Quality Assurance Project Plan Addendum
Supplemental Phase II/Limited Phase III
Environmental Site Assessment
Amerbelle Corporation

104 East Main Street
Vernon, Connecticut

November 2008

FUSS & O'NEILL
Disciplines to Deliver

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Manchester, Connecticut 06040

1.0 TITLE AND APPROVAL PAGE

Document Title	**QUALITY ASSURANCE PROJECT PLAN ADDENDUM SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT AMERBELLE CORPORATION 104 EAST MAIN STREET VERNON, CONNECTICUT**
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QUALITY ASSURANCE PROJECT PLAN ADDENDUM
SUPPLEMENTAL PHASE II/LIMITED PHASE III
ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION
104 EAST MAIN STREET
VERNON, CONNECTICUT

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2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The following is a list of key personnel responsible for management and implementation of this Brownfields Supplemental Phase II/Limited Phase III Environmental Site Assessment (ESA). Any questions regarding project status should be directed to the principal contact. A project management organization chart is provided as Figure 2-1.

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3.0 INTRODUCTION

The following Quality Assurance Project Plan (QAPP) Addendum provides a framework for the proposed Supplemental Phase II/Limited Phase III Environmental Assessment (ESA) to be conducted on the property located at 104 East Main Street located in Vernon, Connecticut. In June 2006, Fuss & O'Neill, Inc. submitted a Generic QAPP (RFA #06246) document to the Quality Assurance Unit of the United States Environmental Protection Agency (USEPA) for the Capitol Region Council of Governments Metro-Hartford Community-Wide Brownfields Assessment Program. The format for that document was developed from the USEPA's Brownfields Quality Assurance Project Plan Guidance Document. This "Generic" QAPP defines the overall field and laboratory procedures to be used for the Capitol Region Council of Governments (CRCOG) Metro-Hartford Community-Wide Brownfields Assessment Program. This "Generic" QAPP contains several attachments, which includes field sampling Standard Operating Procedures (SOPs), field laboratory SOPs, fixed laboratory SOPs, and other attachments. The Generic QAPP was approved by the USEPA on June 20, 2006. The format for this site-specific QAPP closely follows the "Generic" document previously submitted to the USEPA.

The work outlined in this QAPP will be conducted in a phased approach to accommodate budget requirements. As outlined in Section 4-2 and Table 4-1, initial investigations will focus on characterizing site groundwater and areas of concern (AOCs) north of Brooklyn Street. AOCs south of Brooklyn Street (Buildings 12 and 14) will be investigated at a later date.

3.1 Site Description and History

The subject site, the current Amerbelle Corporation, is located on the western side of East Main Street in an industrial zone of Vernon, Connecticut (Tolland County). A portion of a United States Geological Survey (USGS) topographic map showing the subject site location is provided as Figure 3-1. Amerbelle Corporation produces specialty textiles for various applications.

The subject site is divided into two parcels, one 2.7-acre parcel located south of Brooklyn Street and one 1.5-acre parcel located north of Brooklyn Street. The site building on the southern parcel contains Amerbelle's dyeing, mixing and finishing operations, while the building on the northern parcel is used for coating operations and as a storage area. Several aboveground storage tanks (ASTs) are located throughout the property as follows:

- Two 18,000-gallon waste oil storage tanks
- One 27,000-gallon production water supply tank
- One 500-gallon tank containing sodium hydroxide for dyeing processes
- Two 275-gallon finishing resin tanks
- Two 7,500-gallon pH neutralization tanks
- One 275-gallon tank containing sodium hydroxide for pH neutralization
- One 275-gallon tank containing sulfuric acid for pH neutralization
- One 10,000-gallon hot water storage tank.

A site plan is provided as Figure 3-2. The site buildings, numbered 1 through 14, are distributed over the two parcels. Buildings 12 and 14 are the only two located on the southern parcel. Operations conducted in each building are summarized below:

Buildings 1 and 2

Building 1 is used for the mixing and storage of flammable, organic coatings. Raw materials are stored on the northern side of the building. Constituents noted in the storage area included formaldehyde, toluene, and isopropyl alcohol as well as brand-named compounds. The mixing area is located on the southern side. A hazardous waste storage area is located in the northwestern portion of the mixing area. The floor in Building 1 is concrete. A wood-floored basement and earth/stone sub-basement underlie this area. The main floor appears to have been reinforced with additional steel support columns that extend to bedrock in the sub-basement. We suspect that the original floor was likely wood and that the new construction was completed to accommodate the current use.

Directly west of Building 1, the topography slopes down steeply to the west. Personnel from the Vernon Sewer department reported seeing water seeping from the embankment in 1994. The seepage was observed at the same time as dye-colored water was noted in a sewer line excavation adjacent to Building 14. It was inferred that a release of wastewater had occurred from the Amerbelle facility (GeoDesign, 2004). GeoDesign also noted solid waste debris in this area in the winter of 2004, when vegetation was minimal.

Building 2

Building 2 is a storage area with three loading docks on the southwest side. Rolls of fabric were stored in this area at the time of Fuss & O'Neill's site visit, which was made in July 2008. The floor of Building 2 is concrete with a wood-floored basement area below. The area in front of the loading docks is asphalt paved. Files held by the Fire Marshal indicate that tank trailers were used for the temporary storage of oil in 1989 (GeoDesign, 2004).

Buildings 3, 4 and 5

These buildings are used for general storage. Building 5 is located above the raceway. Buildings 3 and 4 both have basements. The basement of Building 3 is used for storage. The basement of Building 4 houses fire pumps that draw water from American Mill Pond.

Building 6

Building 6 is located adjacent to the boiler room and built around the base of the boiler stack. No manufacturing processes appear to take place in this area. A shallow floor trough (less than three inches deep) is present to provide drainage for groundwater infiltration. Boiler operations are located to the northwest and northeast of Building 6. Concrete cradles for a historical AST are located outside Building 6, adjacent to the raceway.

Building 7

Building 7 houses two solvent coater lines. The solvents are primarily methyl ethyl ketone (MEK)- and toluene-based. The solvents are stored in Building 1. Emissions from the coating lines are discharged to a gas-fired thermal oxidizer to destroy volatile compounds prior to discharge to the air. The solvent coaters operate in conjunction with air-to-air heat dryers which utilize heat from exhaust gases coming from the oxidizer. The coating lines are located above the raceway. A two-bay loading dock is located in the eastern end of Building 7.

Building 8

Water is withdrawn from the Hockanum River for use in manufacturing operations. The water is processed through a filtration system in the western portion of the Building 8 basement and pumped to a 27,000-gallon holding tank in the eastern portion. Process wastewater is discharged to the sanitary sewer. A floor drain system in the basement also discharges to the sanitary sewer. Non-contact cooling water that is withdrawn from the raceway is discharged back to the river. Several 55-gallon drums containing waste oil are stored on containment pallets. Equipment that may have been used in former mixing or wastewater treatment operations is also located in the basement.

Building 8 was used as a dye house until 1927 (GeoDesign, 2004). GeoDesign indicated that quality control testing, using up to three gallons of tetrachloroethylene per month for test drycleaning, was conducted on the upper floors and that used PCE was stored here until it was shipped off-site as a hazardous waste.

Building 9

This area is used for general storage. Groundwater seepage from the raceway is evident and a sump pump pumps water to the floor drain system in Building 8. Building 9 was used for dye storage from 1868 to 1927 (GeoDesign, 2004). A Hazardous Materials Survey in 1986 identified several miscellaneous chemicals as being stored on the ground of this building.

Building 10

No Building 10 is identified on available mapping.

Building 11

This area is used for the storage of equipment, drums of oil, and chemicals. The building was previously used for dye operations prior to 1927 (GeoDesign, 2004). A floor trench system currently conveys groundwater infiltration but in the past may have conveyed liquid seepage from former operations. The central collection point of the trench system is not known, but is suspected to have discharged to American Mill Pond. One loading bay is located along the northern edge of the building. An elevator shaft is present on the west wall. Dyeing operations subsequently moved to Building 14.

Building 12

This area is used as a machine shop and storage area. Operations include welding, turning, milling, grinding and electrical repair. A small parts cleaner area is located here. The 4-floor building was constructed between 1885 and 1892 (GeoDesigns, 2004). It is not known if historical manufacturing operations were conducted in this building.

Building 13

The latex coating line is located in the eastern end of Building 13. The latex coatings are stored in a storage area located just east of the coating line. The western end of the building is usually empty. At the time of the July 2008 site visit, the facility was shut down for maintenance and this area was used to temporarily store rolls of fabric.

Building 14

This building occupies most of the southern parcel and is used for textile dyeing and finishing. Two loading docks are located at the southwest end of the facility; three are located on the southeast side. A textile storage area with an elevator is located in the southern corner of the building.

Most of the dying operations occur in the western portion of the building. A dye mixing room is located in the northwest corner of the ground floor. Dyes are stored just outside the dyeing room in 55-gallon drums. The rest of the ground floor is generally open and houses dyeing and finishing machines. A floor drain trench system is located throughout the ground floor to collect oversplash and drips that occur when cleaning the equipment and removing processed material from the machines. The liquid is directed to a wastewater sump, approximately 20 feet deep, located in the southwestern end of the building. Two 7,500-gallon pH neutralization tanks are located in a loading dock west of the sump. Wastewater treatment chemicals (including sodium hydroxide, citric acid, soda ash, and sodium bicarbonate) are stored in 55-gallon drums in the vicinity of the sump. Treated wastewater is discharged to the sanitary sewer.

Most of the finishing operations occur in the southwestern portion of the building. Finishing products are applied to fabrics which are then dried. Finishing chemicals (including formaldehyde, fabric protector, and brand name chemicals) are stored in the southwestern portion of the building.

During work conducted by the Town of Vernon on the sewer line in Brooklyn Street, dye-colored water was observed infiltrating the excavation near the dye mixing room. A bridge contractor also reportedly observed dye-colored water near the southeast corner of Building 14, near process water overflows (GeoDesign, 2004).

18,000-Gallon Fuel Oil ASTs

Two 18,000-gallon fuel oil ASTs are located east of Building 13 in a concrete containment structure. The structure is walled and roofed.

Two 20,000-gallon fuel oil USTs were formerly located in this area. The USTs were removed in 1989 along with an undocumented quantity of contaminated soil (GeoDesign, 2004).

Exterior Pad-Mounted Transformers

Three PCB-containing transformers and one non-PCB-containing transformer are located south of Building 7 in a fenced-in area. The PCB transformers are on a concrete pad that adjoins a concrete paved bridge over the raceway to the northeast and the concrete wall of the AST structure to the southwest.

3.2 Project Definition

This section provides a summary of previous investigations conducted at the site, including Phase I and Phase II investigations completed by GeoDesign, Inc. and a Targeted Brownfields Assessment Report completed in 2006 by Metcalf & Eddy. The reports contained information regarding description of AOCs, locations of AOCs, and a summary of constituents of concern identified from these investigations.

3.2.1 Previous Environmental Investigations and Areas of Concern

A Phase I report prepared by GeoDesign, Inc. in 2004 has identified 21 AOCs on the subject site properties. After reviewing this information as well as the results of the Phase II investigation, Fuss & O'Neill has identified 2 additional AOCs. A list of AOCs identified for the subject site properties is detailed below. A detailed description of each AOC is summarized in Table 4-1.

- AOC 1 – Former xylene USTs south of Building 14
- AOC 2 – Building 14 south loading dock
- AOC 3 – Building 14 west loading dock
- AOC 4 – Northwest corner of Building 14
- AOC 5 – Building 14 wastewater conveyance trenches
- AOC 6 – Southeast corner of Building 14
- AOC 7 – Building 12, Maintenance
- AOC 8 – Slope west of Buildings 1 and 2
- AOC 9 – Building 13, Latex Coating
- AOC 10 – Building 2 loading dock
- AOC 11 – Buildings 1 and 2, Coating Storage
- AOC 12 – Building 3, Storage
- AOC 13 – Building 7, Solvent Coating
- AOC 14 – Fuel oil ASTs

- AOC 15 – Transformers
- AOC 16 – Building 7 loading dock
- AOC 17 – Building 9, Dye Storage
- AOC 18 – Building 8, Former Dye House
- AOC 19 – Building 11, Former Dyeing/Current Chemical Storage
- AOC 20 – Building 11 loading dock
- AOC 21 – Former off-site gasoline station
- AOC 22 – Fill
- AOC 23 – Groundwater

February and March 2004, *Phase I and II ESA*, completed by GeoDesign, Inc.: Environmental investigations included the following:

- Site history and file review
- Interior and exterior site inspection
- Identification of AOCs
- Five exterior soil borings
- Six interior soil borings
- Installation of four groundwater monitoring wells.

