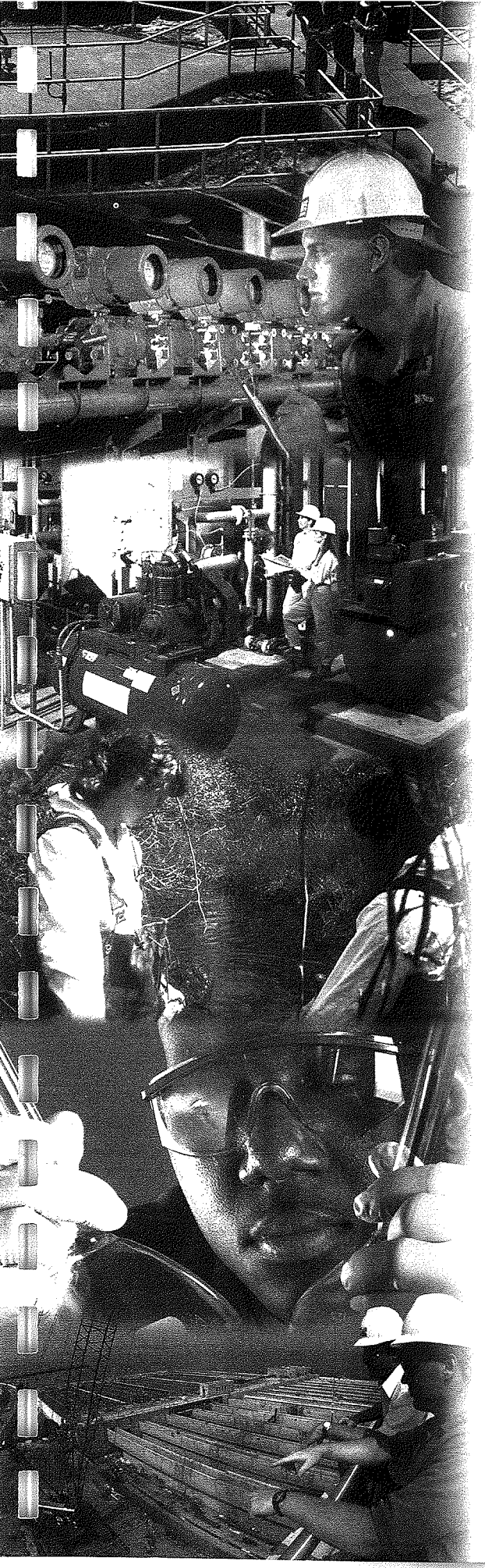

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Targeted Brownfields Assessment Report Addendum

54-67 Mill Street Brookfield, Massachusetts

TARGETED BROWNFIELDS ASSESSMENTS

November 2003

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1.0 INTRODUCTION

The Targeted Brownfields Assessment (TBA) report addendum for the properties collectively known as the Mill Street property (street numbers 54 through 67 Mill Street) in Brookfield, Massachusetts, has been prepared by Metcalf & Eddy in accordance with the EPA-approved Field Task Work Plan Amendment (M&E, 2003) for conducting the supplemental TBA under EPA's Response Action Contract (RAC). The Mill Street properties (the site) are located on Mill Street, just north of the former Boston and Albany railroad tracks (now operated by CSX) on the southern edge of the business district of Brookfield, Massachusetts. The site is now owned by the town of Brookfield. It was acquired by the town on June 12, 2003 (personal communication between B. Weir of M&E and B. Lund, Brookfield First Selectman, November 17, 2003).

M&E completed an initial Targeted Brownfields Assessment (TBA) for the Mill Street property in November 2002 (M&E, 2002a), prior to the town's acquisition of the property and with the permission of the previous owner. Based on the results of the initial TBA, and at the request of EPA, a Field Task Work Plan Amendment was developed to detail proposed additional assessment for the property. This TBA report addendum presents the results of the additional assessment, which was conducted in August 2003. It consists of the following sections:

Section 2.0 Background and Objectives - Site background, summary of the initial TBA investigation, and objectives of the supplemental TBA investigation

Section 3.0 Supplemental Site Investigation - Soil boring and piezometer installation, water level measurements, and groundwater flow direction evaluation

Section 4.0 Analytical Data Evaluation - Summary of analytical data and comparison to relevant criteria

Section 5.0 Conclusions - Interpretation of Results

Section 6.0 Recommendations - Suggestions for remedial action and regulatory compliance

2.0 BACKGROUND AND OBJECTIVES

Information presented in this section summarizes site history and site conditions, including a discussion of previous environmental investigations and activities that occurred at the site. A summary of site history was previously included in the Background Summary Memorandum (M&E, 2002b). This section also summarizes the results of the initial TBA investigation (M&E, 2002a) and briefly describes the objectives of the supplemental TBA investigation.

2.1 Site History

Prior to 1893, the Mill Street property was undeveloped. In 1893, the on-site mill building was constructed and was occupied by a leather finishing business. The mill building was subsequently occupied by various other businesses; including a paper-coating company, a shoe company, a plastic injection molding business, a charcoal filter manufacturer, and various other small businesses. The on-site mill building was destroyed by fire in August 2000.

The property originally included a coal storage shed (through 1954). Coal was replaced by fuel oil on an unknown date. A 20,000-gallon underground storage tank (UST) was located on the north side of Mill Street. The UST is thought to have held heating oil, which was pumped under the street to the mill. Although fill pipes and exposed lines indicated the general location of the UST, exact information regarding contents and location was not available to M&E before the initial TBA was conducted. As part of the initial TBA, M&E confirmed the location and size of the UST using geophysical techniques. The UST was not on file with the Brookfield Fire Department. The UST, including the pipe leading from the UST under Mill Street to the former mill building, has since been removed by Peak Environmental under contract to the town of Brookfield (see Appendix A). The removal was conducted on June 25, 2003. No contamination was observed in the UST grave. The UST closure report by Peak Environmental is included as Appendix A. Because the closure report did not specifically discuss the fate of the underground pipe from the tank to the mill building area, M&E contacted Peak Environmental to inquire about it. The record of that conversation is also included in Appendix A (personal communication between Bill Abrahams-Dematte of M&E and Bill Anthony of Peak Environmental, July 31, 2003).

In April 1995, the Massachusetts Department of Environmental Protection (MADEP) issued a notice of responsibility (NOR) for the Brookfield Mill to the property owner. The NOR was based on the results of a Limited Site Investigation conducted by Lycott Environmental Research Inc. in 1991, on behalf of the Country Bank for Savings (Lycott, 1991). The conditions cited in the 1995 NOR were: groundwater concentrations of total petroleum hydrocarbons (TPH) and cadmium that exceeded reportable concentrations; evidence of oil-stained soil; the location of the site within the Zone II of a public drinking water supply well; and the existence of an unspecified rare wetland species habitat within 500 feet of the site. The MADEP reached the conclusion that the site is located within a Zone II and within 500 feet of a rare wetland species habitat, by reviewing the Bureau of Waste Site Cleanup Priority Resource Maps available at the time (1995). The current MADEP site scoring map (November 2003) does not show the site to be within a Zone II or Interim Wellhead Protection Area, which indicates that the maps have been revised since 1995.

Based on the original TPH and cadmium issues identified by Lycott, the Brookfield Mill parcel was assigned Release Tracking Number (RTN) 2-10354 by MADEP. The site is classified as a Tier ID site because the responsible party failed to file a Phase I Report and Tier Classification by April 1996. To M&E's knowledge, no Massachusetts Contingency Plan (MCP) compliance activities for this RTN have been conducted either by the original responsible party or by subsequent owners of the parcel.

On January 3, 2003, MADEP received notification of the 120-day reporting conditions that were identified in the initial TBA report (M&E, 2002a). Several metals and PAHs in soil samples were found to exceed their respective reportable concentrations for S-1 category soils (see Section 2.2). MADEP assigned RTN 2-14601 to this release. Separate reporting was recommended in the TBA report because the reported conditions were different from those noted by Lycott that led to the assignment of RTN 2-10354.

In June 2003, the town of Brookfield acquired a portion of the property, including the former mill building parcel. The town plans to use the property it acquired for a municipal building and parking.

Other notices for the Mill Street property include notices of non-compliance issued to TJF Realty in June 1998 related to inspections by MADEP in September 1997 and January 1998. The inspections noted illegally stored hazardous waste including 33 drums of waste oil and other EPA regulated wastes. In February 1998, TJF Realty had the drums removed under hazardous waste manifests. The Brookfield Mill building was destroyed by fire in August 2000. It is unknown how much oil or hazardous material (OHM) was being stored, if any, within the building at the time of the fire.

