PHASE II SCOPE OF WORK

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA
RTN 4-0601

Prepared for

AVX Corporation
801 17th Avenue South
Myrtle Beach, SC 29578

August 2013

URS
5 Industrial Way
Salem, NH 03079
(603) 893-0616

PN: 39743350

Table of Contents

1.0 INTRODUCTION 1

2.0 BACKGROUND 2

3.0 PROPOSED FIELD ACTIVITIES 5

3.1 Bedrock Topography 5

3.2 Membrane Interface Probe 5

3.3 Soil Characterization 6

3.4 Groundwater Investigations 7

3.5 Stormwater Evaluation 8

4.0 DATA INTERPRETATION AND PHASE II REPORT 9

5.0 IMPLEMENTATION SCHEDULE 10

Acronyms and Abbreviations

LIST OF ACRONYMS & ABBREVIATIONS

ACO	Administrative Consent Order (MassDEP-AVX Agreement)
AST	Aboveground Storage Tank
bgs	below ground surface
CSA	Comprehensive Site Assessment
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States. Environmental Protection Agency
f_{oc}	fraction of organic carbon
HAC	Hydraulic Asphalt Concrete
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
MIP	Membrane Interface Probe
NAPL	Non-Aqueous Phase Liquid
PCBs	Polychlorinated Biphenyls
PID	Photoionization Detector
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RTN	Release Tracking Number
SOW	Scope of Work
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TSS	Total suspended solids
UCL	Upper Concentration Limit
VOC	Volatile Organic Compound

1.0 INTRODUCTION

On behalf of AVX Corporation (AVX), URS Corporation (URS) has prepared this *Phase II Comprehensive Site Assessment (Phase II CSA) Scope of Work (SOW)* for the disposal site located at 740 Belleville Avenue in New Bedford, Massachusetts. The Release Tracking Number (RTN) for the Site is 4-0601.

The site assessment and remediation under Massachusetts General Law Chapter 21E and the Massachusetts Contingency Plan (MCP) is subject to the Administrative Consent Order and Notice of Responsibility (ACO) between AVX and the Massachusetts Department of Environmental Protection (MassDEP) and the Massachusetts Office of the Attorney General, effective as of June 3, 2010 (ACO-SE-09-3P-016).

2.0 BACKGROUND

The Phase I Initial Site Investigation (Phase I) and Conceptual Site Model (CSM) included within, summarizes information known to date on the history, contaminants of concern, geology, hydrogeology, and releases relative to the Aerovox site (the Site). Based on current conditions, the only two remaining sources of contaminants at the Site are impacted soil and impacted groundwater. Soil beneath the building and beneath the cap contains polychlorinated biphenyls (PCBs) and chlorinated solvents that are a potential source to groundwater. Similarly, groundwater at the Site, based on multiple recent rounds of annual sampling, is impacted at levels that may be a source to surface water, and depending upon groundwater flow patterns may also be a potential source to indoor air. Data gaps associated with the previous investigation results include the following:

- *Extent of contamination below pump room floor* – In 1998, analytical results for soil samples collected beneath the former pump room concrete foundation indicated the presence of PCBs and trichloroethene (TCE). PCB concentrations were above the existing MCP upper concentration limit (UCL) of 100 parts per million (ppm). Further investigation is required to determine the lateral and vertical extent of this contamination.
- *Extent of UCL soils below east end of the building* – In 1998, a PCB concentration of 180 ppm was detected in a soil collected from immediately (0-2") below the concrete foundation. Further investigation is required to determine the lateral and vertical extent of contamination.
- *Extent of UCL soils below the eastern half of the parking area* – Several soil samples collected below the parking area (outside of the hydraulic asphalt concrete [HAC] cap footprint) contained PCBs above the UCL, including locations SB5, SB-7, SB13, and SB-14. Further investigation is required to assess the lateral and vertical extent of contamination.
- *Subsurface stratigraphic profile* – Although soil borings have been completed on the Site, there are several areas of the Site that have limited boring information, either spatially or vertically. In addition, subsurface features likely to impede downward migration of possible non-aqueous phase liquid (NAPL) should be identified, whether these features include the peat layer observed on the eastern end of the site, the till observed on the west end of the site, or the bedrock surface itself. Additional borings and a seismic refraction survey are needed to complete the subsurface profile of the Site.
- *Northern drainage ditch source area* – Visual observations made, and analytical data obtained, for samples collected in the northern drainage ditch in 1982 by Versar (on behalf of the United States Environmental Protection Agency [EPA]), indicated oil saturated soils in several areas of the trench. The TCE aboveground storage tank (AST) and virgin PCB oil AST fill pipes were located on the north side of the building. Releases as a result of overfills of these ASTs likely would have been intercepted and

preferentially distributed via the northern drainage trench. The MW-6A/MW-6 monitoring well couplet is installed adjacent to the former trench location. However, the extent of contamination along the length of this trench is unknown and requires further investigation.