Analytical results from the Phase II soil sampling indicated the presence of trace VOCs at several locations throughout the site. ETPH was detected at low concentrations at almost all of the sample locations; however, the Connecticut Remediation Standard Regulations (RSRs) Residential Direct Exposure Criteria for ETPH was exceeded in the samples from the boring in Building 3 (770 mg/kg) and from the boring north of Building 11 (920 mg/kg). Formaldehyde was detected in two samples, both collected from the northwestern portion of Building 14. The only metals exceedance of the baseline RSRs was for arsenic in the shallow soil near the Building 7 loading dock. No SVOCs or PCBs were detected in any of the samples.

Groundwater samples were analyzed for VOCs, SVOCs, ETPH, formaldehyde, aniline and dissolved metals. Trace VOC concentrations were detected in several of the groundwater samples; however none exceeded the applicable CT RSR criteria. ETPH was detected at concentrations up to 1,100 ug/L. The detected concentrations of arsenic (11 ug/L) and copper (82 ug/L) in the groundwater sample from the monitoring well installed in Building 11 exceeded the SWPC for each constituent, 4 ug/L and 48 ug/L respectively. The sample collected from the town well on Brooklyn Street showed zinc at a concentration of 171 ug/L, which is above the SWPC of 123 ug/L. There were no other SWPC exceedances in any of the other monitoring wells sampled.

August 2006, *Targeted Brownfields Assessment Report,* completed by Metcalf & Eddy: Between November 28 and December 3, 2005, five soil borings were drilled, and overburden soil samples were collected. Four monitoring wells were installed during drilling- three in bedrock (ME-1, 2 and 6) and one in the overburden (ME-5). See Figure 3-2 for a map showing sampling locations. Soil analytical results are summarized below:

- VOCs were detected at trace concentrations in several of the shallow soil samples collected throughout the site.
- SVOCs were detected throughout the site and may be associated with fill. Coal ash, which contains SVOC compounds, was found to be present in fill in one of the borings.
- The sample from soil boring AM-1 (south of the Building 7 loading dock) also contained arsenic at a concentration of 54.4 mg/kg, which is above the RSR Industrial/Commercial Direct Exposure Criteria. There were no other detected metal concentrations that exceeded the applicable CT RSR criteria.
- ETPH concentrations ranging from 21 to 75 mg/kg were detected, the highest concentrations being detected in samples collected from Building 3, a general storage area, and outside of the Building 7 loading dock.

Groundwater samples were collected from all four of the newly installed wells (ME-1, 2, 5, 6) as well as from an existing monitoring well (AM-7). Analytical results indicate the presence of TCE, PCE and several other VOCs in the groundwater downgradient of Building 11. The source of TCE and PCE contamination is unknown; however PCE and TCE are currently used in several site operations. PCE and TCE have also been identified as constituents of concern in groundwater as a result of an off-site release at the upgradient Roosevelt Mills facility located 0.5 miles east of the site. ETPH was detected at concentrations below the CT RSR criteria. Metals were found in exceedance of the SWPC at monitoring wells ME-2 (chromium, lead and copper) and AM-7 (copper and zinc). The groundwater sample collected at ME-2 was reported to have a blue-green tint. ME-2 is located on Brooklyn Street in the area where dye-colored water was encountered during sewer installation.

3.2.2 Constituents of Concern (COCs)

Based on the review of the previous environmental reports, the following COCs were identified for the site: VOCs, PCBs, SVOCs, extractable total petroleum hydrocarbons (ETPH), lead, RCRA 8 (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) metals plus copper, nickel and zinc, formaldehyde, glycols, methanol and ammonia.

3.3 Plan Objective

The objectives of this plan are to define the specific data quality objectives (DQOs), scope of work, policies, organization, and Quality Assurance (QA) and Quality Control (QC) goals related to field, laboratory, and reporting activities for this investigation. The goal is to obtain data of sufficient quality to characterize the environmental quality of soil and groundwater at the site. This goal requires the identification and characterization of potential contaminant sources associated with previous and current site activities that may have had a negative impact on soil and groundwater. This property will continue to be used for textile manufacturing and finishing. The purpose of this investigation is to determine site environmental conditions such that a Remedial Action Plan can be prepared.

As described in Section 3.2.1, previous investigations have identified releases of VOCs, SVOCs, ETPH and several metals to soil and groundwater at the site. We plan to target the identified areas of concern with supplemental investigations; however, the site is an active manufacturing facility, and the nature of the processes and arrangement of the buildings prevents access to many areas with drill rigs.

In addition, bedrock at the site is shallow. In many areas, the groundwater table is below the bedrock surface, and collecting groundwater samples would require the use of a truck-mounted drill rig to install bedrock wells.

Our proposed approach to investigating the site is two-fold:

- Characterize potential releases to shallow, unconsolidated soil to the extent that identified AOCs are accessible. Soil sampling will likely be conducted by hand beneath the floor in many areas with only a few locations being accessible to a drill rig.
- Evaluate the potential for the off-site migration of impacted groundwater in the shallow bedrock by installing three bedrock wells. We anticipate that this degree of groundwater characterization will be sufficient to meet project goals for the following reasons:
    - The site is located in a GB classified groundwater area.
    - Groundwater discharge in the shallow bedrock aquifer is likely to the site raceway and the Hockanum River.
    - Off-site upgradient source areas of groundwater contamination have been identified.

3.4 Data Quality Objectives

The concentration of the contaminants of concern in the soil and groundwater will be evaluated relative to state remediation standards. The Connecticut RSRs (Regulations of Connecticut State Agencies Sections 22a-133k-1 through -3) were adopted January 30, 1996. The RSRs contain procedures to evaluate whether actions (e.g., remediation or institutional controls) will be required to abate identified releases of hazardous substances and hazardous waste.

The RSRs require that the nature and extent of release areas be fully characterized prior to making final determinations with respect to RSR compliance.

Soil Criteria

Soil criteria that apply to the site include:

- Residential (Res) Direct Exposure Criteria (DEC)
- Industrial Commercial (I/C) DEC
- GB Pollutant Mobility Criteria (PMC).

The RSR Standards for Soil Remediation (RCSA Section 22a-133k-2) require that soil that has been polluted as a result of a release of hazardous waste or substance be remediated to meet the DEC to protect against the effects of contact or ingestion of contaminants. Regardless of the site's use, the Res DEC apply to all properties located in the State of Connecticut unless an Environmental Land Use Restriction is executed on the site's land records indicating that the parcel can only be used for industrial/commercial purposes.

Soil must also meet the PMC, which are intended to prevent impacts to groundwater which could result from leaching of contaminants in soil. Based on the site's location in a GB-designated area, the GB PMC apply to any polluted soils that might be present at the site.

The RSRs also define specific alternatives to strict compliance with the baseline numeric DEC and PMC by including self-implementing options, exceptions, and variances. These alternatives include environmental isolation of the contamination (environmentally isolated soils), rendering the contamination inaccessible (inaccessible soils), and engineered controls. Variances exist for areas covered by widespread fill or for soils that contain ash or asphalt fragments.

Groundwater Criteria

Surface Water Protection Criteria (SWPC) and the proposed (draft) Res and I/C Volatilization Criteria (VC). The draft VC have not been formally approved, but are currently used as guidelines by CTDEP personnel. The VC generally apply to groundwater beneath or directly adjacent to a building. These criteria are discussed separately in the subsections below.

The subject site is located in a GB groundwater quality designated area. RSR criteria that apply to groundwater in such areas include the Surface Water Protection Criteria (SWPC) and the Residential Volatilization Criteria (ResVC) (or background conditions, if the site's groundwater has been impacted by an off-site source of contamination).

The SWPC are applicable to any groundwater which ultimately discharges to a surface water body and are designed to be protective of aquatic organisms. For any environmental investigation, all groundwater is inferred to ultimately discharge to a surface water body. The VC represent concentrations of volatile organic compounds above which adverse indoor air quality impacts may occur. Based on current regulations, the VC are considered for areas where groundwater is within 15 feet of the ground surface and/or within 15 feet of a structure intended for human occupancy. However, in March 2003, the CTDEP proposed revisions to the VC. The proposed revisions increase compliance depth from 15 feet to 30 feet below grade and specify risk-based compliance criteria for several compounds. Although the proposed criteria have not yet been promulgated as regulation, the CTDEP has indicated they expect LEPs to use the proposed criteria when making compliance verifications. The VC are specific to a site's land use (i.e., residential versus industrial/commercial); however, as with the DEC, the execution of an Environmental Land Use Restriction on the site's land records is required to use the industrial/commercial criteria.

Request for Site-Specific Criteria

RSR criteria have not been established for formaldehyde. In addition, an I/C DEC has not been established for aniline (a component of some dyes historically used at the site). We will submit site-specific criteria to the CTDEP for those constituents of concern where criteria has not yet been approved. The criteria will be calculated in accordance with the formulae provided in the RSRs.

4.0 SAMPLING DESIGN

To achieve the objectives for this investigation, the following field investigation program is proposed. This field investigation will include both soil sampling and groundwater sampling. Proposed sample locations, including those for each AOC, are shown on Figure 3-2. The planned field activities include the following:

- The advancement of approximately 45 soil borings, including those at proposed monitoring well locations, using both a Geoprobe sampling rig and using Hand Geoprobe techniques.
- The collection of soil samples to depths up to four feet (may continue deeper based on PID readings and bedrock depth).
- The installation and development of three new two-inch bedrock groundwater monitoring wells.
- The collection of approximately 18 groundwater samples.
- Screening of soil samples for VOCs and petroleum using a photo ionization detector and (PID)
- Field screening of soil samples for metals using X-Ray Fluorescence (XRF) technology
- The analyses of soil samples to evaluate releases associated with identified AOCs
- The analyses of groundwater samples to evaluate site-wide groundwater quality and from select AOCs

A summary of the proposed subsurface investigation and anticipated laboratory analysis is outlined in Table 4-1. Phoenix Environmental Laboratories, Inc. located in Manchester, Connecticut will be used for fixed-based laboratory analysis for this project.

4.1 Site Mark-out

Prior to initiating field work associated with this Supplemental Phase II/Limited Phase III ESA, potential sampling locations will be marked at the site. As required by law, the state-wide underground utility locating service will be contacted prior to commencement of subsurface sampling activities to mark the location of public underground utilities entering the property.

4.2 Soil Borings

Approximately 45 soil borings will be advanced at the site over a six day period using a Geoprobe sampling rig for the exterior locations and sampling by Hand Geoprobe techniques for the interior locations. The locations of the proposed soil borings are shown on Figure 3-2. Soil sampling locations and sampling depths were selected based the results of previous subsurface investigations and on observations made during the site inspection of areas most likely to identify a release of hazardous materials and/or petroleum products.

In general, soil sampling will be conducted to depths of up to 4 feet below the ground surface. Previous investigations have reported the presence of bedrock at depths as shallow as 3 feet at the southern portion of the property. If bedrock is encountered above four feet, the samples will be collected from the available interval of soil below asphalt/concrete. At certain AOCs we will be targeting a particular depth interval based knowledge of previous site operations. Soil sampling will be logged and screened in the field for volatile organic compounds (VOCs) using a photoionization detector (PID). In addition, we will screen for select metals (arsenic, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, and zinc) using X-Ray Fluorescence (XRF) technology at some locations. Screening results and visual observation will be used to select samples for fixed-base laboratory analysis. Soil that appears to be visibly stained as a result of a potential release of dyes will be analyzed for aniline (SVOCs).

Samples will be analyzed for potential constituents of concern (COCs) on an AOC-specific basis. Table 4-1 summarizes the analysis and number of samples to be submitted for each AOC is provided below.