2.2 Initial Targeted Brownfields Assessment Results

Field activities were performed at the Mill Street Property in June 2002 in accordance with the M&E Field Task Work Plan for the site (M&E, 2002c). The field investigation focused on potential areas of concern identified during the background review. Figure 1 presents the property and field investigation locations. The investigation included:

- Geophysical survey to identify UST location
- Test pit investigation of former building footprint, with soil sampling and analysis
- Soil borings, including surface and subsurface soil sampling and analysis
- Temporary groundwater well installation and development
- Groundwater monitoring and sampling

The field and analytical data from the initial TBA investigation are presented and discussed in this section. The tables that summarize the results are included as Appendix B. The analyses conducted on each sample are summarized in Table B-1. Analytical results for test pit soils are presented in Table B-2, while surface and subsurface soil data from soil borings are summarized in Table B-3. Analytical results for groundwater are summarized in Table B-4. The tables present detected data by analytical fraction. For each fraction, an analyte is presented if it was detected in at least one sample for that media.

On each table, the Massachusetts Contingency Plan (MCP) reportable concentrations applicable to the site are presented for comparison to detected concentrations. This information is provided to evaluate whether a release of oil and/or hazardous material has occurred at the site that requires MADEP notification (MCP 40.03000) based on the reporting category that best characterizes the use of the site. MADEP background concentrations for natural soil, and for fill soil containing coal ash or wood ash, are also presented for comparative purposes (MADEP, 2002). For test pit soil, results from Toxicity Characteristic Leaching Procedure (TCLP) metals extraction and analysis are compared to the TCLP regulatory levels (310 CMR 30.125B). A waste material that exceeds TCLP regulatory levels is classified as a hazardous waste due to the toxicity characteristic, and it must be managed in accordance with the Massachusetts Hazardous Waste Regulations (310 CMR 30.000).

A reporting category of RCS-1 currently applies to the site soil, because there are residences within 500 feet of the site. The reporting category for groundwater, based on the MADEP site scoring map obtained in November 2003 (see Appendix C), is RCGW-2 because the site does not appear to be located within a current drinking water source area or a potential drinking water source area. This is not consistent with the MADEP's 1995 NOR letter, in which it was stated that the site is within the Zone II for a public water supply, and hence is within a current drinking water source area. Changes in the priority resource map for this area have apparently occurred since 1995. The most recent map (November 2003) is assumed to be correct and a groundwater classification of RCGW-2 is now being used for the site.

2.2.1 Geophysical Survey. An area of approximately 200 square feet was surveyed by Hager GeoScience, under subcontract to M&E, to more accurately locate the UST north of Mill Street (see Figure 1). Based on the survey, an underground structure (likely the UST) was discovered, with approximate dimensions of 20 feet long and 15 feet wide. Its location was marked on the pavement using permanent paint. Location of the UST was a main objective of the TBA, because it was suspected that the UST or its transmission line may have leaked. No evidence was uncovered during the TBA suggesting that the UST had leaked. The UST and associated transmission line have since been removed by Peak Environmental for the town (see Appendix A), and no evidence of a release was observed.

2.2.2 Test Pit Investigation. Four (4) test pits were dug in the footprint of the former mill building (destroyed by fire in August 2000), to characterize the soil and debris present in the basement of the building after the burned building shell was demolished. Possible sources of contamination in the soil include ash from the fire that destroyed the building, as well as residues from materials and machinery present in the building before it burned (for example, waste oil or possibly PCB-containing machinery or electrical devices).

The approximate locations of the pits are shown on Figure 1 (TP-1, TP-2, TP-3, and TP-4). The test pit logs document the presence of sandy loam mixed with ash and various debris (e.g. pipes, bricks, wires, small equipment pieces, a small device that appeared to be electrical equipment, and partially burned vinyl flooring and wood) in the subsurface.

Six test pit soil samples were collected with analysis of each sample for volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), polychlorinated biphenyls (PCBs), total metals (EPA target analyte list), and TCLP metals. No VPH fractions or target compounds were detected. Low levels of some EPH fractions and PCBs were detected, but the concentrations did not approach reportable concentrations. The PCBs detected are likely to be remnants from equipment located within the building that burned in the August 2000 fire. The levels of PCBs are an order of magnitude below the reportable concentration. The VPH, EPH, and PCB results do not indicate that a release of petroleum or PCBs has occurred in this area. If releases had occurred previously, the intensity of the building fire, which was well-documented in newspaper articles, has likely destroyed any oils that may have been present within the building. Newspaper articles about the fire mention that the oil-soaked wood floors contributed to the intensity and rapid spread of the fire.

Low levels of polycyclic aromatic hydrocarbons (PAHs) were detected, consistent with natural soil background concentrations. Concentrations of benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene exceeded RCS-1 values in some samples. However, the detected concentrations of PAHs are below the May 2002 MADEP background levels for natural soils (MADEP, 2002). It was anticipated that PAHs would be detected in the test pit soils, due to the observed presence of ash and burned wood, mixed in with the sandy loam soils used to backfill the basement void (cellar hole) left from the building fire. The ash is most likely wood ash from the fire (the mill building was a wood structure), although some coal ash and oil ash may also be present from the historical use of coal and oil in the mill boiler.

With respect to metals, the test pit soil samples exhibit elevated concentrations of barium, copper, and lead in particular. Concentrations of these three metals exceed reportable concentrations in one or more samples. As with the PAHs, one source of metals is believed to be wood ash, although the levels detected are significantly higher than MADEP background values for soil containing coal ash or wood ash. It is not known what materials were in use within the building immediately prior to the fire, but the building was leased to multiple tenants with various small businesses, and several tenants used the building for storage. TCLP extraction and analysis of several samples showed exceedances of the TCLP regulatory level for lead. Hence, in addition to being a reportable condition under the MCP, the test pit soil would be classified as hazardous waste for disposal purposes, due to the lead toxicity characteristic (EPA Hazardous Waste Number D008). The exceedance of TCLP regulatory levels also indicates that a release of hazardous materials (i.e., soil containing lead) has occurred which is subject to MCP response actions. Because the building was wood and was an old structure used for commercial purposes, it is probable that building surfaces were coated with lead-based paint. The small businesses that operated within the building may also have used lead; for example, one small business mentioned was a welding business that repaired early model cars, and another applied coatings to ceramics and glass.

The TCLP extraction/analysis was developed to simulate conditions in a municipal solid waste (MSW) landfill, and makes use of an acetic acid extraction solution because MSW

landfills tend to produce acidic leachate. The fact that metals leached out of soil samples using the TCLP procedure suggests that the material may leach metals to groundwater at levels that may impact the groundwater, and ultimately the Quabog River. However, the TCLP is not likely to be reflective of actual environmental conditions on the site, due to its acidic nature. A procedure that was developed to better reflect environmental conditions is the Synthetic Precipitation Leaching Procedure (SPLP), which uses an extraction solution (synthetic precipitation) that was developed to be similar to rain water. The SPLP, with analysis of the extracts for metals, was used for the supplemental TBA to generate metals concentrations that are more likely to represent levels that could arise in groundwater and migrate to the Quabog River. For completeness, all the MCP-regulated metals were analyzed in the SPLP extracts, although lead is considered to be the primary metal of concern. The soil samples were also analyzed for total metals, to allow comparison of total metals and SPLP metals results, and to confirm initial TBA results for total metals. Details are presented in Section 4.0.

2.2.3 Soil Borings. Soil borings were advanced by alternately advancing split spoon samplers and 4 ¼-inch hollow stem augers using a drill rig. Two-foot long split spoons were used to collect continuous soil samples from each location. The soil samples were logged and characterized. Observations also included visual appearance and jar-headspace screening using a photoionization detector (PID). A total of four borings were advanced across the site. Approximate locations are shown on Figure 1. Boring locations were selected to target possible areas of concern and/or to allow installation of monitoring wells between the site and the Quabog River. Groundwater flow direction was assumed to be to the south towards the river, and this assumption was confirmed by the TBA and the supplemental TBA.

The surface soil samples [approximately 1 to 4 feet below ground surface (bgs)] and subsurface soil samples (approximately 4 feet bgs to the end of the boring) were collected for analysis as shown in Table B-1. These samples were submitted for laboratory analyses for VPH, EPH and total metals. These analytes were selected based on a previous site assessment (Lycott, 1991), which documented the detection of petroleum hydrocarbons and certain metals in site soils and groundwater and ultimately led to listing of the site by MADEP (RTN 2-10354).

No VPH fractions, target VPH compounds, or target PAHs were detected in surface or subsurface soils. Low levels of the C_{19}-C_{36} aliphatic fraction were detected in surface soil samples from ME-1 and ME-4, but no other EPH fractions were detected. No detections were reported in any of the subsurface soil samples. The evidence of a petroleum release in soils suspected by Lycott (1991) may have since attenuated or may have been removed by on-site activities; for example, the installation of the new septic system to the west of the Spencer Plating building. This particular area was not sampled to avoid disturbing the septic system. Also, due to safety concerns, borings and wells were not installed within 50 feet of the railroad tracks.

Concentrations of metals in soil samples were consistent with background levels for natural soils, with the exception of the surface soil sample collected from ME-1. This

boring was located near the building footprint, near where Lycott noted that drums were stored. The soils at this location may have been impacted by the fire, and were logged as "fill/disturbed" to a depth of six feet below ground surface. Concentrations of beryllium and copper from this sample exceed the reportable concentrations, as well as the MADEP background levels for natural soils and for soils containing coal ash and wood ash. Copper is particularly elevated relative to other metals in this sample. A similarly high concentration of copper was detected in the deep soil sample from Test Pit 2 (4 to 7 feet), but this result was not comparable to its field duplicate. Copper from wire, pipes or small machinery parts are possible sources of copper within the building footprint. Wire is known to have been stored in the building at one time.

