt/Concrete Cap	Application of a layer of asphalt or concrete over areas containing constituents of concern.	Technically feasible.
		Multi-Media Cap	Application of clay material and a synthetic membrane over areas containing constituents of concern.	Technically feasible.
	Physical Containment	Slurry Walls	Involves excavating a trench to the depth of a confining base layer while adding a slurry (e.g., soil/cement-bentonite mixture) to limit downgradient migration of constituents of interest.	Not retained. Excavation to confining base layer (located approximately 80 feet below grade) is not technically practical.

Table 6

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Preliminary Remedial Technology Screening Evaluation for Soil

General Response Action	Remedial Technology	Technology Process	Description	Screening Comments
In-Situ Containment/Control (cont'd)	Physical Containment (cont'd)	Steel Sheet Piles	Steel sheet piles are driven to the depth of a confining layer to limit downgradient migration of constituents of interest.	Not retained. Installation of sheet piling to confining base layer (located approximately 80 feet below grade) is not practical considering the length and depth of sheet piling necessary.
In-Situ Treatment	Immobilization	Stabilization/ Solidification	Treatment process which immobilizes constituents of concern within a solid mass (monolith). A solid monolith is formed by injecting and mixing an immobilization agent into the media. A variety of agents (e.g., portland cement, lime, polymerics, proprietary agents, etc.) have been utilized and could be effective for immobilizing various constituents and media.	Technically feasible.
		Vitrification	Immobilizes or destroys constituents by melting the media utilizing electrical currents. The melted media then solidifies to form a glass-like monolith.	Not retained. This process is not technically practical for surface and shallow sub-surface impacts. Limited data on long term effectiveness.
	Extraction	Soil Flushing	Groundwater is extracted via extraction wells, passed through a treatment system (if required), extraction media is introduced into the water, and the water is then reinjected into the source areas to flush constituents from soil.	Not retained. This process is difficult to control.

Table 6

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Preliminary Remedial Technology Screening Evaluation for Soil

General Response Action	Remedial Technology	Technology Process	Description	Screening Comments
Removal	Excavation	Excavation	Physical removal of media containing constituents of concern to prevent future migration and exposure. Typical excavation equipment includes backhoes, loaders, and/or dozers.	Technically feasible.
Ex-Situ On-Site Disposal	On-Site Disposal	RCRA Landfill	Construction of a landfill that would meet RCRA requirements.	Not retained. Concerns based on the site's location adjacent to a residential area.
		Solid Waste Landfill	Construction of a landfill that would meet NYSDEC solid waste requirements.	Not retained. Concerns based on the site's location adjacent to a residential area.
Off-Site Disposal	Off-Site Disposal	RCRA Subtitle C Landfill	Disposal of media in an existing RCRA permitted landfill.	Technically feasible.
		Subtitle D Solid Waste Landfill	Disposal of media in an existing permitted non-hazardous landfill.	Technically feasible for non-hazardous soil.

Note:

1. Shaded technologies have not been retained for further evaluation.

Table 7

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Preliminary Remedial Technology Screening Evaluation for Groundwater

General Response Action	Remedial Technology	Technology Process	Description	Screening Comments
No Action	No Action	No Action	Alternative would not include any remedial action.	Technically feasible.
Institutional Controls	Use Restrictions	Deed Restrictions/ Groundwater Use Restrictions	Deeds for the property and down gradient off-site properties may include restrictions on use of groundwater.	Potentially applicable.
In-Situ Containment/Control	Capping/Infiltration Control	Clay/Soil Cap	Placing and compacting clay material or soil material over areas containing constituents of concern to minimize infiltration of storm water.	Technically feasible.
		Asphalt/Concrete Cap	Application of a layer of asphalt or concrete over areas containing constituents of concern to minimize infiltration of storm water.	Technically feasible.
		Multi-Media Cap	Application of clay material and a synthetic membrane over areas containing constituents of concern to minimize infiltration of storm water.	Technically feasible.
	Hydraulic Containment	Slurry Walls	Involves excavating a trench to the depth of a confining base layer while adding a slurry (e.g., soil/cement-betonies mixture) to limit down gradient migration.	Not retained. Excavation to confining base layer (located approximately 80 feet below grade) is not practical.
		Steel Sheet Piles	Steel sheet piles are driven to the depth of a confining layer to limit down gradient migration of groundwater.	Not retained. Installation of sheet piling to confining base layer (located approximately 80 feet below grade) is not practical considering the length and depth that would be needed.

Table 7

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Preliminary Remedial Technology Screening Evaluation for Groundwater

General Response Action	Remedial Technology	Technology Process	Description	Screening Comments
In-Situ Containment/Control (cont'd)	Hydraulic Containment (cont'd)	Grout Curtains	Holes are drilled around groundwater plumes. A grout is injected under pressure through the holes and allowed to cure to create a vertical barrier.	Not retained. Ability to achieve and maintain the desired permeability is limited.
In-Situ Treatment	Biodegradation	Enhanced In-Situ Aerobic Biodegradation	Degradation of constituents by utilizing aerobic micro-organisms with the addition of amendments and controls to enhance the process performance and decrease duration.	Technically feasible.
		Enhanced In-Situ Anaerobic Biodegradation	Degradation of constituents by utilizing anaerobic micro-organisms with the addition of amendments and controls to enhance the process performance and decrease duration.	Technically feasible.
	Chemical Treatment	In-Situ Chemical Oxidation	Addition of oxidizing agents (e.g., ozone, hydrogen peroxide, etc.) below the water table to degrade organic constituents to less-toxic byproducts.	Technically feasible.
	Monitored Natural Attenuation	Monitored Natural Attenuation	Natural biological and physical processes that result in the reduction of concentration, toxicity, and mobility of chemical constituents. This process relies on long-term monitoring to demonstrate the reduction of impacts caused by chemical constituents.	Technically feasible.
	Physical Separation	Air Sparging	A process in which VOCs are removed through volatilization by injection of air into the subsurface below the groundwater table under controlled pressure.	Not retained. Effectiveness is limited by the size of the groundwater plume and difficulties associated with accessing offsite portions of the plume.

Table 7

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Preliminary Remedial Technology Screening Evaluation for Groundwater

General Response Action	Remedial Technology	Technology Process	Description	Screening Comments
Extraction	Groundwater Extraction	Vertical Extraction Wells	Vertical wells are installed and utilized to recover groundwater for treatment/disposal.	Technically feasible.
		Horizontal Extraction Wells	Horizontal wells are utilized to replace conventional cluster wells in soils.	Technically feasible.
		Collection Trenches	A zone of higher permeability material is installed within the desired capture area with a perforated collection laterally placed along the base to direct groundwater to a collection area for treatment and/or disposal.	Technically feasible.
		Subsurface Drains	A high permeability channel is installed to provide groundwater collection and redirection of movement for treatment and/or disposal.	Not retained. Difficult to install due to depth to groundwater.
Ex-Situ On-Site Treatment	Chemical Treatment	Ion Exchange	Exchange of constituent cationic or anionic ions in the groundwater with ions held by an ion exchange material. Typically used to remove metallic elements and inorganic ions.	Not retained. Not proven to effectively treat organics.
		UV/Oxidation	Oxidation by subjecting groundwater to ultraviolet light and ozone.	Technically feasible.
		Chemical Oxidation	Addition of oxidizing agents to degrade organic constituents to less-toxic byproducts.	Not retained. Not practical to treat the volume of water to be extracted.
	Physical Separation	Carbon Adsorption	Process by which organic constituents are adsorbed to the carbon as groundwater is passed through carbon units.	Technically feasible.

Table 7

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Preliminary Remedial Technology Screening Evaluation for Groundwater

General Response Action	Remedial Technology	Technology Process	Description	Screening Comments
Ex-Situ On-Site Treatment (cont'd)	Physical Separation	Air Stripping	A process in which VOCs are removed through volatilization by increasing the contact between the groundwater and air.	Not retained. Effectiveness is significantly limited by the low concentrations detected at and in the vicinity of the Site.
		Precipitation/Coagulation/ Flocculation	Process which transforms dissolved constituents into insoluble solids by adding coagulating agents to facilitate subsequent removal from the liquid phase by sedimentation/ filtration. The process usually uses pH adjustment, addition of a chemical precipitant, and flocculation.	Not retained. May not effectively treat organics.
Extraction with Off-Site Treatment/Disposal	Hydraulic Control	Discharge to a local Publicly Owned Treatment Works (POTW)	Water is discharged to a sanitary sewer and treated at a local POTW facility.	Not retained. The local POTW is unlikely to approve the discharge.
		Discharge to Surface Water via Storm Sewer	Treated or untreated water is discharged to a surface water, provided that quality and quantity meet the allowable discharge requirements for surface waters (NYSDEC SPDES compliance).	Technically feasible.
		Reinsertion	Groundwater is extracted via extraction wells, passed through a treatment system, and is then reinvested into the ground through injection wells.	Technically feasible.

Note:
1. Shaded technologies have not been retained for further evaluation.

Table 8

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Secondary Remedial Technology Screening Evaluation for Soil

General Response Action	Remedial Technology	Technology Process	Effectiveness	Implementability
No Action	No Action	No Action	Does not achieve the corrective measure objectives for soil.	Not applicable.
Institutional Controls	Access Restrictions	Deed Restrictions	This option alone would not meet the corrective measure objectives. However, institutional controls could be used in conjunction with other remedial technologies to achieve the corrective measure objectives.	Readily implementable.
In-Situ Containment/ Control	Capping	Clay/Soil Cap	Effective for reducing infiltration of precipitation/surface water. Effective for reducing potential exposure to impacted surface soils. Long-term effectiveness requires ongoing maintenance and monitoring. Not suitable for high-traffic areas.	Equipment and materials to construct a clay/soil cap are readily available.
		Asphalt/Concrete Cap	Effective for reducing infiltration of precipitation/surface water. Effective for reducing potential exposure to impacted surface soils. Long-term effectiveness requires ongoing maintenance and monitoring. Suitable for high-traffic areas.	Equipment and materials to construct an asphalt/concrete cap are readily available.
		Multi-Media Cap	Effective for reducing infiltration of precipitation/surface water. Effective for reducing potential exposure to impacted surface soils. Long-term effectiveness requires ongoing maintenance and monitoring. Not suitable for high-traffic areas.	Equipment and materials to construct a multi-media cap are readily available.

Table 8

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Secondary Remedial Technology Screening Evaluation for Soil

General Response Action	Remedial Technology	Technology Process	Effectiveness	Implementability
In-Situ Treatment	Immobilization	Stabilization/Solidification	Proven process for effectively reducing mobility and toxicity of inorganic and select organic constituents. Overall effectiveness of this process would need to be evaluated through a treatability study.	Technically implementable.
Removal	Excavation	Excavation	Proven process for effectively removing unsaturated soil above the water table.	Technically implementable. Equipment capable of excavating the soil is readily available.
Off-Site Disposal	Disposal	RCRA Subtitle C Landfill	Proven process that can effectively disposal of RCRA hazardous solid waste.	Easily implemented.
		Subtitle D Solid Waste Landfill	Proven process that can effectively disposal of non-hazardous solid waste.	Easily implemented.

Note:

1. Shaded technologies have not been retained for development of remedial alternatives.

Table 9

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Secondary Remedial Technology Screening Evaluation for Groundwater

General Response Action	Remedial Technology	Technology Process	Effectiveness	Implementability
No Action	None	None	Does not achieve the corrective measure objectives for groundwater.	Technically feasible.
Institutional Controls	Use Restrictions	Deed Restrictions/ Groundwater Use Restrictions	This option alone would not meet the corrective measure objectives. However, institutional controls could be used in conjunction with other remedial technologies to achieve the corrective measure objectives.	Readily implementable. Would require coordination with off-site property owners for off-site impacts.
In-Situ Containment/ Control	Capping/Infiltration Control	Clay/Soil Cap	Effective for reducing infiltration of precipitation/surface water to assist in maintaining hydraulic control. Long-term effectiveness requires ongoing maintenance and monitoring. Not suitable for high-traffic areas.	Equipment and materials necessary to construct a clay/soil cap are readily available.
		Asphalt/Concrete Cap	Effective for reducing infiltration of precipitation/surface water to assist in maintaining hydraulic control. Long-term effectiveness requires ongoing maintenance and monitoring. Suitable for high-traffic areas.	Equipment and materials necessary to construct an asphalt/concrete cap are readily available.
		Multi-Media Cap	Effective for reducing infiltration of precipitation/surface water to assist in maintaining hydraulic control. Long-term effectiveness requires ongoing maintenance and monitoring. Not suitable for high-traffic areas.	Equipment and materials necessary to construct a multi-media cap are readily available.

Table 9

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Secondary Remedial Technology Screening Evaluation for Groundwater

General Response Action	Remedial Technology	Technology Process	Effectiveness	Implementability
In-Situ Treatment	Biodegradation	Enhanced In-Situ Aerobic Biodegradation	Innovative technology. Process effective for addressing site-related constituents. Radius of influence surrounding injection points is uncertain. A delivery system could be designed based on available bio-geochemical data.	Not retained. Requires presence of appropriate microorganisms and nutrients, as well as appropriate environmental conditions. Delivery of large amounts of supplemental nutrients would be required.
		Enhanced In-Situ Anaerobic Biodegradation	Innovative technology. Process effective for addressing site-related constituents. Radius of influence surrounding injection points is uncertain. A delivery system could be designed based on available bio-geochemical data.	Not retained. Requires presence of appropriate microorganisms and nutrients, as well as appropriate environmental conditions. Delivery of large amounts of supplemental nutrients would be required.
	Chemical Treatment	In-Situ Chemical Oxidation	Innovative technology. Process effective for addressing site-related constituents. This technology is most efficiently used to reduce chemical concentrations within "hot-spot" areas.	Not retained. Effectiveness is based on the ability to deliver oxidizing agents to impacted media. Radius of influence surrounding injection points is uncertain.
	Monitored Natural Attenuation	Monitored Natural Attenuation	Potentially achieves corrective measure objectives for offsite groundwater in conjunction with other in-situ technology such as biodegradation or chemical oxidation.	Easily implemented. Appropriate environmental conditions have been identified, appropriate microorganisms may be present.
Removal	Groundwater Extraction	Vertical Extraction Wells	Proven process for effectively extracting groundwater. Implementation of this process along with treatment could effectively achieve the corrective measure objectives for groundwater.	Not retained. Access to appropriate offsite locations not permitted.

Table 9

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Secondary Remedial Technology Screening Evaluation for Groundwater

General Response Action	Remedial Technology	Technology Process	Effectiveness	Implementability
Removal (Continued)	Groundwater Extraction	Horizontal Extraction Wells	Proven process for effectively extracting groundwater. Implementation of this process along with treatment could effectively achieve the corrective measure objectives for groundwater.	Not retained. Requires specialized horizontal drilling equipment. Not necessarily appropriate for the site.
		Collection Trenches	Proven process for effectively extracting groundwater. Implementation of this process along with treatment could effectively achieve the corrective measure objectives for groundwater.	Not retained. The required depth of the collection trench would likely be below the reach of excavation equipment.
Ex-Situ On-Site Treatment	Chemical Treatment	UV/Oxidation	Process available for treating organic compounds. May be implemented as part of process treatment train.	Not retained. Special provisions would likely be required for the storage of process chemicals. A bench-scale treatability study would also be required to evaluate this process.
	Physical Separation	Carbon Adsorption	Effective at removing organic constituents. May be implemented as part of process treatment train.	Not retained. Access to appropriate offsite locations not permitted.
Off-Site Treatment/Disposal	Hydraulic Control	Discharge to Surface Water via Storm Sewer	Potentially available process for discharging treated groundwater. Effectiveness depends upon treatment of impacted groundwater.	Not retained. Would require treating a large volume of water and effectiveness of the treatment aspect is limited.

Table 9

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study
Secondary Remedial Technology Screening Evaluation for Groundwater

General Response Action	Remedial Technology	Technology Process	Effectiveness	Implementability
Off-Site Treatment/Disposal (Cont'd)	Hydraulic Control (Cont'd)	Reinsertion	Proven process for discharging treated groundwater. Prior to reinjection, impacted groundwater would require treatment to achieve water quality criteria established by the NYSDEC. Groundwater reinjection may affect the ability to maintain hydraulic control under groundwater extraction and containment scenarios.	Not retained. Would require treating a large volume of water and effectiveness of the treatment aspect is limited.

Note:

1. Shaded technologies have not been retained for development of remedial alternatives.

Table 10

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 2: Site Controls and Monitoring

Item #	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
CAPITAL COSTS					
1	Institutional Controls	1	LS	$20,000	$20,000
				Subtotal Capital Cost	***$20,000***
				Engineering and Administration (10%)	***$2,000***
				Contingency (25%)	***$5,000***
				Estimated Capital Cost	**$27,000**
ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS					
Annual O&M					
2	Fence Inspection/Maintenance	1	LS	$2,000	$2,000
				Subtotal Annual O&M Cost	***$2,000***
				O&M Contingency (25%)	***$500***
				Estimated Annual O&M Cost	**$2,500**
				Present Worth Factor (30 years, 7%)	**12.4090**
				Present Worth of Fence Inspection/Maintenance	**$31,023**
3	Groundwater Monitoring and Reporting	1	LS	$20,000	$20,000
				Subtotal Annual O&M Cost	***$20,000***
				O&M Contingency (25%)	***$5,000***
				Estimated Annual O&M Cost	**$25,000**
				Present Worth Factor (10 years, 7%)	**7.0236**
				Present Worth of Groundwater Monitoring and Reporting	**$175,590**
				Total Present Worth of Annual O&M	**$206,612**
				Total Estimated Cost	**$233,612**
				Rounded To	**$240,000**

Table 10

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 2: Site Controls and Monitoring

General Comments:

1. All costs include labor, equipment, and materials, unless otherwise noted.
2. Costs do not include legal fees, negotiations, or oversight by the New York State Department of Environmental Conservation (NYSDEC).
3. Unit costs are in 2004 dollars and are estimated from standard estimating guides, vendors, and professional judgment and experience from other projects.
4. Costs are based on current site information and project understanding.
5. Cost estimates for the CMS are for the purpose of comparing relative costs against each other and do not represent actual design or construction cost estimates. Following the selection of a corrective measure alternative, statement of basis, and pre-design activities, a design/construction cost estimate can be prepared.

Assumptions:

1. Institutional controls cost estimate includes costs for a deed restriction to notify future property owners of the presence of chemical constituents in soil and groundwater at the Site, the need to maintain the fencing, and the need for health and safety provisions in the event that excavation activities had to occur. Also includes costs for a Site Management Plan to provide for long-term maintenance of the fencing and provide guidelines for management of soil material during future activities that involve excavation.
2. Fence inspection/maintenance cost estimate includes costs for visually inspecting the fencing around the perimeter of the Site and performing repairs, as needed.
3. Groundwater monitoring and reporting cost estimate is based on implementation of the NYSDEC-approved *Groundwater Monitoring Plan* (BBL, April 2004). This cost estimate includes costs for obtaining groundwater field parameter measurements and collecting groundwater samples at select wells in the Site monitoring well network on an annual basis, and submitting those samples for laboratory analysis of select VOCs. This cost estimate also includes costs to prepare annual letter reports summarizing the results of the groundwater monitoring events.

Table 11

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 3: Barrier Layer, Site Controls and Monitoring

Item #	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
CAPITAL COSTS					
1	Pre-Design Investigation	1	LS	$25,000	$25,000
2	Engineering Design	1	LS	$30,000	$30,000
3	Mobilization/Demobilization	1	LS	$30,000	$30,000
4	Onsite Observation	1	LS	$42,000	$42,000
5	Erosion/Sedimentation Control	1	LS	$12,000	$12,000
6	General Fill Material	2,600	CY	$20	$52,000
7	Topsoil (6-inches)	2,600	CY	$25	$65,000
8	Monitoring Well Modification	1	Each	$2,000	$2,000
9	Institutional Controls	1	LS	$25,000	$25,000
10	Site Restoration	1	LS	$15,000	$15,000
11	Reporting	1	LS	$15,000	$15,000
				Subtotal Capital Cost	***$313,000***
				Engineering and Administration (10%)	***$31,300***
				Contingency (25%)	***$78,250***
				Estimated Capital Cost	**$422,550**
ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS					
Annual O&M					
12	Annual Barrier Layer Inspection/Maintenance	1	LS	$5,000	$5,000
				Subtotal Annual O&M Cost	***$5,000***
				O&M Contingency (25%)	***$1,250***
				Estimated Annual O&M Cost	**$6,250**
				Present Worth Factor (30 years, 7%)	**12.4090**
				Present Worth of Annual Barrier Layer Inspection/Maintenance	**$77,557**
13	Groundwater Monitoring and Reporting	1	LS	$20,000	$20,000
				Subtotal Annual O&M Cost	***$20,000***
				O&M Contingency (25%)	***$5,000***
				Estimated Annual O&M Cost	**$25,000**
				Present Worth Factor (10 years, 7%)	**7.0236**
				Present Worth of Groundwater Monitoring and Reporting	**$175,590**
				Total Present Worth of Annual O&M	**$253,146**
				Total Estimated Cost	**$675,696**
				Rounded To	**$680,000**

Table 11

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 3: Barrier Layer, Site Controls and Monitoring

General Comments:

1. All costs include labor, equipment, and materials, unless otherwise noted.
2. Costs do not include legal fees, negotiations, or oversight by the New York State Department of Environmental Conservation (NYSDEC).
3. Unit costs are in 2004 dollars and are estimated from standard estimating guides, vendors, and professional judgment and experience from other projects.
4. Costs are based on current site information and project understanding.
5. Cost estimates for the CMS are for the purpose of comparing relative costs against each other and do not represent actual design or construction cost estimates. Following the selection of a corrective measure alternative, statement of basis, and pre-design activities, a design/construction cost estimate can be prepared.

Assumptions:

1. Pre-design investigation cost estimate includes costs for additional investigation to further delineate the extent of remedial activities prior to beginning construction.
2. Engineering design cost estimate includes costs for all labor and materials necessary to design and prepare contract documents for the remedial elements of this alternative.
3. Mobilization/demobilization cost estimate includes costs for the mobilization and demobilization of all labor, equipment, and materials necessary to implement this corrective measure alternative.
4. Onsite observation cost estimate includes costs for an onsite observer to monitor the progress of field activities, and perform air monitoring. Cost estimate is based on providing a representative for up to 10 hours per day, 5-days per week, for a period of up to 8 weeks at an hourly rate of $100/hour.
5. Erosion/sedimentation control cost estimate includes costs for installation and maintenance of erosion and sedimentation control measures anticipated to include approximately 1,500 linear feet of silt fencing.
6. General fill material cost estimate includes costs to place 6-inches of fill over top the area of impacted soils.
7. Topsoil cost estimate includes costs to install a layer of topsoil approximately 6-inches thick over the general fill layer, so that a vegetative cover may be established.
8. Monitoring well modification cost estimate includes costs to install additional riser materials at MW03-3 to match the new final grade established by construction of the barrier layer.
9. Institutional controls cost estimate includes costs for a deed restriction to notify future property owners of the presence of chemical constituents in soil and groundwater at the Site, the need to maintain the barrier layer, and the need for health and safety provisions/barrier layer repair in the event that excavation activities had to occur. Also includes costs for a Site Management Plan to provide for long-term maintenance of the barrier layer and provide guidelines for management of soil material during future activities that would breach the barrier layer.
10. Site restoration cost estimate includes costs to seed the topsoil over the barrier layer and conduct general site cleanup following completion of barrier layer installation activities.
11. Reporting cost estimate includes costs for a certification report to summarize the barrier layer construction activities.

Table 11

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 3: Barrier Layer, Site Controls and Monitoring

Assumptions (continued):

12. Annual barrier layer inspection/maintenance cost estimate includes costs for visually inspecting the barrier layer and performing minor repairs that may be needed.
13. Post-remedial groundwater monitoring and reporting cost estimate is based on implementation of the NYSDEC-approved *Groundwater Monitoring Plan* (BBL, April 2004). This cost estimate includes costs for obtaining groundwater field parameter measurements and collecting groundwater samples at select wells in the Site monitoring well network on an annual basis, and submitting those samples for laboratory analysis of select VOCs. This cost estimate also includes costs to prepare annual letter reports summarizing the results of the groundwater monitoring events.

Table 12

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 4: Stabilization/Solidification, Barrier Layer, Site Controls and Monitoring

Item #	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
CAPITAL COSTS					
1	Pre-Design Investigation	1	LS	$25,000	$25,000
2	Treatability Study	1	LS	$100,000	$100,000
3	Engineering Design	1	LS	$75,000	$75,000
4	Mobilization/Demobilization	1	LS	$75,000	$75,000
5	Onsite Observation	1	LS	$50,000	$50,000
6	Erosion/Sedimentation Control	1	LS	$10,000	$10,000
7	Below-grade footer removal	1	LS	$50,000	$50,000
8	Stabilization/Solidification - Grout Installation	5,600	ton	$150	$840,000
9	General Fill Material	2,600	CY	$20	$52,000
10	Topsoil (6-inches)	2,600	CY	$25	$65,000
11	Monitoring Well Modification	1	Each	$2,000	$2,000
12	Institutional Controls	1	LS	$25,000	$25,000
13	Site Restoration	1	LS	$15,000	$15,000
14	Reporting	1	LS	$20,000	$20,000
				Subtotal Capital Cost	***$1,404,000***
				Engineering and Administration (10%)	***$140,400***
				Contingency (25%)	***$351,000***
				Estimated Capital Cost	**$1,895,400**
ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS					
Annual O&M					
15	Annual Barrier Layer Inspection/Maintenance	1	LS	$5,000	$5,000
				Subtotal Annual O&M Cost	***$5,000***
				O&M Contingency (25%)	***$1,250***
				Estimated Annual O&M Cost	**$6,250**
				Present Worth Factor (30 years, 7%)	**12.4090**
				Present Worth of Annual Barrier Layer Inspection/Maintenance	**$77,557**
16	Groundwater Monitoring and Reporting	1	LS	$20,000	$20,000
				Subtotal Annual O&M Cost	***$20,000***
				O&M Contingency (25%)	***$5,000***
				Estimated Annual O&M Cost	**$25,000**
				Present Worth Factor (10 years, 7%)	**7.0236**
				Present Worth of Annual Groundwater Monitoring and Reporting	**$175,590**
				Total Present Worth of Annual O&M	**$253,146**
				Total Estimated Cost	**$2,148,546**
				Rounded To	**$2,150,000**

Table 12

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 4: Stabilization/Solidification, Barrier Layer, Site Controls and Monitoring

General Comments:

1. All costs include labor, equipment, and materials, unless otherwise noted.
2. Costs do not include legal fees, negotiations, or oversight by the New York State Department of Environmental Conservation (NYSDEC).
3. Unit costs are in 2004 dollars and are estimated from standard estimating guides, vendors, and professional judgment and experience from other projects.
4. Costs are based on current site information and project understanding.
5. Cost estimates for the CMS are for the purpose of comparing relative costs against each other and do not represent actual design or construction cost estimates. Following the selection of a corrective measure alternative, statement of basis, and pre-design activities, a design/construction cost estimate can be prepared.