- *Bedrock groundwater contamination* – Only one bedrock monitoring well has been advanced at the Site. Several monitoring wells currently contain elevated concentrations of PCBs and/or TCE above the TCE and PCB solubility values. Bedrock wells are needed to define the downward extent of contamination and to evaluate hydrogeology for the presence of vertical gradients.
- *Tidal impact to existing site conditions* – The existing HAC cap and sheet pile wall were constructed for the purpose of limiting migration of soil contamination as a result of infiltration. The sheet pile wall was reportedly keyed into the peat layer observed below the eastern end of the Site. However, existing data is not complete to assess hydrogeologic interaction of the tidal cycle on existing soil contamination and groundwater contaminant concentrations.
- *Effectiveness of existing containment* – The existing sheet pile wall is keyed into a peat layer at the eastern end of the site and tied back to the former building foundation along the north end and also extends partially up the southern property boundary. The relative effectiveness of this depth and configuration in accomplishing source control and minimizing the migration of contaminants from the site to the adjacent surface water needs to be evaluated.
- *Extent of impacts to the remaining storm sewer system* – The remaining onsite storm sewer structures (lines, catch basins and manholes) are presumed to contain potentially impacted residual sediment and the integrity of the lines is unknown. Assessment of the lines and sampling of sediment within the system is needed to determine if a source exists within the system and if a pathway exists between the system and surrounding soil or groundwater.
- *The extent of surface soil impacts, if any, that may have resulted from storm sewer overflow and overland transport* – During heavy storm events, flooding of the Site and Hadley Street has been observed. Migration of impacted soils through the storm sewer in combination with flooding of Hadley Street could potentially have carried impacts via overland flow to the adjacent property owned by Titleist. Surface soil sampling is needed to assess whether this was historically a complete contaminant migration pathway and if so, whether contaminants remain in soil that could potentially pose a risk and require response actions.

This Phase II SOW allows for the collection of additional site specific data to close these data gaps and further define site geology and hydrogeologic conditions, document the environmental fate and transport of hazardous materials, determine the nature and extent of contamination

associated with the sources, complete a refined exposure assessment and risk characterization, and, if applicable, provide the basis for identifying and evaluating remedial action at the Site. Where the addition of site specific data may change the CSM, additional data gaps may be identified and additional steps may be added to the scope of Phase II work over time.

3.0 Proposed Field Activities

The objective of the Phase II SOW, as provided by 310 CMR 40.0834(2), is to outline the investigative approach that will be undertaken to fulfill the requirements of a Phase II, including investigation of the data gaps identified in Section 2.0 above. The steps below are presented in their intended chronological order, allowing the data collected in the early investigative steps to inform decisions made in later steps. In other words, specific boring or sampling locations enumerated in subsequent steps are not plotted on figures or defined at this time because the approach is intended to be iterative, with each data collection step providing information to refine the area and depth of exploration necessary in the subsequent efforts.

3.1 BEDROCK TOPOGRAPHY

Based upon information presented on soil boring logs and cross-sections developed by others for the Site, a bedrock knob is interpreted to exist beneath the parking lot on the south side of where the Aerovox building was located prior to its demolition. Bedrock may also slope from an area of the Site where elevated concentrations of chlorinated volatile organic compounds (CVOCs) have been detected in groundwater (vicinity of MW-4) toward the north or east. In addition, glacial till has been identified in some soil boring logs overlying the bedrock. Glacial till is often dense and can act as a capillary barrier to dense non-aqueous phase liquid (DNAPL). The bedrock and overlying glacial till are likely to control the movement of NAPL, if present.

A seismic refraction survey of the Site will be conducted to evaluate the depth to bedrock and depth to till. The seismic refraction survey will be conducted over selected areas of the Site using 100-foot spaced transect lines. Two surface contour maps, one for the till surface and one for the bedrock surface, will be generated from the seismic data.

3.2 MEMBRANE INTERFACE PROBE

Membrane Interface Probe (MIP) investigation will be conducted along portions of the northern and eastern property lines. A MIP is a field screening tool used in conjunction with direct push boring to evaluate the relative concentrations of volatile organic compounds (VOCs) in subsurface soil. The MIP probe can also assist in identifying subsurface soil types and stratigraphy. (More information regarding the application of MIP may be found at the EPA CLU-IN web page: http://www.clu-in.org/characterization/technologies/mip.cfm).