As noted above, additional TBA activities included collection of soil samples for analysis by SPLP. SPLP results are believed to provide results more reflective of actual site conditions than TCLP results. These data were used to assess leachability impacts to the nearby river. Refer to Section 3.0 for a discussion of groundwater flow, and Section 4.0 for the analytical data.

2.2.4 Groundwater Sampling. Four overburden monitoring wells were installed at the site during the initial TBA investigation. The wells are identified as ME-1, ME-2, ME-3, and ME-4 on Figure 1 and were constructed using two-inch schedule-40 flush joint PVC. Each well was screened across the water table with a 10-foot section of 20-slot PVC well screen and was brought flush to grade with a solid PVC riser that was capped and housed in a six-inch gate box. The annulus backfill consisted of a sand pack around the screened PVC to approximately 2 feet above the top of the well screen, approximately 0.5-1 foot of hydrated bentonite, and an additional 6 inches of sand. The remaining annular space was taken up by the concrete pad in which the gate box was set. Groundwater depth at these wells was measured between 0.5 and 7 feet bgs.

Well development was completed following installation of the wells. The Lycott well MW-5 was also located and developed for sampling. The other Lycott wells were not located and are presumed to have been destroyed. During well development, the purge water was monitored for temperature, pH, conductivity and turbidity. Non-aqueous phase liquids (NAPL) and odors were not observed in any well. In addition, headspace readings on a PID from within the wells were all non-detect.

Groundwater samples were collected from the four temporary monitoring wells (ME-1, ME-2, ME-3, and ME-4) installed at the site, as well as from an existing well, believed to be Lycott well MW-5. The sample from MW-5 was analyzed for metals only, because Lycott detected cadmium in excess of the reportable concentration in a sample from this well. Water levels obtained from the monitoring wells, in combination with the topography of the land, indicate that groundwater flow is to the south-southeast. This flow direction is consistent with the findings in the Lycott (1991) investigation of the site.

No VPH fractions, VPH target compounds, EPH fractions, or target PAHs were detected in the groundwater samples. Very low levels of acetone and methyl tert-butyl ether (MTBE) were detected in some samples, but the levels are not high enough to be

suggestive of a release from the on-site UST. A release from the on-site UST, if present, would be expected to be evidenced at well ME-2 in particular, which is located downgradient of the former UST location. The UST formerly contained No. 2 oil and possibly waste oil. A significant release of No. 2 oil would be expected to impact groundwater with VPH and EPH fractions, but these were not detected in any groundwater samples. The detections of TPH in water reported by Lycott (1991) may have since attenuated over the 11 years that have elapsed. Also, the old TPH analytical method, EPA Method 418.1, is known to experience "false positives" from materials other than petroleum hydrocarbons. In any case, the TBA data do not indicate an impact to site groundwater from petroleum, and the UST closure report (Appendix A) notes that there was no evidence of contamination observed when the UST was removed in June 2003.

Similarly, the total metals data for site groundwater do not suggest any impacts. Cadmium was not detected in any of the samples, including the sample from Lycott well MW-5. The detection reported by Lycott may have been due to suspended particulate material in the sample. The 2002 sampling event used the EPA low-flow method to collect the samples, a method that minimizes sample turbidity as much as possible. Of the metals that were elevated in soil samples (barium, copper, and lead), only barium was detected in the groundwater, and the concentrations were well below the reportable concentration.

As part of additional TBA activities, M&E personnel installed eight (8) piezometers. Water level data collected from the piezometers was used in the conjunction with the SPLP data obtained from soil sampling to determine if leachability issues exist at the site.

2.3 Supplemental Investigation Objectives

The primary objectives of the supplemental TBA investigation for the Mill Street property were to:

1) Evaluate leachability of material in the building footprint using a method more representative of actual environmental conditions. This effort entailed collection of soil samples for analysis by SPLP.

2) Determine if the ash/debris within the former building area is in direct contact with the groundwater. M&E also collected data needed to estimate leachate flow and contaminant concentrations that could ultimately reach the river. M&E installed 8 piezometers to determine groundwater elevations and flow direction in the immediate vicinity of the former building area. Groundwater elevation measurements were recorded at two different times over a one month period.

3.0 SUPPLEMENTAL SITE INVESTIGATION

The supplemental TBA investigation was conducted in August 2003 and consisted of: advancement of four soil borings with sampling and analysis for total metals and SPLP metals, installation of 8 piezometers, and two rounds of water level measurements to evaluate groundwater flow direction and velocity.

3.1 Soil Borings and Piezometers

The soil borings were advanced and the piezometers were installed on August 5 and 6, 2003, using a direct-push rig. Logs are included in Appendix D. The soil borings were advanced within the footprint of the former mill building (see Figure 2) to a depth of 8 to 12 feet below ground surface. Surface (0 to 4 feet) and subsurface (> 4 feet) soil samples were collected at each of the four soil boring locations. Brick, wood, burnt material, slag, and possible coal chips were observed in several of the samples.

The 8 piezometers were installed around the perimeter of the former building to a depth of 8 to 12 feet below ground surface. At location P4, concrete and a perched water table were encountered at a depth of 4 feet below ground surface. The boring was advanced to 12 feet and a bentonite plug was installed to span the concrete floor, to separate the water perched above the concrete from groundwater below it.

3.2 Water Level Measurements

Water level measurements were made on August 6, 2003 and again on September 12, 2003 for the 8 piezometers installed during the supplemental TBA, and the monitoring wells that had been installed during the initial TBA. During the September 12 monitoring round, silt was encountered in the piezometers that sometimes coated the water level indicator and interfered with the signal from the indicator. Careful, repeated attempts were necessary to obtain an accurate elevation at which the water table was encountered. The measurements and field survey notes are included in Appendix E.

3.3 Groundwater Elevations, Flow Direction, and Velocity

Figure 3 presents groundwater elevation contours for the August 6, 2003 water level monitoring round. Contours from the September 12 monitoring round are consistent with those shown in Figure 3. The groundwater flow direction is due south towards the Quabog River. The gradient was calculated at 0.08 foot/foot (8%). Assuming a hydraulic conductivity of 2.83 ft/day (equal to 10^{-3} cm/s: consistent with sand containing silt), a porosity of 0.30 (30%) and an 0.08 (8%) gradient, the groundwater velocity is estimated to be 0.76 feet per day (assuming effective porosity equal to porosity and saturated conditions).

Figure 4 presents a schematic cross-section through the former building footprint, showing the ground surface, approximate water table elevation, and the estimated extent of building walls and floors, demolition debris, and fill. It is assumed that natural material is present at approximately

three feet below ground surface, under the former basement floor of the building. The buried wall and floor serve as a partial barrier to groundwater flow through the demolition area. It is believed that regional groundwater flow mostly passes under this area (below the floor that is at least partially intact).

4.0 ANALYTICAL DATA EVALUATION

The analytical data from the supplemental site investigation conducted by M&E are presented and discussed in this section. The analytical results for soil samples (total metals and SPLP metals analyses) are presented in Table 1.

Total metals concentrations detected in the soil samples are compared to the Massachusetts Contingency Plan (MCP) reportable concentrations applicable to the site. The reportable concentrations are provided to evaluate whether a release of oil and/or hazardous material has occurred at the site that requires MADEP notification (MCP 40.03000) based on the reporting category that best characterizes the use of the site. A reporting category of RCS-1 currently applies to the site soil, because there are residences within 500 feet of the site. MADEP background concentrations for fill soils containing coal ash or wood ash are also presented for comparative purposes (MADEP, 2002).

The reporting category for groundwater, based on the MADEP site scoring map obtained in November 2003 (see Appendix C), is RCGW-2 because the site does not appear to be located within a current drinking water source area or a potential drinking water source area. This is not consistent with the MADEP's 1995 NOR letter, in which it was stated that the site is within the Zone II for a public water supply, and hence is within a current drinking water source area. The January 2002 MADEP site scoring map presented in the Final TBA Report (M&E, 2002a) does not show the site within a Zone II area, but shows it to be approximately 500 feet from an Interim Wellhead Protection Area (IWPA). This IWPA is not shown on the November 2003 map; three IWPAs are shown, all south of the Quabog River and greater than 500 feet from the site. Changes in the priority resource map for this area have apparently occurred over time. The most recent map (November 2003) is assumed to be correct and a groundwater classification of RCGW-2 is now being used for the site.