Assumptions:

1. Pre-design investigation cost estimate includes costs for additional investigation to further delineate the extent of remedial activities prior to beginning construction.
2. Treatability study cost estimate includes costs to conduct a study to evaluate the type and quantity of stabilization agents appropriate for Site conditions.
3. Engineering design cost estimate includes costs for all labor and materials necessary to design and prepare contract documents for the remedial elements of this alternative.
4. Mobilization/demobilization cost estimate includes costs for the mobilization and demobilization of all labor, equipment, and materials necessary to implement this corrective measure alternative.
5. Onsite observation cost estimate includes costs for an onsite observer to monitor the progress of field activities, and perform air monitoring. Cost estimate is based on providing a representative for up to 10 hours per day, 5-days per week, for a period of up to 10 weeks at an hourly rate of $100/hour.
6. Erosion/sedimentation control cost estimate includes costs for installation and maintenance of erosion and sedimentation control measures anticipated to include approximately 1,500 linear feet of silt fencing.
7. Below-grade footer removal cost estimate includes costs to remove remaining footers, foundation walls, and subsurface structures in the vicinity of AOC Nos. 4, 8.1, and 14, and crush the concrete for re-use as onsite backfill.
8. Stabilization/Solidification cost estimate includes costs all labor, equipment, and materials necessary to treat 5,600 tons of impacted soil (approximately 3,500 cubic yards of soil assumed to weigh 1.6 tons/cubic yard) using grout injection technologies. Estimate assumes no subsurface obstructions are encountered.
9. General fill material cost estimate includes costs to place 6-inches of fill over-top impacted soils.
10. Topsoil cost estimate includes costs to install a layer of topsoil approximately 6-inches thick over the general fill layer, so that a vegetative cover may be established.
11. Monitoring well modification cost estimate includes costs to install additional riser materials at MW03-3 to match the new final grade established by construction of the barrier layer.

Table 12

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 4: Stabilization/Solidification, Barrier Layer, Site Controls and Monitoring

Assumptions (continued):

12. Institutional controls cost estimate includes costs for a deed restriction to notify future property owners of the presence of chemical constituents in soil and groundwater at the Site, the need to maintain the monolith and the barrier layer, and the need for health and safety provisions/barrier layer repair in the event that excavation activities had to occur. Also includes costs for a Site Management Plan to provide for long-term maintenance of the barrier layer and provide guidelines for management of the monolith and/or soil material during future activities that would breach the barrier laver.
13. Site restoration cost estimate includes costs to seed the barrier layer and conduct general site cleanup following completion of barrier layer installation activities.
14. Reporting cost estimate includes costs for a certification report to summarize the soil stabilization/solidification and barrier layer construction activities.
15. Annual inspection/maintenance cost estimate includes costs for visually inspecting the barrier layer and performing minor repairs that may be needed.
16. Post-remedial groundwater monitoring and reporting cost estimate is based on implementation of the NYSDEC-approved *Groundwater Monitoring Plan* (BBL, April 2004). This cost estimate includes costs for obtaining groundwater field parameter measurements and collecting groundwater samples at select wells in the Site monitoring well network on an annual basis, and submitting those samples for laboratory analysis of select VOCs. This cost estimate also includes costs to prepare annual letter reports summarizing the results of the groundwater monitoring events.

Table 13

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 5: Excavation/Offsite Disposal, Site Controls and Monitoring

Item #	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
CAPITAL COSTS					
1	Pre-Design Investigation	1	LS	$75,000	$75,000
2	Engineering Design	1	LS	$75,000	$75,000
3	Mobilization/Demobilization	1	LS	$25,000	$25,000
4	Onsite Observation	1	LS	$50,000	$50,000
5	Material Staging Area Construction	1	LS	$30,000	$30,000
6	Erosion and Sedimentation Control	1	LS	$25,000	$25,000
7	Soil Excavation/Handling	14,500	CY	$20	$290,000
8	Verification Soil Sample Analysis	1	LS	$30,000	$30,000
9	Waste Characterization Sample Analysis	1	LS	$30,000	$30,000
10	Offsite T&D of Non-Hazardous Solid Waste	23,500	tons	$75	$1,762,500
11	Offsite T&D of Non-Hazardous Liquid Waste	20,000	gallons	$0.50	$10,000
12	Equipment Decontamination	1	LS	$5,000	$5,000
13	Run-of-Bank Gravel Backfill Placement	17,500	tons	$15	$262,500
14	Topsoil Placement	4,500	tons	$25	$112,500
15	Institutional Controls	1	LS	$20,000	$20,000
16	Site Restoration	1	LS	$10,000	$10,000
17	Reporting	1	LS	$15,000	$15,000
				Subtotal Capital Cost	***$2,827,500***
				Engineering and Administration (10%)	***$282,750***
				Contingency (25%)	***$706,875***
				Estimated Capital Cost	**$3,817,125**
ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS					
Annual O&M					
18	Groundwater Monitoring and Reporting	1	LS	$20,000	$20,000
				Subtotal Annual O&M Cost	***$20,000***
				O&M Contingency (25%)	***$5,000***
				Estimated Annual O&M Cost	**$25,000**
				Present Worth Factor (10 years, 7%)	**7.0236**
				Total Present Worth of Annual O&M	**$175,590**
				Total Estimated Cost	**$3,992,715**
				Rounded To	**$4,000,000**

Table 13

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Report
Cost Estimate for Alternative 5: Excavation/Offsite Disposal, Site Controls and Monitoring

General Comments:

1. All costs include labor, equipment, and materials, unless otherwise noted.
2. Costs do not include legal fees, negotiations, or oversight by the New York State Department of Environmental Conservation (NYSDEC).
3. Unit costs are in 2004 dollars and are estimated from standard estimating guides, vendors, and professional judgment and experience from other projects.
4. Costs are based on current site information and project understanding.
5. Cost estimate assumes that limited additional soil removal would be performed within the excavation areas identified in the Interim Corrective Measure Additional PCB Soil Removal Certification Report (BBL, November 2004).
6. Cost estimates for the CMS are for the purpose of comparing relative costs against each other and do not represent actual design or construction cost estimates. Following the selection of a corrective measure alternative, statement of basis, and pre-design activities, a design/construction cost estimate can be prepared.

Assumptions:

1. Pre-design investigation cost estimate includes costs for additional investigation to further delineate the extent of removal activities prior to beginning excavation.
2. Engineering design cost estimate includes costs for all labor and materials necessary to design and prepare contract documents for the remedial elements of this alternative.
3. Mobilization/demobilization cost estimate includes costs for the mobilization and demobilization of all labor, equipment, and materials necessary to implement this corrective measure alternative.
4. Onsite observation cost estimate includes costs for an onsite observer to monitor the progress of field activities, and perform air monitoring. Cost estimate is based on providing a representative for up to 10 hours per day, 5 days per week, for a period of up to 10 weeks at an hourly rate of $100/hour.
5. Material staging area construction cost estimate includes costs to construct bermed and lined staging areas for soils removed from the proposed excavation areas.
6. Erosion/sedimentation control cost estimate includes costs for installation and maintenance of erosion and sedimentation control measures anticipated to include approximately 1,500 linear feet of silt fencing.
7. Soil excavation/handling cost estimate includes costs to remove soil from the excavation areas using conventional equipment and transfer the excavated soil to a material staging area.
8. Verification soil sample analysis cost estimate includes costs for laboratory analysis of verification soil samples collected at the excavation limits for PCBs, SVOCs, and metals, as appropriate.
9. Waste characterization sample analysis cost estimate includes costs for laboratory analysis of samples collected to characterize excavated soils for disposal. Cost is based on one waste characterization sample per approximately 500 CY of excavated material at an estimated cost of $1,000 per sample.
10. Transportation and offsite disposal of non-hazardous solid waste cost estimate includes costs to transport approximately 14,500 cubic yards (CY) of soil exhibiting PCBs, SVOCs, and/or metals at concentrations below thresholds for a characteristic hazardous waste. Cost estimate assumes a soil density of 1.6 tons per CY.

Table 13

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

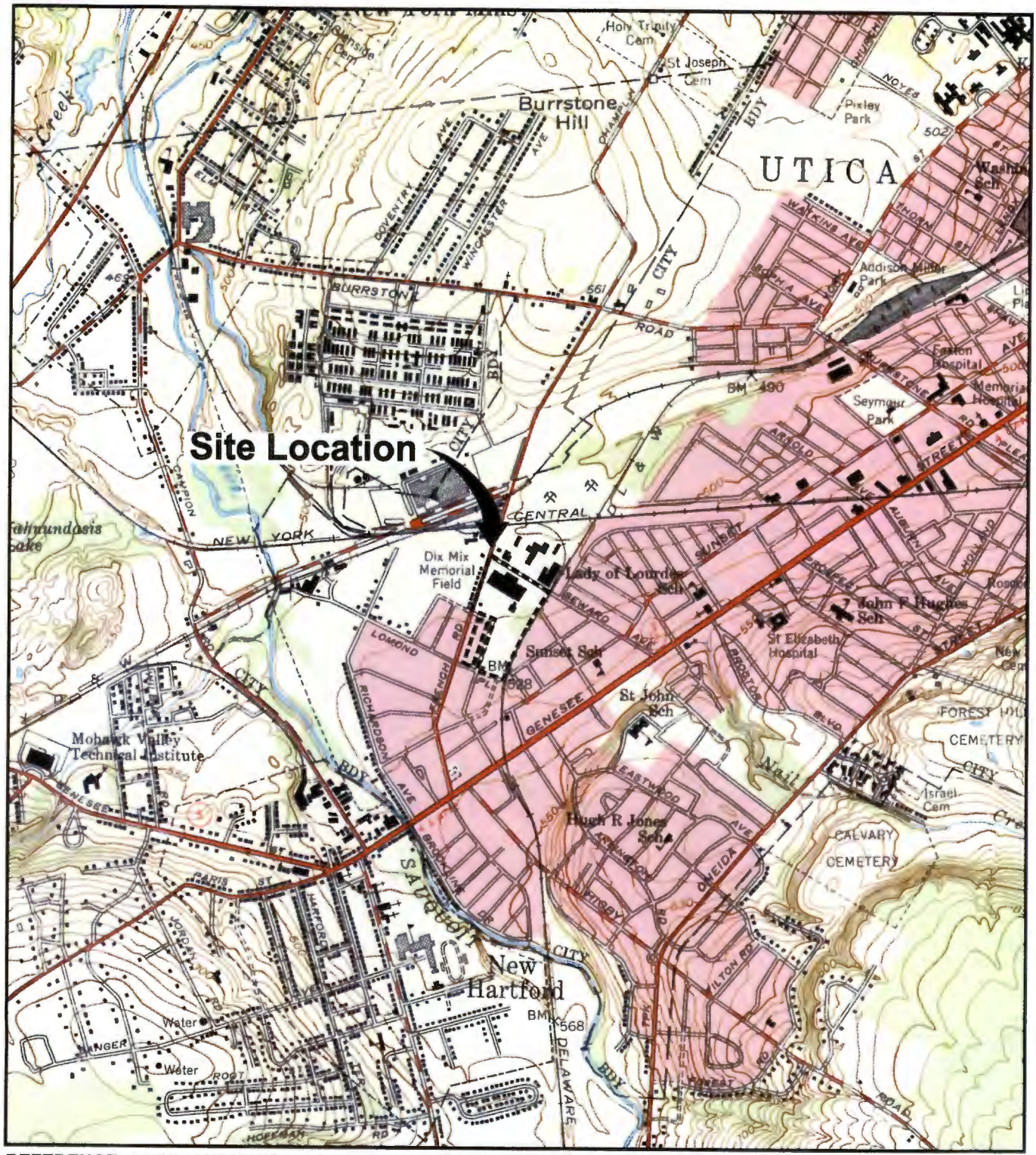
Corrective Measures Study Report
Cost Estimate for Alternative 5: Excavation/Offsite Disposal, Site Controls and Monitoring

Assumptions (continued):

11. Transportation and offsite disposal of non-hazardous liquid waste cost estimate includes costs to transport 20,000 gallons of water collected in the excavation areas, the material staging areas, and equipment decontamination area to an offsite wastewater treatment facility for treatment/disposal.
12. Equipment decontamination cost estimate includes costs to decontaminate excavation equipment after excavating impacted soils, prior to handling clean backfill material, and prior to demobilization.
13. Run-of-bank gravel backfill placement cost estimate includes costs to provide, place, grade, and compact run-of-bank backfill material within the excavation areas to a height of approximately 4-inches from the ground surface.
14. Topsoil placement cost estimate includes costs to provide, place, and grade topsoil over the excavated areas.
15. Institutional controls cost estimate includes costs for a deed restriction to notify future property owners of the presence of chemical constituents in soil and groundwater at the Site and the need for health and safety provisions in the event that excavation activities had to occur. Also includes costs for a Site Management Plan to provide guidelines for management of soil material during future activities.
16. Site restoration cost estimate includes costs for general site cleanup following completion of excavation/ backfilling activities.
17. Reporting cost estimate includes costs for a certification report to summarize the soil removal and waste handling activities.
18. Post-remedial groundwater monitoring and reporting cost estimate is based on implementation of the NYSDEC-approved *Groundwater Monitoring Plan* (BBL, April 2004). This cost estimate includes costs for obtaining groundwater field parameter measurements and collecting groundwater samples at select wells in the Site monitoring well network on an annual basis, and submitting those samples for laboratory analysis of select VOCs. This cost estimate also includes costs to prepare annual letter reports summarizing the results of the groundwater monitoring events.

Figures

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., UTICA, WEST, NEW YORK, 1983.

2000' 0 2000'

Approximate Scale: 1" = 2000'

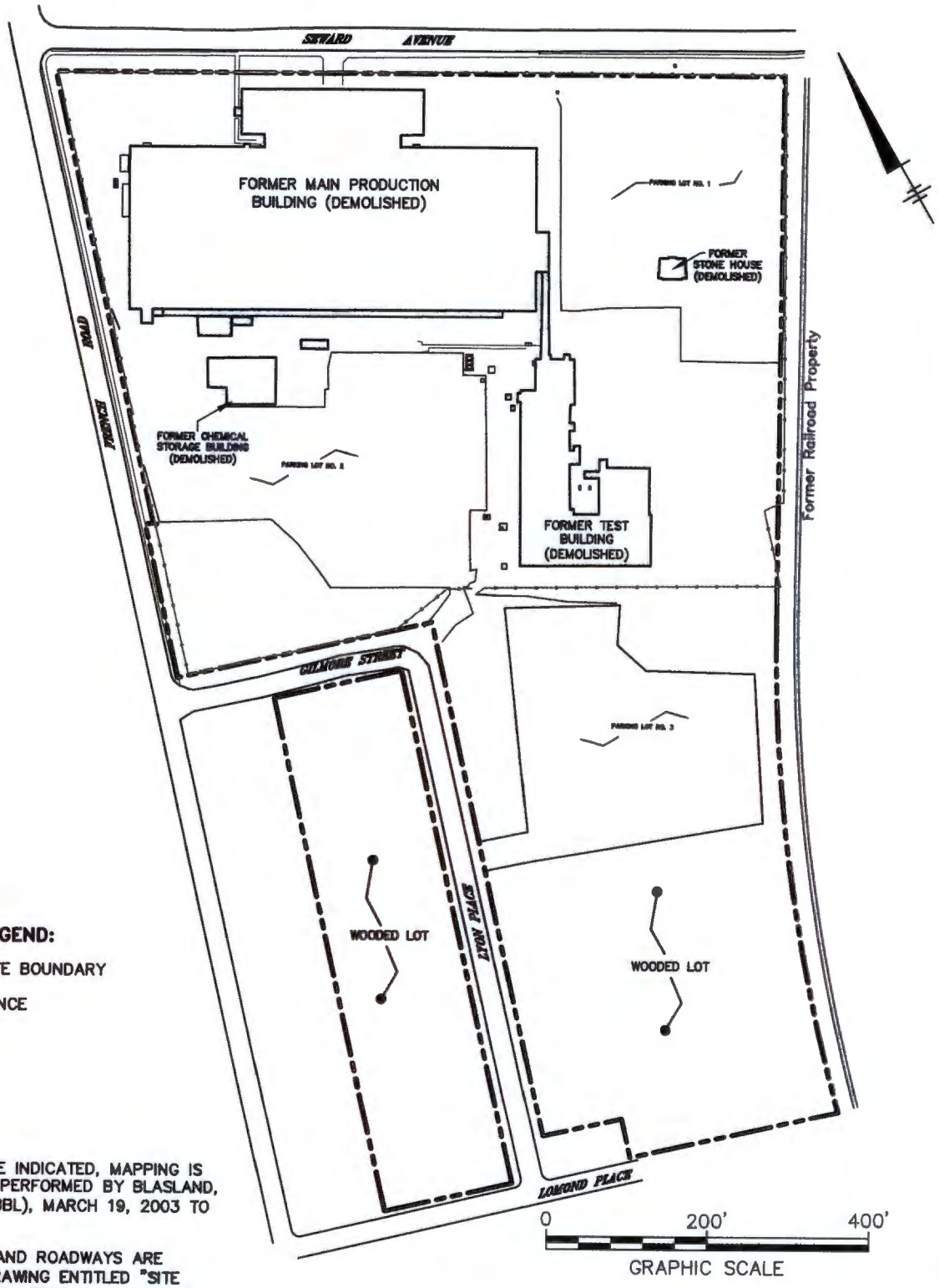
03/16/04 SYR-D85-DJH KFS
48107001/48107n02.cdr

FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

SITE LOCATION MAP

BBL
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

FIGURE
1



LEGEND:

SITE BOUNDARY

FENCE

NOTE:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC.(BBL), MARCH 19, 2003 TO JUNE 28, 2004.

2. PROPERTY LINES AND ROADWAYS ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCE MANAGEMENT, INC. (ERM), EXTON, PA., AT A SCALE OF 1" = 40', DATED AUGUST 27, 2002.

FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

SITE LAYOUT PLAN

BBL
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

FIGURE
2

X: 48107X07.DWG
L: ON=*, OFF=REF*
P: PAGESET/PLT-AP
12/22/04 SYR-85-RCB NJR
48107006/ICMADD/48107B04.DWG

Appendix A

Relevant Project Correspondence

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

8/10/2004
Letter to NYSDEC

CMS Work Plan

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Dextra

Transmitted Via E-Mail & Federal Express

August 10, 2004

Ms. Alicia Barraza
New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Solid Waste and Corrective Action
625 Broadway
Albany, New York 12233-7258

Re: Former TRW Aeronautical Systems Facility
211 Seward Avenue – Utica, New York
USEPA ID#: NYD002244911

Dear Ms. Barraza:

On behalf of Lucas Western LLC (Lucas Western), this letter presents the Corrective Measures Study (CMS) Work Plan for the CMS to be completed for onsite groundwater and soils at the former TRW Aeronautical Systems facility located in Utica, New York (the "Site"). The CMS Work Plan outlines the approach of this CMS to address environmental conditions at the Site. The Plan is intended to facilitate preparation and review of the CMS requested by the New York State Department of Environmental Conservation (NYSDEC) in a July 27, 2004 letter that provides approval of the *RCRA Facility Investigation Report* prepared by Blasland, Bouck & Lee, Inc. (BBL) in April 2004 [the "RFI Report"]. The Plan has been prepared in accordance with guidance provided in the United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Directive 9902.3-2A – RCRA (Resource Conservation and Recovery Act) Corrective Action Plan dated May 1994.

A detailed discussion of current site conditions is presented in the NYSDEC-approved RFI Report. As set forth in the RFI Report, concentrations of inorganic constituents (arsenic, beryllium, cadmium, chromium, cobalt, copper, cyanide, mercury, nickel, selenium, and zinc) identified in soils within six areas of concern (AOCs) at the Site are above the RFI screening criteria, as developed using the soil guidance values presented in the NYSDEC Technical and Administrative Guidance Memorandum titled *Determination of Soil Cleanup Objectives and Cleanup Levels*, HWR-94-4046, dated January 24, 1994 (TAGM 4046). In addition, polychlorinated biphenyl (PCB) concentrations identified in four AOCs and semi-volatile organic compound (SVOC) concentrations identified in three AOCs are above the TAGM 4046 soil guidance values.

The Dextra Group, LLC
Environmental Business Solutions
4665 Lower Roswell Road, #154
Marietta, Georgia 30068
(770) 578-9696 Phone
(770) 321-5345 Fax

As also provided in the RFI Report, volatile organic compound (VOC) and PCB concentrations in onsite groundwater were identified above the groundwater quality standards presented in the NYSDEC Division of Water, Technical and Operational Guidance Series document titled *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitation*, (TOGS 1.1.1), dated June 1998, last updated April 2000.

Various corrective measure alternatives for addressing these constituents in onsite soils and groundwater will be evaluated in the CMS. Groundwater hydraulically downgradient from the Site will be addressed under a separate CMS, as needed.

This CMS Work Plan is organized into the following sections:

- Background;
- Purpose and Objectives;
- Potential corrective measures technologies and/or alternatives;
- Evaluation of potential corrective measures;
- Proposed pilot or bench scale studies;
- Outline for the CMS Report; and
- Schedule.

I. BACKGROUND

Based on the results of the RFI, the nature and extent of constituents of interest in onsite soil and onsite groundwater have been determined and the potential exposure routes from these sources to the human population are understood. The following complete exposure pathways have been identified:

- *Potential Trespasser* – While the Site is surrounded by a locked chain-link fence, the potential still exists for trespassers. Exposure of trespassers would be infrequent and of relatively short duration. Possible exposure routes may include dermal contact, incidental ingestion of surface soil, and inhalation of wind-blown particles.

- *Future Commercial/Industrial Worker* – The Site is expected to be redeveloped for future commercial/industrial use. Under existing conditions, future workers have the potential for exposure to constituents of interest in surface soil via dermal contact, incidental ingestion, and inhalation of wind-blown particles. Inhalation of VOCs from soil is unlikely because VOCs were only identified in subsurface soils and were only detected at concentrations below TAGM 4046 soil guidance values. However, worker exposure to other constituents of interest in subsurface soil could potentially occur during future construction activities. In addition, if a building were to be constructed in the future, a potentially complete exposure pathway could be associated with intrusion of VOCs from groundwater into indoor air. Further analysis of this pathway (as summarized in a memorandum from BBL attached to a June 10, 2004 letter from the Dextra Group LLC to the NYSDEC) indicated that risks would not be significant.

- *Potential Offsite Exposure* – Residential and commercial properties currently exist west and north of the Site, respectively. Potential exposure to individuals in these areas could

occur in the unlikely event of onsite dust generation and wind-blown transport of particulates.

II. PURPOSE AND OBJECTIVES

A CMS will be conducted to evaluate potential final corrective measure alternatives to address elevated levels of chemical constituents in the AOCs and onsite groundwater at the Site, thereby addressing potential exposure pathways. The CMS will also identify a recommended alternative that is protective of human health and the environment and appropriate for the intended commercial/industrial future site use.

Corrective measure objectives have been developed for the CMS considering the results of the qualitative human exposure evaluation, potentially-applicable standards/criteria/ guidance, and intended future site use. Consideration of site use in the development of the corrective measure objectives is consistent with the new New York State (NYS) Superfund Refinancing and Reform Legislation (NYS Assembly Bill 9120 (June 20, 2003)), passed in October 2003, that endorses future site use as a relevant factor in remediation decision-making. Specifically, the Legislation states, in the discussion of Remedial Program Requirements to be enacted pursuant to Section 27-1415, Paragraph 6 titled "Soil Cleanup Objectives", that "the regulations shall include three generic tables of contaminant-specific remedial action objectives for soil *based on a site's current, intended or reasonably anticipated future use*, including: (I) unrestricted, (II) commercial and (III) industrial (emphasis added)." [refer to http://assembly.state.ny.us/leg/?bn=A09120&sh=t].

Accordingly, qualitative corrective measure objectives established for the Site are as follows:

- Prevent/mitigate potential future exposure of commercial/industrial workers at the Site to soil containing elevated levels of constituents of interest or exposure to offsite residents via wind-blown dust;

- Prevent potential human exposure to chemical constituents in groundwater within Site boundaries at concentrations exceeding groundwater quality standards/guidance values; and

- Prevent exposure to VOCs potentially migrating through soil vapor at the Site as a precautionary measure, although preliminary evaluation indicates that this exposure pathway is not an issue.

The proposed corrective measures will address each AOC at the Site where PCBs, SVOCs, and inorganic constituents have been identified in soil at concentrations above the Soil Performance Goals identified below. The corrective measures will also address groundwater beneath the Site boundaries that exhibits VOCs at concentrations above the Groundwater Performance Goals, identified below. AOCs to be addressed as part of the CMS and the constituents of interest within these AOCs are listed in the table below.

AOC No.	AOC Title	Constituent of Interest		
		PCBs	SVOCs	Inorganics
1	Former Chemical Storage Building		✔	
4	Former Plating Area Wastewater Treatment Equipment			✔
7.3	Former 550-Gallon Diesel Fuel Aboveground Storage Tank		✔	
8.1	Former Cyanide Waste Pit No. 1			✔
8.2	Former Cyanide Waste Pit No. 2			✔
13	Former VOC-Impacted Soils Area		✔	
14	Former Plating Area			✔
17.3	Former Electrical Transformer Substation No. 3	✔		
18	Former Drum Storage Area			✔
20	Former Main Production Building Footprint	✔		
21	Former Test Building Footprint and Vicinity	✔		
23	Grass-Covered Area East of Enclosed Passageway	✔		
24	South Storm Sewer Line Catch Basin Area including the limits of the backfilled storm sewer interim corrective measure (ICM) south sewer line excavation			✔

In support of the corrective measure objectives, numerical performance goals have been established to determine the extent of soil to be addressed under each proposed corrective measure. Additionally, specific performance goals have been established for onsite groundwater. The development of performance goals for onsite soil and groundwater is presented below.

Development of Soil Performance Goals

Performance goals for soil were developed considering various comparison criteria, the site location/ setting, and intended commercial/industrial future site use. As a starting point, the USEPA Region 3 Risk Based Concentrations (RBCs) and the Region 9 Preliminary Remediation Goals (PRGs), developed to be protective of human health in an industrial setting, were considered in developing the performance goals. Regional and site-specific background inorganic constituent concentrations were considered next, including the 95% upper confidence limits for the background sample data (calculated values below which inorganics concentrations are predicted to be in 95% of collected background samples). The soil guidance values presented in TAGM 4046, which are generally lower than the other criteria discussed above, were also considered. The TAGM 4046 guidance values for inorganic constituents (excluding mercury) are established as the higher value of either a conservative health-based tabulated criteria presented in the document (where available) or background. TAGM 4046 indicates that New York State or eastern United States background soil values may be used as cleanup criteria for heavy metals (except mercury). The comparison criteria are summarized in Table 1.