Location	Number of Borings	Depths (feet)	Analyses and Number of Samples
AOC 1*	2	Base of tanks	Xylenes (4)
AOC 2*	3	0.5 – 2	VOCs, ETPH, PAHs, and metals (3) SVOCs, formaldehyde, glycols, ammonia, and methanol (1)
AOC 3*	1	0.5 – 2	VOCs, ETPH, SVOCs, formaldehyde, glycols, ammonia, methanol, and metals (1)
AOC 4*	3	Below piping (2-6 feet)	VOCs, ETPH, and metals (3) SVOCs, formaldehyde, glycols, ammonia, and methanol (1)
AOC 5*	6	Below piping (2-6 feet)	VOCs, ETPH, PAHs, and metals (6) SVOCs, formaldehyde, glycols, ammonia, and methanol (2)
AOC 6*	2	0.5 – 2	VOCs, SVOCs, ETPH, formaldehyde, glycols, methanol, metals, ammonia (2)
AOC 7*	1	0.5 – 2	VOCs, ETPH, and metals
AOC 8	0	NA	None
AOC 9	2	0.5 – 2	VOCs, SVOCs, ETPH, glycols, and metals (2)

Location	Number of Borings	Depths (feet)	Analyses and Number of Samples
AOC 10	3	0.5 – 2	VOCs, ETPH, PAHs, and metals (3) SVOCs, formaldehyde, glycols, ammonia, and methanol (1)
AOC 11	0	NA	None
AOC 12	1	Water table	VOCs, SVOCs, ETPH, formaldehyde, methanol, metals, ammonia (1)
AOC 13	1	0.5 – 2	VOCs, ETPH, PAHs, and metals (1) SVOCs, formaldehyde, glycols, ammonia, and methanol (1)
AOC 14	1	2-4 Water table	ETPH and PAHs (2)
AOC 15	1	0.5 – 2	ETPH and PCBs (1)
AOC 16	2	0.5 – 2	VOCs, ETPH, PAHs and metals (2) SVOCs, formaldehyde, methanol, glycols, and ammonia (1)
AOC 17	1	0.5 – 2	VOCs, SVOCs, ETPH, formaldehyde, glycols, methanol, metals, ammonia (1)
AOC 18	2	0.5 – 2	VOCs, ETPH, and metals (2) SVOCs, formaldehyde, methanol, glycols, and ammonia (1)
AOC 19	3	0.5 – 2	VOCs, ETPH, and metals (3) SVOCs, formaldehyde, methanol, glycols, and ammonia (1)
AOC 20	1	0.5 – 2	VOCs, ETPH, and metals (1) SVOCs, formaldehyde, methanol, glycols, and ammonia (1)
AOC 21	0	NA	None
AOC 22	3	Fill	ETPH, PAHs, and metals (3)
AOC 23	13 *Groundwater Samples*	NA	VOCs, SVOCs, metals formaldehyde (13) Glycols, methanol, ammonia (up to 6)

*Budgetary considerations require that the proposed investigations be conducted using a phased approach. AOCs 8-23 will be investigated first. AOCs 1-7 will be investigated at a later date.

4.3 Monitoring Well Installation and Groundwater Sampling

A total of three bedrock groundwater monitoring wells will be installed using an air rotary drill rig at two downgradient locations along the northern border of the site and an upgradient location near the current hazardous waste storage areas. Wells will consist of 2.0-inch diameter PVC screen and will be advanced several feet below the soil/bedrock interface to ensure that the screened interval is within bedrock. The interval above the well screen at the soil/bedrock interface will be sealed to prevent vertical migration of potential contamination. The locations of the proposed monitoring wells are shown on Figure 3-2.

The new monitoring wells and existing site wells will be developed to ensure proper hydraulic connection. The monitoring wells will then be allowed to stabilize for a minimum of one week prior to groundwater sampling.

Groundwater samples will be collected from the three newly installed wells and the following ten existing wells using low flow sampling techniques:

Well ID	Installation Date	Consultant	Geologic Unit Screened	Screened Interval (feet below grade)
AM-1	1/22/2004	GeoDesign	Overburden at top of bedrock	7 - 12
AM-3	1/22/2004	GeoDesign	Overburden at top of bedrock	9.5 - 14.5
AM-4	1/22/2004	GeoDesign	Overburden at top of bedrock	9 - 19
AM-5	1/22/2004	GeoDesign	Overburden at top of bedrock	7.5 - 12.5
AM-7	1/23/2004	GeoDesign	Overburden at top of bedrock	4.5 - 9.5
ME-1	11/29/2005	Metcalf & Eddy	Shallow Bedrock	4.9 - 14.9
ME-2	11/28/2005	Metcalf & Eddy	Shallow Bedrock	8 - 18
ME-5	11/28/2005	Metcalf & Eddy	Overburden at top of bedrock	4.8 - 12.8
ME-6	11/30/2005	Metcalf & Eddy	Shallow Bedrock	15.5 - 25.5
W-1	Unknown	Town of Vernon	Unknown	Unknown

Thirteen groundwater samples will be submitted to the laboratory for analysis. Groundwater samples collected from the wells will be analyzed by the laboratory for VOCs, SVOCs, and RCRA8 metals plus copper, nickel, and zinc. Additional parameters (formaldehyde, methanol, ammonia, and glycols) may be added to some wells based on soil analytical results. Two additional groundwater samples will be collected from the deep bedrock monitoring well and analyzed for VOCs to provide a VOC depth profile of the bedrock aquifer.

Results from the laboratory analysis will be reviewed to characterize the groundwater beneath the subject site and to assess the source of PCE and TCE contamination north of Building 11. Based on laboratory analytical results, additional groundwater investigations may be proposed as part of a future supplemental Phase III investigation.

4.4 Elevation Survey

The locations of exterior borings, the new monitoring wells and the existing site wells will be located using a handheld GPS system. The GPS system we intend to use for this project is a Precision Instruments GEOXH. This handheld GPS device has a precision accuracy of less than 1 foot. A summary of its capabilities is listed below:

- The GEOXH has the ability to collect and store a minimum of 20 points at each location which are needed to achieve accuracies less than 1 foot at 95% confidence.
- Has a download port to a personal computer
- Can export format that can be imported into GIS as well as other EPA data systems.
- Can set its Precision Dilution of Position (PDOP) to be set to <6

- The GEOXH is on the coordinate system referenced to North American Datum 1983 (NAD83)

All interior borings will be measured by a field scientist from existing site structures and interior building features.

In addition to the handheld GPS location survey, a leveling survey will be completed on the wells to obtain measuring point elevations to determine groundwater flow direction. A site plan including the location of soil borings and monitoring wells will be prepared.

5.0 SAMPLING AND ANALYTICAL PROCEDURES AND REQUIREMENTS

Fuss & O'Neill Standard Operating Procedures (SOPs) pertaining to sample collection (soil, sediment, soil vapor, surface water and groundwater) and sampling well installation are referenced in Section 5.0, Tables 5-1 through Table 5-9 and Appendix C through Appendix J of the Generic QAPP previously submitted for the Metro-Hartford Community-Wide Brownfields Assessment Program and include the following sub-sections:

5.1 Sampling Procedures

5.2 Mobile Laboratory and Field Screening Procedures

5.3 Analytical Procedures

5.4 Laboratory Data Package Deliverables

Specific SOPs that will be used for this project are identified in Table 5-1, Table 5-2, and Table 5-6.

6.0 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Procedures for sample handling and custody requirements are documented in Section 6.0 and Appendix E, Appendix F, and Appendix J of the Generic QAPP previously submitted for the Metro-Hartford Community-Wide Brownfields Assessment Program and include the following sub-sections:

6.1 Documentation of Field Activities

6.2 Sample Identification

6.3 Sample Location Identification

6.4 Sample Labels

6.5 Field data sheets

6.6 Chain-of-Custody Records

6.7 Sample Containers and Preservation

6.8 Sample Custody at the Laboratory

6.9 Sample Custody at the Fuss & O'Neill Mobile Laboratory

7.0 QUALITY CONTROL REQUIREMENTS

Quality Assurance and Quality Control samples will be collected for this project. The purpose of these samples is to confirm that laboratory results reflect the condition of the various media in the environment and are not a product of instrument or handling errors.

Each quality assurance/quality control (QA/QC) sample will be given its own sample code. When more than one QA/QC sample is submitted with a set of samples, they will be interspersed within those samples. The types of QA/QC samples which will be submitted are described in the subsections that follow.

7.1 Equipment Blanks

Equipment blanks will be obtained from equipment that has come into direct contact with samples after decontamination and drying between sample locations. The blanks will be prepared in the field using laboratory-supplied deionized water. This water will then be transferred from that piece of equipment to the sample container.

Sampling equipment that could potentially come into contact with soil or groundwater for this project includes manual soil, direct-push soil, and groundwater sampling equipment. Equipment blanks will be analyzed for the same parameters as samples collected with the piece of equipment used. For most parameters, the sampling device is the only piece of equipment that comes into contact with the sample. The frequency of equipment blank collection will be approximately one per 20 samples by piece of equipment.

7.2 Trip Blanks

One trip blank for VOC analysis will be collected each day that VOC samples are collected at the site to evaluate whether samples have been compromised during handling and transportation. The blank will be prepared by the fixed-base laboratory and will accompany the sample containers from the time they leave the lab until the time arrival at the lab as a sample. Trip blanks sample are labeled as samples and submitted with the samples to the fixed-base laboratory for VOC analysis. One set of trip blanks will be prepared and submitted per VOC sample cooler.

7.3 Field Blanks

Field blanks will not be obtained for this project.

7.4 Field Duplicate Samples

Field duplicate samples for analysis will be collected for groundwater, surface water, soil gas, soil, and sediment samples to check the precision of the laboratory analysis. Field duplicate samples will be collected at the same time as the original sample and will be analyzed for the same parameters. The field duplicate sample will be assigned a different sample ID than the original set so that the sample identity is blind to the laboratory. One field duplicate sample by matrix will be collected nominally per 20 samples submitted to the laboratory. For groundwater and surface water samples, sampling will be in the order of decreasing parameter volatility by alternating between containers in the original set and those in the field duplicate set.

7.5 Field Matrix Spike and Matrix Spike Duplicates

A matrix spike (MS) and a matrix spike duplicate (MSD) will be included in the sampling plan if a parameter in a matrix exceeds 20 locations. The laboratory Quality Assurance Plan explains the type of quality control checks which are routinely followed. This includes such items as analysis of client reference standards, matrix spikes, blanks, the use of internal standards and surrogate spikes. A MS/MSD is submitted for every 20 samples collected. The laboratory is notified which sample location is collected as a MS/MSD. The laboratory quality control compares the data of the MS/MSD. If the analytical system does not pass the initial QC limits, then the system is determined to be out of control and the cause of the problem must be determined and corrected before measurements can continue. After the problem is corrected, QC measurements are repeated to verify the calibration. If the system still does not meet control limits, the system is re-examined until the problem is corrected.

7.6 Field Sample Control Limits

The standard Fuss & O'Neill field sample control limits for quality control are specified below. If the control limits are not met, the Quality Assurance Officer will investigate the cause of the exceedance and determine the validity of the associated data.

Quality Control Sample	Control Limit
Trip Blank	Less than detection limit*
Field Blank	Less than detection limit*
Equipment Blank	Less than detection limit*
Field Duplicates	± 30% Percent Difference for Water; ± 50% difference for soil, if concentrations are > 2x RL for organic and >4x RL for inorganic parameters**

* With the exception of common laboratory contaminants of acetone, 2-butanone, methylene chloride, phthalates, and toluene, which will have a control limit of 5X detection limit.

** Discrepancies will be addressed on a case-by-case basis.

7.7 Laboratory Internal Quality Control

The laboratory Quality Assurance Plan explains the type of quality control checks which are routinely followed. This includes such items as analysis of client reference standards, matrix spikes, blanks, the use of internal standards and surrogate spikes. All calibrations are checked before sample analysis can begin. If the analytical system does not pass the initial QC limits, then the system is determined to be out of control and the cause of the problem must be determined and corrected before measurements can continue. After the problem is corrected, QC measurements are repeated to verify the calibration. If the system still does not meet control limits, the system is re-examined until the problem is corrected. The QA/QC procedures and analytical precision and accuracy of the methods to be used for this project are provided in Appendices G and I (contract laboratory's SOPs for analytical methods and QC limits) and Table 7-1 and Appendix E of the Generic QAPP previously submitted for the Metro-Hartford Community-Wide Brownfields Assessment Program.

8.0 DATA MANAGEMENT AND DOCUMENTATION

Sections incorporated by reference to the Generic QAPP previously submitted for the Metro-Hartford Community-Wide Brownfields Assessment Program include the following sub-sections:

8.1 Introduction

8.2 Data Classes

8.3 Data Administration

8.4 DMS Output for QA Interpretation

8.5 Data Presentation

9.0 ASSESSMENTS AND RESPONSE ACTIONS

The Project Manager is responsible for determining the need for and implementation of any corrective action measures to the sampling or analytical procedures. Corrective action will be implemented upon the identification of problems discovered through system audits by analytical data review. If a problem is identified, the QA Officer will:

- Report the problem to the Project Manager,
- Evaluate the problem in accordance with data quality objectives,
- Determine whether implementation of corrective action is required,
- Assign and implement a corrective action, and
- Evaluate the effectiveness of the corrective action.

The QA Officer may conduct an on-site audit of the field operations depending on the complexity of the work being performed. A minimum of one field audit will be conducted

during the program. The following is a list of possible occurrences that may require corrective action and the corresponding action that would likely take place:

- If any sample bottles break during transit such that insufficient sample is available to complete the analysis, that location will be re-sampled to replace the bottles that have been broken.