The Synthetic Precipitation Leaching Procedure (SPLP, EPA Method 1312) metals results are also presented in Table 1. The list of metals analyzed includes the metals regulated under the MCP, which is a subset of the metals routinely analyzed under the EPA Contract Laboratory Program (CLP-Routine Analytical Services). The SPLP procedure uses an extraction solution (synthetic precipitation) that was developed to be similar to rain water. Soil samples are extracted using the synthetic precipitation solution, and that solution is then analyzed to measure the concentrations of contaminants that were extracted from the soil into the synthetic precipitation solution. The intent of the SPLP is to simulate the concentrations of contaminants that could become dissolved into groundwater as it migrates through a contaminated soil matrix. The results of SPLP analysis are presented in units of micrograms per liter (ug/L), and are typically compared to relevant groundwater and surface water criteria to evaluate whether the extracted contaminants could pose a significant risk to human health or the environment. For this site, the criteria selected as relevant are the MCP Method 1 GW-3 standards, that were derived to be protective of surface water resources. MCP Method 1 GW-2 standards are also relevant, but there are no GW-2 standards for metals, because GW-2 standards are only established for volatile compounds that could migrate from groundwater to indoor air. Volatile compounds (VOCs, VPH) were analyzed in site groundwater samples collected during the initial

TBA (M&E, 2002), and were not found to be contaminants of concern at the site (see Appendix B).

The GW-3 standards are compared to SPLP results in Table 1. Note that for copper, MADEP has not established Method 1 standards. The standard presented in Table 1 for copper is explained in Section 4.3.

4.1 Total Metals

The results for total metals in soil samples collected during the supplemental investigation are consistent with the results for test pit soil samples collected during the initial investigation (Appendix B). Concentrations of barium, copper, and lead exceed reportable concentrations in samples from location SB-4 near the eastern end of the former building. As noted in the TBA Report (M&E, 2002a), one source of the metals is believed to be wood ash, although the levels detected are significantly higher than MADEP background values for soil containing coal ash or wood ash. It is not known what materials were in use within the building immediately prior to the fire, but the building was leased to multiple tenants with various small businesses, and several tenants used the building for storage. Because the building was wood and was an old structure used for commercial purposes, it is probable that building surfaces were coated with lead-based paint. The small businesses that operated within the building may also have used various metals. Barium compounds are used as pigments and in the manufacture of brick and ceramic products (http://www.toxnet.nlm.nih.gov). One small business that operated in the building applied coatings to ceramics and glass. Copper from wire, pipes or small machinery parts are possible sources of copper within the building footprint. Wire is known to have been stored in the building at one time.

4.2 SPLP Metals

Of the metals analyzed in the SPLP extracts from the soil samples collected during the supplemental investigation, six were not detected in any of the extracts (beryllium, cadmium, mercury, selenium, silver, and thallium). There were no exceedances of the MCP Method 1 GW-3 standards (protective of surface water), nor was the GW-3 standard derived for copper exceeded (see Section 4.3 for derivation). These results indicate that leaching of metals from site soil into groundwater would not be likely to have an adverse impact on the Quabog River.

4.3 Groundwater Criteria for Copper

MADEP has not published Method 1 standards for copper. In the absence of Method 1 standards, the MCP provides a method for deriving standards called Method 2. Method 2 was used to derive a GW-3 standard for copper according to the procedure in 310 CMR 40.0983(4). The lowest current ecologically-based water quality criterion for copper was obtained by consulting the most recently issued edition of the federal National Recommended Water Quality Criteria (U.S. EPA, 2002). The lowest such value is the Saltwater Continuous Criterion Concentration of 3.1 ug/L. Following the MCP procedure, this value was multiplied by ten to derive a GW-3 standard for copper of 31 ug/L.

4.4 Data Quality Assessment

Samples were analyzed using a combination of EPA's Contract Laboratory Program (CLP) for Routine Analytical Services (RAS) and a directly-subcontracted laboratory. Total metals samples were analyzed by CLP-RAS, and the SPLP metals samples were analyzed by Mitkem, Warwick, Rhode Island. Quality control (QC) samples were collected and submitted for laboratory analysis to monitor and evaluate laboratory and sampling performance. The field QC samples collected included field duplicates and matrix spike samples.

M&E conducted a limited QC review/validation of analytical laboratory data in accordance with the EPA-approved Field Task Work Plan Amendment (M&E, 2003). The review/validation provides an overview of the laboratory and field QC data by identifying potential QC issues and assessing common QC criteria that might affect reporting and usability of the environmental data, as well as verifying that the laboratory has met minimum data acceptance criteria established by M&E. Although the limited review/validation was based on EPA Region I data validation guidelines (U.S. EPA, 1996), it was more limited in scope. The review/validation performed by M&E consisted of completing Region I Tier II-like forms only for applicable criteria parameters, assessing data usability, and summarizing the results in abbreviated Tier II-like memoranda. The validation memoranda are included in Appendix F.

Data found to be suspect during the validation/review process were qualified. Laboratory data forms were revised by hand to indicate any validation qualifications that supersede laboratory qualifiers and are included in the data validation memoranda. The final validation qualifiers are consistent with EPA validation guidelines. Positive results that were shown to exhibit poor precision or accuracy were qualified as approximated and flagged with a "J." Nondetect results were flagged with a "UJ" if the associated QC data did not meet applicable criteria. Positive results were not qualified if they were found to meet all validation criteria. Nondetect results that were found to meet the validation criteria were shown as the quantitation limit or detection limit followed by a "U" qualifier. Sample data that failed to meet associated QC criteria would have been rejected and flagged with an "R" using EPA data validation guidelines; however, it was not necessary to reject any sample data collected during this investigation. All sample data were judged to be usable for further evaluations.

5.0 CONCLUSIONS

This section presents a summary of site data and information from the initial and supplemental TBA investigations conducted at the Mill Street site. The conclusions presented are based on the findings of these investigations, including analytical data results.

5.1 Underground Storage Tank

The UST and associated transmission line were removed by a contractor hired by the town of Brookfield in June 2003. There was no evidence of a release noted during the removal (see Appendix A). No further assessment of the former UST area is deemed necessary.

5.2 Former Building Footprint

The primary contaminants detected in the soil, rubble, and ash that fill the hole left from the mill building demolition are barium, copper, lead, and PAHs. Concentrations of barium, copper, and lead exceed the applicable MCP reportable concentrations (those for S-1 category soil) in several samples from this area. For one soil sample, the RCS-1 concentration for beryllium was also exceeded. Total metals results from the initial and supplemental investigations were consistent.

Results from the initial investigation show that concentrations of some PAHs exceed reportable concentrations, but the detected PAH concentrations are below the May 2002 MADEP background levels for natural soil (MADEP, 2002). It was anticipated that PAHs would be detected in the soil, because of the observed presence of ash and burned wood, mixed in with the sandy loam soil used to backfill the basement void (cellar hole) left from the building fire. The ash is most likely wood ash from the fire (the mill building was a wood structure), although some coal ash and oil ash may also be present from the historical use of coal and oil in the mill boiler.

The initial investigation results also show that under TCLP extraction conditions, lead can leach from some soil samples at levels which cause the TCLP regulatory level to be exceeded. For this reason, some of the material that fills the former building footprint is classified for disposal as a hazardous waste because of toxicity from lead (EPA hazardous waste number D008). Residues from the fire are the most likely source of the lead, other metals, and PAHs that were detected. The levels of PCBs that were detected are very low and should not affect the choice of remedial options for the soil and rubble.

Because TCLP lead concentrations exceeded the regulatory level in some samples, there was concern that lead and other metals might leach from the soil at levels that could adversely impact groundwater and surface water. However, it was noted that the TCLP simulates conditions in a municipal solid waste landfill, in which the leachate tends to be quite acidic. The SPLP extraction procedure was used during the supplemental investigation to evaluate leachability under more typical environmental conditions (*i.e.,* exposure to rain water rather than landfill leachate), and the SPLP extract concentrations were compared to MCP GW-3 standards. It was found that metals concentrations in groundwater would be unlikely to exceed these standards under typical environmental conditions.

6.0 RECOMMENDATIONS

This section presents recommendations for the site based on the findings of the initial and supplemental TBA investigations. These recommendations are presented to address the site based on current conditions and information reviewed to date, and the recommendations may be modified as new or different conditions are discovered. Approaches to site compliance other than those described below may be implemented as determined by a licensed site professional (LSP) and/or the MADEP in accordance with the MCP. Because the town of Brookfield now owns the site, the town is responsible for MCP compliance activities.

6.1 RTN 2-10354 and RTN 2-14601

Laboratory results from the initial TBA analysis of soil/debris samples from the building footprint indicate that reportable concentrations are exceeded for several metals and PAHs. This condition was reported to MADEP on January 3, 2003 and assigned release tracking number (RTN) 2-14601.

There is an older release tracking number (RTN 2-10354) associated with the site, that was assigned by MADEP when the site was listed based on the results of the Lycott investigation (1991), which suggested the possibility of petroleum and cadmium contamination in site groundwater. These conditions noted by Lycott do not appear to exist any longer, based on the TBA investigations. When the site is tier-classified as described in Section 6.2 below, it is suggested that the RTNs be linked to avoid confusion and bring the old RTN into compliance. The address for the old RTN is listed as 112-114 Mill Street, which differs from the current address (54-67 Mill Street), but the site location (the former mill building) is the same for both RTNs.