Based on review of the various comparison criteria, at this time, the conservative TAGM 4046 soil guidance values have been selected as the performance goals for onsite soil. However, substantial revisions to the New York State clean up levels are pending. We understand that these revisions are anticipated to include development of new soil clean up levels for three different categories of site use (or cleanup tracks), including residential (unrestricted), commercial, and industrial use. We also understand that the revisions are anticipated to allow for calculation of site-specific cleanup levels based on site-specific circumstances. At such time that the new cleanup levels are proposed or promulgated, Lucas Western reserves the right to evaluate the new criteria with regards to the site conditions, and to propose less conservative performance goals for the onsite soils.

Development of Groundwater Performance Goals

The results of the RFI groundwater monitoring event conducted for the Site indicate the presence of VOCs at concentrations above groundwater quality standards within the Site boundaries, as summarized below.

- Two chlorinated solvents, 1,1,1-trichloroethane (1,1,1-TCA) and trichloroethene (TCE), were detected in samples at concentrations slightly above the TOGS 1.1.1 groundwater quality standard for each constituent;

- Ethylbenzene, isopropylbenzene, and xylenes were detected in one onsite sample at concentrations slightly above the TOGS 1.1.1 groundwater quality standard. These three constituents were not detected above laboratory detection limits in any other RFI groundwater samples; and

- Chloroform was detected in all of the RFI groundwater samples. The concentration of chloroform in select samples was above the TOGS 1.1.1 groundwater quality standard. The chloroform concentrations detected in onsite wells was generally consistent with concentrations of chloroform found in wells located hydraulically upgradient from the Site, and concentrations of chloroform in wells hydraulically downgradient from the Site were less than those in wells upgradient from the Site. Chloroform is not attributed to former site activities. Historic data suggested that there is a chloroform source hydraulically upgradient of the Site.

Aside from three typical mineral constituents (iron, manganese, and sodium), Target Analyte List (TAL) inorganic constituents were not detected in groundwater samples at concentrations above the TOGS 1.1.1 groundwater quality standards. PCBs were detected in only one of the groundwater samples collected during the RFI. The PCB concentration in that onsite sample was above the TOGS 1.1.1 groundwater quality standard. However, PCBs were not detected in the sample from this location, or for any other samples, collected for the first round of annual groundwater monitoring activities in June 2004 [complete results for the June 2004 annual groundwater monitoring activities will be summarized in a letter report to be submitted to NYSDEC by the end of September 2004].

As mentioned in the RFI Report, potential exposure to VOCs in onsite groundwater is not expected to occur because there is no potable use of groundwater at the Site and the depth to groundwater (at least 10 feet below ground surface) precludes the possibility of direct contact. A comparison of the results of the RFI groundwater sampling with data from previous

groundwater sampling activities indicates that the concentrations of VOCs in onsite groundwater have generally declined over the past several years and are anticipated to decline due to natural processes. Accordingly, the evaluation of corrective measures for onsite groundwater will be limited to evaluation of a monitoring alternative to confirm the anticipated continuing reduction in onsite groundwater VOC concentrations.

III. POTENTIAL CORRECTIVE MEASURES TECHNOLOGIES AND/OR ALTERNATIVES

Based on a review of previous investigation results [as presented in the RFI Report] and results for verification soil sampling performed in connection with the previously completed Storm Sewer ICM removal activities [refer to the NYSDEC-approved *Interim Corrective Measure Storm Sewer Removal Certification Report* (BBL, March 2004)], a streamlined approach will be used for the CMS. Three potential site-wide corrective measure alternatives that satisfy the objectives of the CMS will be evaluated and compared against each other to determine which alternative best satisfies the evaluation criteria. Three potential corrective measure technologies to address soils will be used in combination with various site controls/monitoring to form the three separate site-wide alternatives. Under each alternative, constituents of interest in onsite groundwater would be addressed in the same manner as follows:

- Onsite groundwater monitoring would be performed to evaluate the concentrations of constituents of interest at the Site; and

- Onsite groundwater use restrictions would be implemented to prevent exposure to groundwater constituents above groundwater standards.

The proposed site-wide alternatives and their corresponding elements (in addition to the above-mentioned groundwater controls and monitoring) are summarized below:

- *Alternative 1 - Barrier Layer and Site Controls & Monitoring:* Under this first alternative, a barrier layer (soil cover, asphalt/concrete pavement, concrete building foundation, etc.) would be installed as an active exposure prevention method in the AOCs over areas of soil exhibiting constituents at concentrations above the soil performance goals identified above. The following site controls would also be implemented under this alternative:

  - A deed restriction would be imposed to restrict property use to commercial/industrial only;

  - A Soils Management Plan would be developed and would provide for long-term maintenance of the barrier/cover. The Soil Management Plan would be referenced in the deed to the property; and

  - The Soils Management Plan would also provide guidelines to be followed for management of soil material during future activities that would breach the barrier/cover system.

The CMS will also evaluate under this alternative the need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier).

- *Alternative 2 - Stabilization/Solidification and Site Controls & Monitoring:* Under this second alternative, soils in the AOCs that exhibit constituents at concentrations above the performance goals would be stabilized/solidified. The following site controls would also be implemented under this alternative:

  - A deed restriction would be imposed to restrict property use to commercial/industrial only; and

  - A Soils Management Plan would be developed to establish guidelines to be followed for management of stabilized soil material disturbed during future activities. The Soils Management Plan would be referenced in the deed to the property.

  The CMS will also evaluate under this alternative the need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier).

- *Alternative 3 – Excavation/Offsite Disposal and Site Controls:* Under this third alternative, soils in the AOCs exhibiting constituents at concentrations above the performance goals would be excavated and transported for offsite disposal. The CMS will also evaluate under this alternative the need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier).

IV. EVALUATION OF POTENTIAL CORRECTIVE MEASURES

The three corrective measure alternatives will be evaluated in terms of the following criteria:

- *Technical Analysis*. A description of the proposed approach and technical considerations for implementing the corrective measures will be presented. The technical analysis will consist of an evaluation of the anticipated performance, reliability, implementability, and safety of the corrective measures;

- *Environmental Analysis.* The ability of the corrective measures to achieve adequate source control and/or address constituents of interest will be assessed. The environmental analysis will include an assessment of the potential short-term and long-term effects (both adverse and beneficial) resulting from implementation of the corrective measures. Mitigative measures will be identified to minimize potential adverse effects (if any);

- *Human Health Analysis*. Potential risks to human health that may occur during and/or after implementation of the corrective measures will be assessed. The human health analysis will also identify mitigative measures to reduce potential risks to human health associated with the implementation of the corrective measures;

- *Institutional Analysis*. An evaluation of the corrective measure alternatives with respect to federal, state, and local standards, regulations, and guidance will be performed. In the process of this analysis, permitting requirements will be identified and permitting schedules for implementation of each alternative will be identified (if applicable).

- *Cost Analysis*. Both capital and operation and maintenance cost for the corrective measures will be assessed.

V. PROPOSED PILOT OR BENCH SCALE STUDIES

No pilot or bench scale studies are proposed. The RFI activities generated adequate data to assess the AOCs and evaluate potential corrective measures.

VI. OUTLINE FOR THE FOCUSED CMS REPORT

At the completion of the CMS, a focused CMS Report will be prepared. The focused CMS Report will be organized into the following sections.

Section	Purpose
Section 1 - Introduction	Presents a brief overview of the project and describes the purpose of the document.
Section 2 - Current Conditions	Presents a summary of activities completed and new information obtained since completion of the RFI.
Section 3 - Cleanup Standards	Presents proposed cleanup standards for each impacted media.
Section 4 - Corrective Measures Alternatives	Identifies alternatives evaluated in the focused CMS.
Section 5 - Evaluation of Final Corrective Measure Alternatives	Presents an evaluation of proposed corrective measure alternatives against various criteria.
Section 6 - Selection of Final Corrective Measure Alternative	Presents the selected corrective measure alternative and the rationale used for selection.

VII. SCHEDULE

Pursuant to the NYSDEC's July 27, 2004 RFI Report approval letter, we currently anticipate that a CMS Report will be submitted to the NYSDEC by October 29, 2004. If field conditions are encountered during implementation of the NYSDEC-approved *ICM Additional PCB Soil Removal Work Plan* (BBL, March 2004) that could delay the schedule for completing the CMS, then the NYSDEC will be notified promptly of the conditions and length of any anticipated delay.

We await NYSDEC approval of this CMS Work Plan and are prepared to begin work on the CMS Report following Work Plan approval. If you have any questions on this letter, please do not hesitate to contact me at 770-578-9696 or via e-mail at batsel@dextra-group.com.

Sincerely,
The Dextra Group LLC

Kurt Batsel, P.E.
Principal

JCB/jcb
Attachment

cc: Valerie M. Hanna, Esq., Brouse McDowell
Mr. David R. Gerber, P.E., BBL Environmental Services, Inc.
Mr. John C. Brussel, P.E., Blasland, Bouck & Lee, Inc.

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Work Plan
Potentially Applicable Criteria for Detected SVOCs and TAL Inorganics (ppm)

Constituent	USEPA Region 3 RBCs - Industrial Soil	USEPA Region 9 PRGs - Industrial Soil	NY Region Background Values	Maximum Site Background	Upper Limit 95% Confidence Interval of Sample Population	NYSDEC TAGM 4046 Soil Guidance Values	Range of Observed Site Values	Max Detected Value Location
Detected Semi-Volatile Organic Compounds (SVOCs)								
1,1'-Biphenyl	NA	350	NA	NA	NA	NA	0.062 - 2.3	7.3-1 (0-0.5')
3,4-Methylphenol	NA	NA	NA	NA	NA	0.9	0.046 - 0.046	13-5 (2-4')
Acenaphthene	61,000	29,000	NA	NA	NA	50	0.022 - 37	7.3-1 (0-0.5')
Acenaphthylene	NA	NA	NA	NA	NA	41	0.04 - 0.04	13-5 (2-4')
Anthracene	310,000	100,000	NA	NA	NA	50	0.021 - 81	7.3-1 (0-0.5')
Benzo(a)anthracene	3.9	2.1	NA	NA	NA	0.224	0.044 - 130	7.3-1 (0-0.5')
Benzo(a)pyrene	0.39	0.21	NA	NA	NA	0.061	0.039 - 120	7.3-1 (0-0.5')
Benzo(b)fluoranthene	3.9	2.1	NA	NA	NA	1.1	0.046 - 140	7.3-1 (0-0.5')
Benzo(ghi)perylene	NA	NA	NA	NA	NA	50	0.037 - 46	7.3-1 (0-0.5')
Benzo(k)fluoranthene	39	2.1	NA	NA	NA	1.1	0.027 - 79	7.3-1 (0-0.5')
bis(2-Ethylhexyl) phthalate	200	120	NA	NA	NA	50	0.026 - 0.16	7.3-4 (6-18')
Carbazole	140	86	NA	NA	NA	NA	0.03 - 37	7.3-1 (0-0.5')
Chrysene	390	210	NA	NA	NA	0.4	0.024 - 150	7.3-1 (0-0.5')
Di-n-butyl phthalate	NA	NA	NA	NA	NA	8.1	0.031 - 0.61	BV-3
Dibenz(a,h)anthracene	0.39	0.21	NA	NA	NA	0.014	0.031 - 14	7.3-1 (0-0.5')
Dibenzofuran	2,000	3,100	NA	NA	NA	6.2	0.023 - 22	7.3-1 (0-0.5')
Fluoranthene	41,000	22,000	NA	NA	NA	50	0.029 - 430	7.3-1 (0-0.5')
Fluorene	41,000	26,000	NA	NA	NA	50	0.024 - 42	7.3-1 (0-0.5')
Indeno(1,2,3-cd)pyrene	3.9	2.1	NA	NA	NA	3.2	0.03 - 48	7.3-1 (0-0.5')
Naphthalene	20,000	190	NA	NA	NA	13	0.032 - 14	7.3-1 (0-0.5')
Naphthalene, 2-methyl-	20,000	NA	NA	NA	NA	36.4	0.034 - 5.4	7.3-1 (0-0.5')
Phenanthrene	NA	NA	NA	NA	NA	50	0.029 - 390	7.3-1 (0-0.5')
Pyrene	31,000	29,000	NA	NA	NA	50	0.022 - 310	7.3-1 (0-0.5')
Target Analyte List (TAL) Inorganic Constituents								
Aluminum	1,000,000	100,000	7,000 - 100,000	9,360	10,961	SB	4070 - 12000	18-11 (0-0.5')
Antimony	410	410	NA	6.9	7.5	SB	0.25 - 1.3	18-5 (6-18')
Arsenic	1.9	260	3 - 12	11.2	13.1	7.5 or SB	4.8 - 26.6	18-8 (2-4')
Barium	72,000	67,000	15 - 600	83	97.3	300 or SB	24.6 - 135	8.2-3 (10.5-11.5')
Beryllium	2,000	1,900	0 - 1.75	0.5	0.62	0.16 or SB	0.14 - 0.74	18-9 (0-0.5')
Cadmium	1,000	450	0.1 - 1	< 0.61	0.62	1.0 or SB	0.044 - 61.3	14-5 (0-1')
Calcium	NA	NA	130 - 35,000	167,000	181,304	SB	1230 - 145000	8.1-3 (4-5')
Chromium	1,500,000	450	1.5 - 40	23.8	22.4	10 or SB	7.3 - 1390	14-1 (0-1')
Hexavalent Chromium	3,100	64	NA	1.4	1.5	NA	0.09 - 401	14-1 (0-1')
Cobalt	20,000	1,900	2.5 - 60	7.4	8.6	30 or SB	3.1 - 246	18-3 (0-0.5')
Copper	41,000	41,000	<1 - 50	27.9	30.2	25 or SB	1.7 - 372	18-9 (0-0.5')
Iron	310,000	100,000	2,000 - 550,000	27,400	30,866	2,000 or SB	12200 - 38700	18-6 (0-0.5')
Lead	NA	750	200 - 500	26.7	28.1	SB	1.6 - 198	18-5 (0-0.5')
Magnesium	NA	NA	100 - 5,000	21,100	18,459	SB	2180 - 33500	8.1-3 (13-14')
Manganese	140,000	19,000	50 - 5,000	1,780	1,890	SB	456 - 2350	18-3 (2-4')
Mercury	NA	310	0.001 - 0.2	0.12	0.125	0.1	0.011 - 5.6	8.1-6 (8-9')
Nickel	20,000	20,000	0.5 - 25	15.7	17.1	13 or SB	8.7 - 599	18-3 (0-0.5')
Potassium	NA	NA	8,500 - 43,000	759	747	SB	357 - 1200	18-9 (0-0.5')
Selenium	5,100	5,100	<0.1 - 3.9	< 1.2	1.2	2.0 or SB	0.35 - 7.9	4-2 (0-1')
Silver	5,100	5,100	NA	< 1.2	1.2	SB	0.092 - 0.87	4-1 (0-1')
Sodium	NA	NA	<50 - 50,000	82.4	872	SB	26.2 - 1350	14-5 (0-1')
Thallium	72	67	NA	< 1.2	1.2	SB	0.52 - 2.3	18-3 (0-0.5')
Vanadium	310	7,200	1 - 300	17.9	21.9	150 or SB	6.6 - 26.9	4-1 (1-2')
Zinc	310,000	100,000	9 - 50	92	95.8	20 or SB	33.5 - 232	18-11 (0-0.5')
Cyanide (total)	NA	NA	NA	< 0.61	0.62	Site Specific	0.13 - 1.9	14-5 (0-1')
Cyanide (free)	20,000	12,000	NA	NA	NA	NA	ND	NA

See notes on Page 2.

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Work Plan
Potentially Applicable Criteria for Detected SVOCs and TAL Inorganics (ppm)

Notes:

1. United States Environmental Protection Agency (USEPA) Region 3 Risk-Based Concentrations (RBCs) were obtained from USEPA Region 3 website (http://www.epa.gov/reg3hwmd/risk/riskmenu.htm) last updated October 15, 2003.
2. USEPA Region 9 Preliminary Remediation Goals (PRGs) were obtained from USEPA Region 9 website (http://www.epa.gov/region09/waste/sfund/prg/index.htm) last updated October 1, 2002.
3. NY Region Background values were obtained from the New York State Department of Environmental Conservation (NYSDEC) document titled "Background Concentrations of 20 Elements in Soils with Special Regard for New York State", by E. Carol McGovern, dated 1988.
4. Maximum site background represents the highest concentration identified at background soil sampling locations BGD-1 through BGD-5 as part of a background soil sampling program completed during January 2002.
5. The upper limit of the 95% confidence interval was calculated using the background sample population.
6. NYSDEC TAGM 4046 Soil Guidance Values were obtained from the NYSDEC TAGM titled, "Determination of Soil Cleanup Objectives and Cleanup Levels," HWR-94-4046 (TAGM 4046), dated January 24, 1994, revised December 20, 2000.
7. Concentrations presented in parts per million (ppm), which are equivalent to milligrams per kilogram (mg/kg).
8. NA = Not Available.
9. SB = Site background.
10. Site Specific = TAGM 4046 indicates the soil cleanup objective for cyanide is site-specific.

10/14/2004
Letter from NYSDEC

Comments on CMS Work Plan

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Hazardous Waste & Radiation Management
625 Broadway, Albany, NY 12233-7258
Phone: (518) 402-8594 • **FAX:** (518) 402-9025
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

October 14, 2004

Mr. Kurt Batsel
The Dextra Group, LLC
4665 Lower Roswell Road, #154
Marietta, Georgia 30068

Dear Mr. Batsel:

Re: Former TRW Aeronautical Systems Facility, Utica, NY, USEPA ID No. NYD002244911; Corrective Measures Study Work Plan, August 10, 2004

The New York State Department of Environmental Conservation (Department) and the New York State Department of Health (DOH) have reviewed the work plan referenced above. The Department's and DOH's comments are discussed in "Enclosure A" below.

As previously discussed with Lucas Western (Lucas) representatives, the on-site "Additional PCB Soil Removal ICM" should be completed so that a summary of activities may be included in the CMS. The final outcome of this ICM may affect the evaluation and selection of proposed remedial alternatives.

If you have any questions please contact me at (518) 402-8594.

Sincerely,

/s/

Alicia Barraza
Environmental Engineer
Hazardous Waste Engineering Eastern Section

Enclosure

cc: J. Reidy, EPA Region II
G. Rys, NYSDOH

ecc: D. Evans
L. Rosenmann
S. Shoemaker, R6
S. Hamilton

ENCLOSURE A

Introduction

- The first page, second paragraph, states that PCBs were identified in four AOCs and SVOCs in three AOCs. In the RFI Report there appear to be five AOCs with PCBs (17.3, 18, 20, 21 and 23), and four AOCs with SVOCs (1, 7.3, 13, 24). This should be clarified.

Background

- In the second bullet ("Future Commercial/Industrial Worker"), the last sentence in the paragraph should be modified since the Department and NYSDOH have not concluded that risks from intrusion of VOCs into indoor air would not be significant.

Purpose and Objectives

- The table in section 7.0 of the RFI Report states that for AOC 18, PCBs were identified in samples collected from the western portion of the AOC at concentrations above 1 ppm. However, the table in the CMS Work Plan for AOC 18 does not include PCBs as a constituent of concern.
- The table in the CMS Work Plan does not include SVOCs for AOC 24. SVOCs were identified as constituents of concern in the RFI Report (see the table in section 7.0 and the new Table 23 in Lucas' responses dated June 18, 2004).

Development of Soil Performance Goals

- Table 1 in the work plan references the maximum values obtained for metals in site background soil samples. A range and/or the minimum site background values should be used for comparison purposes in selecting the performance goals.
- Generally, hexavalent chromium (Cr+6) should not be found in surface or near surface soils, as it readily converts to the less toxic forms of chromium. Significant amounts of Cr+6 are indicative of waste disposal. If the reported Cr+6 was identified in a limited area, removal and disposal of this soil should be undertaken. Cr+6 should not be left in surface soils at detectable levels.

Development of Groundwater Performance Goals

- The work plan indicates that on-site contaminant constituents in both groundwater and soil will be addressed, yet it does not propose remedial measures for groundwater other than continued groundwater monitoring and evaluation. The work plan also indicates that groundwater hydraulically down gradient from the facility will be addressed in a separate CMS. Very often the remedial measures for offsite groundwater migration are conducted on-site through source control. One of the primary criteria for assessing the need for on-site remedial measures of groundwater are the impacts that are occurring due to offsite migration. Therefore, it appears appropriate to address the on-site and off-site groundwater remedial measures in one CMS. The Department agrees that groundwater

remedial measures for some potential off-site impacts may need to be postponed until there is sufficient data from the recently proposed soil vapor sampling program. Lucas should complete the CMS for all known potential impacts and receptors at this time, with a caveat that other impacts will be addressed in a separate CMS if and when they become known.

Potential Corrective Measures Technologies and/or Alternatives

- Lucas should refer to *NYS TAGM #4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, May 15, 1990*, for additional guidance. In developing the remedial alternatives and technologies, Lucas should focus on the hierarchy of remedial technologies, including no further action. In general, the Department believes it is important to implement permanent remedies whenever practical.

Evaluation of Potential Corrective Measures

- The evaluation of the individual remedial alternatives and technologies should take into consideration the seven criteria discussed in NYS TAGM 4030.
  - short-term impacts and effectiveness;
  - long-term effectiveness and performance;
  - reduction of toxicity, mobility, or volume;
  - implementability;
  - compliance with NYS Standards, Criteria and Guidelines (SCGs);
  - overall protection of human health and the environment; and
  - cost

Outline for the Focused CMS Report

- In section 2, include a discussion of completed and any on-going interim corrective measures (ICM's) at the site.
- The selection of proposed remedial measures will have to go through a public comment period of 45 days. This will require preparation of a Statement of Basis (SOB) which summarizes background information and completed activities, and describes the proposed measures. The SOB is usually prepared by the site owner who is most familiar with corrective action activities at the site, with review and approval by the Department. The Department is then required to respond to all comments and issue a final SOB with the selected remedial measures for implementation.

11/9/2004
Letter to NYSDEC

Response to NYSDEC Comments and CMS Work Plan Modification

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Dextra

Transmitted Via E-Mail & Federal Express

November 9, 2004

Ms. Alicia Barraza
New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Solid Waste and Corrective Action
625 Broadway
Albany, New York 12233-7258

Re: Former TRW Aeronautical Systems Facility
211 Seward Avenue – Utica, New York
USEPA ID#: NYD002244911
CMS Work Plan Modification

Dear Ms. Barraza:

On behalf of Lucas Western LLC (Lucas Western), attached is the *Modification to the Corrective Measures Study Work Plan* , dated August 10, 2004. The Modification is being submitted in response to the New York State Department of Environmental Conservation's (NYSDEC's) comments provided in your e-mail correspondence dated October 15, 2004. For ease of presentation, each NYSDEC comment is provided in Attachment 1, followed by Lucas Western's response. Please note that the revised data table and new graph referenced in the response are included as Table 1 and Figure 1.

As discussed during our recent telephone conversation, the interim corrective measure (ICM) activities to remove soils at the Site exhibiting polychlorinated biphenyls (PCBs) at concentrations above 50 parts per million (ppm) are near completion. Backfilling activities are scheduled to be completed within approximately one week. A brief summary of the completed ICM Soil PCB activities will be presented in the CMS Report. A detailed summary of the completed activities will be presented in an ICM PCB Soil Removal Certification Report to be submitted to the NYSDEC by December 3, 2004 (in accordance with the schedule included in my e-mail correspondence dated August 30, 2004).

Based on the schedule for completing the ICM PCB Soil Removal Certification Report, the CMS Report will be submitted to the NYSDEC within 45 days of receipt of NYSDEC approval of the Modifications to the CMS Work Plan.

The Dextra Group, LLC
Environmental Business Solutions
4665 Lower Roswell Road, #154
Marietta, Georgia 30068
(770) 578-4614 Phone
(770) 579-6713 Fax

Please do not hesitate to contact me at (770) 578-9696 or via e-mail at batsel@dextra-group.com if you have any questions or require additional information regarding the attached modification or any other aspect of the project.

Sincerely,
The Dextra Group LLC

Kurt Batsel, P.E.
Principal

Attachments

cc: Valerie M. Hanna, Esq., Brouse McDowell (via U.S. Mail)
Mr. David R. Gerber, P.E., BBL Environmental Services, Inc.
~~Mr. John C. Brassel, P.E., Pleasland, Bouck & Lee, Inc.~~

Attachment 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Modification to the CMS Work Plan

Comment on Introduction

Comment 1

The first page, second paragraph, states that PCBs were identified in four AOCs and SVOCs in three AOCs. In the RFI Report there appear to be five AOCs with PCBs (17.3, 18, 20, 21 and 23), and four AOCs with SVOCs (1, 7.3, 13, 24). This should be clarified.

Response 1

The areas of concern (AOCs) identified in the New York State Department of Environmental Conservation- (NYSDEC-) approved *RCRA Facility Investigation Report* prepared by Blasland, Bouck & Lee, Inc. (BBL, April 2004) ["the RFI Report"] as exhibiting polychlorinated biphenyls (PCBs) and semi-volatile organic compounds (SVOCs) at concentrations above the soil guidance values are correct. The first page, second paragraph of the Corrective Measures Study (CMS) Work Plan is hereby revised to state the following:

> "In addition, polychlorinated biphenyl (PCB) concentrations identified in five AOCs and semi-volatile organic compound (SVOC) concentrations identified in four AOCs are above the TAGM 4046 soil guidance values."

For clarification, AOC No. 18 – Former Drum Storage Area and AOC No. 24 – South Storm Sewer Line Catch Basin Area were inadvertently omitted when determining the total number of AOCs exhibiting PCBs and SVOCs, respectively, at concentrations above the soil guidance values. Accordingly, the table included on Page 4 of the CMS Work Plan is hereby revised as follows.