- If meters or other sampling equipment break or malfunction during sampling, efforts will be made to repair, re-calibrate, or replace them with back-up equipment.
- If the analysis of trip or equipment blanks indicates the presence of target analytes above acceptable concentrations, re-sampling and reanalysis of samples taken that day may be required.

- If there are unusual changes in detection limits, re-sampling, and re-analysis may be indicated.

- If PCBs are detected at concentrations greater than 1 ppm, Kimberly Tisa EPA PCB Coordinator will be notified at (617) 918-1527, FAX (617) 918-0527, or tisa.kimberly@epa.gov. The clean up and disposal of polychlorinated biphenyls (PCBs) materials are regulated under the Toxic Substance Control Act (TSCA), 40 CFR Part 761. Remediation of the Brownfield site must comply with the TSCA regulations for cleanup of PCB contaminated sites.

Assessment and Response Actions for the contract laboratories are defined in Appendices E, F, and H of the Generic QAPP previously submitted for the Metro-Hartford Community-Wide Brownfields Assessment Program.

10.0 PROJECT REPORTS

Sections incorporated by reference to the Generic QAPP previously submitted for the Metro-Hartford Community-Wide Brownfields Assessment Program include the following sub-sections:

10.1 Introduction

10.2 Project Status Reports

10.3 Internal Assessments and Response Actions

10.4 Project Results

10.5 Project Report Format

A report will be prepared that summarizes the results of the investigation. The format of the document will be prepared to discuss the results on an AOC and building specific basis. Maps

and tables will be prepared to support the text and development of the site conceptual release model.

11.0 DATA VERIFICATION AND VALIDATION

Sections incorporated by reference to the Generic QAPP previously submitted for the Metro-Hartford Community-Wide Brownfields Assessment Program include the subsections below.

11.1 Levels of Data Validation Review

A modified Tier I level of data validation will be completed for this project.

11.2 Evaluation Criteria

12.0 DATA USABILITY

The purpose of this QAPP is to outline a systematic process and structure for data quality such that the data will support decisions. The generation and use of quality data is important in the assessment of constituent impact on the site and, if necessary, in the selection of adequate responses to concentrations in soil, groundwater, sediment, surface water, indoor air, or soil gas. The function of the data verification process is to identify sampling and "analytical error" and not to make final determinations about the overall usability of the data for the project (U.S. EPA, 1996). The usability assessment will be conducted by the QAO and the results of the assessment will be reported to the Project Hydrogeologist. The usability assessment will report how validated project data is reconciled with the project quality objectives and limitations, if any, of the data. All reported limits will be below the CT RSR for the specific site for the data to be usable. Reconciliation may require re-sampling or recommending the use of selected data even through it did not meet the DQOs.

For example, assume that a sample is analyzed for SVOCs by Method 8270 and the QC for benzo(a)pyrene (BAP) is not acceptable, while the QC for all other SVOCs is acceptable. It is possible that the results may be usable for SVOCs excluding BAP.

Quality control issues will be discussed in the usability assessment and the QA Officer will recommend the use or rejection of the data. Ultimately, the end user will determine the usability of the data based on an understanding of the project data quality objectives and the results of the data verification process. The results of the usability assessment will be summarized in periodic reports developed annually.

13.0 REFERENCES

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TABLES

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
1	Former Xylene USTs South of Building 14	Xylenes	The USTs were removed in 1993, but no closure sampling was conducted. Xylenes were not detected in a shallow soil sample (3-5 feet) or downgradient groundwater. ETPH detected in soil (240 mg/kg) could be associated with fill.	Incomplete characterization of the soil beneath the former tank grave. Since post-excavation samples were not collected at the time of UST removal, xylene impacted soil may be present directly below the tank grave.	• ***Borings***: 2 soil borings will be advanced in the tank grave to confirm that xylenes were not released to the soil in the vicinity of the former UST. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). • ***Sampling***: Samples will be collected from each boring at depth intervals depending on field observations, using the following rationale: - If elevated PID readings *are not* encountered, 1 soil sample will be collected from just below the base of the tank grave (inferred to be at least 8 feet below grade) - If elevated PID readings are encountered, 1 soil sample will be collected from the depth interval exhibiting the highest PID result and 1 sample will be collected from unimpacted soil beneath the impacted interval. • ***Analyses***: All samples collected from this AOC will be analyzed for xylenes.
2	Building 14 South Loading Dock	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Ammonia Metals	Building 14 has been used for textile dyeing and finishing since its construction in 1956. This area contains three loading docks on an asphalt parking lot. There is a potential that chemicals and solvents associated with dyeing processes were spilled during truck loading or unloading. There has been no previous investigation of this AOC.	A determination was not made if chemicals associated with dyeing and finishing operations were released to the shallow soil beneath the AOC. Fill may also be present in this area.	• ***Borings***: 3 soil borings will be advanced, one in front of each loading dock, to a depth of four feet. to determine if a release was made to the shallow soil. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: At each of the two locations, 1 sample will be collected from the 0.5-2 foot depth interval beneath the asphalt. • ***Analyses***: All samples collected at this AOC will be analyzed for VOCs, PAHs, ETPH, and metals. If evidence of contamination is observed, 1 sample exhibiting the greatest impact will also be analyzed for SVOCs, formaldehyde, glycols, and methanol.
3	Building 14 West Loading Dock	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Ammonia Metals	Building 14 has been used for textile dyeing and finishing since its construction in 1956. The loading dock is in the vicinity of the dye and finishing chemical room and wastewater treatment area. Trace concentrations of ETPH, and several SVOCs and metals were detected in a 0.5-3 ft. soil sample. ETPH was detected in shallow bedrock groundwater at a concentration of 0.39 mg/L.	Incomplete characterization of the shallow soil in the vicinity of the loading dock. Fill may also be present in this area.	• ***Borings***: 1 soil boring will be advanced to four feet to characterize soil quality beneath the asphalt. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sample will be collected from the 0.5-2 foot depth interval • ***Analyses***: The sample will be analyzed for VOCs, PAHs, ETPH, and metals. If evidence of contamination is observed, the sample will also be analyzed for SVOCs, formaldehyde, glycols, and methanol.
4	Northwest Corner of Building 14	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	The northwest portion of Building 14 is used as a dye mixing room. Dyeing is conducted in the western portion of the building. During work on a sewer line located adjacent to this AOC, along Brooklyn Street, dye-stained water was observed. In a Phase II investigation completed in 2004, formaldehyde was detected (17 mg/kg) in soil at a depth interval of 3-4 feet. Zinc was detected at a concentration above the SWPC in a Town Well, located at the intersection of Brooklyn and cedar Streets. One bedrock monitoring well was installed in Brooklyn Street as part of an additional investigation. Analytical results from a groundwater sample indicated the presence of Aniline and ETPH. Several metals, including chromium, copper and lead, were detected at concentrations above the SWPC.	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil surrounding this AOC. Incomplete delineation of the horizontal and vertical degree and extent of the SVOC, ETPH, and metals groundwater contamination.	• ***Borings***: 3 soil borings will be advanced to a depth of six feet below grade adjacent to wastewater lines running through the AOC. Boring locations will be chosen to favor the downgradient side of the wastewater line. 2 of these borings will be advanced inside Building 14 using Hand Geoprobe techniques. The third boring will be advanced with a Geoprobe rig along the northern outside edge of the building, on Brooklyn Street. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected from each boring at a depth interval targeting the base of the piping. • ***Analyses***: All samples will be sent to the laboratory for analysis of VOCs, ETPH, and metals. One sample exhibiting the most significant evidence of contamination (based on field screening and/or visual observation) will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
5	Building 14 Wastewater Conveyance Trenches	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	Dyeing and finishing operations discharge wastewater to a network of trenches and sumps in Building 14 that direct water to a collection sump located in the western portion of the building. Following treatment, wastewater is discharged to the sanitary sewer system. Results from the Phase II investigation completed in 2004 reveal formaldehyde at concentrations up to 9.5 mg/kg throughout the northwestern portion of Building 14 as well as trace concentrations of ethylbenzene and xylenes. Additional sampling indicated the presence of several VOCs, metals, ETPH, and one SVOC. None of the concentrations for detected constituents exceeded applicable RSR criteria. Groundwater monitoring wells were not installed due to the presence of shallow bedrock (4-8 feet below grade).	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil as a result of the wastewater piping system and/or collection trenches. A determination was not made if materials transported to and from the wastewater conveyance trenches were released to the groundwater beneath the AOC.	• ***Borings***: 6 soil borings will be advanced using Hand Geoprobe techniques adjacent to wastewater lines running throughout Building 14. Boring locations will be chosen to favor the downgradient side of the wastewater line. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected from each boring at a depth interval targeting the base of the piping. • ***Analyses***: All samples will be sent to the laboratory for analysis of VOCs, ETPH, and metals. 2 samples exhibiting the most significant evidence of contamination will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.
6	Southeast Corner of Building 14	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	This area of the building is identified as the finishing department. Operations include textile finishing, finish chemical storage and textile storage and handling. Finish chemicals are measured and mixed and applied to the fabrics followed by a drying process. Chemical staining and erosion was observed during a previous investigation as well as dye-colored liquids in the corner of the building. Soil samples were collected during an attempted monitoring well installation. Results from the samples collected indicate the presence of several VOCs, metals, ETPH, and one SVOC in soil. None of the concentrations for detected constituents exceeded applicable RSR criteria.	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil surrounding this AOC. Due to the proximity of AOC 6 with AOC 5, there is potential that constituents associated with the wastewater conveyance system have impacted the soil and/or groundwater beneath this AOC.	• ***Borings***: 2 soil borings will be advanced to four feet using Hand Geoprobe techniques to characterize soil quality. 1 of these borings will be placed in the vicinity of process water overflows. The second boring will be placed beneath the chemical storage area. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected from each boring at the 0.5-2 foot depth interval. • ***Analyses***: The samples will be sent to the laboratory for analysis of VOCs, ETPH, and metals. If evidence of contamination is observed, the samples will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.
7	Building 12, Maintenance	VOCs ETPH Metals	The basement of this building is used as a machine shop and storage area. Operations include welding, turning, milling, grinding and electrical repair. A small parts cleaner area is located in the maintenance area. There has been no previous investigation of this AOC.	A determination was not made if chemicals and fluids associated with machine maintenance operations have impacted the shallow sub-slab soil.	• ***Borings***: 1 soil boring will be advanced using Hand Geoprobe techniques to a depth of four feet. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected at the 0.5-2 foot depth interval. • ***Analyses***: The sample will be analyzed at the laboratory VOCs, ETPH, and metals.
8	Slope West of Buildings 1 and 2	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	Solid waste debris and dye-colored water seepage was reportedly observed here in 1994. The local topography slopes steeply westward here; this incline makes the area inaccessible and unavailable for sampling. Soil samples collected in 2004 as part of the Phase II investigation reveal ETPH at a concentration of 360 mg/kg at a depth of 3-5 feet, and lead at a concentration of 438 mg/kg at a depth of 5-7 feet. One monitoring well was installed at the top of the slope. ETPH was detected in groundwater.	The potential migration of coating chemical and/or hazardous waste from Building 1 was not investigated due to a steep slope that renders the area inaccessible.	• No sampling is recommended because the area is not accessible; however the proposed investigation for AOC 23 will place a bedrock monitoring well at the top of the slope to assess the potential for releases from Buildings 1 and 2 to impact groundwater.