6.2 Tier Classification and Phase I Report

Under the MCP, tier classification is the method used to evaluate the severity of a release site and to determine what level of oversight is required. RTN 2-10354 is currently classified by MADEP as a Tier ID site, because none of the property owners (neither Mr. Allard, nor those following Mr. Allard) undertook MCP activities within the time frame specified by MADEP. (Note: such sites were formerly classified as "default Tier IB" sites by MADEP, but the nomenclature was changed to "Tier ID" under the June 27, 2003 MCP revisions). The site was supposed to have been tier-classified by 1996, but no MCP submittals have been made, according to MADEP files. Sites that miss the tier classification deadline automatically default to Tier ID status. To return to compliance, the site must be tier-classified in accordance with the MCP, Subpart E. An LSP must be retained by the property owner (the town of Brookfield) to conduct the tier classification. The tier classification can be based on the results of the TBA investigations, and should take into account both the original release (RTN 2-10354), the new RTN 2-14601 (for which a tier classification is due to MADEP on January 3, 2004), and results of the UST removal. The tier classification can be used to link RTN 2-10354 and RTN 2-14601.

An effort should be made to determine the wetland species that may live within 500 feet of the site, as indicated on the MADEP site scoring maps and cited in the 1995 NOR. The Natural

Heritage & Endangered Species Program (NHESP) is typically contacted in writing to obtain information on the species that are mapped to occur near the site.

Along with tier classification, a Phase I Initial Site Investigation report and a scope of work for follow-up activities to assess the releases (Phase II) must also be submitted to MADEP. All three submittals must be prepared under the direction of an LSP and are due to MADEP one year after notification (that is, January 3, 2004). The information and data presented in this report and the initial TBA report (M&E, 2003a) can serve as the basis for the Phase I report and tier classification.

6.3 Remedial Action and Response Action Outcome

In addition to completing the tier classification, the town and the LSP retained by the town should begin to consider the most efficient way to complete MCP compliance activities and remediate the site. This section outlines one possible approach. The town and LSP need to determine an approach that meets regulatory requirements and the town's objectives.

Due to exceedances of reportable concentrations for several metals and PAHs, some form of remedial action (such as capping or excavation and off-site disposal) will most likely be needed to address the material that fills the building footprint. Capping or removal of the material may be used to reduce risks from direct exposure to the material. The SPLP results suggest that leaching of metals from the material into groundwater will not take place at levels that would impact the Quabog River, because GW-3 standards were not exceeded in SPLP extracts. Also, the groundwater sampling conducted during the initial TBA (M&E, 2002) did not reveal groundwater impacts. However, direct exposure to the soil remains as a potential risk to human health and the environment that must be further evaluated. Also, several more rounds of groundwater monitoring may be recommended by the LSP to confirm that groundwater impacts are not occurring.

The hazardous material within the building footprint meets the definition of "uncontainerized hazardous waste" in the MCP. Hence, all or part of the permitting requirements in 310 CMR 30.000 (Massachusetts Hazardous Waste Regulations) may need to be followed during the remedial action, in addition to MCP requirements. MADEP would make the determination as to which requirements have to be followed, after being notified in writing of the proposed remedial activity. The notification may be made in the form of a Release Abatement Measure (RAM) plan or Phase III Remedial Action Plan (RAP) prepared by an LSP. The requirements for transport and disposal of hazardous waste in 310 CMR 30.000 (e.g., use of hazardous waste manifests to transport the material; disposal at a RCRA facility) would also apply, if the material is moved off site without prior treatment to render it non-hazardous.

Some possible remedial alternatives might include: excavation and off-site disposal as a hazardous waste (i.e., at a RCRA Treatment, Storage, and Disposal Facility); or placing some type of cap over the contaminated soil to limit direct exposure. Other alternatives may be available and worthy of consideration. Capping is a feasible approach and is likely to be the least costly, because it would avoid the need to handle and dispose of materials that would be classified as hazardous waste. The town has indicated that its plans for development of the

property south of Mill Street are limited to possible use as a parking area. Hence, the town could readily accept restrictions on site use in this portion of the property. Placement of a cap, without removal of contaminated soil, would limit the future uses of the property because total concentrations of some metals in the soil exceed MCP Method 1 standards for unrestricted use of the property. It would be necessary to place a deed restriction (an Activity and Use Limitation, or AUL) on the site to prevent activities that might result in direct exposure to the contaminated soil. A detailed evaluation of alternatives is beyond the scope of a Targeted Brownfields Assessment, but it is recommended that such an evaluation be performed by an LSP in consultation with the town.

Planning Level Cost Estimate-Capping. One way to reduce risks at the site is to provide a clean soil cap over the building footprint where the debris is located and extend the cap to nearby contaminated areas associated with the building. An MCP Notice of Activity and Use Limitation would be placed on the deed to the property to further reduce risk by limiting human activities which would breach the cap or expose underlying soils.

Since the debris would not be removed, but covered with a clean soil cap, the LSP would need to perform a risk characterization in accordance with the MCP to evaluate whether the cap is protective and to evaluate the types of Activity and Use Limitations that are needed to prevent human and environmental exposure. Several additional rounds of groundwater monitoring may also be needed to confirm that groundwater impacts are not occurring. Quarterly monitoring for one year, with analysis for the MCP-regulated metals, is suggested to obtain additional data and determine if there might be seasonal variations in groundwater quality.

A planning level cost estimate for capping of the contaminated debris and soil within the building footprint is presented in Table 2. The estimate assumes that the area to be capped is approximately 330 feet long by 90 feet wide and that the cap will be constructed of 2 ½ feet of clean fill topped by ½ foot of loam, and that a grass cover will be established. [Alternatively, the design could incorporate pavement and an appropriate subgrade material so that the area can be paved and used for parking. If the paving option is selected, it may be necessary to remove some of the material within the building footprint to provide a stable base for the parking area construction]. Planning level cost estimates for project planning, engineering, oversight, and MCP submittals are included. The estimate also includes preparation of an Activity and Use Limitation as described above to prevent damage to the cap and limit future excavation of contaminated soil and debris, without proper precautions to limit exposure. Costs for one year of quarterly groundwater monitoring are included, assuming that five new wells are installed once the soil cap is completed, and that all five wells are sampled each quarter. It is assumed that the town would maintain the cap once it is constructed. Hence, no costs for cap maintenance are included in Table 2.

6.4 Phase II, Phase III, and Phase IV Submittals

The MCP requires that a Phase II Comprehensive Site Assessment and Phase III Remedial Action Plan be submitted to MADEP within two years of tier classification if a Response Action Outcome is not achieved by that deadline. The LSP would need to prepare the Phase II and Phase III submittals. Additional investigation may be recommended by the LSP to support the

Phase II and III submittals (for example, the additional year of groundwater monitoring described above, to confirm the assumption that groundwater impacts are not occurring). The Phase II Comprehensive Site Assessment would determine the extent of contamination and subsequent risk to human health and the environment. The Phase III Remedial Action Plan would evaluate the remedial alternatives in considerable detail, and would then be followed by a Phase IV Remedy Implementation Plan that would define the details (plans and specifications) for the selected remedial alternative.

It is more cost effective, typically, to prepare a RAM Plan and conduct the remedial action promptly than to develop Phase II, III and IV documents. However, if the remedial action to be conducted is fairly complex, the additional time involved in the latter process may be needed to select the best remedial alternative for the site, based on its proposed future use and cost considerations. In addition, for the option of a clean soil cap, the MCP Response Action Performance Standards will require that a Phase III-type detailed evaluation of alternatives be performed before capping can be considered a permanent solution, even if a RAM is performed. The town and LSP will need to decide on the appropriate course of action.

6.5 Solid Waste Regulations

Because the site involves demolition and in-place disposal of demolition debris, it is subject to MADEP Bureau of Waste Prevention Regulations found at 310 CMR 19.000-Solid Waste Regulations. The demolition debris falls under the definitions of "Construction and Demolition Waste" and "Solid Waste". The regulations prohibit uncontrolled dumping of solid waste. Since the building was demolished and the debris was disposed of on site without complying with the Solid Waste Site Assignment regulations, the site may meet the definition of an illegal dumping ground and as such may constitute a violation of MADEP solid waste regulations, independent of any issues related to the Massachusetts Contingency Plan.

Based on a conversation with MADEP staff, owning or operating an illegal dumping ground could subject the owner to fines of over $25,000. A buyer of the property could be fined even if it did not cause the situation. In subsequent calls between MADEP Central Region and the town of Brookfield staff, MADEP has indicated flexibility in working with the town to resolve these issues.

In general, compliance with solid waste regulations may require that all debris be removed, or that an engineered landfill cap (instead of a simple soil cap) be constructed over the debris. At a minimum, it must be shown that the site poses no risk, similar to the requirements of the MCP. Coordination with MADEP Bureau of Waste Prevention will be required to determine whether compliance with the MCP will satisfy MADEP Solid Waste Rules.

It should be noted that while MCP activities are carried out under the direction of an LSP with limited involvement by the state, solid waste activities typically require direct involvement and approval of MADEP solid waste staff.