AOC No.	AOC Title	Constituent of Interest		
		PCBs	SVOCs	Inorganics
1	Former Chemical Storage Building		✔	
4	Former Plating Area Wastewater Treatment Equipment			✔
7.3	Former 550-Gallon Diesel Fuel Aboveground Storage Tank		✔	
8.1	Former Cyanide Waste Pit No. 1			✔
8.2	Former Cyanide Waste Pit No. 2			✔
13	Former VOC-Impacted Soils Area		✔	
14	Former Plating Area			✔
17.3	Former Electrical Transformer Substation No. 3	✔		
18	Former Drum Storage Area	✔		✔

AOC No.	AOC Title	Constituent of Interest		
		PCBs	SVOCs	Inorganics
20	Former Main Production Building Footprint	✔		
21	Former Test Building Footprint and Vicinity	✔		
23	Grass-Covered Area East of Enclosed Passageway	✔		
24	South Storm Sewer Line Catch Basin Area including the limits of the backfilled storm sewer interim corrective measure (ICM) south sewer line excavation		✔	✔

Background information on the discovery of PCBs in AOC No. 18 and SVOCs in AOC No. 24 is presented below.

RFI soil samples initially collected from AOC No. 18 were only submitted for laboratory analysis for inorganic constituents. Later, during the third phase of the RFI sampling, PCB soil sampling in AOC No. 21 (Former Test Building Footprint and Vicinity) was expanded and it ultimately overlapped into the western portion of AOC No. 18. PCBs were identified at concentrations above the TAGM 4046 soil guidance values in certain AOC No. 21 samples that were also within the boundaries of AOC No. 18. After the RFI was completed, during collection of delineation soil samples in support of interim corrective measure (ICM) activities to remove soils exhibiting PCBs at concentrations above 50 parts per million (ppm), PCBs were identified further east within AOC No. 18. PCBs remaining in AOC No. 18 soils at concentrations above the TAGM 4046 soil guidance values after completion of the PCB Soil ICM activities will be addressed in the CMS Report.

SVOCs were identified at concentrations above the TAGM 4046 soil guidance values at only one RFI sampling location in AOC No. 24, and the concentrations at that location were only slightly above the guidance values. Specifically, benzo(a)anthracene and benzo(a)pyrene were identified at sampling location CB-4N (3-4') at estimated concentrations of 0.33 and 0.31 ppm, above the guidance values of 0.224 and 0.061 ppm, respectively. These SVOCs were not proposed in the RFI Report or CMS Work Plan for inclusion in the CMS. Because the NYSDEC has indicated that SVOCs should be identified as constituents of interest in AOC No. 24 (refer to Comment 4), the CMS Work Plan is hereby modified to indicate that the SVOCs identified in AOC No. 24 will be addressed in the CMS Report.

◆ ◆ ◆

Comment on Background

Comment 2

In the second bullet ("Future Commercial/Industrial Worker"), the last sentence in the paragraph should be modified since the Department and NYSDOH have not concluded that risks from intrusion of VOCs into indoor air would not be significant.

Response 2

The comment above refers to a conclusion made based on the Desk-Top Evaluation of Potential Vapor Intrusion Scenarios, which was prepared using methodologies developed by the United

States Environmental Protection Agency (USEPA) and Johnson and Ettinger (J&E) for an initial screening level assessment of the potential significance of the vapor intrusion pathway for site-related VOCs. The Desk-Top Evaluation was submitted to the NYSDEC under a cover letter from the Dextra Group, LLC, dated June 10, 2004. Because the Desk-Top Evaluation was prepared using proper application of scientific principles following the above-referenced methodologies, Lucas Western maintains that the conclusions of the Evaluation are valid (i.e. the vapor intrusion pathway does not appear to be significant). Further, the sentence at issue is clearly prefaced by an explanation that the conclusion is solely based on the Evaluation performed on behalf of Lucas Western. Therefore, Lucas Western does not agree to remove this sentence.

However, Lucas Western will add the following language after the statement to provide the NYSDEC's and New York State Department of Health's (NYSDOH's) position:

> "The NYSDEC and NYSDOH reviewed the memorandum, and responded that '*we do not endorse the exclusive use of the Johnson Ettinger model for evaluating potential off-site vapor intrusion impacts if soil gas sampling is possible.*' [*See* July 29, 2004 letter from NYSDEC]. In response to the NYSDEC July 29, 2004 letter, Lucas Western agreed to further evaluate the potential vapor intrusion pathway via collection of soil gas samples, and prepared a Soil Gas Investigation Work Plan that was submitted to the NYSDEC in a letter dated August 23, 2004. Details of the investigation activities are still being discussed between Lucas Western and NYSDEC. Further evaluation of the pathway will be performed using the results of the Soil Gas Investigation."

♦ ♦ ♦

Comments on Purpose and Objectives

Comment 3

The table in section 7.0 of the RFI Report states that for AOC 18, PCBs were identified in samples collected from the western portion of the AOC at concentrations above 1 ppm. However, the table in the CMS Work Plan for AOC 18 does not include PCBs as a constituent of concern.

Response 3

The above-referenced table has been revised to indicate that PCBs are a constituent of interest for AOC No. 18. The revised table is included under Response 1.

♦ ♦ ♦

Comment 4

The table in the CMS Work Plan does not include SVOCs for AOC 24. SVOCs were identified as constituents of concern in the RFI Report (see the table in section 7.0 and the new Table 23 in Lucas' responses dated June 18, 2004).

Response 4

The above-referenced table has also been revised to indicate that SVOCs are a constituent of interest for AOC No. 24. Please refer to the table in Response 1.

♦ ♦ ♦

Comments on Development of Soil Performance Goals

Comment 5

Table 1 in the work plan references the maximum values obtained for metals in site background soil samples. A range and/or the minimum site background values should be used for comparison purposes in selecting the performance goals.

Response 5

Table 1 has been revised to include the range of inorganic constituent concentrations identified at the background sampling locations. The revised table is attached to this response letter. The range in Table 1 is presented for comparison purposes and should be considered only in the broader context of the full background sampling dataset. A detailed discussion of the appropriate site background values to be selected as the performance goals for inorganic constituents in soils will be presented in the CMS Report.

♦ ♦ ♦

Comment 6

Generally, hexavalent chromium (Cr+6) should not be found in surface or near surface soils, as it readily converts to the less toxic forms of chromium. Significant amounts of Cr+6 are indicative of waste disposal. If the reported Cr+6 was identified in a limited area, removal and disposal of this soil should be undertaken. Cr+6 should not be left in surface soils at detectable levels.

Response 6

Based on the results of previous soil investigation activities, hexavalent chromium was detected in surface soil at the following locations at the Site:

- Two sampling locations in AOC No. 14 – Former Plating Area (locations 14-1 and 14-4); and
- Three sampling locations in AOC No. 18 – Former Drum Storage Area (locations 18-7, 18-9, and 18-10).

Soil in AOC No. 14 that exhibited elevated concentrations of chromium (including surface soil at sampling locations 14-1 and 14-4) was recently excavated in conjunction with the expanded PCB Soil ICM activities at the Site. The excavation activities in AOC No. 14 were performed in accordance with a letter to the NYSDEC dated August 20, 2004 and follow-up e-mail correspondence. Accordingly, the hexavalent chromium-impacted soils initially identified in sampling locations 14-1 and 14-4 have been removed, and the excavated area has been restored with clean backfill material. Further discussion of the excavation activities in AOC No. 14 will be provided in the ICM PCB Soil Removal Certification Report to be submitted to the NYSDEC by December 3, 2004 (in accordance with the schedule presented in e-mail correspondence to the NYSDEC dated August 30, 2004).

Hexavalent chromium was detected in surface soil samples collected at the 0- to 6-inch depth interval at RFI sampling locations 18-7, 18-9, and 18-10. The concentrations identified at these locations were 1.3 ppm, 4.7 ppm, and 1.0 ppm, respectively. Hexavalent chromium was also identified in each background soil sample, including the five background surface soil samples (0- to 2-feet bgs) and five background subsurface soil samples (2- to 4-feet bgs). The background concentrations ranged from 0.35 ppm to 1.4 ppm. The detection of hexavalent chromium in each background sample suggests that hexavalent chromium is naturally occurring in Site soils and similar concentrations at onsite locations are not attributed to former industrial activity. As shown on the graph included as Figure 1, the hexavalent chromium concentrations identified in surface soil samples 18-7 and 18-10 are consistent with the concentrations identified in the background samples and below the maximum background concentration. As indicated by the data distribution shown on Figure 1, it is possible that the hexavalent chromium concentration identified in surface soil sample 18-9, which is slightly above background, may also be naturally-occurring. Based on further evaluation, the hexavalent chromium concentration identified in surface soil sample 18-9 is well below the USEPA Region 9 Preliminary Remedial Goals (PRGs) of 30 ppm for residential soil and 64 ppm for industrial soil and the USEPA Region 3 Risk-Based Concentrations (RBCs) of 230 ppm for residential soil and 6,100 ppm for industrial soil.

Although Lucas Western does not consider the hexavalent chromium concentrations identified in AOC No. 18 to be elevated, concentrations of other inorganic constituents (including total chromium) and PCBs remaining in soils within the AOC are elevated. These impacted soils, which include surface soils exhibiting low concentrations of hexavalent chromium, will be addressed in the CMS Report. It is currently anticipated that soils in AOC No. 18 may ultimately be covered by a barrier layer and appropriate site controls will be put in place.

♦ ♦ ♦

Comment on Development of Groundwater Performance Goals

Comment 7

The work plan indicates that on-site contaminant constituents in both groundwater and soil will be addressed, yet it does not propose remedial measures for groundwater other than continued groundwater monitoring and evaluation. The work plan also indicates that groundwater hydraulically down gradient from the facility will be addressed in a separate CMS. Very often the remedial measures for offsite groundwater migration are conducted on-site through source control. One of the primary criteria for assessing the need for on-site remedial measures of groundwater are the impacts that are occurring due to offsite migration. Therefore, it appears appropriate to address the on-site and off-site groundwater remedial measures in one CMS. The Department agrees that groundwater remedial measures for some potential off-site impacts may need to be postponed until there is sufficient data from the recently proposed soil vapor sampling program. Lucas should complete the CMS for all known potential impacts and receptors at this time, with a caveat that other impacts will be addressed in a separate CMS if and when they become known.

Response 7

Pursuant to NYSDEC's request, the CMS will include evaluation of measures to address groundwater hydraulically downgradient from the Site, as well as the onsite groundwater. The CMS will provide a detailed discussion of the remedial measures conducted to date to address

both onsite and offsite groundwater (i.e., source control measures). It will further support that measures consisting of monitoring combined with use restrictions, without further active remedial measures, are appropriate at this Site to address constituents of interest that remain in the groundwater. If the results of the proposed Soil Gas Investigation indicate that the impacted groundwater is a source of VOCs to indoor air, then appropriate measures to address the potential vapor intrusion pathway would be considered via an ICM and/or in a separate CMS.

♦ ♦ ♦

Comment on Potential Corrective Measure Technologies and/or Alternatives

Comment 8

Lucas should refer to NYS TAGM #4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, May 15, 1990, for additional guidance. In developing the remedial alternatives and technologies, Lucas should focus on the hierarchy of remedial technologies, including no further action. In general, the Department believes it is important to implement permanent remedies whenever practical.

Response 8

Pursuant to the NYSDEC's request, Lucas Western will refer to TAGM 4030 for additional guidance in preparing the CMS. It is our understanding that TAGM 4030 was developed by the NYSDEC for Feasibility Studies at inactive hazardous waste disposal sites in New York and differs in several respects from the USEPA Office of Solid Waste and Emergency Response (OSWER) Directive 9902.3-2A, "RCRA Corrective Plan," dated May 1994. Where there is contradiction between TAGM 4030 and OSWER Directive 9902.3-2A, the TAGM guidance will supersede the OSWER Directive and will be used for the CMS.

The CMS will include detailed evaluations of the three corrective measure alternatives identified in Section III of the Work Plan. Each alternative is capable of meeting the corrective measure objectives established for the Site. As requested by the NYSDEC, the CMS will also evaluate the "No Further Action" alternative, which will serve as a baseline for comparing the potential overall effectiveness of the other proposed alternatives. These alternatives to be evaluated in the CMS include applicable technologies from the "Hierarchy of Remedial Technologies" presented in Section 2.1 of TAGM 4030, including: (1) Solidification/Chemical Fixation; (2) Control and Isolation Technologies; and (3) Off-Site Land Disposal. The "Destruction" and "On-Site Separation/Treatment" technologies set forth in Section 2.1 of TAGM 4030 are not applicable for the primary constituents of interest in soils at the Site (metals and PCBs) and their associated levels. In total, there will be four alternatives retained for detailed evaluation in the CMS, which will provide an appropriate scope of alternatives given the extensive investigation and remedial work performed to date through the ICMs and the few issues remaining to be addressed. This scope of alternatives is also consistent with applicable NYSDEC guidance.

Lucas Western disagrees that the concept of "permanent remedy" should be given any special priority beyond that provided for in the seven evaluation criteria identified in Comment 9 below. As is evident from the new Brownfields legislation, the focus on remedy selection remains the protection of public health and the environment, given the intended use of the Site. Each alternative to be considered in the CMS will be evaluated based on the seven evaluation criteria identified in Comment 9 below, and the selected alternative will mitigate potential threats to

public health and the environment through the proper application of scientific and engineering principles.

◆ ◆ ◆

Comment on Evaluation of Potential Corrective Measures

Comment 9

The evaluation of the individual remedial alternatives and technologies should take into consideration the seven criteria discussed in NYS TAGM 4030.

- *short-term impacts and effectiveness;*
- *long-term effectiveness and performance;*
- *reduction of toxicity, mobility, or volume;*
- *implementability;*
- *compliance with NYS Standards, Criteria and Guidelines (SCGs);*
- *overall protection of human health and the environment; and*
- *cost*

Response 9

Acknowledged.

◆ ◆ ◆

Comments on Outline for the Focused CMS Report

Comment 10

In section 2, include a discussion of completed and any on-going interim corrective measures (ICM's) at the site.

Response 10

Per the NYSDEC's request, Section 2 of the proposed CMS Report will also include a summary of the completed Storm Sewer ICM activities and the PCB Soil ICM activities.

◆ ◆ ◆

Comment 11

The selection of proposed remedial measures will have to go through a public comment period of 45 days. This will require preparation of a Statement of Basis (SOB) which summarizes background information and completed activities, and describes the proposed measures. The SOB is usually prepared by the site owner who is most familiar with corrective action activities at the site, with review and approval by the Department. The Department is then required to respond to all comments and issue a final SOB with the selected remedial measures for implementation.

Response 11

Acknowledged. Lucas Western is agreeable to preparing a Statement of Basis following NYSDEC approval of the CMS Report. The Statement of Basis will be revised to address NYSDEC comments prior to the start of the public comment period.

♦ ♦ ♦

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Work Plan
Potentially Applicable Criteria for Detected SVOCs and TAL Inorganics (ppm)

Constituent	USEPA Region 3 RBCs - Industrial Soil	USEPA Region 9 PRGs - Industrial Soil	NY Region Background Values	Minimum Site Background	Maximum Site Background	Upper Limit 95% Confidence Interval of Sample Population	NYSDEC TAGM 4046 Soil Guidance Values	Range of Observed Site Values	Max Detected Value Location
Detected Semi-Volatile Organic Compounds (SVOCs)									
1,1'-Biphenyl	NA	350	NA	NA	NA	NA	NA	0.062 - 2.3	7.3-1 (0-0.5')
3,4-Methylphenol	NA	NA	NA	NA	NA	NA	0.9	0.046 - 0.046	13-5 (2-4')
Acenaphthene	61,000	29,000	NA	NA	NA	NA	50	0.022 - 37	7.3-1 (0-0.5')
Acenaphthylene	NA	NA	NA	NA	NA	NA	41	0.04 - 0.04	13-5 (2-4')
Anthracene	310,000	100,000	NA	NA	NA	NA	50	0.021 - 81	7.3-1 (0-0.5')
Benzo(a)anthracene	3.9	2.1	NA	NA	NA	NA	0.224	0.044 - 130	7.3-1 (0-0.5')
Benzo(a)pyrene	0.39	0.21	NA	NA	NA	NA	0.061	0.039 - 120	7.3-1 (0-0.5')
Benzo(b)fluoranthene	3.9	2.1	NA	NA	NA	NA	1.1	0.046 - 140	7.3-1 (0-0.5')
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	50	0.037 - 46	7.3-1 (0-0.5')
Benzo(k)fluoranthene	39	2.1	NA	NA	NA	NA	1.1	0.027 - 79	7.3-1 (0-0.5')
bis(2-Ethylhexyl) phthalate	200	120	NA	NA	NA	NA	50	0.026 - 0.16	7.3-4 (6-18')
Carbazole	140	86	NA	NA	NA	NA	NA	0.03 - 37	7.3-1 (0-0.5')
Chrysene	390	210	NA	NA	NA	NA	0.4	0.024 - 150	7.3-1 (0-0.5')
Di-n-butyl phthalate	NA	NA	NA	NA	NA	NA	8.1	0.031 - 0.61	BV-3
Dibenz(a,h)anthracene	0.39	0.21	NA	NA	NA	NA	0.014	0.031 - 14	7.3-1 (0-0.5')
Dibenzofuran	2,000	3,100	NA	NA	NA	NA	6.2	0.023 - 22	7.3-1 (0-0.5')
Fluoranthene	41,000	22,000	NA	NA	NA	NA	50	0.029 - 430	7.3-1 (0-0.5')
Fluorene	41,000	26,000	NA	NA	NA	NA	50	0.024 - 42	7.3-1 (0-0.5')
Indeno(1,2,3-cd)pyrene	3.9	2.1	NA	NA	NA	NA	3.2	0.03 - 48	7.3-1 (0-0.5')
Naphthalene	20,000	190	NA	NA	NA	NA	13	0.032 - 14	7.3-1 (0-0.5')
Naphthalene, 2-methyl-	20,000	NA	NA	NA	NA	NA	36.4	0.034 - 5.4	7.3-1 (0-0.5')
Phenanthrene	NA	NA	NA	NA	NA	NA	50	0.029 - 390	7.3-1 (0-0.5')
Pyrene	31,000	29,000	NA	NA	NA	NA	50	0.022 - 310	7.3-1 (0-0.5')
Target Analyte List (TAL) Inorganic Constituents									
Aluminum	1,000,000	100,000	7,000 - 100,000	3,530	9,360	10,961	SB	4070 - 12000	18-11 (0-0.5')
Antimony	410	410	NA	6.9	6.9	7.5	SB	0.25 - 1.3	18-5 (6-18')
Arsenic	1.9	260	3 - 12	3.6	11.2	13.1	7.5 or SB	4.8 - 26.6	18-8 (2-4')
Barium	72,000	67,000	15 - 600	22.2	83	97.3	300 or SB	24.6 - 135	8.2-3 (10.5-11.5')
Beryllium	2,000	1,900	0 - 1.75	0.5	0.5	0.62	0.16 or SB	0.14 - 0.74	18-9 (0-0.5')
Cadmium	1,000	450	0.1 - 1	<0.52	< 0.61	0.62	1.0 or SB	0.044 - 61.3	14-5 (0-1')
Calcium	NA	NA	130 - 35,000	374	167,000	181,304	SB	1230 - 145000	8.1-3 (4-5')
Chromium	1,500,000	450	1.5 - 40	5.3	23.8	22.4	10 or SB	7.3 - 1390	14-1 (0-1')
Hexavalent Chromium	3,100	64	NA	0.35	1.4	1.5	NA	0.09 - 401	14-1 (0-1')
Cobalt	20,000	1,900	2.5 - 60	3	7.4	8.6	30 or SB	3.1 - 246	18-3 (0-0.5')
Copper	41,000	41,000	<1 - 50	11.1	27.9	30.2	25 or SB	1.7 - 372	18-9 (0-0.5')
Iron	310,000	100,000	2,000 - 550,000	11,600	27,400	30,866	2,000 or SB	12200 - 38700	18-6 (0-0.5')
Lead	NA	750	200 - 500	3.8	26.7	28.1	SB	1.6 - 198	18-5 (0-0.5')
Magnesium	NA	NA	100 - 5,000	2,360	21,100	18,459	SB	2180 - 33500	8.1-3 (13-14')
Manganese	140,000	19,000	50 - 5,000	478	1,780	1,890	SB	456 - 2350	18-3 (2-4')
Mercury	NA	310	0.001 - 0.2	0.0091	0.12	0.125	0.1	0.011 - 5.6	8.1-6 (8-9')
Nickel	20,000	20,000	0.5 - 25	7.6	15.7	17.1	13 or SB	8.7 - 599	18-3 (0-0.5')
Potassium	NA	NA	8,500 - 43,000	457	759	747	SB	357 - 1200	18-9 (0-0.5')
Selenium	5,100	5,100	<0.1 - 3.9	<0.52	< 1.2	1.2	2.0 or SB	0.35 - 7.9	4-2 (0-1')
Silver	5,100	5,100	NA	<1	< 1.2	1.2	SB	0.092 - 0.87	4-1 (0-1')
Sodium	NA	NA	<50 - 50,000	62.9	82.4	872	SB	26.2 - 1350	14-5 (0-1')
Thallium	72	67	NA	<1	< 1.2	1.2	SB	0.52 - 2.3	18-3 (0-0.5')
Vanadium	310	7,200	1 - 300	5.9	17.9	21.9	150 or SB	6.6 - 26.9	4-1 (1-2')
Zinc	310,000	100,000	9 - 50	35.9	92	95.8	20 or SB	33.5 - 232	18-11 (0-0.5')
Cyanide (total)	NA	NA	NA	<0.52	< 0.61	0.62	Site Specific	0.13 - 1.9	14-5 (0-1')
Cyanide (free)	20,000	12,000	NA	NA	NA	NA	NA	ND	NA

See notes on Page 2.

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

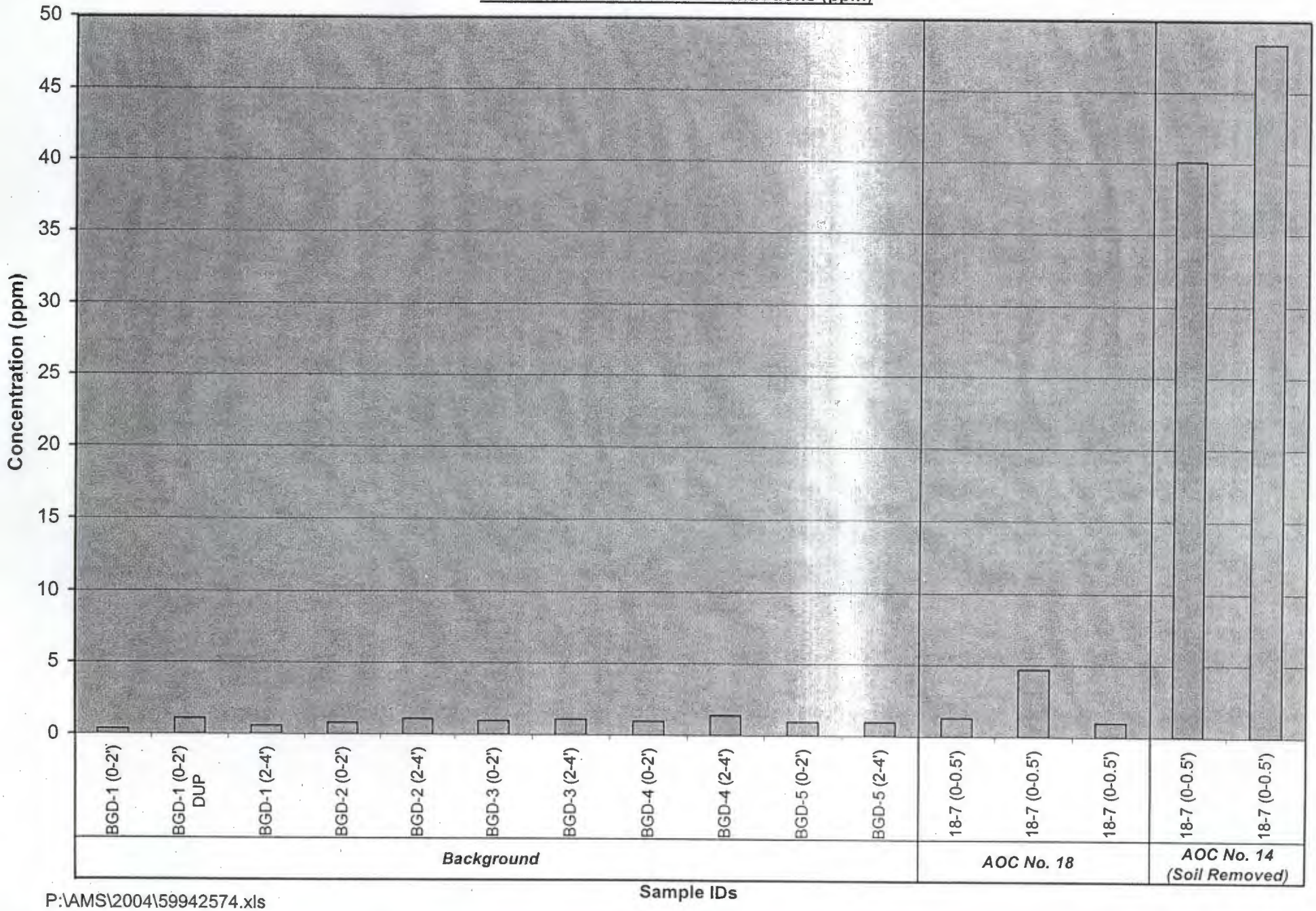
Corrective Measures Study Work Plan
Potentially Applicable Criteria for Detected SVOCs and TAL Inorganics (ppm)

Notes:

1. United States Environmental Protection Agency (USEPA) Region 3 Risk-Based Concentrations (RBCs) were obtained from USEPA Region 3 website (http://www.epa.gov/reg3hwmd/risk/riskmenu.htm) last updated October 15, 2003.
2. USEPA Region 9 Preliminary Remediation Goals (PRGs) were obtained from USEPA Region 9 website (http://www.epa.gov/region09/waste/sfund/prg/index.htm) last updated October 1, 2002.
3. NY Region Background values were obtained from the New York State Department of Environmental Conservation (NYSDEC) document titled "Background Concentrations of 20 Elements in Soils with Special Regard for New York State", by E. Carol McGovern, dated 1988.
4. Maximum site background represents the highest concentration identified at background soil sampling locations BGD-1 through BGD-5 as part of a background soil sampling program completed during January 2002.
5. The upper limit of the 95% confidence interval was calculated using the hackground sample population.
6. NYSDEC TAGM 4046 Soil Guidance Values were obtained from the NYSDEC TAGM titled, "Determination of Soil Cleanup Objectives and Cleanup Levels," HWR-94-4046 (TAGM 4046), dated January 24, 1994, revised December 20, 2000.
7. Concentrations presented in parts per million (ppm), which are equivalent to milligrams per kilogram (mg/kg).
8. NA = Not Available.
9. SB = Site background.
10. Site Specific = TAGM 4046 indicates the soil cleanup objective for cyanide is site-specific.
11. < = not detected above the reported laboratory detection limit.