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
9	Building 13, Latex Coating	VOCs SVOCs ETPH Glycols Metals	This AOC is where water-based latex coatings are applied to fabrics and the supply of latex is stored. There has been no previous investigation of this AOC.	A determination was not made if chemicals associated with latex coating operations have impacted the shallow sub-slab soil.	• ***Borings***: 2 soil borings will be advanced to four feet below grade using direct push techniques adjacent to coating operations and/or equipment. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected at each location from the 0.5-2 foot depth interval. • ***Analyses***: All samples will be analyzed for VOCs, SVOCs, ETPH, glycols, and metals.
10	Building 2 Loading Dock	VOCs SVOCs ETPH Formaldehyde Metals Ammonia Methanol Glycols	Building 2 has three loading docks along the western edge. There is a potential that chemicals and solvents associated with latex and solvent coating processes were spilled during truck loading or unloading. There is also documentation that temporary tank trailers have been used in the past to store oil in the vicinity of the Building 2. One monitoring well was installed outside (west) of Building 2 in 2004 as part of the Phase II investigation. Samples were collected from this boring; analytical results reveal ETPH at a concentration of 360 mg/kg at a depth of 3-5 feet, and lead at a concentration of 438 mg/kg at a depth of 5-7 feet.	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil surrounding this AOC. Fill may also be present in this area.	• ***Borings***: 3 soil borings (1 in front of each loading dock) will be advanced using a direct push drill to a depth of four feet. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sample will be collected at each boring location beneath the asphalt at the 0.5-2 foot depth interval. • ***Analyses***: The sample will be analyzed at the laboratory for VOCs, ETPH, PAHs, and metals. If contamination is observed, 1 sample exhibiting the most significant evidence of contamination will be analyzed for SVOCs, formaldehyde, methanol, glycols, and ammonia.
11	Buildings 1 and 2	VOCs SVOCs ETPH Formaldehyde Ammonia Methanol Metals	Buildings 1 is used for organic mixing and coating operations. There is also a hazardous waste storage area, located in the northwestern corner of Building 1. Chemicals associated with coating processes as well as flammable solvents are stored in this area. One monitoring well was installed outside (west) of Building 2 in 2004 as part of the Phase II investigation. Samples were collected from this boring; analytical results reveal ETPH at a concentration of 360 mg/kg at a depth of 3-5 feet, and lead at a concentration of 438 mg/kg at a depth of 5-7 feet.	Sub-slab sampling is not feasible in this area because of the presence of a basement and sub-basement beneath the operations floor. As a result the potential for a release is low. Additional groundwater sampling is recommended to confirm this conclusion.	• Groundwater data will be used to verify that a release has not occurred from this location (see AOC 23).
12	Building 3	VOCs SVOCs ETPH Formaldehyde Ammonia Methanol Metals	This area is used for general storage and is located east of Buildings 1 and 2. Results from a previous soil sample show ETPH to be present at a depth of 5-6 feet below grade at a concentration of 770 mg/kg.	A determination was not made if the materials stored in Building 3 have had a negative impact on the groundwater at this AOC. This area is not accessible to a drill rig.	• ***Borings***: 1 soil boring will be advanced by hand in the basement of Building 3 to refusal. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). • ***Sampling***: 1 sample will be collected at each boring location just beneath the water table to assess both groundwater and soil. If the water table is below the bedrock surface, a sample from the 0.5- 2 foot depth interval will be collected. • ***Analyses***: The sample will be analyzed at the laboratory for VOCs, ETPH, SVOCs, formaldehyde, ammonia, methanol, and metals
13	Building 7, Solvent Coaters	VOCs SVOCs ETPH Formaldehyde Metals Methanol Ammonia	Building 7 contains two solvent coater lines. Solvent-based coating chemicals primarily include toluene, formaldehyde, isopropyl alcohol, and MEK. This AOC is located above the raceway. Oily material was observed on the floor near the west end of the coating line. There has been no previous investigation of this AOC.	A determination was not made if the chemicals and materials associated with solvent coating have impacted the shallow sub-slab soil at this AOC. Access to the coaters is restricted and the raceway runs beneath the equipment, so sampling is limited.	• ***Borings***: 1 soil boring will be advanced to four feet below grade to determine if a release has occurred. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab soil sample will be collected from the 0.5-2 foot depth interval. • ***Analyses***: The sample will be analyzed at the laboratory for VOCs, ETPH, SVOCs, formaldehyde, metals, methanol, and ammonia.

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
14	Fuel Oil ASTs	ETPH, PAHs	Two 18,000-gallon fuel oil ASTs are located east of Building 13 in a concrete containment structure. Two 20,000-gallon fuel oil USTs were removed and impacted soil removed from this location in 1989. Soil samples collected from the excavation by the tank contractor after the contaminated soils was removed had a maximum concentration of TPH of 150 mg/kg.	To confirm the previous closure sampling results a boring will be advanced in an accessible area of this AOC.	• ***Borings***: 1 soil boring will be advanced to the water table using a direct push drill rig at the accessible west end of the containment structure. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). • ***Sampling***: 1 sample from the 2-4 foot interval (below the base of the containment slab) and 1 sample from the water table will be collected. • ***Analyses***: The samples will be submitted to the laboratory for analysis of ETPH and PAHs.
15	Transformers	PAHs ETPH PCBs	Four transformers- three containing PCBs and one non-PCB- are located east of the two fuel oil ASTs surrounded by a fence. No PCBs were encountered during the Phase II investigation. Because much of this area is concrete paved, the potential for a release is low.	Additional sampling is recommended to confirm that no releases have occurred since the Phase II investigation.	• ***Borings***: 1 soil boring will be advanced by hand adjacent to the west corner of the transformer pad. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). • ***Sampling***: 1 soil sample will be collected from the 0.5-2 foot depth interval. • ***Analyses***: The sample will be submitted to the laboratory for analysis of ETPH, PCBs, and PAHs.
16	Building 7 Loading Dock	VOCs SVOCs ETPH Formaldehyde Metals Ammonia Methanol Glycols	Currently, Building 7 is used for solvent coating operations. Located east of two coating lines is a two-bay loading dock. There is a potential that chemicals and solvents associated with the coating processes were spilled during truck loading or unloading. Soil samples collected in 2004 show ETPH at a concentration of 920 mg/kg at a depth of 1-3 feet below surface and 122 mg/kg of arsenic at a depth of 3-5 feet. Additional samples show arsenic in the shallow soil at concentrations above the applicable CT RSR criteria. The only constituent detected in the groundwater was a low level of ETPH.	Incomplete characterization of the shallow soil in the vicinity of the loading dock.	• ***Borings***: 2 soil borings, one in front of each loading dock, will be advanced to a depth of four feet below grade. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 soil sample from each boring will be collected from the 0.5-4 foot depth interval beneath the asphalt. • ***Analyses***: The samples will be submitted to the laboratory for analysis of VOCs, ETPH, PAHs, and metals. If evidence of significant contamination is observed, one sample will be analyzed for SVOCs, formaldehyde, methanol, glycols, and ammonia.
17	Building 9	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	Building 9 was used for dye storage from 1868 to 1927. A Hazardous Materials Survey in 1986 identified several miscellaneous chemicals as being stored on the ground floor of this building. There has been no previous investigation of this AOC.	A determination was not made if the chemicals stored in Building 9 have impacted the shallow sub-slab soil at this AOC.	• ***Borings***: 1 soil boring will be advanced to a depth of four feet using direct push techniques to determine if a release to shallow soil occurred. - . Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - The soil sample will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals • ***Sampling***: 1 soil sample will be collected from a depth interval of 0.5-2 feet beneath the floor of the building. • ***Analyses***: The sample will be submitted to the laboratory for analysis of VOCs, ETPH, and metals. If evidence of impacted soil is observed, the sample will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
18	Building 8	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	Building 8 was used as a dye house until approximately 1927. Currently, quality control testing is conducted on the second floor of this building. PCE is used to dry clean test the fabrics at a rate of one to three gallons per month. Used PCE solvent is stored here and shipped off-site as hazardous waste. Filtration of water to be used in manufacturing processes is also conducted in this area. Floor drains in this building discharge to the sanitary sewer. Several 55-gallon storage drums containing waste oil are located on a containment pallet. There has been no previous investigation of this AOC.	A determination was not made if either the chemicals stored in Building 8 or if former dyeing operations have impacted the shallow sub-slab soil at this AOC.	• ***Borings***: 2 soil borings will be advanced using direct push techniques. 1 will be in the vicinity of the waste oil storage area. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 soil sample will be collected from each boring from a depth interval of 0.5-2 feet beneath the floor of the building. • ***Analyses***: The samples will be submitted to the laboratory for analysis of VOCs, ETPH, and metals. If evidence of significant contamination is observed, 1 sample will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.
19	Building 11, Former Dyeing/Current Chemical Storage	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	From 1936 to 1956, when the current dyeing building (Building 14) was constructed, Building 11 was used for dyeing operations. Currently, it is a chemical storage area that includes a process water holding tank and several 55-gallon storage containers. Sampling results from the Phase II investigation indicate ETPH in the soil at a concentration of 83 mg/kg at a depth of 3-5 feet below grade. Arsenic and copper are present in the groundwater at concentrations exceeding their respective SWPC. A second groundwater sample was collected in 2006 and confirms the presence of both copper and zinc at concentrations exceeding their respective SWPC.	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil surrounding this AOC. The source of metals contamination in groundwater is unknown. It is also unknown if samples collected from the well at this AOC are representative of actual groundwater conditions. High turbidity was reported during each sampling event and subsequently, the samples were field filtered before being submitted to the laboratory.	• ***Borings***: 3 soil borings will be advanced using direct push techniques to a depth of four feet beneath the floor to characterize soil. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected from each boring from at the 0.5-4 foot depth interval. • ***Analyses***: The samples will be submitted to the laboratory for analysis of VOCs, ETPH, and metals. If evidence of significant contamination is observed, one sample will also be analyzed SVOCs, formaldehyde, glycols, methanol, and ammonia.
20	Building 11, Loading Dock	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	From 1936 to 1956, when the current dyeing building (Building 14) was constructed, Building 11 was used for dyeing operations. Currently, it is a chemical storage area. One loading dock is located along the northern edge of the building on paved asphalt. PCE was detected at a trace concentration in the shallow soil sample collected at this AOC. Several metals were detected in both the shallow (0.5-4 ft.) and deep (10-13.5 ft.) samples, and several SVOCs were detected in the shallow sample. One groundwater monitoring well was installed and sampled. Analytical results from this groundwater sample indicated PCE and TCE contamination.	Incomplete characterization of the degree and extent of SVOC and metal impacted soils at this AOC. Incomplete delineation of the horizontal and vertical degree and extent of the PCE and TCE groundwater contamination. The source of this contamination also remains unknown. Additional investigation at AOC 19 will help determine whether this is the source or if the Roosevelt Mills, a nearby (0.5 mi east) confirmed PCE DNAPL site, is contributing to this groundwater contamination.	• ***Borings***: 1 soil boring will be advanced using a Geoprobe rig to a depth of 4 feet below grade. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sample will be collected from this boring beneath the asphalt from the 0.5-2 foot depth interval. • ***Analyses***: The sample will be analyzed at the laboratory for VOCs, ETPH, and metals. If evidence of significant contamination is observed, one sample will also be analyzed SVOCs, formaldehyde, glycols, methanol, and ammonia.
21	Former Off-Site Gasoline Station	VOCs ETPH	On-site wells were sampled in 2006 and analyzed for BTEX, PAHs and ETPH. It was assumed that if there had been a release of petroleum to the groundwater at the gas station, these constituents would be present in the groundwater at the Amerbelle site. No BTEX compounds or PAHs were detected in groundwater. ETPH was detected; however the sample with the highest concentration came from a well on the western side of the site. The source of ETPH is not likely the off-site gasoline station.	None	• No off-site investigation is recommended.

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
22	Fill	ETPH PAHs Metals	Boring logs completed in 2004 identify the presence of fill throughout the site up to a depth of 13 feet below grade. Analytical results showing arsenic above direct exposure criteria suggests that coal ash was used as fill over a portion of the site.	Incomplete characterization of the quality of the fill material throughout the site.	• ***Borings***: 3 supplemental borings will be advanced across the site to evaluate the fill quality. The borings will be advanced until native material is encountered and changes in soil stratigraphy will be noted. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sample will be collected from each boring from a depth interval within the fill. • ***Analyses***: All samples will be analyzed at the laboratory for ETPH, PAHs and metals. • Data from other AOCs will also be used to assess fill.
23	Site Groundwater	VOCs SVOCs Metals	The groundwater collected from the monitoring well ME-6, a bedrock well located north of Buildings 7 and 8, revealed the presence of several VOCs, including TCE and PCE. The concentration of TCE exceeded the Industrial/Commercial Volatilization Criteria. There were no other detections of VOCs except for trace acetone in the sample collected at ME-2, the well located on Brooklyn Street. Several trace concentrations of SVOCs were detected in the groundwater at ME-2, including aniline, which is a component of dyes. All groundwater samples contained low levels of ETPH below the applicable CT RSR criteria. Metals were found in exceedance of the SWPC at monitoring wells ME-2 (chromium, lead and copper) and AM-7 (copper and zinc). The groundwater sample collected at ME-2 was reported to have a blue-green tint. ME-2 is located on Brooklyn Street in the area where dye-colored water was encountered during sewer installation.	Incomplete characterization of the degree and extent of groundwater contamination.	• ***Well Installation***: 3 bedrock monitoring wells will be installed using an air rotary drill rig to further characterize the groundwater beneath the site. 2 of the wells will be located downgradient of facility operations (one northwest of the boiler room and one southeast of Building 14). 1 well will be installed west of Building 2. Bedrock is expected to be encountered between 10 and 19 feet below grade. The wells will be screened to intersect groundwater migrating through the bedrock to the raceway, the Hockanum River, and American Mills Pond. • ***Development***: The new monitoring wells will be developed prior to sampling. • ***Groundwater Sampling***: Accessible on-site wells will be sampled in one event and analyzed at the laboratory for VOCs, SVOCs, and metals. If formaldehyde, glycols, ammonia, or methanol are detected in soil, the detected constituents will be added to the parameter list for nearby wells.