7.0 LIMITATIONS

No warranty, whether expressed or implied, is given with respect to this report or any opinions herein. It is expressly understood that this report and opinions expressed herein are based upon site conditions reported to M&E, observed by M&E, and as they existed only at the time this targeted Brownfields assessment was conducted. Without limiting the foregoing, this report, any opinions or conclusions stated herein, and its attachments are subject to the complete General Statement of Limitations and Conditions provided in Appendix G, which are incorporated by reference into, and are an integral part of, this report submittal. This report has been prepared on behalf of, and for the exclusive use of, the U.S. Environmental Protection Agency. Any use of or reliance on M&E's report by a third party, even with M&E's consent, shall be at such party's own risk.

8.0 REFERENCES

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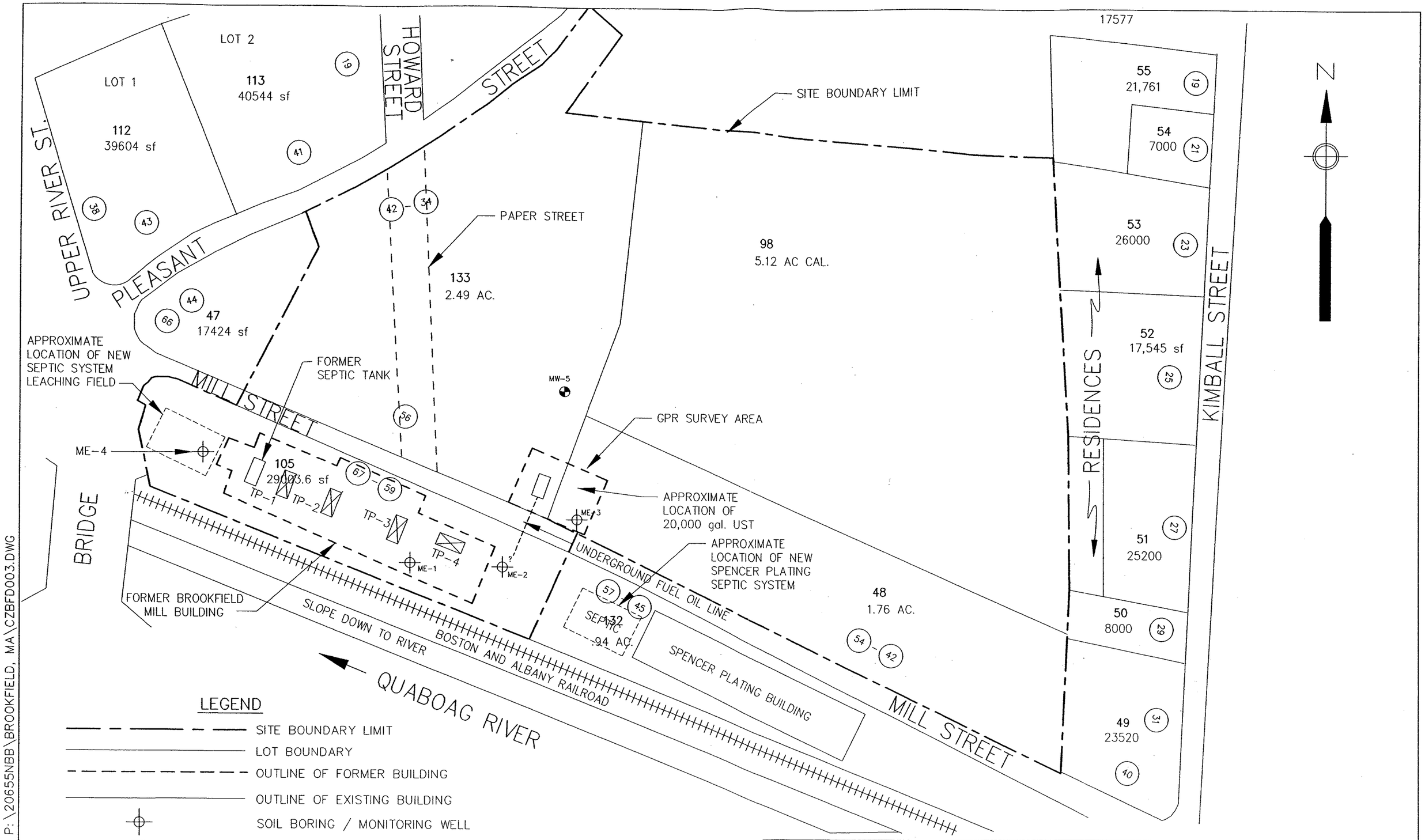
U.S. Environmental Protection Agency (U.S. EPA). 2002. *National Recommended Water Quality Criteria: 2002.* EPA-822-R-02-047, November 2002.

FIGURES



Metcalf & Eddy

FIGURE 1 – SITE INVESTIGATION PLAN
TARGETED BROWNFIELDS SITE ASSESSMENT
64 AND 67 MILL STREET
BROOKFIELD, MASSACHUSETTS

SCALE: 1" = 100'	12/20/2001	W. BALETSA	CZBFD003

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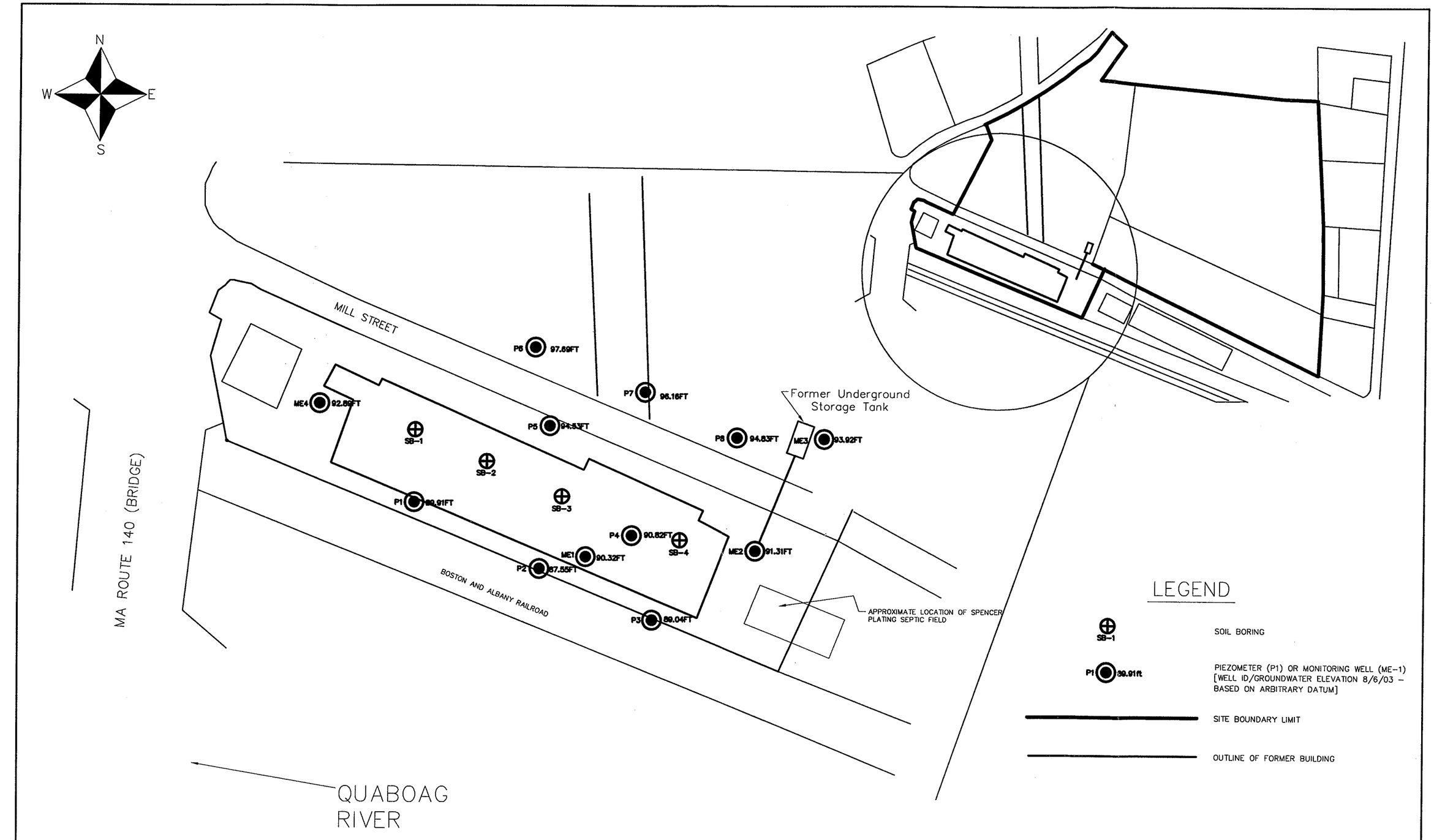
ANSI B – 11-20-01