Figure
Former TRW Aeronautical Systems Facility
211 Seward Avenue - Utica, New York

RFI Analytical Results
Hexavalent Chromium Concentrations (ppm)



P:\AMS\2004\59942574.xls

12/9/2004
Letter from NYSDEC

Approval of Response to Comments and CMS Work Plan Modification

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Hazardous Waste & Radiation Management
625 Broadway, Albany, NY 12233-7258
Phone: (518) 402-8594 • **FAX:** (518) 402-9025
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

December 9, 2004

Mr. Kurt Batsel
The Dextra Group, LLC
4665 Lower Roswell Road, #154
Marietta, Georgia 30068

Dear Mr. Batsel:

Re: Former TRW Aeronautical Systems Facility, Utica, NY, USEPA ID No. NYD002244911; CMS Work Plan Modification, dated November 9, 2004

The New York State Department of Environmental Conservation (Department) and the New York State Department of Health (DOH) have reviewed the document referenced above. The Department approves the Corrective Measures Study (CMS) Work Plan and Modification, with the following clarification.

Comment on Potential Corrective Measure Technologies and/or Alternatives (Response 8)
It should be noted that Lucas Western/TRW (Lucas) is listed on the NYS Inactive Hazardous Waste List under the former name "Bendix", No. 633020.

If you have any questions please contact me at (518) 402-8594.

Sincerely,

Alicia Barraza

Alicia Barraza
Environmental Engineer
Hazardous Waste Engineering Eastern Section

cc: J. Reidy, EPA Region II
G. Rys, NYSDOH

New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Hazardous Waste & Radiation Management
625 Broadway, Albany, NY 12233-7258
Phone: (518) 402-8594 • **FAX:** (518) 402-9025
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

December 9, 2004

Mr. Kurt Batsel
The Dextra Group, LLC
4665 Lower Roswell Road, #154
Marietta, Georgia 30068

Dear Mr. Batsel:

Re: Former TRW Aeronautical Systems Facility, Utica, NY, USEPA ID No. NYD002244911; CMS Work Plan Modification, dated November 9, 2004

The New York State Department of Environmental Conservation (Department) and the New York State Department of Health (DOH) have reviewed the document referenced above. The Department approves the Corrective Measures Study (CMS) Work Plan and Modification, with the following clarification.

Comment on Potential Corrective Measure Technologies and/or Alternatives (Response 8)
It should be noted that Lucas Western/TRW (Lucas) is listed on the NYS Inactive Hazardous Waste List under the former name "Bendix", No. 633020.

If you have any questions please contact me at (518) 402-8594.

Sincerely,

/s/

Alicia Barraza
Environmental Engineer
Hazardous Waste Engineering Eastern Section

cc: J. Reidy, EPA Region II
G. Rys, NYSDOH
ecc: D. Evans
L. Rosenmann
S. Hamilton
S. Shoemaker, R6

Dextra

Transmitted Via E-Mail & Federal Express

November 9, 2004

Ms. Alicia Barraza
New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Solid Waste and Corrective Action
625 Broadway
Albany, New York 12233-7258

Re: Former TRW Aeronautical Systems Facility
211 Seward Avenue – Utica, New York
USEPA ID#: NYD002244911
CMS Work Plan Modification

Dear Ms. Barraza:

On behalf of Lucas Western LLC (Lucas Western), attached is the *Modification to the Corrective Measures Study Work Plan* , dated August 10, 2004. The Modification is being submitted in response to the New York State Department of Environmental Conservation's (NYSDEC's) comments provided in your e-mail correspondence dated October 15, 2004. For ease of presentation, each NYSDEC comment is provided in Attachment 1, followed by Lucas Western's response. Please note that the revised data table and new graph referenced in the response are included as Table 1 and Figure 1.

As discussed during our recent telephone conversation, the interim corrective measure (ICM) activities to remove soils at the Site exhibiting polychlorinated biphenyls (PCBs) at concentrations above 50 parts per million (ppm) are near completion. Backfilling activities are scheduled to be completed within approximately one week. A brief summary of the completed ICM Soil PCB activities will be presented in the CMS Report. A detailed summary of the completed activities will be presented in an ICM PCB Soil Removal Certification Report to be submitted to the NYSDEC by December 3, 2004 (in accordance with the schedule included in my e-mail correspondence dated August 30, 2004).

Based on the schedule for completing the ICM PCB Soil Removal Certification Report, the CMS Report will be submitted to the NYSDEC within 45 days of receipt of NYSDEC approval of the Modifications to the CMS Work Plan.

The Dextra Group, LLC
Environmental Business Solutions
4665 Lower Roswell Road, # 154
Marietta, Georgia 30068
(770) 578-4614 Phone
(770) 579-6713 Fax

Please do not hesitate to contact me at (770) 578-9696 or via e-mail at batsel@dextra-group.com if you have any questions or require additional information regarding the attached modification or any other aspect of the project.

Sincerely,
The Dextra Group LLC

Kurt Batsel, P.E.
Principal

Attachments

cc: Valerie M. Hanna, Esq., Brouse McDowell (via U.S. Mail)
Mr. David R. Gerber, P.E., BBL Environmental Services, Inc.
Mr. John C. Brussel, P.E., Blasland, Bouck & Lee, Inc.

Attachment 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Modification to the CMS Work Plan

Comment on Introduction

Comment 1

The first page, second paragraph, states that PCBs were identified in four AOCs and SVOCs in three AOCs. In the RFI Report there appear to be five AOCs with PCBs (17.3, 18, 20, 21 and 23), and four AOCs with SVOCs (1, 7.3, 13, 24). This should be clarified.

Response 1

The areas of concern (AOCs) identified in the New York State Department of Environmental Conservation- (NYSDEC-) approved *RCRA Facility Investigation Report* prepared by Blasland, Bouck & Lee, Inc. (BBL, April 2004) ["the RFI Report"] as exhibiting polychlorinated biphenyls (PCBs) and semi-volatile organic compounds (SVOCs) at concentrations above the soil guidance values are correct. The first page, second paragraph of the Corrective Measures Study (CMS) Work Plan is hereby revised to state the following:

> "In addition, polychlorinated biphenyl (PCB) concentrations identified in five AOCs and semi-volatile organic compound (SVOC) concentrations identified in four AOCs are above the TAGM 4046 soil guidance values."

For clarification, AOC No. 18 – Former Drum Storage Area and AOC No. 24 – South Storm Sewer Line Catch Basin Area were inadvertently omitted when determining the total number of AOCs exhibiting PCBs and SVOCs, respectively, at concentrations above the soil guidance values. Accordingly, the table included on Page 4 of the CMS Work Plan is hereby revised as follows.

AOC No.	AOC Title	Constituent of Interest		
		PCBs	SVOCs	Inorganics
1	Former Chemical Storage Building		✔	
4	Former Plating Area Wastewater Treatment Equipment			✔
7.3	Former 550-Gallon Diesel Fuel Aboveground Storage Tank		✔	
8.1	Former Cyanide Waste Pit No. 1			✔
8.2	Former Cyanide Waste Pit No. 2			✔
13	Former VOC-Impacted Soils Area		✔	
14	Former Plating Area			✔
17.3	Former Electrical Transformer Substation No. 3	✔		
18	Former Drum Storage Area	✔		✔

AOC No.	AOC Title	Constituent of Interest		
		PCBs	SVOCs	Inorganics
20	Former Main Production Building Footprint	✔		
21	Former Test Building Footprint and Vicinity	✔		
23	Grass-Covered Area East of Enclosed Passageway	✔		
24	South Storm Sewer Line Catch Basin Area including the limits of the backfilled storm sewer interim corrective measure (ICM) south sewer line excavation		✔	✔

Background information on the discovery of PCBs in AOC No. 18 and SVOCs in AOC No. 24 is presented below.

RFI soil samples initially collected from AOC No. 18 were only submitted for laboratory analysis for inorganic constituents. Later, during the third phase of the RFI sampling, PCB soil sampling in AOC No. 21 (Former Test Building Footprint and Vicinity) was expanded and it ultimately overlapped into the western portion of AOC No. 18. PCBs were identified at concentrations above the TAGM 4046 soil guidance values in certain AOC No. 21 samples that were also within the boundaries of AOC No. 18. After the RFI was completed, during collection of delineation soil samples in support of interim corrective measure (ICM) activities to remove soils exhibiting PCBs at concentrations above 50 parts per million (ppm), PCBs were identified further east within AOC No. 18. PCBs remaining in AOC No. 18 soils at concentrations above the TAGM 4046 soil guidance values after completion of the PCB Soil ICM activities will be addressed in the CMS Report.

SVOCs were identified at concentrations above the TAGM 4046 soil guidance values at only one RFI sampling location in AOC No. 24, and the concentrations at that location were only slightly above the guidance values. Specifically, benzo(a)anthracene and benzo(a)pyrene were identified at sampling location CB-4N (3-4') at estimated concentrations of 0.33 and 0.31 ppm, above the guidance values of 0.224 and 0.061 ppm, respectively. These SVOCs were not proposed in the RFI Report or CMS Work Plan for inclusion in the CMS. Because the NYSDEC has indicated that SVOCs should be identified as constituents of interest in AOC No. 24 (refer to Comment 4), the CMS Work Plan is hereby modified to indicate that the SVOCs identified in AOC No. 24 will be addressed in the CMS Report.

♦ ♦ ♦

Comment on Background

Comment 2

In the second bullet ("Future Commercial/Industrial Worker"), the last sentence in the paragraph should be modified since the Department and NYSDOH have not concluded that risks from intrusion of VOCs into indoor air would not be significant.

Response 2

The comment above refers to a conclusion made based on the Desk-Top Evaluation of Potential Vapor Intrusion Scenarios, which was prepared using methodologies developed by the United

States Environmental Protection Agency (USEPA) and Johnson and Ettinger (J&E) for an initial screening level assessment of the potential significance of the vapor intrusion pathway for site-related VOCs. The Desk-Top Evaluation was submitted to the NYSDEC under a cover letter from the Dextra Group, LLC, dated June 10, 2004. Because the Desk-Top Evaluation was prepared using proper application of scientific principles following the above-referenced methodologies, Lucas Western maintains that the conclusions of the Evaluation are valid (i.e. the vapor intrusion pathway does not appear to be significant). Further, the sentence at issue is clearly prefaced by an explanation that the conclusion is solely based on the Evaluation performed on behalf of Lucas Western. Therefore, Lucas Western does not agree to remove this sentence.

However, Lucas Western will add the following language after the statement to provide the NYSDEC's and New York State Department of Health's (NYSDOH's) position:

> "The NYSDEC and NYSDOH reviewed the memorandum, and responded that '*we do not endorse the exclusive use of the Johnson Ettinger model for evaluating potential off-site vapor intrusion impacts if soil gas sampling is possible.*' [*See* July 29, 2004 letter from NYSDEC]. In response to the NYSDEC July 29, 2004 letter, Lucas Western agreed to further evaluate the potential vapor intrusion pathway via collection of soil gas samples, and prepared a Soil Gas Investigation Work Plan that was submitted to the NYSDEC in a letter dated August 23, 2004. Details of the investigation activities are still being discussed between Lucas Western and NYSDEC. Further evaluation of the pathway will be performed using the results of the Soil Gas Investigation."

♦ ♦ ♦

Comments on Purpose and Objectives

Comment 3

The table in section 7.0 of the RFI Report states that for AOC 18, PCBs were identified in samples collected from the western portion of the AOC at concentrations above 1 ppm. However, the table in the CMS Work Plan for AOC 18 does not include PCBs as a constituent of concern.

Response 3

The above-referenced table has been revised to indicate that PCBs are a constituent of interest for AOC No. 18. The revised table is included under Response 1.

♦ ♦ ♦

Comment 4

The table in the CMS Work Plan does not include SVOCs for AOC 24. SVOCs were identified as constituents of concern in the RFI Report (see the table in section 7.0 and the new Table 23 in Lucas' responses dated June 18, 2004).

Response 4

The above-referenced table has also been revised to indicate that SVOCs are a constituent of interest for AOC No. 24. Please refer to the table in Response 1.

♦ ♦ ♦

Comments on Development of Soil Performance Goals

Comment 5

Table 1 in the work plan references the maximum values obtained for metals in site background soil samples. A range and/or the minimum site background values should be used for comparison purposes in selecting the performance goals.

Response 5

Table 1 has been revised to include the range of inorganic constituent concentrations identified at the background sampling locations. The revised table is attached to this response letter. The range in Table 1 is presented for comparison purposes and should be considered only in the broader context of the full background sampling dataset. A detailed discussion of the appropriate site background values to be selected as the performance goals for inorganic constituents in soils will be presented in the CMS Report.

♦ ♦ ♦

Comment 6

Generally, hexavalent chromium (Cr+6) should not be found in surface or near surface soils, as it readily converts to the less toxic forms of chromium. Significant amounts of Cr+6 are indicative of waste disposal. If the reported Cr+6 was identified in a limited area, removal and disposal of this soil should be undertaken. Cr+6 should not be left in surface soils at detectable levels.

Response 6

Based on the results of previous soil investigation activities, hexavalent chromium was detected in surface soil at the following locations at the Site:

- Two sampling locations in AOC No. 14 – Former Plating Area (locations 14-1 and 14-4); and
- Three sampling locations in AOC No. 18 – Former Drum Storage Area (locations 18-7, 18-9, and 18-10).

Soil in AOC No. 14 that exhibited elevated concentrations of chromium (including surface soil at sampling locations 14-1 and 14-4) was recently excavated in conjunction with the expanded PCB Soil ICM activities at the Site. The excavation activities in AOC No. 14 were performed in accordance with a letter to the NYSDEC dated August 20, 2004 and follow-up e-mail correspondence. Accordingly, the hexavalent chromium-impacted soils initially identified in sampling locations 14-1 and 14-4 have been removed, and the excavated area has been restored with clean backfill material. Further discussion of the excavation activities in AOC No. 14 will be provided in the ICM PCB Soil Removal Certification Report to be submitted to the NYSDEC by December 3, 2004 (in accordance with the schedule presented in e-mail correspondence to the NYSDEC dated August 30, 2004).

Hexavalent chromium was detected in surface soil samples collected at the 0- to 6-inch depth interval at RFI sampling locations 18-7, 18-9, and 18-10. The concentrations identified at these locations were 1.3 ppm, 4.7 ppm, and 1.0 ppm, respectively. Hexavalent chromium was also identified in each background soil sample, including the five background surface soil samples (0- to 2-feet bgs) and five background subsurface soil samples (2- to 4-feet bgs). The background concentrations ranged from 0.35 ppm to 1.4 ppm. The detection of hexavalent chromium in each background sample suggests that hexavalent chromium is naturally occurring in Site soils and similar concentrations at onsite locations are not attributed to former industrial activity. As shown on the graph included as Figure 1, the hexavalent chromium concentrations identified in surface soil samples 18-7 and 18-10 are consistent with the concentrations identified in the background samples and below the maximum background concentration. As indicated by the data distribution shown on Figure 1, it is possible that the hexavalent chromium concentration identified in surface soil sample 18-9, which is slightly above background, may also be naturally-occurring. Based on further evaluation, the hexavalent chromium concentration identified in surface soil sample 18-9 is well below the USEPA Region 9 Preliminary Remedial Goals (PRGs) of 30 ppm for residential soil and 64 ppm for industrial soil and the USEPA Region 3 Risk-Based Concentrations (RBCs) of 230 ppm for residential soil and 6,100 ppm for industrial soil.

Although Lucas Western does not consider the hexavalent chromium concentrations identified in AOC No. 18 to be elevated, concentrations of other inorganic constituents (including total chromium) and PCBs remaining in soils within the AOC are elevated. These impacted soils, which include surface soils exhibiting low concentrations of hexavalent chromium, will be addressed in the CMS Report. It is currently anticipated that soils in AOC No. 18 may ultimately be covered by a barrier layer and appropriate site controls will be put in place.

♦ ♦ ♦

Comment on Development of Groundwater Performance Goals

***Comment** 7*

The work plan indicates that on-site contaminant constituents in both groundwater and soil will be addressed, yet it does not propose remedial measures for groundwater other than continued groundwater monitoring and evaluation. The work plan also indicates that groundwater hydraulically down gradient from the facility will be addressed in a separate CMS. Very often the remedial measures for offsite groundwater migration are conducted on-site through source control. One of the primary criteria for assessing the need for on-site remedial measures of groundwater are the impacts that are occurring due to offsite migration. Therefore, it appears appropriate to address the on-site and off-site groundwater remedial measures in one CMS. The Department agrees that groundwater remedial measures for some potential off-site impacts may need to be postponed until there is sufficient data from the recently proposed soil vapor sampling program. Lucas should complete the CMS for all known potential impacts and receptors at this time, with a caveat that other impacts will be addressed in a separate CMS if and when they become known.

Response 7

Pursuant to NYSDEC's request, the CMS will include evaluation of measures to address groundwater hydraulically downgradient from the Site, as well as the onsite groundwater. The CMS will provide a detailed discussion of the remedial measures conducted to date to address

both onsite and offsite groundwater (i.e., source control measures). It will further support that measures consisting of monitoring combined with use restrictions, without further active remedial measures, are appropriate at this Site to address constituents of interest that remain in the groundwater. If the results of the proposed Soil Gas Investigation indicate that the impacted groundwater is a source of VOCs to indoor air, then appropriate measures to address the potential vapor intrusion pathway would be considered via an ICM and/or in a separate CMS.

♦ ♦ ♦

Comment on Potential Corrective Measure Technologies and/or Alternatives

Comment 8

Lucas should refer to NYS TAGM #4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, May 15, 1990, for additional guidance. In developing the remedial alternatives and technologies, Lucas should focus on the hierarchy of remedial technologies, including no further action. In general, the Department believes it is important to implement permanent remedies whenever practical.

Response 8

Pursuant to the NYSDEC's request, Lucas Western will refer to TAGM 4030 for additional guidance in preparing the CMS. It is our understanding that TAGM 4030 was developed by the NYSDEC for Feasibility Studies at inactive hazardous waste disposal sites in New York and differs in several respects from the USEPA Office of Solid Waste and Emergency Response (OSWER) Directive 9902.3-2A, "RCRA Corrective Plan," dated May 1994. Where there is contradiction between TAGM 4030 and OSWER Directive 9902.3-2A, the TAGM guidance will supersede the OSWER Directive and will be used for the CMS.

The CMS will include detailed evaluations of the three corrective measure alternatives identified in Section III of the Work Plan. Each alternative is capable of meeting the corrective measure objectives established for the Site. As requested by the NYSDEC, the CMS will also evaluate the "No Further Action" alternative, which will serve as a baseline for comparing the potential overall effectiveness of the other proposed alternatives. These alternatives to be evaluated in the CMS include applicable technologies from the "Hierarchy of Remedial Technologies" presented in Section 2.1 of TAGM 4030, including: (1) Solidification/Chemical Fixation; (2) Control and Isolation Technologies; and (3) Off-Site Land Disposal. The "Destruction" and "On-Site Separation/Treatment" technologies set forth in Section 2.1 of TAGM 4030 are not applicable for the primary constituents of interest in soils at the Site (metals and PCBs) and their associated levels. In total, there will be four alternatives retained for detailed evaluation in the CMS, which will provide an appropriate scope of alternatives given the extensive investigation and remedial work performed to date through the ICMs and the few issues remaining to be addressed. This scope of alternatives is also consistent with applicable NYSDEC guidance.

Lucas Western disagrees that the concept of "permanent remedy" should be given any special priority beyond that provided for in the seven evaluation criteria identified in Comment 9 below. As is evident from the new Brownfields legislation, the focus on remedy selection remains the protection of public health and the environment, given the intended use of the Site. Each alternative to be considered in the CMS will be evaluated based on the seven evaluation criteria identified in Comment 9 below, and the selected alternative will mitigate potential threats to

public health and the environment through the proper application of scientific and engineering principles.

♦ ♦ ♦

Comment on Evaluation of Potential Corrective Measures

Comment 9

The evaluation of the individual remedial alternatives and technologies should take into consideration the seven criteria discussed in NYS TAGM 4030.

- *short-term impacts and effectiveness;*
- *long-term effectiveness and performance;*
- *reduction of toxicity, mobility, or volume;*
- *implementability;*
- *compliance with NYS Standards, Criteria and Guidelines (SCGs);*
- *overall protection of human health and the environment; and*
- *cost*

Response 9

Acknowledged.

♦ ♦ ♦

Comments on Outline for the Focused CMS Report

Comment 10

In section 2, include a discussion of completed and any on-going interim corrective measures (ICM's) at the site.

Response 10

Per the NYSDEC's request, Section 2 of the proposed CMS Report will also include a summary of the completed Storm Sewer ICM activities and the PCB Soil ICM activities.

♦ ♦ ♦

Comment 11

The selection of proposed remedial measures will have to go through a public comment period of 45 days. This will require preparation of a Statement of Basis (SOB) which summarizes background information and completed activities, and describes the proposed measures. The SOB is usually prepared by the site owner who is most familiar with corrective action activities at the site, with review and approval by the Department. The Department is then required to respond to all comments and issue a final SOB with the selected remedial measures for implementation.

Response 11

Acknowledged. Lucas Western is agreeable to preparing a Statement of Basis following NYSDEC approval of the CMS Report. The Statement of Basis will be revised to address NYSDEC comments prior to the start of the public comment period.

♦ ♦ ♦

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Work Plan
Potentially Applicable Criteria for Detected SVOCs and TAL Inorganics (ppm)

Constituent	USEPA Region 3 RBCs - Industrial Soil	USEPA Region 9 PRGs - Industrial Soil	NY Region Background Values	Minimum Site Background	Maximum Site Background	Upper Limit 95% Confidence Interval of Sample Population	NYSDEC TAGM 4046 Soil Guidance Values	Range of Observed Site Values	Max Detected Value Location
Detected Semi-Volatile Organic Compounds (SVOCs)									
1,1'-Biphenyl	NA	350	NA	NA	NA	NA	NA	0.062 - 2.3	7.3-1 (0-0.5')
3,4-Methylphenol	NA	NA	NA	NA	NA	NA	0.9	0.046 - 0.046	13-5 (2-4')
Acenaphthene	61,000	29,000	NA	NA	NA	NA	50	0.022 - 37	7.3-1 (0-0.5')
Acenaphthylene	NA	NA	NA	NA	NA	NA	41	0.04 - 0.04	13-5 (2-4')
Anthracene	310,000	100,000	NA	NA	NA	NA	50	0.021 - 81	7.3-1 (0-0.5')
Benzo(a)anthracene	3.9	2.1	NA	NA	NA	NA	0.224	0.044 - 130	7.3-1 (0-0.5')
Benzo(a)pyrene	0.39	0.21	NA	NA	NA	NA	0.061	0.039 - 120	7.3-1 (0-0.5')
Benzo(b)fluoranthene	3.9	2.1	NA	NA	NA	NA	1.1	0.046 - 140	7.3-1 (0-0.5')
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	50	0.037 - 46	7.3-1 (0-0.5')
Benzo(k)fluoranthene	39	2.1	NA	NA	NA	NA	1.1	0.027 - 79	7.3-1 (0-0.5')
bis(2-Ethylhexyl) phthalate	200	120	NA	NA	NA	NA	50	0.026 - 0.16	7.3-4 (6-18')
Carbazole	140	86	NA	NA	NA	NA	NA	0.03 - 37	7.3-1 (0-0.5')
Chrysene	390	210	NA	NA	NA	NA	0.4	0.024 - 150	7.3-1 (0-0.5')
Di-n-butyl phthalate	NA	NA	NA	NA	NA	NA	8.1	0.031 - 0.61	BV-3
Dibenz(a,h)anthracene	0.39	0.21	NA	NA	NA	NA	0.014	0.031 - 14	7.3-1 (0-0.5')
Dibenzofuran	2,000	3,100	NA	NA	NA	NA	6.2	0.023 - 22	7.3-1 (0-0.5')
Fluoranthene	41,000	22,000	NA	NA	NA	NA	50	0.029 - 430	7.3-1 (0-0.5')
Fluorene	41,000	26,000	NA	NA	NA	NA	50	0.024 - 42	7.3-1 (0-0.5')
Indeno(1,2,3-cd)pyrene	3.9	2.1	NA	NA	NA	NA	3.2	0.03 - 48	7.3-1 (0-0.5')
Naphthalene	20,000	190	NA	NA	NA	NA	13	0.032 - 14	7.3-1 (0-0.5')
Naphthalene, 2-methyl-	20,000	NA	NA	NA	NA	NA	36.4	0.034 - 5.4	7.3-1 (0-0.5')
Phenanthrene	NA	NA	NA	NA	NA	NA	50	0.029 - 390	7.3-1 (0-0.5')
Pyrene	31,000	29,000	NA	NA	NA	NA	50	0.022 - 310	7.3-1 (0-0.5')
Target Analyte List (TAL) Inorganic Constituents									
Aluminum	1,000,000	100,000	7,000 - 100,000	3,530	9,360	10,961	SB	4070 - 12000	18-11 (0-0.5')
Antimony	410	410	NA	6.9	6.9	7.5	SB	0.25 - 1.3	18-5 (6-18')
Arsenic	1.9	260	3 - 12	3.6	11.2	13.1	7.5 or SB	4.8 - 26.6	18-8 (2-4')
Barium	72,000	67,000	15 - 600	22.2	83	97.3	300 or SB	24.6 - 135	8.2-3 (10.5-11.5')
Beryllium	2,000	1,900	0 - 1.75	0.5	0.5	0.62	0.16 or SB	0.14 - 0.74	18-9 (0-0.5')
Cadmium	1,000	450	0.1 - 1	<0.52	< 0.61	0.62	1.0 or SB	0.044 - 61.3	14-5 (0-1')
Calcium	NA	NA	130 - 35,000	374	167,000	181,304	SB	1230 - 145000	8.1-3 (4-5')
Chromium	1,500,000	450	1.5 - 40	5.3	23.8	22.4	10 or SB	7.3 - 1390	14-1 (0-1')
Hexavalent Chromium	3,100	64	NA	0.35	1.4	1.5	NA	0.09 - 401	14-1 (0-1')
Cobalt	20,000	1,900	2.5 - 60	3	7.4	8.6	30 or SB	3.1 - 246	18-3 (0-0.5')
Copper	41,000	41,000	<1 - 50	11.1	27.9	30.2	25 or SB	1.7 - 372	18-9 (0-0.5')
Iron	310,000	100,000	2,000 - 550,000	11,600	27,400	30,866	2,000 or SB	12200 - 38700	18-6 (0-0.5')
Lead	NA	750	200 - 500	3.8	26.7	28.1	SB	1.6 - 198	18-5 (0-0.5')
Magnesium	NA	NA	100 - 5,000	2,360	21,100	18,459	SB	2180 - 33500	8.1-3 (13-14')
Manganese	140,000	19,000	50 - 5,000	478	1,780	1,890	SB	456 - 2350	18-3 (2-4')
Mercury	NA	310	0.001 - 0.2	0.0091	0.12	0.125	0.1	0.011 - 5.6	8.1-6 (8-9')
Nickel	20,000	20,000	0.5 - 25	7.6	15.7	17.1	13 or SB	8.7 - 599	18-3 (0-0.5')
Potassium	NA	NA	8,500 - 43,000	457	759	747	SB	357 - 1200	18-9 (0-0.5')
Selenium	5,100	5,100	<0.1 - 3.9	<0.52	< 1.2	1.2	2.0 or SB	0.35 - 7.9	4-2 (0-1')
Silver	5,100	5,100	NA	<1	< 1.2	1.2	SB	0.092 - 0.87	4-1 (0-1')
Sodium	NA	NA	<50 - 50,000	62.9	82.4	872	SB	26.2 - 1350	14-5 (0-1')
Thallium	72	67	NA	<1	< 1.2	1.2	SB	0.52 - 2.3	18-3 (0-0.5')
Vanadium	310	7,200	1 - 300	5.9	17.9	21.9	150 or SB	6.6 - 26.9	4-1 (1-2')
Zinc	310,000	100,000	9 - 50	35.9	92	95.8	20 or SB	33.5 - 232	18-11 (0-0.5')
Cyanide (total)	NA	NA	NA	<0.52	< 0.61	0.62	Site Specific	0.13 - 1.9	14-5 (0-1')
Cyanide (free)	20,000	12,000	NA	NA	NA	NA	NA	ND	NA

See notes on Page 2.