The purpose in using the MIP is to evaluate whether NAPL is present from releases associated with the former northern drainage ditch, evaluate interaction of potential NAPL and the sheet pile wall and identify subsurface zones with potential for transmission of CVOCs off site. Along the northern property line, the MIP will aid in evaluation of the potential for off-site migration toward the northern abutting property and the potential for such migration to represent a complete pathway to indoor air. Along the eastern property line, the MIP will assist in

identifying potential layers or zones of CVOCs inside the sheet pile wall and the potential for migration of CVOCs beneath the peat layer into which the sheet pile wall is keyed.

Initially, the MIP survey will include 50 locations to depths of approximately 25 feet and/or the bedrock surface. The investigation may be expanded to include other potential NAPL areas, based on the results of the till and bedrock contours generated by the seismic refraction survey. The data generated will be presented as a vertical profile and/or map showing MIP responses that may be indicative of NAPL.

3.3 SOIL CHARACTERIZATION

Concentrations of PCBs in soil at IB-6 (1-2' below the floor) and ID-7 (3-4' below the floor) which were collected in 1998 contained concentrations of PCBs exceeding the current MCP UCL. Concentrations of PCBs detected in a soil sample (ID63) collected 0-2 inches below the concrete slab in the former Dip Assembly Area exceeded the PCB UCL standard. Soil samples collected from several locations in the parking lot south of the building contained PCBs above the Method 1 S-3 standard (SB-4, SB-6, SB-10, SB-12, and SB-16 and at or above the PCB UCL in samples SB-5, SB-7, SB-13, and SB-14. Neither the vertical nor the lateral limits of PCB impacts in soil in these areas have been delineated. A grid with approximate 100-foot by 100-foot centers will be used to locate soil borings in targeted areas of the Site. Based upon the findings of the initial geoprobe investigations, the grid size may be further reduced to define the horizontal limits of contamination and the horizontal limits of contamination that may exceed the UCL. The specific location and orientation of the grid will be defined after the results of the seismic refraction and MIP work is completed.

Up to 50 geoprobe borings to a maximum depth of 25 feet below the existing ground surface will advanced to characterize soils and target areas for advancement of test borings and installation of monitoring wells. A surficial soil sample will be collected from the 0-2 feet depth interval and at 5-foot depth intervals (5 to 7 feet, 10 to 12 feet, 15 to 17 feet, etc.) or in areas where visual identification or photoionization detector (PID) soil headspace readings indicate the potential for contamination. Continuous soil sampling may be conducted at selected boring locations based on MIP results and/or field observations. Soil samples will be submitted to the laboratory for analysis of PCBs and/or CVOCs. The samples will be analyzed by the laboratory using an iterative process to defining the vertical limits of contamination. The initial samples identified for analysis based on visual and/or PID readings will be analyzed first. If the analytical results indicate concentrations of contaminants of concern greater than applicable standards, samples from additional depth intervals will be analyzed. Additional soil samples may be collected for analysis of soil bulk density and fraction of organic carbon (f_{oc}).

In addition to the grid samples, up to 10 surficial soil samples (0 to 3 feet depth interval) will be collected from selected locations on the Titleist property. These samples will be collected and analyzed to assess whether a stormwater over land flow pathway to the immediately adjacent

property may have historically existed during significant storm events when portions of Hadley Street flooded. These samples will be analyzed for PCBs.

Soil samples collected from soil borings advanced at or near the shoreline may be submitted for analysis of geotechnical parameters for future evaluation and design of potential future site containment measures.

3.4 GROUNDWATER INVESTIGATIONS

Additional investigation is needed to evaluate whether bedrock controls the flow of contaminants in groundwater, assess groundwater flow directions and gradients, define the vertical and lateral limits of PCB and VOC impacts to groundwater, evaluate the tidal influence on groundwater and contaminant transport, evaluate containment effectiveness of the sheet pile wall and evaluate the extent of groundwater contaminant concentrations exceeding the Method 1 GW-2 standard in the vicinity of occupied structures.

Initially, an inventory of the existing wells and conditions of the wells will be conducted. Based on existing soil data and results of the seismic refraction, MIP, and soil characterization activities described above, additional groundwater monitoring wells locations will be identified. It is anticipated that up to 10 overburden (5 shallow overburden and 5 deep overburden) and 10 bedrock monitoring wells will be installed. Both shallow overburden (completed to 15-feet below ground surface [bgs]) and deep overburden (terminated at the overburden-bedrock interface [completed to approximately 25-feet bgs]) wells will be installed. Bedrock monitoring wells will be advanced a minimum of 10 feet into competent bedrock. The monitoring wells will be constructed of 2-inch PVC, using screen lengths of 5-feet to 10-feet. The specific locations of the additional wells will be defined once the seismic, MIP and geoprobe work is complete.