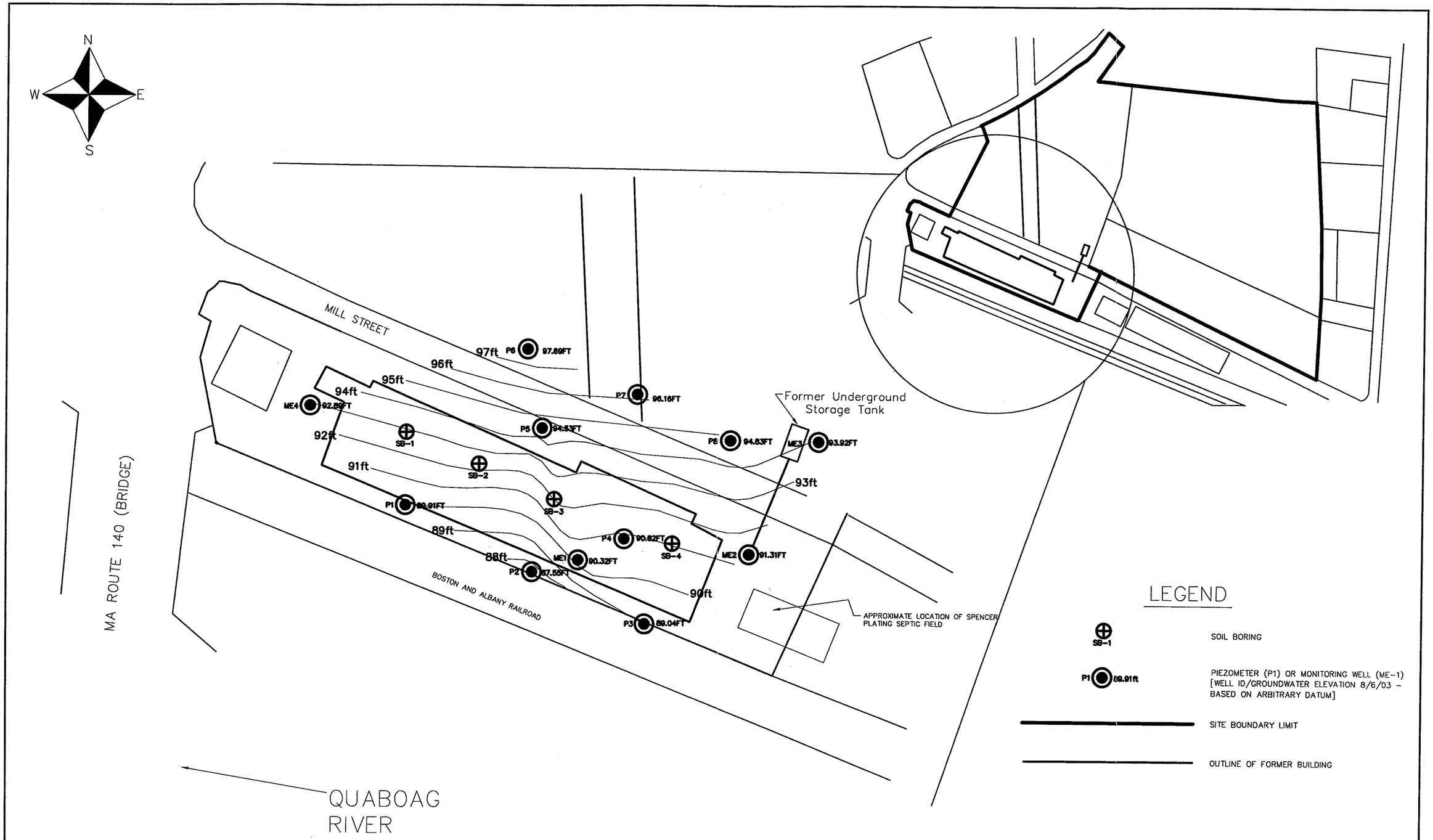
Metcalf & Eddy

FIGURE 2 - SITE INVESTIGATION PLAN

TARGETED BROWNFIELDS SITE ASSESSMENT - AUGUST 2003
64 AND 67 MILL STREET,
BROOKFIELD, MASSACHUSETTS

SCALE: 1:60	10/20/03	W. Abrahams-Demotte	Mill Street

AMSI B - 11-20-01



Metcalf & Eddy

FIGURE 3 - GROUNDWATER ELEVATIONS - AUGUST 6, 2003

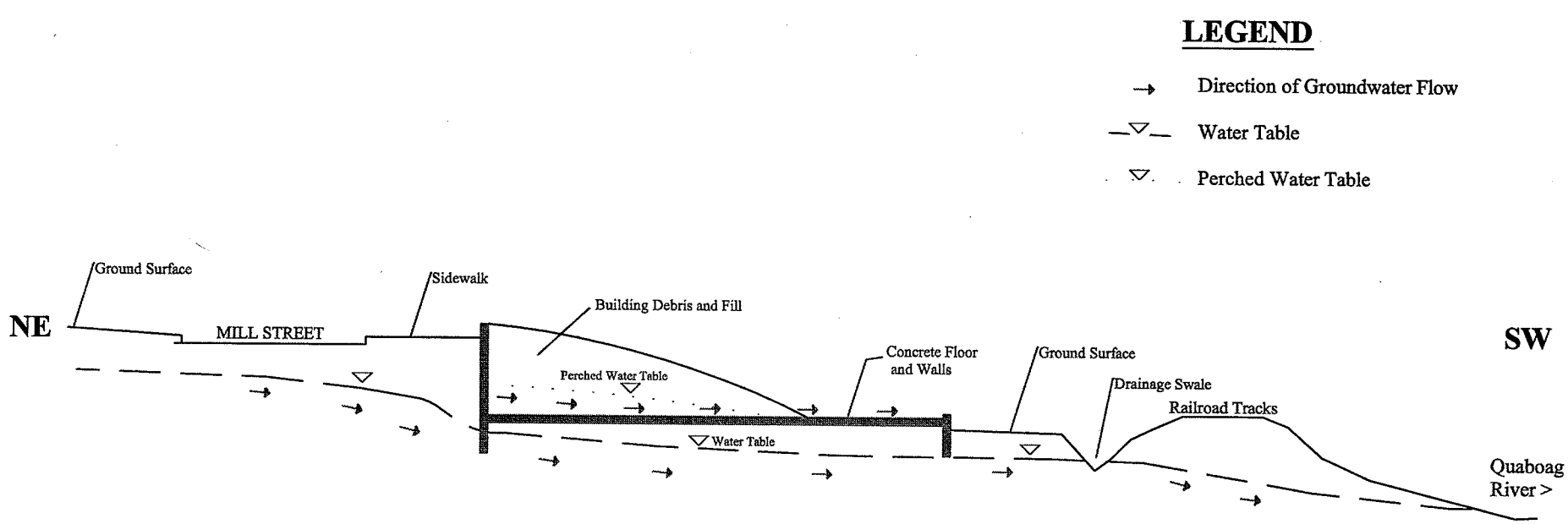
TARGETED BROWNFIELDS SITE ASSESSMENT
64 AND 67 MILL STREET,
BROOKFIELD, MASSACHUSETTS

SCALE: 1:60	10/20/03	W. Abrahams-Demotte	Mill Street

ANSI B - 11-20-01

FIGURE 4:

CONCEPTUAL CROSS-SECTION
MILL STREET, BROOKFIELD, MASSACHUSETTS



TABLES

New (Wave 2)
RC-S1, to be effective on 4/3/06

Table 1. Summary Of Analytical Data -- Soil From Test Borings
TBA Addendum Investigation -- Mill Street Property -- August 2003