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

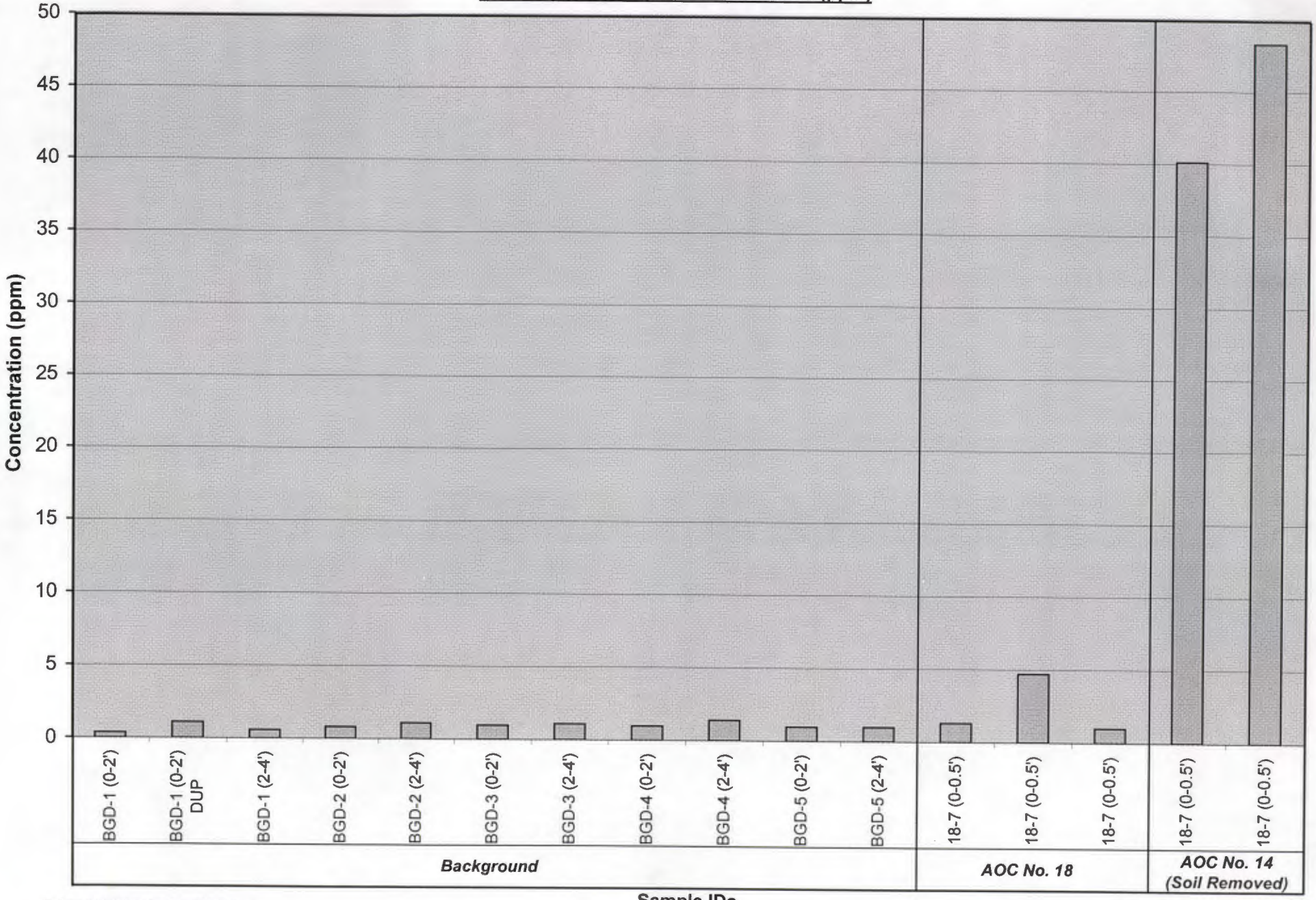
Corrective Measures Study Work Plan
Potentially Applicable Criteria for Detected SVOCs and TAL Inorganics (ppm)

Notes:

1. United States Environmental Protection Agency (USEPA) Region 3 Risk-Based Concentrations (RBCs) were obtained from USEPA Region 3 website (http://www.epa.gov/reg3hwmd/risk/riskmenu.htm) last updated October 15, 2003.
2. USEPA Region 9 Preliminary Remediation Goals (PRGs) were obtained from USEPA Region 9 website (http://www.epa.gov/region09/waste/sfund/prg/index.htm) last updated October 1, 2002.
3. NY Region Background values were obtained from the New York State Department of Environmental Conservation (NYSDEC) document titled "Background Concentrations of 20 Elements in Soils with Special Regard for New York State", by E. Carol McGovern, dated 1988.
4. Maximum site background represents the highest concentration identified at background soil sampling locations BGD-1 through BGD-5 as part of a background soil sampling program completed during January 2002.
5. The upper limit of the 95% confidence interval was calculated using the background sample population.
6. NYSDEC TAGM 4046 Soil Guidance Values were obtained from the NYSDEC TAGM titled, "Determination of Soil Cleanup Objectives and Cleanup Levels," HWR-94-4046 (TAGM 4046), dated January 24, 1994, revised December 20, 2000.
7. Concentrations presented in parts per million (ppm), which are equivalent to milligrams per kilogram (mg/kg).
8. NA = Not Available.
9. SB = Site background.
10. Site Specific = TAGM 4046 indicates the soil cleanup objective for cyanide is site-specific.
11. < = not detected above the reported laboratory detection limit.

Figure 1
Former TRW Aeronautical Systems Facility
211 Seward Avenue - Utica, New York

RFI Analytical Results
Hexavalent Chromium Concentrations (ppm)



P:\AMS\2004\59942574.xls

Alicia Barraza - Re: TRW Utica

From: "Gregory A. Rys" <gar02@health.state.ny.us>
To: "Alicia Barraza" <aabarraz@gw.dec.state.ny.us>
Date: 10/6/2004 10:41 AM
Subject: Re: TRW Utica

Hello Alicia,

I can't seem to locate the document. However, I did receive it. I did discuss the soil clean up values for metals with Mr. Ridenour from our Bureau of Toxic Substance Assessment. The one item we had issue with was the proposed soil clean up values for Cr+6. Cr+6 generally should not be found in surface or near surface soils; as it readily converts to the less toxic forms Cr. Thus, significant amounts of Cr+6 reported are indicative of waste disposal and should be removed. If the reported CR+6 was identified in a limited area removal/disposal of the same should be undertaken. As far as a clean up value, Cr+6 should not be left at the surface in detectable levels.

The report also referenced the maximum values obtained for metals in background surface soil samples. A range and/or the minimum values should have been used for comparison basis.

If there are additional areas you would like me to revisit please send me a note or call @ (315) 866-6879.

Greg

"Alicia Barraza" <aabarraz@gw.dec.state.ny.us> To: <gar02@health.state.ny.us>
cc:
Subject: TRW Utica
10/04/04 11:03 AM

Hi Greg -
This message is regarding the CMS Work Plan dated August 10, 2004 (submitted by Dextra). I don't recall if I sent you a copy or if Kurt Batsel sent one to you? If you have already sent me your comments for this work plan, please let me know when, as I cannot locate them. If you have not sent any comments, let me know if you have any. Thanks for your assistance.

- Do they cover all the potential receptors? Yes
- Do they cover all the qualitative corrective measure objectives?

Development of Soil Performance Goal? (Table 1)
- Selection of perf. goals?
- CM alternatives proposed?
  - Barrier layer & site controls & monitoring (deed restriction)
  - Stabilization/solidification & site controls & monitoring)
  - Excavation / off site disposal & site controls
- Evaluation of potential CM
  - Technical (performance reliability implementability & safety)
  - Environmental (short term & long term effects, mitigative measures)
  - Human health (mitigative measures)
  - Institutional (regulations, permitting)
  - Cost analysis (capital, operation & maintenance)

Dextra

Transmitted Via E-Mail & Federal Express

August 10, 2004

Ms. Alicia Barraza
New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Solid Waste and Corrective Action
625 Broadway
Albany, New York 12233-7258

Re: Former TRW Aeronautical Systems Facility
211 Seward Avenue – Utica, New York
USEPA ID#: NYD002244911

Dear Ms. Barraza:

On behalf of Lucas Western LLC (Lucas Western), this letter presents the Corrective Measures Study (CMS) Work Plan for the CMS to be completed for onsite groundwater and soils at the former TRW Aeronautical Systems facility located in Utica, New York (the "Site"). The CMS Work Plan outlines the approach of this CMS to address environmental conditions at the Site. The Plan is intended to facilitate preparation and review of the CMS requested by the New York State Department of Environmental Conservation (NYSDEC) in a July 27, 2004 letter that provides approval of the *RCRA Facility Investigation Report* prepared by Blasland, Bouck & Lee, Inc. (BBL) in April 2004 [the "RFI Report"]. The Plan has been prepared in accordance with guidance provided in the United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Directive 9902.3-2A – RCRA (Resource Conservation and Recovery Act) Corrective Action Plan dated May 1994.

A detailed discussion of current site conditions is presented in the NYSDEC-approved RFI Report. As set forth in the RFI Report, concentrations of inorganic constituents (arsenic, beryllium, cadmium, chromium, cobalt, copper, cyanide, mercury, nickel, selenium, and zinc) identified in soils within six areas of concern (AOCs) at the Site are above the RFI screening criteria, as developed using the soil guidance values presented in the NYSDEC Technical and Administrative Guidance Memorandum titled *Determination of Soil Cleanup Objectives and Cleanup Levels,* HWR-94-4046, dated January 24, 1994 (TAGM 4046). In addition, polychlorinated biphenyl (PCB) concentrations identified in four AOCs and semi-volatile organic compound (SVOC) concentrations identified in three AOCs are above the TAGM 4046 soil guidance values.

The Dextra Group, LLC
Environmental Business Solutions
4665 Lower Roswell Road, #154
Marietta, Georgia 30068
(770) 578-9696 Phone
(770) 321-5345 Fax

As also provided in the RFI Report, volatile organic compound (VOC) and PCB concentrations in onsite groundwater were identified above the groundwater quality standards presented in the NYSDEC Division of Water, Technical and Operational Guidance Series document titled *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitation*, (TOGS 1.1.1), dated June 1998, last updated April 2000.

Various corrective measure alternatives for addressing these constituents in onsite soils and groundwater will be evaluated in the CMS. Groundwater hydraulically downgradient from the Site will be addressed under a separate CMS, as needed.

This CMS Work Plan is organized into the following sections:

- Background;
- Purpose and Objectives;
- Potential corrective measures technologies and/or alternatives;
- Evaluation of potential corrective measures;
- Proposed pilot or bench scale studies;
- Outline for the CMS Report; and
- Schedule.

I. BACKGROUND

Based on the results of the RFI, the nature and extent of constituents of interest in onsite soil and onsite groundwater have been determined and the potential exposure routes from these sources to the human population are understood. The following complete exposure pathways have been identified:

- *Potential Trespasser* – While the Site is surrounded by a locked chain-link fence, the potential still exists for trespassers. Exposure of trespassers would be infrequent and of relatively short duration. Possible exposure routes may include dermal contact, incidental ingestion of surface soil, and inhalation of wind-blown particles.

- *Future Commercial/Industrial Worker* – The Site is expected to be redeveloped for future commercial/industrial use. Under existing conditions, future workers have the potential for exposure to constituents of interest in surface soil via dermal contact, incidental ingestion, and inhalation of wind-blown particles. Inhalation of VOCs from soil is unlikely because VOCs were only identified in subsurface soils and were only detected at concentrations below TAGM 4046 soil guidance values. However, worker exposure to other constituents of interest in subsurface soil could potentially occur during future construction activities. In addition, if a building were to be constructed in the future, a potentially complete exposure pathway could be associated with intrusion of VOCs from groundwater into indoor air. Further analysis of this pathway (as summarized in a memorandum from BBL attached to a June 10, 2004 letter from the Dextra Group LLC to the NYSDEC) indicated that risks would not be significant.

- *Potential Offsite Exposure* – Residential and commercial properties currently exist west and north of the Site, respectively. Potential exposure to individuals in these areas could

occur in the unlikely event of onsite dust generation and wind-blown transport of particulates.

II. PURPOSE AND OBJECTIVES

A CMS will be conducted to evaluate potential final corrective measure alternatives to address elevated levels of chemical constituents in the AOCs and onsite groundwater at the Site, thereby addressing potential exposure pathways. The CMS will also identify a recommended alternative that is protective of human health and the environment and appropriate for the intended commercial/industrial future site use.

Corrective measure objectives have been developed for the CMS considering the results of the qualitative human exposure evaluation, potentially-applicable standards/criteria/ guidance, and intended future site use. Consideration of site use in the development of the corrective measure objectives is consistent with the new New York State (NYS) Superfund Refinancing and Reform Legislation (NYS Assembly Bill 9120 (June 20, 2003)), passed in October 2003, that endorses future site use as a relevant factor in remediation decision-making. Specifically, the Legislation states, in the discussion of Remedial Program Requirements to be enacted pursuant to Section 27-1415, Paragraph 6 titled "Soil Cleanup Objectives", that "the regulations shall include three generic tables of contaminant-specific remedial action objectives for soil *based on a site's current, intended or reasonably anticipated future use*, including: (I) unrestricted, (II) commercial and (III) industrial (emphasis added)." [refer to http://assembly.state.ny.us/leg/?bn=A09120&sh=t].

Accordingly, qualitative corrective measure objectives established for the Site are as follows:

- Prevent/mitigate potential future exposure of commercial/industrial workers at the Site to soil containing elevated levels of constituents of interest or exposure to offsite residents via wind-blown dust;

- Prevent potential human exposure to chemical constituents in groundwater within Site boundaries at concentrations exceeding groundwater quality standards/guidance values; and

- Prevent exposure to VOCs potentially migrating through soil vapor at the Site as a precautionary measure, although preliminary evaluation indicates that this exposure pathway is not an issue.

The proposed corrective measures will address each AOC at the Site where PCBs, SVOCs, and inorganic constituents have been identified in soil at concentrations above the Soil Performance Goals identified below. The corrective measures will also address groundwater beneath the Site boundaries that exhibits VOCs at concentrations above the Groundwater Performance Goals, identified below. AOCs to be addressed as part of the CMS and the constituents of interest within these AOCs are listed in the table below.

AOC No.	AOC Title	Constituent of Interest		
		PCBs	SVOCs	Inorganics
1	Former Chemical Storage Building		✔	
4	Former Plating Area Wastewater Treatment Equipment			✔
7.3	Former 550-Gallon Diesel Fuel Aboveground Storage Tank		✔	
8.1	Former Cyanide Waste Pit No. 1			✔
8.2	Former Cyanide Waste Pit No. 2			✔
13	Former VOC-Impacted Soils Area		✔	
14	Former Plating Area			✔
17.3	Former Electrical Transformer Substation No. 3	✔		
18	Former Drum Storage Area			✔
20	Former Main Production Building Footprint	✔		
21	Former Test Building Footprint and Vicinity	✔		
23	Grass-Covered Area East of Enclosed Passageway	✔		
24	South Storm Sewer Line Catch Basin Area including the limits of the backfilled storm sewer interim corrective measure (ICM) south sewer line excavation			✔

In support of the corrective measure objectives, numerical performance goals have been established to determine the extent of soil to be addressed under each proposed corrective measure. Additionally, specific performance goals have been established for onsite groundwater. The development of performance goals for onsite soil and groundwater is presented below.

Development of Soil Performance Goals

Performance goals for soil were developed considering various comparison criteria, the site location/ setting, and intended commercial/industrial future site use. As a starting point, the USEPA Region 3 Risk Based Concentrations (RBCs) and the Region 9 Preliminary Remediation Goals (PRGs), developed to be protective of human health in an industrial setting, were considered in developing the performance goals. Regional and site-specific background inorganic constituent concentrations were considered next, including the 95% upper confidence limits for the background sample data (calculated values below which inorganics concentrations are predicted to be in 95% of collected background samples). The soil guidance values presented in TAGM 4046, which are generally lower than the other criteria discussed above, were also considered. The TAGM 4046 guidance values for inorganic constituents (excluding mercury) are established as the higher value of either a conservative health-based tabulated criteria presented in the document (where available) or background. TAGM 4046 indicates that New York State or eastern United States background soil values may be used as cleanup criteria for heavy metals (except mercury). The comparison criteria are summarized in Table 1.

Based on review of the various comparison criteria, at this time, the conservative TAGM 4046 soil guidance values have been selected as the performance goals for onsite soil. However, substantial revisions to the New York State clean up levels are pending. We understand that these revisions are anticipated to include development of new soil clean up levels for three different categories of site use (or cleanup tracks), including residential (unrestricted), commercial, and industrial use. We also understand that the revisions are anticipated to allow for calculation of site-specific cleanup levels based on site-specific circumstances. At such time that the new cleanup levels are proposed or promulgated, Lucas Western reserves the right to evaluate the new criteria with regards to the site conditions, and to propose less conservative performance goals for the onsite soils.

Development of Groundwater Performance Goals

The results of the RFI groundwater monitoring event conducted for the Site indicate the presence of VOCs at concentrations above groundwater quality standards within the Site boundaries, as summarized below.

- Two chlorinated solvents, 1,1,1-trichloroethane (1,1,1-TCA) and trichloroethene (TCE), were detected in samples at concentrations slightly above the TOGS 1.1.1 groundwater quality standard for each constituent;

- Ethylbenzene, isopropylbenzene, and xylenes were detected in one onsite sample at concentrations slightly above the TOGS 1.1.1 groundwater quality standard. These three constituents were not detected above laboratory detection limits in any other RFI groundwater samples; and

- Chloroform was detected in all of the RFI groundwater samples. The concentration of chloroform in select samples was above the TOGS 1.1.1 groundwater quality standard. The chloroform concentrations detected in onsite wells was generally consistent with concentrations of chloroform found in wells located hydraulically upgradient from the Site, and concentrations of chloroform in wells hydraulically downgradient from the Site were less than those in wells upgradient from the Site. Chloroform is not attributed to former site activities. Historic data suggested that there is a chloroform source hydraulically upgradient of the Site.

Aside from three typical mineral constituents (iron, manganese, and sodium), Target Analyte List (TAL) inorganic constituents were not detected in groundwater samples at concentrations above the TOGS 1.1.1 groundwater quality standards. PCBs were detected in only one of the groundwater samples collected during the RFI. The PCB concentration in that onsite sample was above the TOGS 1.1.1 groundwater quality standard. However, PCBs were not detected in the sample from this location, or for any other samples, collected for the first round of annual groundwater monitoring activities in June 2004 [complete results for the June 2004 annual groundwater monitoring activities will be summarized in a letter report to be submitted to NYSDEC by the end of September 2004].

As mentioned in the RFI Report, potential exposure to VOCs in onsite groundwater is not expected to occur because there is no potable use of groundwater at the Site and the depth to groundwater (at least 10 feet below ground surface) precludes the possibility of direct contact. A comparison of the results of the RFI groundwater sampling with data from previous

groundwater sampling activities indicates that the concentrations of VOCs in onsite groundwater have generally declined over the past several years and are anticipated to decline due to natural processes. Accordingly, the evaluation of corrective measures for onsite groundwater will be limited to evaluation of a monitoring alternative to confirm the anticipated continuing reduction in onsite groundwater VOC concentrations.

III. POTENTIAL CORRECTIVE MEASURES TECHNOLOGIES AND/OR ALTERNATIVES

Based on a review of previous investigation results [as presented in the RFI Report] and results for verification soil sampling performed in connection with the previously completed Storm Sewer ICM removal activities [refer to the NYSDEC-approved *Interim Corrective Measure Storm Sewer Removal Certification Report* (BBL, March 2004)], a streamlined approach will be used for the CMS. Three potential site-wide corrective measure alternatives that satisfy the objectives of the CMS will be evaluated and compared against each other to determine which alternative best satisfies the evaluation criteria. Three potential corrective measure technologies to address soils will be used in combination with various site controls/monitoring to form the three separate site-wide alternatives. Under each alternative, constituents of interest in onsite groundwater would be addressed in the same manner as follows:

- Onsite groundwater monitoring would be performed to evaluate the concentrations of constituents of interest at the Site; and

- Onsite groundwater use restrictions would be implemented to prevent exposure to groundwater constituents above groundwater standards.

The proposed site-wide alternatives and their corresponding elements (in addition to the above-mentioned groundwater controls and monitoring) are summarized below:

- *Alternative 1 - Barrier Layer and Site Controls & Monitoring:* Under this first alternative, a barrier layer (soil cover, asphalt/concrete pavement, concrete building foundation, etc.) would be installed as an active exposure prevention method in the AOCs over areas of soil exhibiting constituents at concentrations above the soil performance goals identified above. The following site controls would also be implemented under this alternative:

  - A deed restriction would be imposed to restrict property use to commercial/industrial only;

  - A Soils Management Plan would be developed and would provide for long-term maintenance of the barrier/cover. The Soil Management Plan would be referenced in the deed to the property; and

  - The Soils Management Plan would also provide guidelines to be followed for management of soil material during future activities that would breach the barrier/cover system.

The CMS will also evaluate under this alternative the need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier).

- *Alternative 2 - Stabilization/Solidification and Site Controls & Monitoring:* Under this second alternative, soils in the AOCs that exhibit constituents at concentrations above the performance goals would be stabilized/solidified. The following site controls would also be implemented under this alternative:

  - A deed restriction would be imposed to restrict property use to commercial/industrial only; and

  - A Soils Management Plan would be developed to establish guidelines to be followed for management of stabilized soil material disturbed during future activities. The Soils Management Plan would be referenced in the deed to the property.

  The CMS will also evaluate under this alternative the need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier).

- *Alternative 3 – Excavation/Offsite Disposal and Site Controls:* Under this third alternative, soils in the AOCs exhibiting constituents at concentrations above the performance goals would be excavated and transported for offsite disposal. The CMS will also evaluate under this alternative the need for additional control measures to address potential onsite vapor intrusion via a deed restriction mandating future building construction requirements (i.e., vapor barrier).

IV. EVALUATION OF POTENTIAL CORRECTIVE MEASURES

The three corrective measure alternatives will be evaluated in terms of the following criteria:

- *Technical Analysis*. A description of the proposed approach and technical considerations for implementing the corrective measures will be presented. The technical analysis will consist of an evaluation of the anticipated performance, reliability, implementability, and safety of the corrective measures;

- *Environmental Analysis.* The ability of the corrective measures to achieve adequate source control and/or address constituents of interest will be assessed. The environmental analysis will include an assessment of the potential short-term and long-term effects (both adverse and beneficial) resulting from implementation of the corrective measures. Mitigative measures will be identified to minimize potential adverse effects (if any);

- *Human Health Analysis*. Potential risks to human health that may occur during and/or after implementation of the corrective measures will be assessed. The human health analysis will also identify mitigative measures to reduce potential risks to human health associated with the implementation of the corrective measures;

- *Institutional Analysis*. An evaluation of the corrective measure alternatives with respect to federal, state, and local standards, regulations, and guidance will be performed. In the process of this analysis, permitting requirements will be identified and permitting schedules for implementation of each alternative will be identified (if applicable).

- *Cost Analysis*. Both capital and operation and maintenance cost for the corrective measures will be assessed.

V. PROPOSED PILOT OR BENCH SCALE STUDIES

No pilot or bench scale studies are proposed. The RFI activities generated adequate data to assess the AOCs and evaluate potential corrective measures.

VI. OUTLINE FOR THE FOCUSED CMS REPORT

At the completion of the CMS, a focused CMS Report will be prepared. The focused CMS Report will be organized into the following sections.

Section	Purpose
Section 1 - Introduction	Presents a brief overview of the project and describes the purpose of the document.
Section 2 - Current Conditions	Presents a summary of activities completed and new information obtained since completion of the RFI.
Section 3 - Cleanup Standards	Presents proposed cleanup standards for each impacted media.
Section 4 - Corrective Measures Alternatives	Identifies alternatives evaluated in the focused CMS.
Section 5 - Evaluation of Final Corrective Measure Alternatives	Presents an evaluation of proposed corrective measure alternatives against various criteria.
Section 6 - Selection of Final Corrective Measure Alternative	Presents the selected corrective measure alternative and the rationale used for selection.

VII. SCHEDULE

Pursuant to the NYSDEC's July 27, 2004 RFI Report approval letter, we currently anticipate that a CMS Report will be submitted to the NYSDEC by October 29, 2004. If field conditions are encountered during implementation of the NYSDEC-approved *ICM Additional PCB Soil Removal Work Plan* (BBL, March 2004) that could delay the schedule for completing the CMS, then the NYSDEC will be notified promptly of the conditions and length of any anticipated delay.

We await NYSDEC approval of this CMS Work Plan and are prepared to begin work on the CMS Report following Work Plan approval. If you have any questions on this letter, please do not hesitate to contact me at 770-578-9696 or via e-mail at batsel@dextra-group.com.

Sincerely,
The Dextra Group LLC

Kurt Batsel, P.E.
Principal

JCB/jcb
Attachment

cc: Valerie M. Hanna, Esq., Brouse McDowell
Mr. David R. Gerber, P.E., BBL Environmental Services, Inc.
Mr. John C. Brussel, P.E., Blasland, Bouck & Lee, Inc.

Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Work Plan
Potentially Applicable Criteria for Detected SVOCs and TAL Inorganics (ppm)

Constituent	USEPA Region 3 RBCs - Industrial Soil	USEPA Region 9 PRGs - Industrial Soil	NY Region Background Values	Maximum Site Background	Upper Limit 95% Confidence Interval of Sample Population	NYSDEC TAGM 4046 Soil Guidance Values	Range of Observed Site Values	Max Detected Value Location
Detected Semi-Volatile Organic Compounds (SVOCs)								
1,1'-Biphenyl	NA	350	NA	NA	NA	NA	0.062 - 2.3	7.3-1 (0-0.5')
3,4-Methylphenol	NA	NA	NA	NA	NA	0.9	0.046 - 0.046	13-5 (2-4')
Acenaphthene	61,000	29,000	NA	NA	NA	50	0.022 - 37	7.3-1 (0-0.5')
Acenaphthylene	NA	NA	NA	NA	NA	41	0.04 - 0.04	13-5 (2-4')
Anthracene	310,000	100,000	NA	NA	NA	50	0.021 - 81	7.3-1 (0-0.5')
Benzo(a)anthracene	3.9	2.1	NA	NA	NA	0.224	0.044 - 130	7.3-1 (0-0.5')
Benzo(a)pyrene	0.39	0.21	NA	NA	NA	0.061	0.039 - 120	7.3-1 (0-0.5')
Benzo(b)fluoranthene	3.9	2.1	NA	NA	NA	1.1	0.046 - 140	7.3-1 (0-0.5')
Benzo(ghi)perylene	NA	NA	NA	NA	NA	50	0.037 - 46	7.3-1 (0-0.5')
Benzo(k)fluoranthene	39	2.1	NA	NA	NA	1.1	0.027 - 79	7.3-1 (0-0.5')
bis(2-Ethylhexyl) phthalate	200	120	NA	NA	NA	50	0.026 - 0.16	7.3-4 (6-18')
Carbazole	140	86	NA	NA	NA	NA	0.03 - 37	7.3-1 (0-0.5')
Chrysene	390	210	NA	NA	NA	0.4	0.024 - 150	7.3-1 (0-0.5')
Di-n-butyl phthalate	NA	NA	NA	NA	NA	8.1	0.031 - 0.61	BV-3
Dibenz(a,h)anthracene	0.39	0.21	NA	NA	NA	0.014	0.031 - 14	7.3-1 (0-0.5')
Dibenzofuran	2,000	3,100	NA	NA	NA	6.2	0.023 - 22	7.3-1 (0-0.5')
Fluoranthene	41,000	22,000	NA	NA	NA	50	0.029 - 430	7.3-1 (0-0.5')
Fluorene	41,000	26,000	NA	NA	NA	50	0.024 - 42	7.3-1 (0-0.5')
Indeno(1,2,3-cd)pyrene	3.9	2.1	NA	NA	NA	3.2	0.03 - 48	7.3-1 (0-0.5')
Naphthalene	20,000	190	NA	NA	NA	13	0.032 - 14	7.3-1 (0-0.5')
Naphthalene, 2-methyl-	20,000	NA	NA	NA	NA	36.4	0.034 - 5.4	7.3-1 (0-0.5')
Phenanthrene	NA	NA	NA	NA	NA	50	0.029 - 390	7.3-1 (0-0.5')
Pyrene	31,000	29,000	NA	NA	NA	50	0.022 - 310	7.3-1 (0-0.5')
Target Analyte List (TAL) Inorganic Constituents								
Aluminum	1,000,000	100,000	7,000 - 100,000	9,360	10,961	SB	4070 - 12000	18-11 (0-0.5')
Antimony	410	410	NA	6.9	7.5	SB	0.25 - 1.3	18-5 (6-18')
Arsenic	1.9	260	3 - 12	11.2	13.1	7.5 or SB	4.8 - 26.6	18-8 (2-4')
Barium	72,000	67,000	15 - 600	83	97.3	300 or SB	24.6 - 135	8.2-3 (10.5-11.5')
Beryllium	2,000	1,900	0 - 1.75	0.5	0.62	0.16 or SB	0.14 - 0.74	18-9 (0-0.5')
Cadmium	1,000	450	0.1 - 1	< 0.61	0.62	1.0 or SB	0.044 - 61.3	14-5 (0-1')
Calcium	NA	NA	130 - 35,000	167,000	181,304	SB	1230 - 145000	8.1-3 (4-5')
Chromium	1,500,000	450	1.5 - 40	23.8	22.4	10 or SB	7.3 - 1390	14-1 (0-1')
Hexavalent Chromium	3,100	64	NA	1.4	1.5	NA	0.09 - 401	14-1 (0-1')
Cobalt	20,000	1,900	2.5 - 60	7.4	8.6	30 or SB	3.1 - 246	18-3 (0-0.5')
Copper	41,000	41,000	<1 - 50	27.9	30.2	25 or SB	1.7 - 372	18-9 (0-0.5')
Iron	310,000	100,000	2,000 - 550,000	27,400	30,866	2,000 or SB	12200 - 38700	18-6 (0-0.5')
Lead	NA	750	200 - 500	26.7	28.1	SB	1.6 - 198	18-5 (0-0.5')
Magnesium	NA	NA	100 - 5,000	21,100	18,459	SB	2180 - 33500	8.1-3 (13-14')
Manganese	140,000	19,000	50 - 5,000	1,780	1,890	SB	456 - 2350	18-3 (2-4')
Mercury	NA	310	0.001 - 0.2	0.12	0.125	0.1	0.011 - 5.6	8.1-6 (8-9')
Nickel	20,000	20,000	0.5 - 25	15.7	17.1	13 or SB	8.7 - 599	18-3 (0-0.5')
Potassium	NA	NA	8,500 - 43,000	759	747	SB	357 - 1200	18-9 (0-0.5')
Selenium	5,100	5,100	<0.1 - 3.9	< 1.2	1.2	2.0 or SB	0.35 - 7.9	4-2 (0-1')
Silver	5,100	5,100	NA	< 1.2	1.2	SB	0.092 - 0.87	4-1 (0-1')
Sodium	NA	NA	<50 - 50,000	82.4	872	SB	26.2 - 1350	14-5 (0-1')
Thallium	72	67	NA	< 1.2	1.2	SB	0.52 - 2.3	18-3 (0-0.5')
Vanadium	310	7,200	1 - 300	17.9	21.9	150 or SB	6.6 - 26.9	4-1 (1-2')
Zinc	310,000	100,000	9 - 50	92	95.8	20 or SB	33.5 - 232	18-11 (0-0.5')
Cyanide (total)	NA	NA	NA	< 0.61	0.62	Site Specific	0.13 - 1.9	14-5 (0-1')
Cyanide (free)	20,000	12,000	NA	NA	NA	NA	ND	NA

See notes on Page 2.

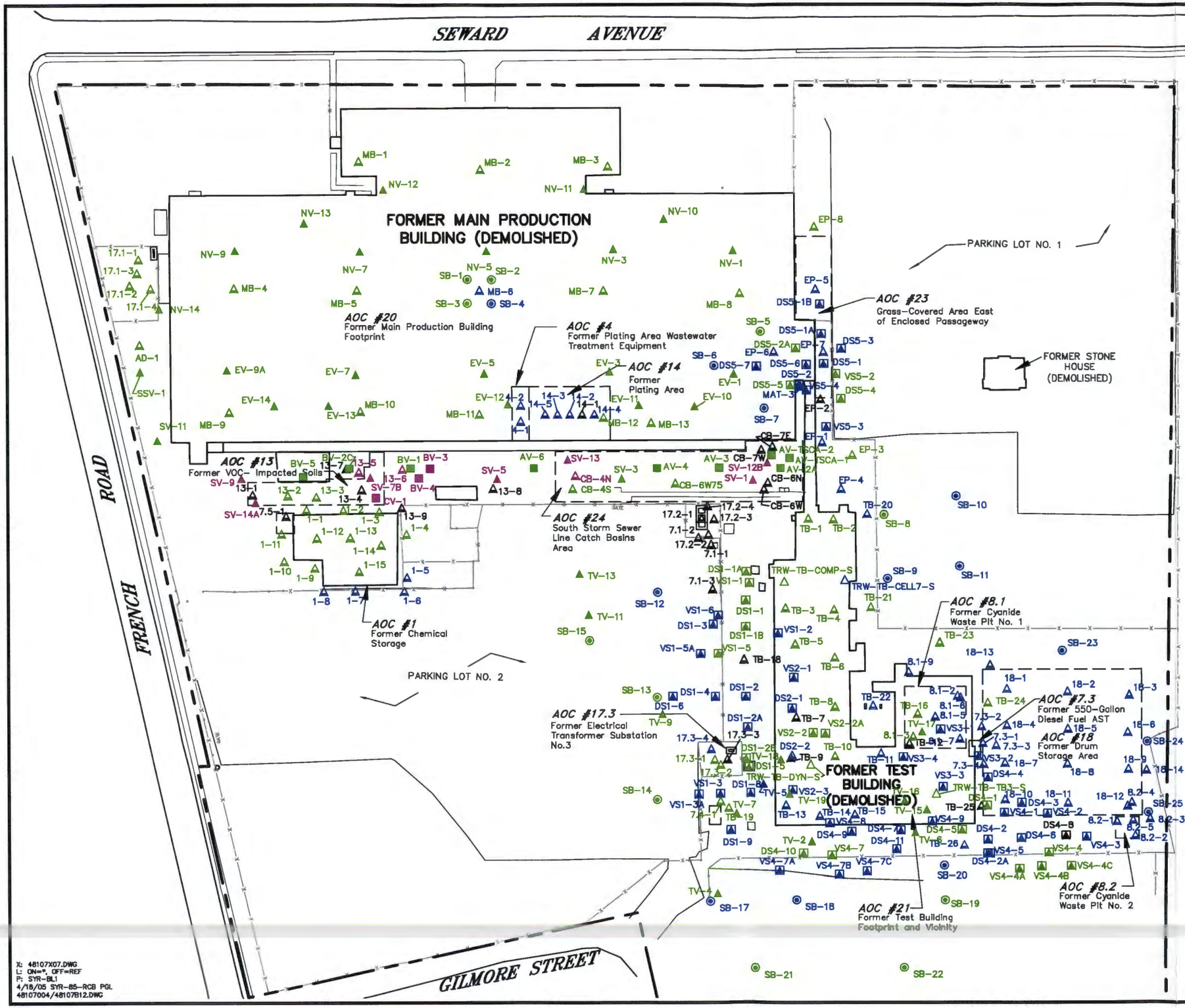
Table 1

Former TRW Aeronautical Systems Facility
211 Seward Avenue
Utica, New York

Corrective Measures Study Work Plan
Potentially Applicable Criteria for Detected SVOCs and TAL Inorganics (ppm)

Notes:

1. United States Environmental Protection Agency (USEPA) Region 3 Risk-Based Concentrations (RBCs) were obtained from USEPA Region 3 website (http://www.epa.gov/reg3hwmd/risk/riskmenu.htm) last updated October 15, 2003.
2. USEPA Region 9 Preliminary Remediation Goals (PRGs) were obtained from USEPA Region 9 website (http://www.epa.gov/region09/waste/sfund/prg/index.htm) last updated October 1, 2002.
3. NY Region Background values were obtained from the New York State Department of Environmental Conservation (NYSDEC) document titled "Background Concentrations of 20 Elements in Soils with Special Regard for New York State", by E. Carol McGovern, dated 1988.
4. Maximum site background represents the highest concentration identified at background soil sampling locations BGD-1 through BGD-5 as part of a background soil sampling program completed during January 2002.
5. The upper limit of the 95% confidence interval was calculated using the background sample population.
6. NYSDEC TAGM 4046 Soil Guidance Values were obtained from the NYSDEC TAGM titled, "Determination of Soil Cleanup Objectives and Cleanup Levels," HWR-94-4046 (TAGM 4046), dated January 24, 1994, revised December 20, 2000.
7. Concentrations presented in parts per million (ppm), which are equivalent to milligrams per kilogram (mg/kg).
8. NA = Not Available.
9. SB = Site background.
10. Site Specific = TAGM 4046 indicates the soil cleanup objective for cyanide is site-specific.



LEGEND:

- PROPERTY LINE
- FENCE
- AOC — AREA OF CONCERN
- TRW-TB-COMP-S — PRE-DEMOLITION SOIL SAMPLING LOCATION
- 13-1 — RFI SOIL SAMPLING LOCATION
- SV-11 — ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATION
- BV-5 — ICM SOUTH LINE DRAINAGE AREA VERIFICATION SOIL SAMPLING LOCATION
- VS3-1 — ICM PCB-IMPACTED SOIL REMOVAL SOIL SAMPLING LOCATION
- SB-1 — CMS SOIL SAMPLING LOCATION

COLOR CODES FOR SAMPLE ID'S ARE AS FOLLOWS:

BLUE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046, TO BE ADDRESSED BY CAPPING/STABILIZATION/EXCAVATION AND SITE MANAGEMENT PLAN (AS APPROPRIATE)

PURPLE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046 AT DEPTH, TO BE ADDRESSED BY SITE MANAGEMENT PLAN ONLY

GREEN = SOIL SAMPLING LOCATION WHERE CONSTITUENTS <TAGM 4046

BLACK = SOIL SAMPLING LOCATION WHERE SOIL WAS EXCAVATED DURING PREVIOUS EXCAVATION

NOTES:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC.(BBL), MARCH 19, 2003 TO JUNE 28, 2004.

2. PROPERTY LINES, AREAS OF CONCERN (AOCs), AND ROADWAYS ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCE MANAGEMENT, INC. (ERM), EXTON, PA., AT A SCALE OF 1" = 40', DATED AUGUST 27, 2002.

3. LOCATION OF PLATING AREA IS FROM A DRAWING ENTITLED "EXISTING FLOOR PLAN" BY STETSON-DALE, SHEET NO. A1, DATED 1/27/84 AT A SCALE OF 1/16"=1'.

4. SAMPLING LOCATIONS IN AOC NOS. 4 AND 14 ARE FROM VARIOUS ERM DRAWINGS AND THE LOCATIONS ARE APPROXIMATE.

5. AOCs THAT WERE NOT SAMPLED DURING THE SITE INVESTIGATION ARE NOT SHOWN.

6. ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATIONS ARE APPROXIMATE.

7. RFI = RCRA FACILITY INVESTIGATION

8. ICM = INTERIM CORRECTIVE MEASURE

0 80' 160'

GRAPHIC SCALE

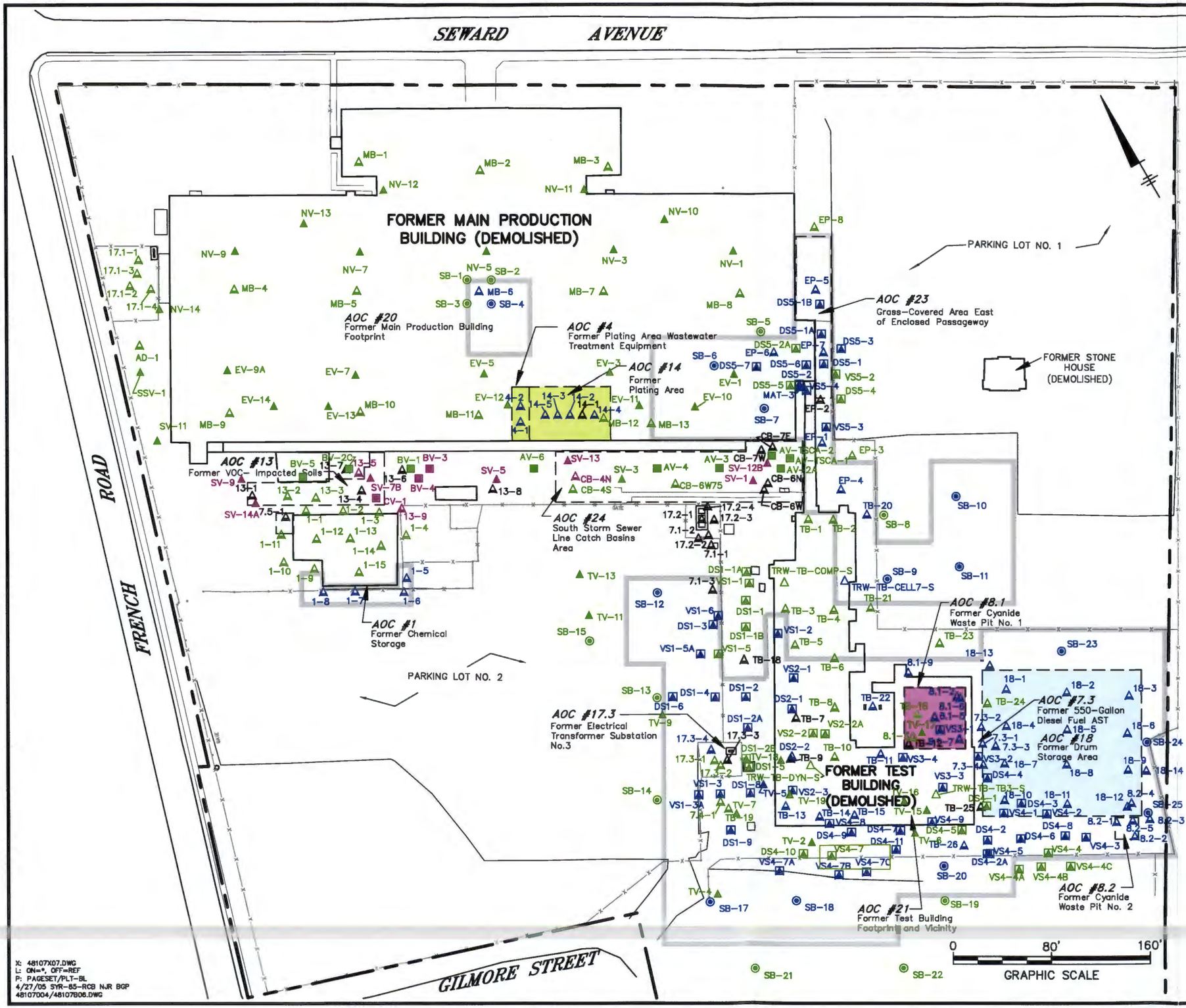
FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

RFI AND ICM SOIL SAMPLING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 4

X: 48107X07.DWG
L: ON=*, OFF=REF
P: SYR-BL1
4/18/05 SYR-85-RCB PGL
48107004/48107B12.DWG



LEGEND:

- ANTICIPATED AREA OF BARRIER LAYER
- STABILIZATION/SOLIDIFICATION OF SOIL ANTICIPATED TO AVERAGE DEPTH OF 3 FEET
- STABILIZATION/SOLIDIFICATION OF SOIL ANTICIPATED TO AVERAGE DEPTH OF 6 FEET
- STABILIZATION/SOLIDIFICATION OF SOIL ANTICIPATED TO AVERAGE DEPTH OF 10 FEET
- PROPERTY LINE
- FENCE
- AOC — AREA OF CONCERN
- TRW-TB-COMP-S — PRE-DEMOLITION SOIL SAMPLING LOCATION
- 13-1 — RFI SOIL SAMPLING LOCATION
- SV-11 — ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATION
- BV-5 — ICM SOUTH LINE DRAINAGE AREA VERIFICATION SOIL SAMPLING LOCATION
- VS3-1 — ICM PCB-IMPACTED SOIL REMOVAL SOIL SAMPLING LOCATION
- SB-1 — CMS SOIL SAMPLING LOCATION

COLOR CODES FOR SAMPLE ID'S ARE AS FOLLOWS:

- BLUE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046, TO BE ADDRESSED BY CAPPING/STABILIZATION/EXCAVATION AND SITE MANAGEMENT PLAN (AS APPROPRIATE)
- PURPLE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046 AT DEPTH, TO BE ADDRESSED BY SITE MANAGEMENT PLAN ONLY
- GREEN = SOIL SAMPLING LOCATION WHERE CONSTITUENTS <TAGM 4046
- BLACK = SOIL SAMPLING LOCATION WHERE SOIL WAS EXCAVATED DURING PREVIOUS EXCAVATION

NOTES:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC.(BBL), MARCH 19, 2003 TO JUNE 28, 2004.
2. PROPERTY LINES, AREAS OF CONCERN (AOCs), AND ROADWAYS ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCE MANAGEMENT, INC. (ERM), EXTON, PA., AT A SCALE OF 1" = 40', DATED AUGUST 27, 2002.
3. LOCATION OF PLATING AREA IS FROM A DRAWING ENTITLED "EXISTING FLOOR PLAN" BY STETSON-DALE, SHEET NO. A1, DATED 1/27/84 AT A SCALE OF 1/16"=1'.
4. SAMPLING LOCATIONS IN AOC NOS. 4 AND 14 ARE FROM VARIOUS ERM DRAWINGS AND THE LOCATIONS ARE APPROXIMATE.
5. AOCs THAT WERE NOT SAMPLED DURING THE SITE INVESTIGATION ARE NOT SHOWN.
6. ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATIONS ARE APPROXIMATE.
7. RFI = RCRA FACILITY INVESTIGATION
8. ICM = INTERIM CORRECTIVE MEASURE

FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

ALTERNATIVE 4 - STABILIZATION/ SOLIDIFICATION, BARRIER LAYER, SITE CONTROLS, AND MONITORING

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 7

X: 48107X07.DWG
L: ON=*, OFF=REF
P: PAGESET/PLT-BL
4/27/05 SYR-85-RC8 NJR BGP
48107004/48107B06.DWG

SEWARD AVENUE

FRENCH ROAD

GILMORE STREET

FORMER MAIN PRODUCTION BUILDING (DEMOLISHED)

FORMER CHEMICAL STORAGE BUILDING (DEMOLISHED)

FORMER TEST BUILDING (DEMOLISHED)

FORMER STONE HOUSE (DEMOLISHED)

PARKING LOT NO. 1

PARKING LOT NO. 2

PARKING LOT NO. 3

GATE

GATE

LEGEND:

- PROPERY LINE
- FENCE
- FORMER CYANIDE WASTE PIT NO. 2 (AOC NO. 8.2) EXCAVATION (1986)
- VOC-IMPACTED SOIL (AOC NO. 13) EXCAVATION (1998)
- STORM SEWER ICM EXCAVATION (2003-2004)
- SOUTH LINE DRAINAGE AREA (AOC NO. 24) EXCAVATION (2003-2004)
- PCB-IMPACTED SOIL EXCAVATION CONDUCTED DURING STORM SEWER ICM (2003-2004)
- FORMER SANITARY SEWER (AOC NO. 19) EXCAVATION (2003-2004)
- FORMER FUEL OIL UST (AOC NO. 7.1) EXCAVATION (2003-2004)
- ICM PCB-IMPACTED SOIL EXCAVATION (2004)
- CHROMIUM-IMPACTED SOIL EXCAVATION (2004)

NOTES:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC.(BBL), MARCH 19, 2003 TO JUNE 28, 2004.

2. PROPERTY LINES AND ROADWAYS ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCES MANAGEMENT (ERM), EXTON, PA., AT A SCALE OF 1"=40', DATED 8/27/02.

0 80' 160'

GRAPHIC SCALE

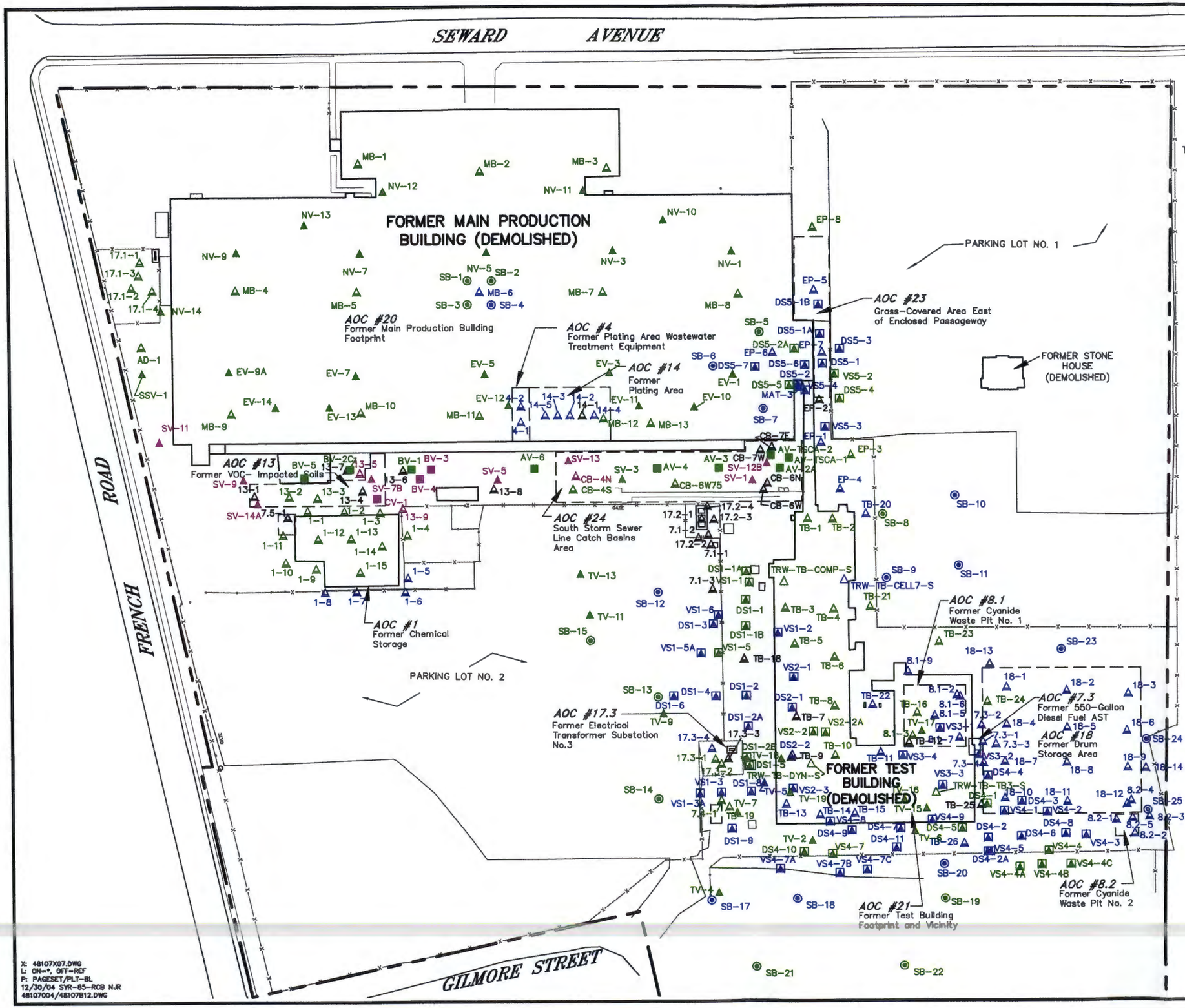
FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

LIMITS OF PREVIOUS REMEDIAL ACTIVITIES

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 3

X: 48107X07.DWG
L: ON=*, OFF=REF
P: PAGESET/PLT-BL
12/17/04 SYR-85-RCB NJR
48107004/48107B08.DWG



LEGEND:

- PROPERTY LINE
- FENCE
- AOC — AREA OF CONCERN
- TRW-TB-COMP-S — PRE-DEMOLITION SOIL SAMPLING LOCATION
- 13-1 — RFI SOIL SAMPLING LOCATION
- SV-11 — ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATION
- BV-5 — ICM SOUTH LINE DRAINAGE AREA VERIFICATION SOIL SAMPLING LOCATION
- VS3-1 — ICM PCB-IMPACTED SOIL REMOVAL SOIL SAMPLING LOCATION
- SB-1 — CMS SOIL SAMPLING LOCATION

COLOR CODES FOR SAMPLE ID'S ARE AS FOLLOWS:

- BLUE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046, TO BE ADDRESSED BY CAPPING/STABILIZATION/EXCAVATION AND SITE MANAGEMENT PLAN (AS APPROPRIATE)
- PURPLE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046 AT DEPTH, TO BE ADDRESSED BY SITE MANAGEMENT PLAN ONLY
- GREEN = SOIL SAMPLING LOCATION WHERE CONSTITUENTS <TAGM 4046
- BLACK = SOIL SAMPLING LOCATION WHERE SOIL WAS EXCAVATED DURING PREVIOUS EXCAVATION

NOTES:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC.(BBL), MARCH 19, 2003 TO JUNE 28, 2004.