Drilling methodology for advancement of soil borings and installation of monitoring wells will be determined prior to field mobilization. Where the MIP or soil investigation data indicate the potential for NAPL seams or NAPL overlying a confining or semi-confining layer, telescoping drilling or isolated nested wells may be used to limit the potential for carrying impacts to unimpacted areas during drilling.

Groundwater monitoring wells will be developed with a submersible or centrifugal pump until water quality parameters (dissolved oxygen, conductivity, pH, and temperature) stabilize and the water discharge is relatively clear. A minimum of three well volumes will be removed from each well during development. Well development will occur no sooner than 48 hours after well installation for deep overburden and bedrock monitoring wells that are sealed with grout. Shallow overburden monitoring wells may be developed immediately after installation.

Borehole permeability (hydraulic conductivity) testing will be conducted in representative shallow overburden, deep overburden, and bedrock monitoring wells for evaluation of formation

hydraulic conductivity. The monitoring well casing (PVC) will be surveyed relative to one of the two designated site benchmarks and groundwater elevations will be calculated and a staff gauging will be installed in the Acushnet River, beyond the eastern site boundary and within a location within the maximum limit of low tide. The staff gauge will be surveyed relative to the site benchmark..

Two groundwater sampling rounds will be conducted, approximately 6 months apart. The monitoring wells will be sampled for VOCs, PCBs, and total suspended solids (TSS). Standard attenuation parameters (ferrous iron, sulfate, nitrate, total organic carbon, ammonia, phosphorus, methane, ethane, and ethylene) will also be assessed in select wells. A synoptic groundwater gauging round will be conducted prior to each groundwater sampling event. The monitoring wells will be gauged for depth to groundwater and presence of NAPL prior to conducting sampling.

The tidal influence of the Acushnet River on site groundwater and contaminant transport will be investigated by installation of pressure transducers for a minimum of three days in selected existing and newly installed monitoring wells both within and beyond the known extent of tidal influence on the property (estimated to be just west of the MW-6/MW-6A couplet.

3.5 STORMWATER EVALUATION

The condition of the existing stormwater drainage system is unknown. In addition, there may be contaminated solids in the drainage system that could migrate off site through stormwater outfalls. A video survey of the components of the existing stormwater conveyance system will be conducted. The survey will assess the condition of the infrastructure and whether there are any breaches or groundwater seepage.

In addition, the accumulated soils in the on-site and Hadley Street catch basins and manholes associated with the stormwater drainage system will be sampled and analyzed for PCBs and waste characterization parameters including VOCs, semi-VOCs, herbicides, Resource and Conservation and Recovery Act (RCRA) metals, ignitability, corrosivity, and pH. Samples will be collected and held by the laboratory for analysis of RCRA Metals by Toxicity Characteristic Leaching Potential (TCLP) pending results of the total RCRA metals analysis. Collection of 8 samples (8 on-site and 4 from Hadley Street) are anticipated.

4.0 DATA INTERPRETATION AND PHASE II REPORT

The Phase II data generated during field investigation will be preliminarily reviewed at each step prior to initiation of the next phase of investigation, as locations for collection of samples for subsequent field events will frequently be based on the prior field activities. Field forms for certain field activities, soil boring advancement, monitoring well installation, groundwater monitoring well development and sampling, will be included as appendices to the Phase II Report.

Data generated during Phase II field activities will be evaluated in accordance with MassDEP's guidance document entitled *Representativeness Evaluation and Data Usability Assessment*. The data will be used to conduct an exposure assessment and Method 3 Risk Characterization.

5.0 IMPLEMENTATION SCHEDULE

The schedule for implementing Phase II field activities will be based upon MassDEP's approval of the Phase II SOW. Assuming that MassDEP approves the Phase II SOW by September 2013, the estimated schedule for implementation is outlined in the following table:

Task	Approximate Schedule
Seismic survey	October 2013
Membrane interface probe investigation	November 2013
Soil characterization activities – Geoprobe	November 2013
Monitoring well installations and development	January 2014 – February 2014
Groundwater sampling – Round 1	March 2014
Tidal induced groundwater fluctuation survey	April 2014
Storm water video survey	May 2014
Storm water system soil sampling and additional soil characterization, if needed	June 2014
Groundwater sampling – Round 2	September 2014
Draft Phase II CSA Report Preparation	April 2014 – October 2014
Submission of draft Phase II CSA Report to City	November 2014
Submission of Phase II CSA Report to MassDEP	December 2014