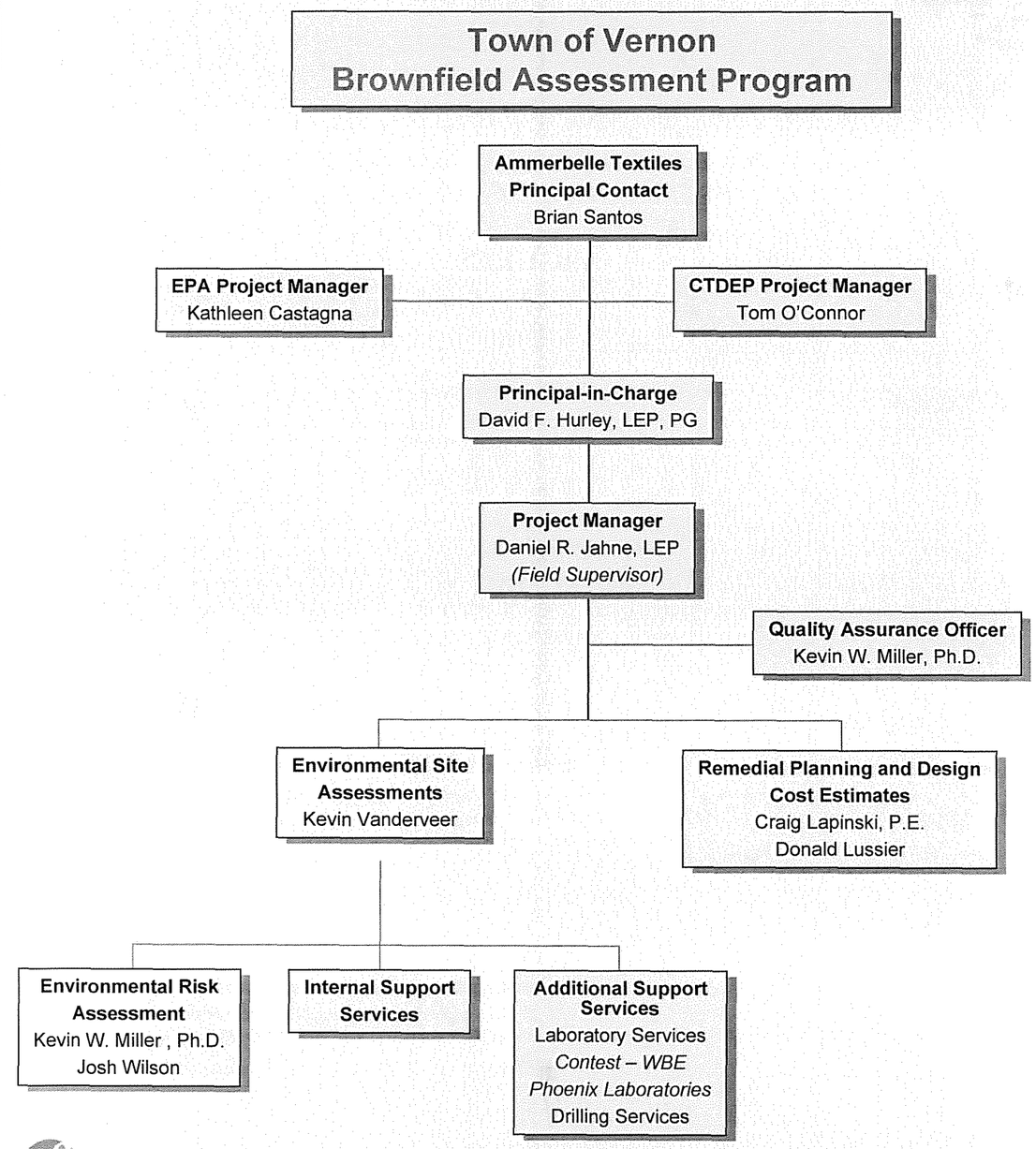
Sampling Objective:
To address data gaps

Definitions:
AOC = Recognized Environmental Condition
COC = Constituent of Concern
AST = Aboveground Storage Tank
RSR = Remediation Standard Regulations
SWPC = Surface Water Protection Criteria
ETPH = Extractible Total Petroleum Hydrocarbons
Metals = RCRA 8 plus copper, nickel and zinc
PAHs = Polynuclear Aromatic Hydrocarbons
SVOCs = Semi-Volatile Organic Compounds, to include aniline in analysis
VOCs = Volatile Organic Compounds
PCE = Tetrachloroethylene
TCE = Trichloroethylene

Gray shading: Budgetary considerations require that the proposed investigations be conducted using a phased approach. AOCs 8-23 will be investigated first. AOCs 1-7 will be investigated at a later date.

FIGURES

Figure 2-1
Project Management Organization Chart



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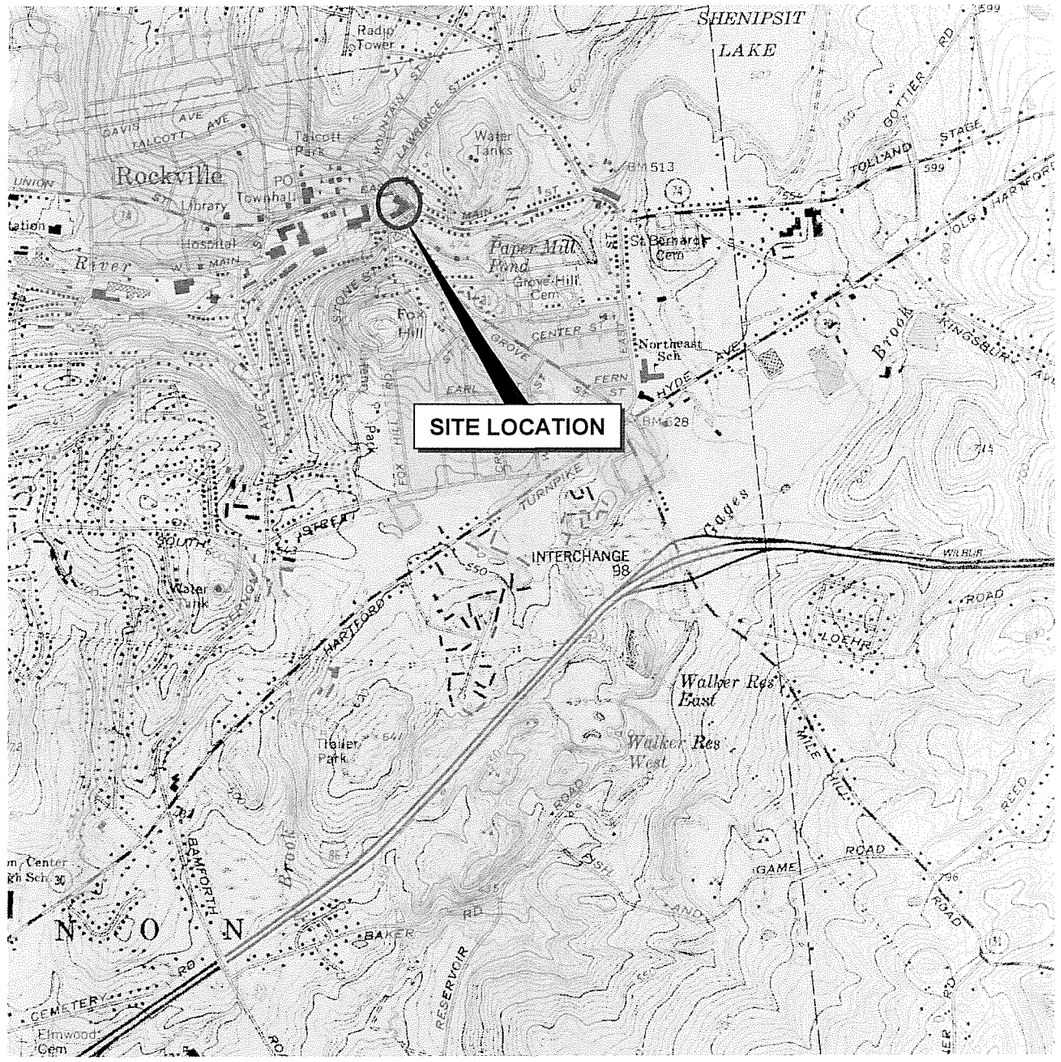
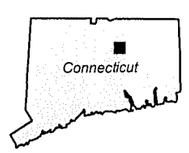


MAP REFERENCE:
THIS MAP WAS PREPARED FROM THE FOLLOWING
7.5 MINUTE SERIES TOPOGRAPHIC MAP:
SPRINGFIELD SOUTH, MASS-CONN. 1958 PHOTOREVISED 1979



Quadrangle Location

0 1000 2000
GRAPHIC SCALE
SCALE: 1"=2000'

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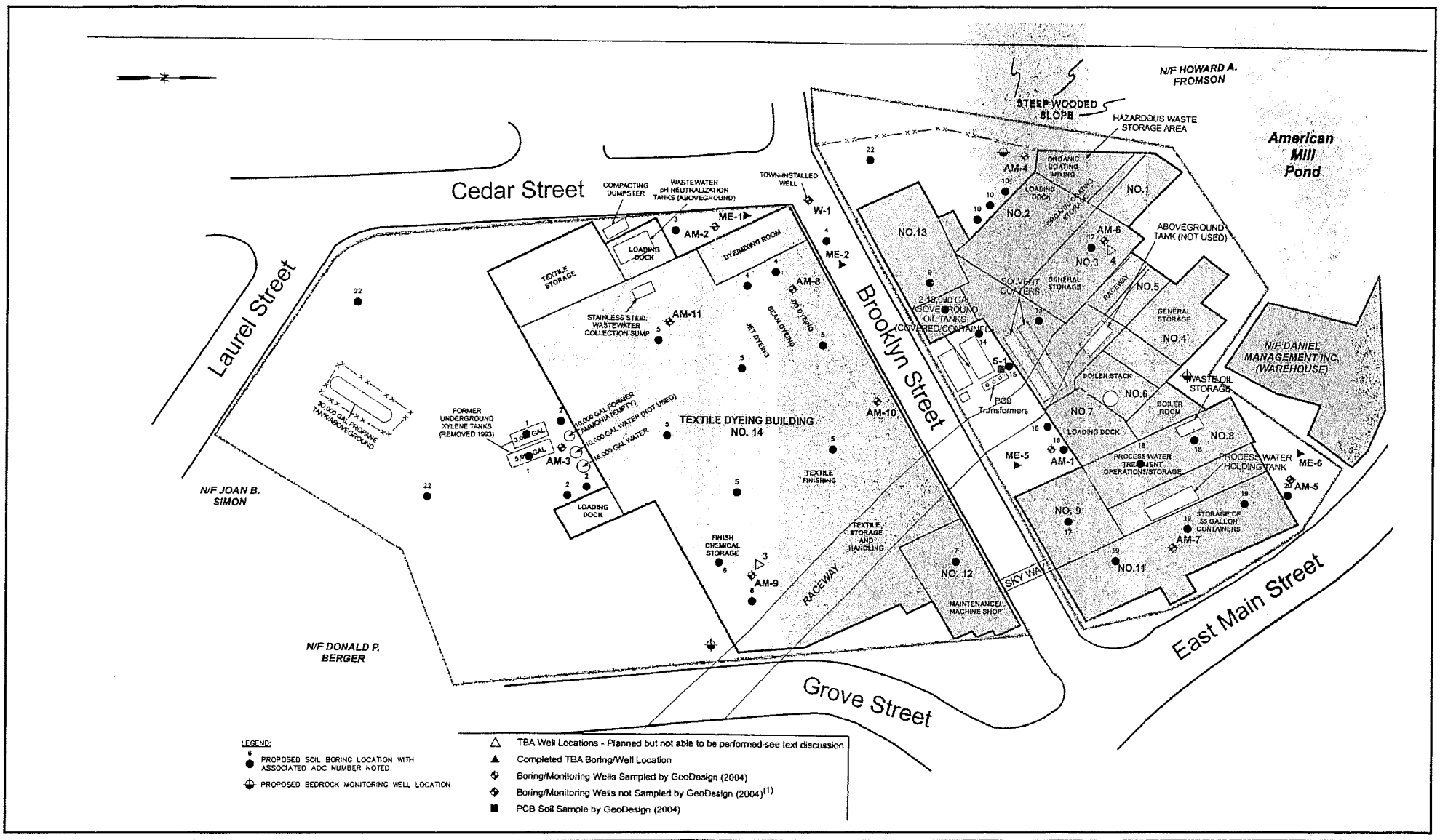
SITE LOCATION MAP
AMERBELLE CORPORATION
104 EAST MAIN STREET
VERNON CONNECTICUT

PROJ. No: 20080371.A10
DATE: July 2008

FIGURE 3-1

20080371\A10\QAPP\SITELOC.PPT



No.	DATE	DESCRIPTION	BY

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

NOTE:
BASEMAPPING FROM "FIGURE 3. SAMPLING LOCATIONS" AMERBELLE TEXTILES, VERNON, CONNECTICUT, METCALF & EDDY/AECOM.