2. PROPERTY LINES, AREAS OF CONCERN (AOCs), AND ROADWAYS ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCE MANAGEMENT, INC. (ERM), EXTON, PA., AT A SCALE OF 1" = 40', DATED AUGUST 27, 2002.

3. LOCATION OF PLATING AREA IS FROM A DRAWING ENTITLED "EXISTING FLOOR PLAN" BY STETSON-DALE, SHEET NO. A1, DATED 1/27/84 AT A SCALE OF 1/16"=1'.

4. SAMPLING LOCATIONS IN AOC NOS. 4 AND 14 ARE FROM VARIOUS ERM DRAWINGS AND THE LOCATIONS ARE APPROXIMATE.

5. AOCs THAT WERE NOT SAMPLED DURING THE SITE INVESTIGATION ARE NOT SHOWN.

6. ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATIONS ARE APPROXIMATE.

7. RFI = RCRA FACILITY INVESTIGATION

8. ICM = INTERIM CORRECTIVE MEASURE

0 80' 160'

GRAPHIC SCALE

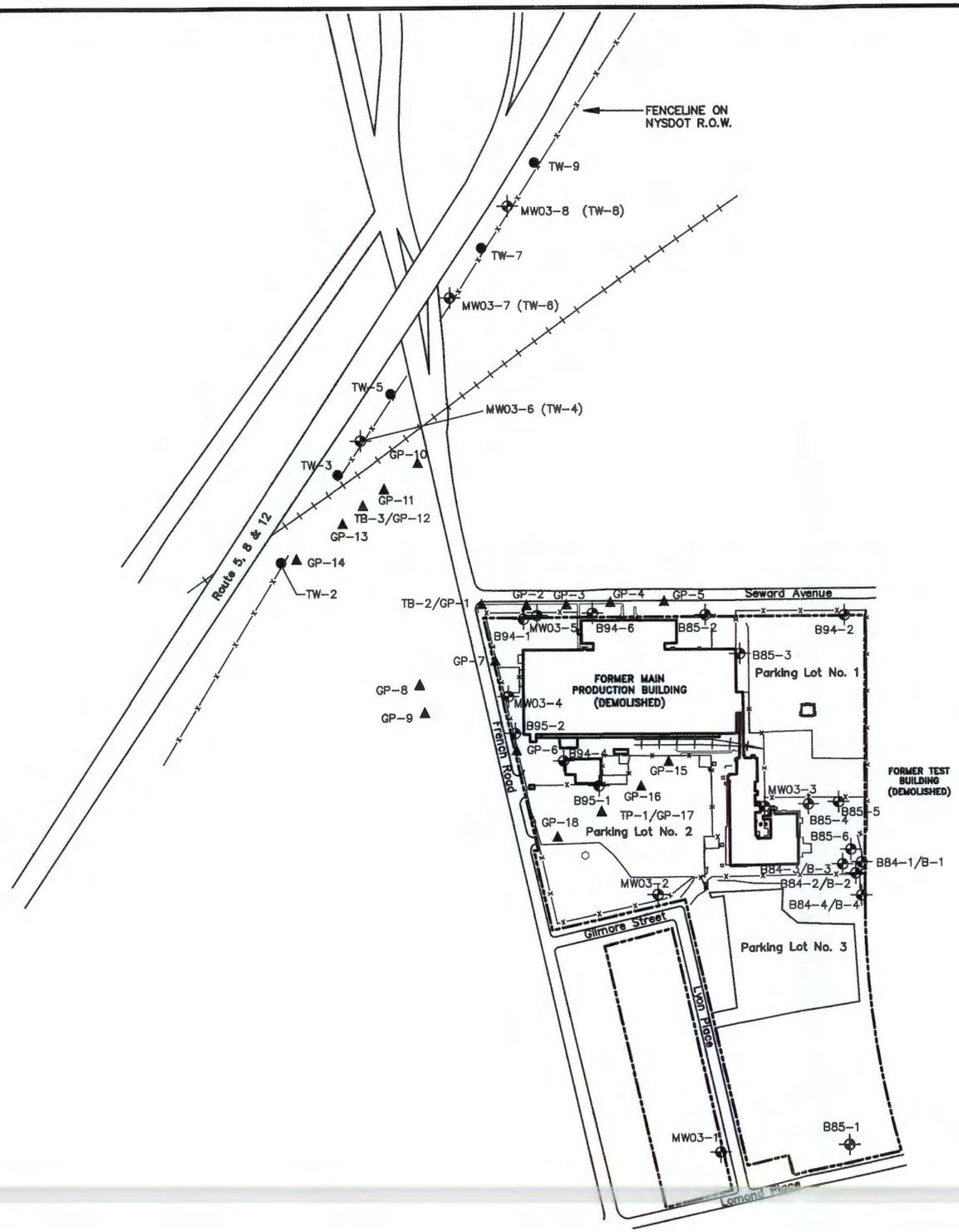
X: 48107X07.DWG
L: ON=*, OFF=REF
P: PAGESET/PLT-BL
12/30/04 SYR-85-RCB NJR
48107004/48107B12.DWG

FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

RFI AND ICM SOIL SAMPLING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 4



LEGEND:

- B85-5 — PERMANENT MONITORING WELL
- TW-3 — RFI TEMPORARY MONITORING WELL (ABANDONED)
- GP-5 — PREVIOUS TEMPORARY MONITORING WELL/TEST BORING (ABANDONED)
- FENCE
- SITE BOUNDARY
- RAILROAD TRACKS

NOTES:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC. (BBL), MARCH 19, 2003 TO JUNE 28, 2004.

2. PROPERTY LINES, ROADWAYS, AND PREVIOUS TEMPORARY MONITORING WELL/TEST BORING LOCATIONS AND WELL LOCATION B85-1 ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCES MANAGEMENT (ERM), EXTON, PA., AT A SCALE OF 1"=40', DATED 08/27/02.

3. LOCATION OF ROUTE 5, 8 & 12 IS ADAPED FROM A UNITED STATES GEOLOGIC SURVEY AERIAL PHOTOGRAPH DATED 5/2/1997.

4. FENCELINE ON NYSDOT RIGHT-OF-WAY ADAPTED FROM DRAWINGS ENTITLED "20 PLAN", DRAWING NUMBERS 20P-6 THROUGH 20P-10, BY THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION, AT A SCALE OF 1"=20', DATED 12/91.

0 300' 600'

GRAPHIC SCALE

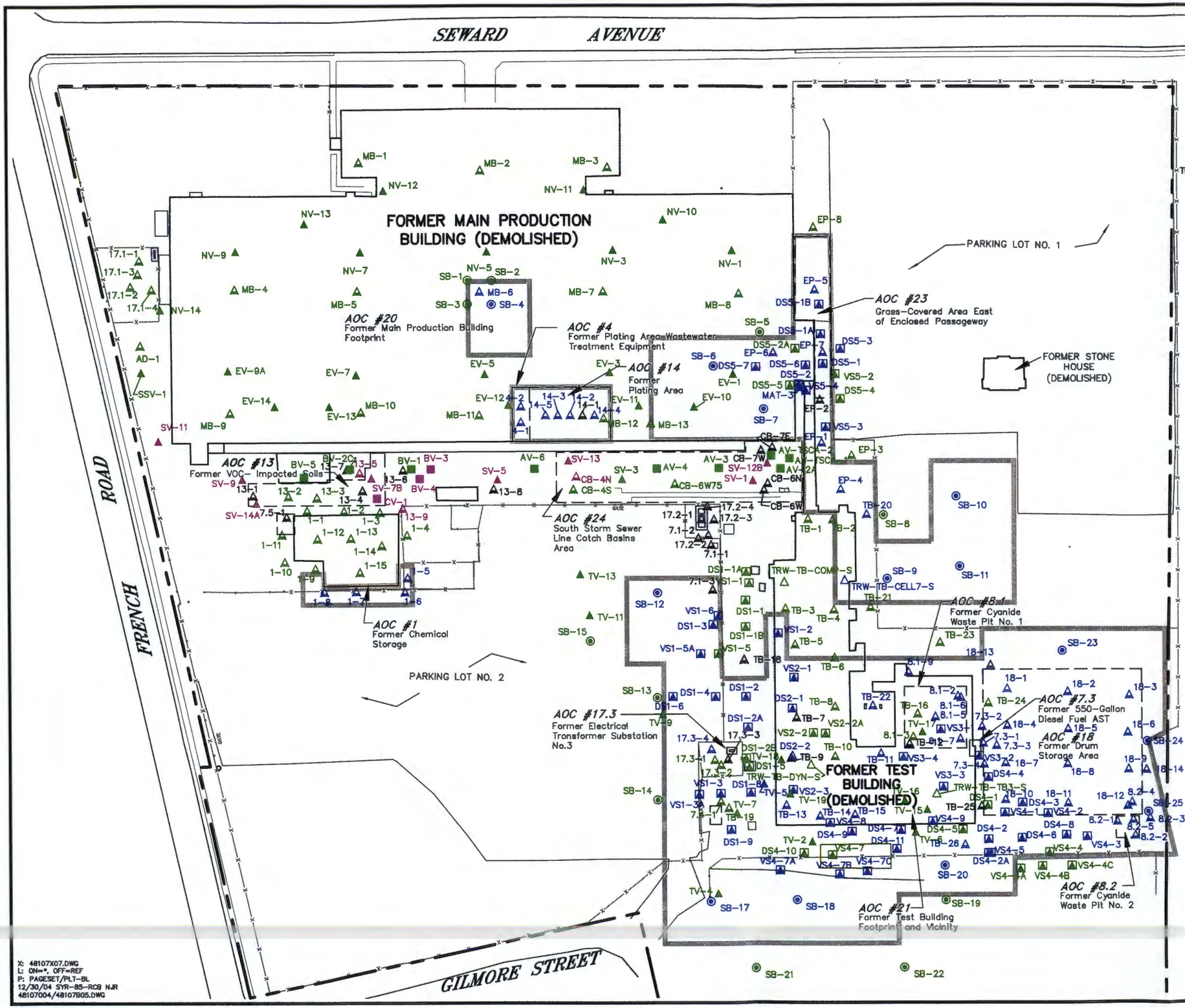
FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

MONITORING WELL LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 5

X: 48107X00, X01.DWG
L: ON=* OFF=REF*
P: PAGESET/PLT-BL
12/22/04 SYR-65-DJP RCB NJR
48107004/48107B04.DWG



LEGEND:

- ANTICIPATED AREA OF BARRIER LAYER
- PROPERTY LINE
- FENCE
- AOC — AREA OF CONCERN
- TRW-TB-COMP-S — PRE-DEMOLITION SOIL SAMPLING LOCATION
- 13-1 — RFI SOIL SAMPLING LOCATION
- SV-11 — ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATION
- BV-5 — ICM SOUTH LINE DRAINAGE AREA VERIFICATION SOIL SAMPLING LOCATION
- VS3-1 — ICM PCB-IMPACTED SOIL REMOVAL SOIL SAMPLING LOCATION
- SB-1 — CMS SOIL SAMPLING LOCATION

COLOR CODES FOR SAMPLE ID'S ARE AS FOLLOWS:

- BLUE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046, TO BE ADDRESSED BY CAPPING/STABILIZATION/EXCAVATION AND SITE MANAGEMENT PLAN (AS APPROPRIATE)
- PURPLE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046 AT DEPTH, TO BE ADDRESSED BY SITE MANAGEMENT PLAN ONLY
- GREEN = SOIL SAMPLING LOCATION WHERE CONSTITUENTS <TAGM 4046
- BLACK = SOIL SAMPLING LOCATION WHERE SOIL WAS EXCAVATED DURING PREVIOUS EXCAVATION

NOTES:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC.(BBL), MARCH 19, 2003 TO JUNE 28, 2004.
2. PROPERTY LINES, AREAS OF CONCERN (AOCs), AND ROADWAYS ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCE MANAGEMENT, INC. (ERM), EXTON, PA., AT A SCALE OF 1" = 40', DATED AUGUST 27, 2002.
3. LOCATION OF PLATING AREA IS FROM A DRAWING ENTITLED "EXISTING FLOOR PLAN" BY STETSON-DALE, SHEET NO. A1, DATED 1/27/84 AT A SCALE OF 1/16"=1'.
4. SAMPLING LOCATIONS IN AOC NOS. 4 AND 14 ARE FROM VARIOUS ERM DRAWINGS AND THE LOCATIONS ARE APPROXIMATE.
5. AOCs THAT WERE NOT SAMPLED DURING THE SITE INVESTIGATION ARE NOT SHOWN.
6. ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATIONS ARE APPROXIMATE.
7. RFI = RCRA FACILITY INVESTIGATION
8. ICM = INTERIM CORRECTIVE MEASURE

0 80' 160'

GRAPHIC SCALE

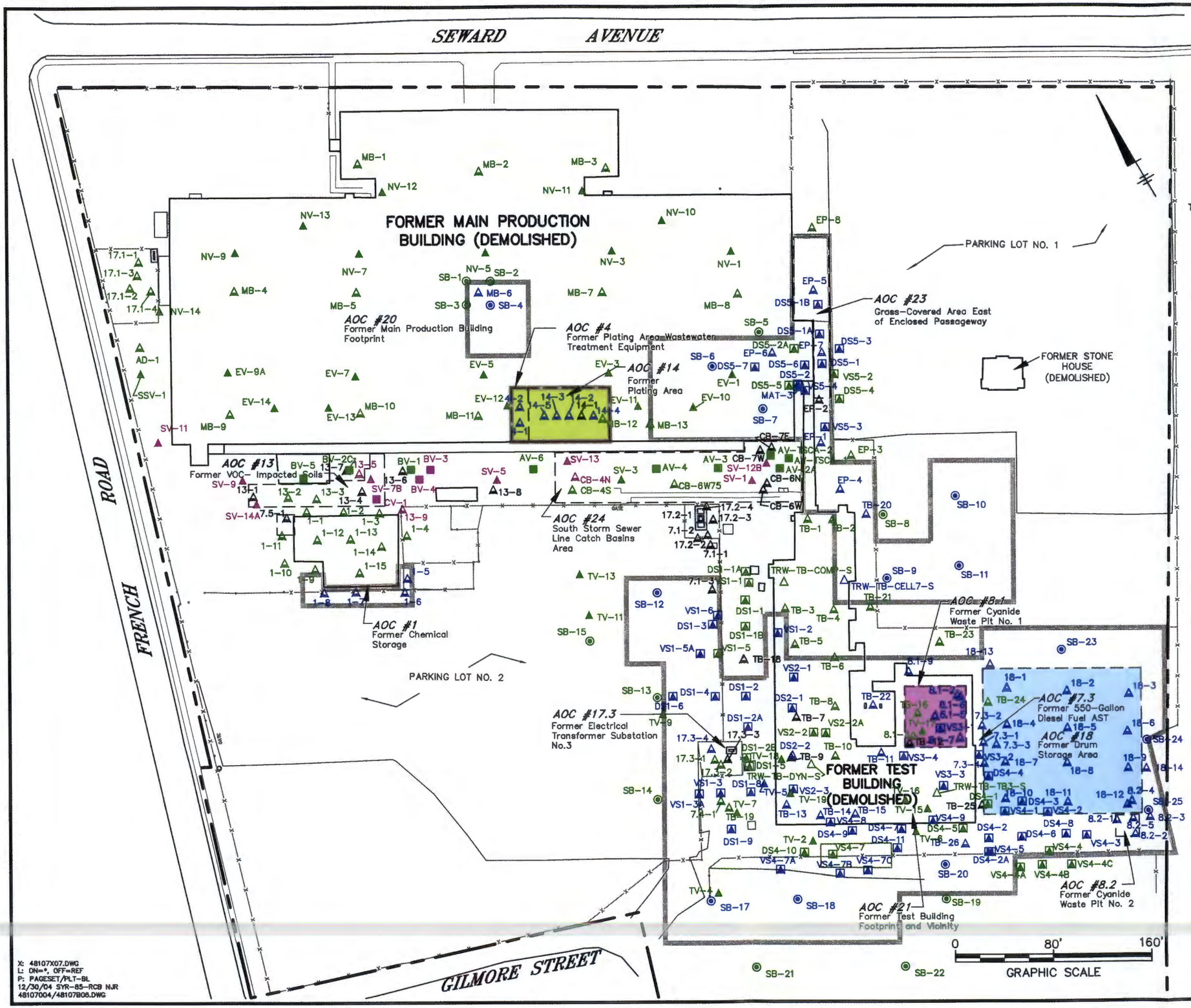
FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

ALTERNATIVE 3 - BARRIER LAYER, SITE CONTROLS, AND MONITORING

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 6

X: 48107X07.DWG
L: ON=*, OFF=REF
P: PAGESET/PLT-BL
12/30/04 SYR-BS-RCB NJR
48107004/48107B05.DWG



LEGEND:

- ANTICIPATED AREA OF BARRIER LAYER
- STABILIZATION/SOLIDIFICATION OF SOIL ANTICIPATED TO AVERAGE DEPTH OF 3 FEET
- STABILIZATION/SOLIDIFICATION OF SOIL ANTICIPATED TO AVERAGE DEPTH OF 6 FEET
- STABILIZATION/SOLIDIFICATION OF SOIL ANTICIPATED TO AVERAGE DEPTH OF 10 FEET
- PROPERTY LINE
- FENCE
- AOC — AREA OF CONCERN
- TRW-TB-COMP-S — PRE-DEMOLITION SOIL SAMPLING LOCATION
- 13-1 — RFI SOIL SAMPLING LOCATION
- SV-11 — ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATION
- BV-5 — ICM SOUTH LINE DRAINAGE AREA VERIFICATION SOIL SAMPLING LOCATION
- VS3-1 — ICM PCB-IMPACTED SOIL REMOVAL SOIL SAMPLING LOCATION
- SB-1 — CMS SOIL SAMPLING LOCATION

COLOR CODES FOR SAMPLE ID'S ARE AS FOLLOWS:

- BLUE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046, TO BE ADDRESSED BY CAPPING/STABILIZATION/EXCAVATION AND SITE MANAGEMENT PLAN (AS APPROPRIATE)
- PURPLE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046 AT DEPTH, TO BE ADDRESSED BY SITE MANAGEMENT PLAN ONLY
- GREEN = SOIL SAMPLING LOCATION WHERE CONSTITUENTS <TAGM 4046
- BLACK = SOIL SAMPLING LOCATION WHERE SOIL WAS EXCAVATED DURING PREVIOUS EXCAVATION

NOTES:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC.(BBL), MARCH 19, 2003 TO JUNE 28, 2004.
2. PROPERTY LINES, AREAS OF CONCERN (AOCs), AND ROADWAYS ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCE MANAGEMENT, INC. (ERM), EXTON, PA., AT A SCALE OF 1" = 40', DATED AUGUST 27, 2002.
3. LOCATION OF PLATING AREA IS FROM A DRAWING ENTITLED "EXISTING FLOOR PLAN" BY STETSON-DALE, SHEET NO. A1, DATED 1/27/84 AT A SCALE OF 1/16"=1'.
4. SAMPLING LOCATIONS IN AOC NOS. 4 AND 14 ARE FROM VARIOUS ERM DRAWINGS AND THE LOCATIONS ARE APPROXIMATE.
5. AOCs THAT WERE NOT SAMPLED DURING THE SITE INVESTIGATION ARE NOT SHOWN.
6. ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATIONS ARE APPROXIMATE.
7. RFI = RCRA FACILITY INVESTIGATION
8. ICM = INTERIM CORRECTIVE MEASURE

FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

ALTERNATIVE 4 - STABILIZATION/ SOLIDIFICATION, BARRIER LAYER, SITE CONTROLS, AND MONITORING

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 7

X: 48107X07.DWG
L: ON=*, OFF=REF
P: PAGESET/PLT-BL
12/30/04 SYR-85-RCB NJR
48107004/48107B05.DWG

SEWARD AVENUE

FRENCH ROAD

GILMORE STREET

FORMER MAIN PRODUCTION BUILDING (DEMOLISHED)

PARKING LOT NO. 1

PARKING LOT NO. 2

FORMER STONE HOUSE (DEMOLISHED)

FORMER TEST BUILDING (DEMOLISHED)

AOC #20
Former Main Production Building Footprint

AOC #4
Former Plating Area Wastewater Treatment Equipment

AOC #14
Former Plating Area

AOC #23
Grass-Covered Area East of Enclosed Passageway

AOC #13
Former VOC-Impacted Soils

AOC #24
South Storm Sewer Line Catch Basins Area

AOC #1
Former Chemical Storage

AOC #17.3
Former Electrical Transformer Substation No.3

AOC #8.1
Former Cyanide Waste Pit No. 1

AOC #7.3
Former 550-Gallon Diesel Fuel AST

AOC #18
Former Drum Storage Area

AOC #8.2
Former Cyanide Waste Pit No. 2

AOC #21
Former Test Building Footprint and Vicinity

0 80' 160'
GRAPHIC SCALE

LEGEND:

- SOIL EXCAVATION ANTICIPATED TO AVERAGE DEPTH OF 1 FOOT
- SOIL EXCAVATION ANTICIPATED TO AVERAGE DEPTH OF 1.5 FEET
- SOIL EXCAVATION ANTICIPATED TO AVERAGE DEPTH OF 2.5 FEET
- SOIL EXCAVATION ANTICIPATED TO AVERAGE DEPTH OF 3 FEET
- SOIL EXCAVATION ANTICIPATED TO AVERAGE DEPTH OF 6 FEET
- AREA OF PREVIOUS EXCAVATION
- AREA OF PREVIOUS EXCAVATION AND ANTICIPATED ADDITIONAL EXCAVATION
- PROPERTY LINE
- FENCE
- AOC — AREA OF CONCERN
- TRW-TB-COMP-S — PRE-DEMOLITION SOIL SAMPLING LOCATION
- 13-1 — RFI SOIL SAMPLING LOCATION
- SV-11 — ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATION
- BV-5 — ICM SOUTH LINE DRAINAGE AREA VERIFICATION SOIL SAMPLING LOCATION
- VS3-1 — ICM PCB-IMPACTED SOIL REMOVAL SOIL SAMPLING LOCATION
- SB-1 — CMS SOIL SAMPLING LOCATION

COLOR CODES FOR SAMPLE ID'S ARE AS FOLLOWS:

BLUE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046, TO BE ADDRESSED BY CAPPING/STABILIZATION/EXCAVATION AND SITE MANAGEMENT PLAN (AS APPROPRIATE)

PURPLE = SOIL SAMPLING LOCATION WHERE CONSTITUENTS >TAGM 4046 AT DEPTH, TO BE ADDRESSED BY SITE MANAGEMENT PLAN ONLY

GREEN = SOIL SAMPLING LOCATION WHERE CONSTITUENTS <TAGM 4046

BLACK = SOIL SAMPLING LOCATION WHERE SOIL WAS EXCAVATED DURING PREVIOUS EXCAVATION

NOTES:

1. UNLESS OTHERWISE INDICATED, MAPPING IS BASED ON SURVEYS PERFORMED BY BLASLAND, BOUCK & LEE, INC.(BBL), MARCH 19, 2003 TO JUNE 28, 2004.

2. PROPERTY LINES, AREAS OF CONCERN (AOCs), AND ROADWAYS ARE ADAPTED FROM A DRAWING ENTITLED "SITE LAYOUT MAP SHOWING AREAS OF CONCERN", FIGURE 1-1, BY ENVIRONMENTAL RESOURCE MANAGEMENT, INC. (ERM), EXTON, PA., AT A SCALE OF 1" = 40', DATED AUGUST 27, 2002.

3. LOCATION OF PLATING AREA IS FROM A DRAWING ENTITLED "EXISTING FLOOR PLAN" BY STETSON-DALE, SHEET NO. A1, DATED 1/27/84 AT A SCALE OF 1/16"=1'.

4. SAMPLING LOCATIONS IN AOC NOS. 4 AND 14 ARE FROM VARIOUS ERM DRAWINGS AND THE LOCATIONS ARE APPROXIMATE.

5. AOCs THAT WERE NOT SAMPLED DURING THE SITE INVESTIGATION ARE NOT SHOWN.

6. ICM STORM SEWER REMOVAL VERIFICATION SOIL SAMPLING LOCATIONS ARE APPROXIMATE.

7. RFI = RCRA FACILITY INVESTIGATION

8. ICM = INTERIM CORRECTIVE MEASURE

FORMER TRW AERONAUTICAL SYSTEMS FACILITY
211 SEWARD AVENUE
UTICA, NEW YORK

ALTERNATIVE 5 - EXCAVATION/OFFSITE DISPOSAL, SITE CONTROLS, AND MONITORING

BBL BLASLAND, BOUCK & LEE, INC. engineers, scientists, economists

FIGURE 8

X: 48107X07.DWG
L: ON=*, OFF=REF
P: PAGESET/PLT-BL
12/30/04 SYR-85-RCB NJR
48107004/48107B07.DWG