SCALE:
HORZ.: 1" = 60'
VERT.:
DATUM:
HORZ.:
VERT.:
0 30 60
GRAPHIC SCALE

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PROPOSED AND EXISTING SAMPLING LOCATIONS
AMERBELLE TEXTILES
VERNON CONNECTICUT

PROJ. No. 20080371A10
DATE: JULY 2008

FIGURE 3-2

TABLES

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
1	Former Xylene USTs South of Building 14	Xylenes	The USTs were removed in 1993, but no closure sampling was conducted. Xylenes were not detected in a shallow soil sample (3-5 feet) or downgradient groundwater. ETPH detected in soil (240 mg/kg) could be associated with fill.	Incomplete characterization of the soil beneath the former tank grave. Since post-excavation samples were not collected at the time of UST removal, xylene impacted soil may be present directly below the tank grave.	• ***Borings***: 2 soil borings will be advanced in the tank grave to confirm that xylenes were not released to the soil in the vicinity of the former UST. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). • ***Sampling***: Samples will be collected from each boring at depth intervals depending on field observations, using the following rationale: - If elevated PID readings *are not* encountered, 1 soil sample will be collected from just below the base of the tank grave (inferred to be at least 8 feet below grade) - If elevated PID readings are encountered, 1 soil sample will be collected from the depth interval exhibiting the highest PID result and 1 sample will be collected from unimpacted soil beneath the impacted interval. • ***Analyses***: All samples collected from this AOC will be analyzed for xylenes.
2	Building 14 South Loading Dock	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Ammonia Metals	Building 14 has been used for textile dyeing and finishing since its construction in 1956. This area contains three loading docks on an asphalt parking lot. There is a potential that chemicals and solvents associated with dyeing processes were spilled during truck loading or unloading. There has been no previous investigation of this AOC.	A determination was not made if chemicals associated with dyeing and finishing operations were released to the shallow soil beneath the AOC. Fill may also be present in this area.	• ***Borings***: 3 soil borings will be advanced, one in front of each loading dock, to a depth of four feet. to determine if a release was made to the shallow soil. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: At each of the two locations, 1 sample will be collected from the 0.5-2 foot depth interval beneath the asphalt. • ***Analyses***: All samples collected at this AOC will be analyzed for VOCs, PAHs, ETPH, and metals. If evidence of contamination is observed, 1 sample exhibiting the greatest impact will also be analyzed for SVOCs, formaldehyde, glycols, and methanol.
3	Building 14 West Loading Dock	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Ammonia Metals	Building 14 has been used for textile dyeing and finishing since its construction in 1956. The loading dock is in the vicinity of the dye and finishing chemical room and wastewater treatment area. Trace concentrations of ETPH, and several SVOCs and metals were detected in a 0.5-3 ft. soil sample. ETPH was detected in shallow bedrock groundwater at a concentration of 0.39 mg/L.	Incomplete characterization of the shallow soil in the vicinity of the loading dock. Fill may also be present in this area.	• ***Borings***: 1 soil boring will be advanced to four feet to characterize soil quality beneath the asphalt. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sample will be collected from the 0.5-2 foot depth interval • ***Analyses***: The sample will be analyzed for VOCs, PAHs, ETPH, and metals. If evidence of contamination is observed, the sample will also be analyzed for SVOCs, formaldehyde, glycols, and methanol.
4	Northwest Corner of Building 14	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	The northwest portion of Building 14 is used as a dye mixing room. Dyeing is conducted in the western portion of the building. During work on a sewer line located adjacent to this AOC, along Brooklyn Street, dye-stained water was observed. In a Phase II investigation completed in 2004, formaldehyde was detected (17 mg/kg) in soil at a depth interval of 3-4 feet. Zinc was detected at a concentration above the SWPC in a Town Well, located at the intersection of Brooklyn and cedar Streets. One bedrock monitoring well was installed in Brooklyn Street as part of an additional investigation. Analytical results from a groundwater sample indicated the presence of Aniline and ETPH. Several metals, including chromium, copper and lead, were detected at concentrations above the SWPC.	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil surrounding this AOC. Incomplete delineation of the horizontal and vertical degree and extent of the SVOC, ETPH, and metals groundwater contamination.	• ***Borings***: 3 soil borings will be advanced to a depth of six feet below grade adjacent to wastewater lines running through the AOC. Boring locations will be chosen to favor the downgradient side of the wastewater line. 2 of these borings will be advanced inside Building 14 using Hand Geoprobe techniques. The third boring will be advanced with a Geoprobe rig along the northern outside edge of the building, on Brooklyn Street. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected from each boring at a depth interval targeting the base of the piping. • ***Analyses***: All samples will be sent to the laboratory for analysis of VOCs, ETPH, and metals. One sample exhibiting the most significant evidence of contamination (based on field screening and/or visual observation) will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
5	Building 14 Wastewater Conveyance Trenches	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	Dyeing and finishing operations discharge wastewater to a network of trenches and sumps in Building 14 that direct water to a collection sump located in the western portion of the building. Following treatment, wastewater is discharged to the sanitary sewer system. Results from the Phase II investigation completed in 2004 reveal formaldehyde at concentrations up to 9.5 mg/kg throughout the northwestern portion of Building 14 as well as trace concentrations of ethylbenzene and xylenes. Additional sampling indicated the presence of several VOCs, metals, ETPH, and one SVOC. None of the concentrations for detected constituents exceeded applicable RSR criteria. Groundwater monitoring wells were not installed due to the presence of shallow bedrock (4-8 feet below grade).	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil as a result of the wastewater piping system and/or collection trenches. A determination was not made if materials transported to and from the wastewater conveyance trenches were released to the groundwater beneath the AOC.	• ***Borings***: 6 soil borings will be advanced using Hand Geoprobe techniques adjacent to wastewater lines running throughout Building 14. Boring locations will be chosen to favor the downgradient side of the wastewater line. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected from each boring at a depth interval targeting the base of the piping. • ***Analyses***: All samples will be sent to the laboratory for analysis of VOCs, ETPH, and metals. 2 samples exhibiting the most significant evidence of contamination will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.
6	Southeast Corner of Building 14	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	This area of the building is identified as the finishing department. Operations include textile finishing, finish chemical storage and textile storage and handling. Finish chemicals are measured and mixed and applied to the fabrics followed by a drying process. Chemical staining and erosion was observed during a previous investigation as well as dye-colored liquids in the corner of the building. Soil samples were collected during an attempted monitoring well installation. Results from the samples collected indicate the presence of several VOCs, metals, ETPH, and one SVOC in soil. None of the concentrations for detected constituents exceeded applicable RSR criteria.	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil surrounding this AOC. Due to the proximity of AOC 6 with AOC 5, there is potential that constituents associated with the wastewater conveyance system have impacted the soil and/or groundwater beneath this AOC.	• ***Borings***: 2 soil borings will be advanced to four feet using Hand Geoprobe techniques to characterize soil quality. 1 of these borings will be placed in the vicinity of process water overflows. The second boring will be placed beneath the chemical storage area. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected from each boring at the 0.5-2 foot depth interval. • ***Analyses***: The samples will be sent to the laboratory for analysis of VOCs, ETPH, and metals. If evidence of contamination is observed, the samples will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.
7	Building 12, Maintenance	VOCs ETPH Metals	The basement of this building is used as a machine shop and storage area. Operations include welding, turning, milling, grinding and electrical repair. A small parts cleaner area is located in the maintenance area. There has been no previous investigation of this AOC.	A determination was not made if chemicals and fluids associated with machine maintenance operations have impacted the shallow sub-slab soil.	• ***Borings***: 1 soil boring will be advanced using Hand Geoprobe techniques to a depth of four feet. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected at the 0.5-2 foot depth interval. • ***Analyses***: The sample will be analyzed at the laboratory VOCs, ETPH, and metals.
8	Slope West of Buildings 1 and 2	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	Solid waste debris and dye-colored water seepage was reportedly observed here in 1994. The local topography slopes steeply westward here; this incline makes the area inaccessible and unavailable for sampling. Soil samples collected in 2004 as part of the Phase II investigation reveal ETPH at a concentration of 360 mg/kg at a depth of 3-5 feet, and lead at a concentration of 438 mg/kg at a depth of 5-7 feet. One monitoring well was installed at the top of the slope. ETPH was detected in groundwater.	The potential migration of coating chemical and/or hazardous waste from Building 1 was not investigated due to a steep slope that renders the area inaccessible.	• No sampling is recommended because the area is not accessible; however the proposed investigation for AOC 23 will place a bedrock monitoring well at the top of the slope to assess the potential for releases from Buildings 1 and 2 to impact groundwater.

TABLE 4-1
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SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
REVISION 1.0 – NOVEMBER 2008

AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
9	Building 13, Latex Coating	VOCs SVOCs ETPH Glycols Metals	This AOC is where water-based latex coatings are applied to fabrics and the supply of latex is stored. There has been no previous investigation of this AOC.	A determination was not made if chemicals associated with latex coating operations have impacted the shallow sub-slab soil.	• ***Borings***: 2 soil borings will be advanced to four feet below grade using direct push techniques adjacent to coating operations and/or equipment. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected at each location from the 0.5-2 foot depth interval. • ***Analyses***: All samples will be analyzed for VOCs, SVOCs, ETPH, glycols, and metals.
10	Building 2 Loading Dock	VOCs SVOCs ETPH Formaldehyde Metals Ammonia Methanol Glycols	Building 2 has three loading docks along the western edge. There is a potential that chemicals and solvents associated with latex and solvent coating processes were spilled during truck loading or unloading. There is also documentation that temporary tank trailers have been used in the past to store oil in the vicinity of the Building 2. One monitoring well was installed outside (west) of Building 2 in 2004 as part of the Phase II investigation. Samples were collected from this boring; analytical results reveal ETPH at a concentration of 360 mg/kg at a depth of 3-5 feet, and lead at a concentration of 438 mg/kg at a depth of 5-7 feet.	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil surrounding this AOC. Fill may also be present in this area.	• ***Borings***: 3 soil borings (1 in front of each loading dock) will be advanced using a direct push drill to a depth of four feet. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sample will be collected at each boring location beneath the asphalt at the 0.5-2 foot depth interval. • ***Analyses***: The sample will be analyzed at the laboratory for VOCs, ETPH, PAHs, and metals. If contamination is observed, 1 sample exhibiting the most significant evidence of contamination will be analyzed for SVOCs, formaldehyde, methanol, glycols, and ammonia.
11	Buildings 1 and 2	VOCs SVOCs ETPH Formaldehyde Ammonia Methanol Metals	Buildings 1 is used for organic mixing and coating operations. There is also a hazardous waste storage area, located in the northwestern corner of Building 1. Chemicals associated with coating processes as well as flammable solvents are stored in this area. One monitoring well was installed outside (west) of Building 2 in 2004 as part of the Phase II investigation. Samples were collected from this boring; analytical results reveal ETPH at a concentration of 360 mg/kg at a depth of 3-5 feet, and lead at a concentration of 438 mg/kg at a depth of 5-7 feet.	Sub-slab sampling is not feasible in this area because of the presence of a basement and sub-basement beneath the operations floor. As a result the potential for a release is low. Additional groundwater sampling is recommended to confirm this conclusion.	• Groundwater data will be used to verify that a release has not occurred from this location (see AOC 23).
12	Building 3	VOCs SVOCs ETPH Formaldehyde Ammonia Methanol Metals	This area is used for general storage and is located east of Buildings 1 and 2. Results from a previous soil sample show ETPH to be present at a depth of 5-6 feet below grade at a concentration of 770 mg/kg.	A determination was not made if the materials stored in Building 3 have had a negative impact on the groundwater at this AOC. This area is not accessible to a drill rig.	• ***Borings***: 1 soil boring will be advanced by hand in the basement of Building 3 to refusal. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). • ***Sampling***: 1 sample will be collected at each boring location just beneath the water table to assess both groundwater and soil. If the water table is below the bedrock surface, a sample from the 0.5- 2 foot depth interval will be collected. • ***Analyses***: The sample will be analyzed at the laboratory for VOCs, ETPH, SVOCs, formaldehyde, ammonia, methanol, and metals
13	Building 7, Solvent Coaters	VOCs SVOCs ETPH Formaldehyde Metals Methanol Ammonia	Building 7 contains two solvent coater lines. Solvent-based coating chemicals primarily include toluene, formaldehyde, isopropyl alcohol, and MEK. This AOC is located above the raceway. Oily material was observed on the floor near the west end of the coating line. There has been no previous investigation of this AOC.	A determination was not made if the chemicals and materials associated with solvent coating have impacted the shallow sub-slab soil at this AOC. Access to the coaters is restricted and the raceway runs beneath the equipment, so sampling is limited.	• ***Borings***: 1 soil boring will be advanced to four feet below grade to determine if a release has occurred. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab soil sample will be collected from the 0.5-2 foot depth interval. • ***Analyses***: The sample will be analyzed at the laboratory for VOCs, ETPH, SVOCs, formaldehyde, metals, methanol, and ammonia.

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
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AMERBELLE CORPORATION, VERNON, CONNECTICUT
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AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
14	Fuel Oil ASTs	ETPH, PAHs	Two 18,000-gallon fuel oil ASTs are located east of Building 13 in a concrete containment structure. Two 20,000-gallon fuel oil USTs were removed and impacted soil removed from this location in 1989. Soil samples collected from the excavation by the tank contractor after the contaminated soils was removed had a maximum concentration of TPH of 150 mg/kg.	To confirm the previous closure sampling results a boring will be advanced in an accessible area of this AOC.	• ***Borings***: 1 soil boring will be advanced to the water table using a direct push drill rig at the accessible west end of the containment structure. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). • ***Sampling***: 1 sample from the 2-4 foot interval (below the base of the containment slab) and 1 sample from the water table will be collected. • ***Analyses***: The samples will be submitted to the laboratory for analysis of ETPH and PAHs.
15	Transformers	PAHs ETPH PCBs	Four transformers- three containing PCBs and one non-PCB- are located east of the two fuel oil ASTs surrounded by a fence. No PCBs were encountered during the Phase II investigation. Because much of this area is concrete paved, the potential for a release is low.	Additional sampling is recommended to confirm that no releases have occurred since the Phase II investigation.	• ***Borings***: 1 soil boring will be advanced by hand adjacent to the west corner of the transformer pad. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). • ***Sampling***: 1 soil sample will be collected from the 0.5-2 foot depth interval. • ***Analyses***: The sample will be submitted to the laboratory for analysis of ETPH, PCBs, and PAHs.
16	Building 7 Loading Dock	VOCs SVOCs ETPH Formaldehyde Metals Ammonia Methanol Glycols	Currently, Building 7 is used for solvent coating operations. Located east of two coating lines is a two-bay loading dock. There is a potential that chemicals and solvents associated with the coating processes were spilled during truck loading or unloading. Soil samples collected in 2004 show ETPH at a concentration of 920 mg/kg at a depth of 1-3 feet below surface and 122 mg/kg of arsenic at a depth of 3-5 feet. Additional samples show arsenic in the shallow soil at concentrations above the applicable CT RSR criteria. The only constituent detected in the groundwater was a low level of ETPH.	Incomplete characterization of the shallow soil in the vicinity of the loading dock.	• ***Borings***: 2 soil borings, one in front of each loading dock, will be advanced to a depth of four feet below grade. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 soil sample from each boring will be collected from the 0.5-4 foot depth interval beneath the asphalt. • ***Analyses***: The samples will be submitted to the laboratory for analysis of VOCs, ETPH, PAHs, and metals. If evidence of significant contamination is observed, one sample will be analyzed for SVOCs, formaldehyde, methanol, glycols, and ammonia.
17	Building 9	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	Building 9 was used for dye storage from 1868 to 1927. A Hazardous Materials Survey in 1986 identified several miscellaneous chemicals as being stored on the ground floor of this building. There has been no previous investigation of this AOC.	A determination was not made if the chemicals stored in Building 9 have impacted the shallow sub-slab soil at this AOC.	• ***Borings***: 1 soil boring will be advanced to a depth of four feet using direct push techniques to determine if a release to shallow soil occurred. - . Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - The soil sample will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals • ***Sampling***: 1 soil sample will be collected from a depth interval of 0.5-2 feet beneath the floor of the building. • ***Analyses***: The sample will be submitted to the laboratory for analysis of VOCs, ETPH, and metals. If evidence of impacted soil is observed, the sample will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.

TABLE 4-1
PROPOSED INVESTIGATION FOR AREAS OF CONCERN
SUPPLEMENTAL PHASE II/LIMITED PHASE III ENVIRONMENTAL SITE ASSESSMENT
AMERBELLE CORPORATION, VERNON, CONNECTICUT
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AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
18	Building 8	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	Building 8 was used as a dye house until approximately 1927. Currently, quality control testing is conducted on the second floor of this building. PCE is used to dry clean test the fabrics at a rate of one to three gallons per month. Used PCE solvent is stored here and shipped off-site as hazardous waste. Filtration of water to be used in manufacturing processes is also conducted in this area. Floor drains in this building discharge to the sanitary sewer. Several 55-gallon storage drums containing waste oil are located on a containment pallet. There has been no previous investigation of this AOC.	A determination was not made if either the chemicals stored in Building 8 or if former dyeing operations have impacted the shallow sub-slab soil at this AOC.	• ***Borings***: 2 soil borings will be advanced using direct push techniques. 1 will be in the vicinity of the waste oil storage area. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 soil sample will be collected from each boring from a depth interval of 0.5-2 feet beneath the floor of the building. • ***Analyses***: The samples will be submitted to the laboratory for analysis of VOCs, ETPH, and metals. If evidence of significant contamination is observed, 1 sample will also be analyzed for SVOCs, formaldehyde, glycols, methanol, and ammonia.
19	Building 11, Former Dyeing/Current Chemical Storage	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	From 1936 to 1956, when the current dyeing building (Building 14) was constructed, Building 11 was used for dyeing operations. Currently, it is a chemical storage area that includes a process water holding tank and several 55-gallon storage containers. Sampling results from the Phase II investigation indicate ETPH in the soil at a concentration of 83 mg/kg at a depth of 3-5 feet below grade. Arsenic and copper are present in the groundwater at concentrations exceeding their respective SWPC. A second groundwater sample was collected in 2006 and confirms the presence of both copper and zinc at concentrations exceeding their respective SWPC.	Incomplete characterization of the degree and extent of released contaminants to the sub-slab soil surrounding this AOC. The source of metals contamination in groundwater is unknown. It is also unknown if samples collected from the well at this AOC are representative of actual groundwater conditions. High turbidity was reported during each sampling event and subsequently, the samples were field filtered before being submitted to the laboratory.	• ***Borings***: 3 soil borings will be advanced using direct push techniques to a depth of four feet beneath the floor to characterize soil. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sub-slab sample will be collected from each boring from at the 0.5-4 foot depth interval. • ***Analyses***: The samples will be submitted to the laboratory for analysis of VOCs, ETPH, and metals. If evidence of significant contamination is observed, one sample will also be analyzed SVOCs, formaldehyde, glycols, methanol, and ammonia.
20	Building 11, Loading Dock	VOCs SVOCs ETPH Formaldehyde Glycols Methanol Metals Ammonia	From 1936 to 1956, when the current dyeing building (Building 14) was constructed, Building 11 was used for dyeing operations. Currently, it is a chemical storage area. One loading dock is located along the northern edge of the building on paved asphalt. PCE was detected at a trace concentration in the shallow soil sample collected at this AOC. Several metals were detected in both the shallow (0.5-4 ft.) and deep (10-13.5 ft.) samples, and several SVOCs were detected in the shallow sample. One groundwater monitoring well was installed and sampled. Analytical results from this groundwater sample indicated PCE and TCE contamination.	Incomplete characterization of the degree and extent of SVOC and metal impacted soils at this AOC. Incomplete delineation of the horizontal and vertical degree and extent of the PCE and TCE groundwater contamination. The source of this contamination also remains unknown. Additional investigation at AOC 19 will help determine whether this is the source or if the Roosevelt Mills, a nearby (0.5 mi east) confirmed PCE DNAPL site, is contributing to this groundwater contamination.	• ***Borings***: 1 soil boring will be advanced using a Geoprobe rig to a depth of 4 feet below grade. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sample will be collected from this boring beneath the asphalt from the 0.5-2 foot depth interval. • ***Analyses***: The sample will be analyzed at the laboratory for VOCs, ETPH, and metals. If evidence of significant contamination is observed, one sample will also be analyzed SVOCs, formaldehyde, glycols, methanol, and ammonia.
21	Former Off-Site Gasoline Station	VOCs ETPH	On-site wells were sampled in 2006 and analyzed for BTEX, PAHs and ETPH. It was assumed that if there had been a release of petroleum to the groundwater at the gas station, these constituents would be present in the groundwater at the Amerbelle site. No BTEX compounds or PAHs were detected in groundwater. ETPH was detected; however the sample with the highest concentration came from a well on the western side of the site. The source of ETPH is not likely the off-site gasoline station.	None	• No off-site investigation is recommended.

TABLE 4-1
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AOC		Conceptual Model			Proposed Investigations
No.	Description	COCs	AOC Characterization Summary	Data Gaps to be Addressed	Sampling/Analytical Detail
22	Fill	ETPH PAHs Metals	Boring logs completed in 2004 identify the presence of fill throughout the site up to a depth of 13 feet below grade. Analytical results showing arsenic above direct exposure criteria suggests that coal ash was used as fill over a portion of the site.	Incomplete characterization of the quality of the fill material throughout the site.	• ***Borings***: 3 supplemental borings will be advanced across the site to evaluate the fill quality. The borings will be advanced until native material is encountered and changes in soil stratigraphy will be noted. - Soil stratigraphy and observations regarding potential contamination will be logged by a field scientist. - Soil samples will be screened in the field with a photo ionization detector (PID). - XRF analysis will be used to screen samples for metals. • ***Sampling***: 1 sample will be collected from each boring from a depth interval within the fill. • ***Analyses***: All samples will be analyzed at the laboratory for ETPH, PAHs and metals. • Data from other AOCs will also be used to assess fill.
23	Site Groundwater	VOCs SVOCs Metals	The groundwater collected from the monitoring well ME-6, a bedrock well located north of Buildings 7 and 8, revealed the presence of several VOCs, including TCE and PCE. The concentration of TCE exceeded the Industrial/Commercial Volatilization Criteria. There were no other detections of VOCs except for trace acetone in the sample collected at ME-2, the well located on Brooklyn Street. Several trace concentrations of SVOCs were detected in the groundwater at ME-2, including aniline, which is a component of dyes. All groundwater samples contained low levels of ETPH below the applicable CT RSR criteria. Metals were found in exceedance of the SWPC at monitoring wells ME-2 (chromium, lead and copper) and AM-7 (copper and zinc). The groundwater sample collected at ME-2 was reported to have a blue-green tint. ME-2 is located on Brooklyn Street in the area where dye-colored water was encountered during sewer installation.	Incomplete characterization of the degree and extent of groundwater contamination.	• ***Well Installation***: 3 bedrock monitoring wells will be installed using an air rotary drill rig to further characterize the groundwater beneath the site. 2 of the wells will be located downgradient of facility operations (one northwest of the boiler room and one southeast of Building 14). 1 well will be installed west of Building 2. Bedrock is expected to be encountered between 10 and 19 feet below grade. The wells will be screened to intersect groundwater migrating through the bedrock to the raceway, the Hockanum River, and American Mills Pond. • ***Development***: The new monitoring wells will be developed prior to sampling. • ***Groundwater Sampling***: Accessible on-site wells will be sampled in one event and analyzed at the laboratory for VOCs, SVOCs, and metals. If formaldehyde, glycols, ammonia, or methanol are detected in soil, the detected constituents will be added to the parameter list for nearby wells.

Sampling Objective:
To address data gaps

Definitions:
AOC = Recognized Environmental Condition
COC = Constituent of Concern
AST = Aboveground Storage Tank
RSR = Remediation Standard Regulations
SWPC = Surface Water Protection Criteria
ETPH = Extractible Total Petroleum Hydrocarbons
Metals = RCRA 8 plus copper, nickel and zinc
PAHs = Polynuclear Aromatic Hydrocarbons
SVOCs = Semi-Volatile Organic Compounds, to include aniline in analysis
VOCs = Volatile Organic Compounds
PCE = Tetrachloroethylene
TCE = Trichloroethylene

Gray shading: Budgetary considerations require that the proposed investigations be conducted using a phased approach. AOCs 8-23 will be investigated first. AOCs 1-7 will be investigated at a later date.