LOCATION NAME	SB-1S	SB-1D	SB-2S	SB-2D	SB-3S	SB-3D	SB-4S	SB-4D	SBK-4D	MCP Reportable Concentrations RCS-1 (mg/kg)	MADEP Background for Natural Soils (mg/kg)	MADEP Background for Soil Containing Coal Ash or Wood Ash (mg/kg)
APPROXIMATE SAMPLE DEPTH (ft bgs)	0-4	4-10.5	0-4	4-12	0-4	4-12	0-4	4-8	4-8			
M&E SAMPLE ID	SB-1S	SB-1D	SB-2S	SB-2D	SB-3S	SB-3D	SB-4S	SB-4D	SBK-4D			
DATE SAMPLED	08/05/03	08/05/03	08/05/03	08/05/03	08/05/03	08/05/03	08/05/03	08/05/03	08/05/03			
COMMENTS									Field duplicate of SB-4D			
RAS INORGANICS - Total Metals (mg/kg)												
Aluminum	4,170	11,000	9,970	10,800	11,700	12,200	9,070	8,530	8,340	--	10,000	10,000
Antimony	0.57 UJ	0.60 UJ	0.64 UJ	0.59 UJ	0.64 UJ	0.60 UJ	0.68 UJ	1.8 J	2.8 J	10 → 20	1	7
Arsenic	1.0 UJ	2.7 UJ	5.4	2.8 UJ	4.5	4.1	2.4 UJ	8.0 J	5.4 J	30 → 20	20	20
Barium	13.8 J	106 J	166 J	132 J	236 J	141 J	766 J	1,140 J	1,220 J	1,000	50	50
Beryllium	0.11	0.34	0.34	0.34	0.39	0.40	0.28	0.29	0.23	0.7	0.4	0.9
Cadmium	0.10 U	0.11 U	0.11 U	0.10 U	0.45	0.11 U	0.21 J	0.53	1.0	30 → 2	2	3
Calcium	277	1,780	3,900	1,090	6,290	3,290	29,900	9,740	10,100	--	--	--
Chromium	3.3	21.3	18.3	17.1	21.3	19.6	16.5	17.0	16.4	1,000 → 30	30	40
Cobalt	1.3	3.4	3.2	3.7	3.0	4.8	2.5	5.3 J	3.5 J	500	4	4
Copper	3.0 J	17.6 J	38.7 J	21.7 J	56.7 J	42.8 J	247 J	1,210 J	1,260 J	1,000	40	200
Iron	4,200 J	15,100 J	17,300 J	19,100 J	19,100 J	18,900 J	17,700 J	34,600 J	25,400 J	--	20,000	20,000
Lead	3.5 J	13.2 J	84.6 J	7.8 J	250 J	141 J	524 J	468 J	686 J	300	100	600
Magnesium	270	3,140	2,400	2,920	2,690	3,030	3,450	1,980	1,760	--	5,000	5,000
Manganese	30.9	228	152	282	191	308	205	256	214	--	300	300
Mercury	0.042 UJ	0.049 UJ	0.084 J	0.048 UJ	0.35 J	2.2 J	0.15 J	0.15 J	0.32 J	20	0.3	1
Nickel	2.3	8.1	8.1	7.4	8.1	8.1	10.0	18.4	14.1	300 → 20	20	30
Potassium	217	2,640	1,800	2,670	1,800	2,650	2,570	1,120	902	--	--	--
Selenium	0.65 U	0.68 U	0.73 U	0.67 U	0.74 U	0.68 U	0.77 U	0.78 UJ	0.76 UJ	400	0.5	1
Silver	0.26 U	0.28 U	0.30 U	0.27 U	0.96	0.28 U	0.31 U	0.32 U	2.6	100	0.6	5
Sodium	69.2 U	121 J	78.6 J	134 J	78.8 J	223	264	141 J	126 J	--	--	--
Thallium	0.70 U	0.73 UJ	0.77 U	0.71 U	0.78 U	0.72 U	0.82 U	0.83 U	0.80 U	8	0.6	5
Vanadium	6.3	27.6	26.4	27.8	28.4	30.8	23.0	21.8	16.8	400 → 600	30	30
Zinc	6.8 J	38.1 J	148 J	39.4 J	204 J	66.3 J	420 J	670 J	782 J	2,500	100	300
SPLP Metals (ug/L, in SPLP extract of soil)											**MCP Method 1 GW-3 Standard (ug/L)**	
Antimony	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.1 J	3.0 U		300	
Arsenic	3.6 J	3.0 U	3.0 J	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.2 J		400	
Barium	124	134	168	136	101	141	62.0	175	178		30,000	
Beryllium	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U		50	
Cadmium	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U		10	
Chromium	1.4	0.83 J	1.0 J	0.60 U	1.3	0.60 U	1.2	0.60 U	0.60 U		2,000 (total); 100 (hexavalent)	
Copper	15.3	4.0 U	4.0 U	4.0 U	4.8 J	4.0 U	4.0 U	17.2	10.1		31 (see ** on Notes page)	
Lead	29.1	4.0 U	4.8 J	4.0 U	8.3	5.1 J	4.0 U	9.4	18.6		~~30~~ 10	
Mercury	0.14 U	0.14 U	0.13 U	0.14 U	0.15 U	0.14 U	0.15 U	0.15 U	0.16 U		1	
Nickel	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	1.1 J	0.80 U		80	
Selenium	9.0 U	9.0 U	9.0 U	9.0 U	9.0 U	9.0 U	9.0 U	9.0 U	9.0 U		80	
Silver	3.4 UJ	3.9 UJ	2.4 UJ	2.9 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		7	
Thallium	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U		400	
Vanadium	2.8	1.3 J	1.5	0.70 U	2.0	0.70 U	3.9	0.70 U	0.70 U		2,000	
Zinc	12.7 J	8.7 J	21.7	7.8 J	18.6	7.0 U	7.0 U	24.2	20.1		900	
LAB SAMPLE ID												
SPLP METALS	SB-1S	SB-1D	SB-2S	SB-2D	SB-3S	SB-3D	SB-4S	SB-4D	SBK-4D			
RAS - Total Metals	MA1358	MA1357	MA1360	MA1359	MA1362	MA1361	MA1364	MA1363	MA1365			

TABLE 1 NOTES:

MADEP Criteria

MCP Reportable Concentrations, 310 CMR 40.0000 Subpart P Massachusetts Oil and Hazardous Material List

MCP Method 1 Standards, 310 CMR 40.0974(2).

"--" indicates no MCP Reportable Concentration or Method 1 Standard available

Background Levels - MADEP Technical Update, May 2002. Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil.

ft bgs - feet below ground surface

J - Quantitation is approximate due to limitations identified in the quality control review.

U - Analyte was not detected. Value reported is the sample-specific detection limit.

UJ - Sample-specific detection limit is approximate due to limitations identified in the quality control review.

Bold - indicates value greater than applicable MCP reportable concentration, or GW-3 Standard (where applicable).

* Value is the Massachusetts drinking water standard (MMCL) for copper (MADEP, Spring 2001).

** Value calculated using the procedure in 310 CMR 40.0983(4). The most recently issued ecologically-based National Recommended Water Quality Criteria (EPA, November 2002, EPA-822-R-02-047) for copper are as follows:
Freshwater Criteria Maximum Concentration (CMC) = 13 ug/L, Freshwater Criterion Continuous Concentration (CCC) = 9.0 ug/L, Saltwater CMC = 4.8 ug/L, and Saltwater CCC = 3.1 ug/L. The lowest criterion (3.1 ug/L) is selected and multiplied by a factor of ten to derive a Method 2 GW-3 Standard of 31 ug/L.

Table 2. Planning Level Cost Estimate for Soil Cap Option and MCP Compliance Activities

Tasks and subtasks	Estimated Qty	Unit	Unit cost	Subtotal cost
BUILDING FOOTPRINT SOIL REMEDIATION: -SOIL CAP OPTION				
Drill rig and operator (pre-capping soil delineation)	1	day	$1,500	$1,500
Soil samples for delineation of capping	12	ea	$150	$1,800
Install permanent monitoring wells (five)	1	ls	$7,500	$7,500
Install erosion controls around site	1	ls	$5,000	$5,000
Regrade site in preparation for soil cap	1	ls	$10,000	$10,000
Place soil barrier of clean fill, overlain by soil (for grass planting)	1	ls	$20,000	$20,000
Cost of fill (2.5 feet thick, 330 feet long, 90 feet wide - plus 20% for bulk)	3,000	cy	$8	$24,000
Cost of soil (6 inches thick; plus 20% for bulk)	600	cy	$16	$9,600
Fertilize, seed, and watering	1	ls	$5,000	$5,000
Subtotal:				**$84,400**
ENGINEERING, OVERSIGHT, AND MCP COMPLIANCE				
Tier classification, Phase I report, Phase II scope of work	120	hr	$75	$9,000
Quarterly groundwater monitoring for one year	1	ls	$32,000	$32,000
Phase II Site Assessment Report with Method 3 Risk Characterization	280	hr	$75	$21,000
Phase III and Phase IV plan (remedial action selection/implementation)	100	hr	$75	$7,500
Permitting (wetlands) and coordination with conservation commission	80	hr	$75	$6,000
Remediation design and specifications (for bidding)	80	hr	$75	$6,000
Site survey and development of site grading plans	50	hr	$75	$3,750
Allowance for engineering oversight of cap construction	1	ls	$7,500	$7,500
Filing of Activity and Use Limitation	50	hr	$75	$3,750
Response Action Outcome Statement	75	hr	$75	$5,625
Subtotal:				**$102,125**
Grand Total:				**$186,525**

Notes:

- Quantities are based on TBA investigation data and assumptions regarding area of former building basement [estimated to be 330 feet long by 90 feet wide and 7 feet deep].

APPENDIX A

UST CLOSURE REPORT

Weir, Barb

From: Abrahams-Dematte, Bill
Sent: Thursday, July 31, 2003 11:33 AM
To: Weir, Barb
Subject: Mill Street Tank Pull

Barb,

I just spoke with Bill Anthony from Peak Environmental; the company that pulled the UST at 56-67 Mill Street in Brookfield. He said that the piping from the UST was sleeved in a black poly PVC pipe under the road and that Peak was able to easily pull the lines out. Mr. Anthony said that there was ~50 feet of line and that there were two lines (a delivery and a return). He also said that these lines did not appear to be attached to anything on the other side of the road because they were so easily pulled from the pipe liner.

Bill

William A. Abrahams-Dematte, PG
Environmental Geologist/Hydrogeologist
Metcalf & Eddy
30 Harvard Mill Square
P.O. Box 4071
Wakefield, MA 01880
phone: 781-224-6530

PEAK ENVIRONMENTAL SERVICES, INC.

1200 Millbury Street Suite 7L
Worcester, MA 01607

Telephone 508 / 756-0700
Toll Free 866 / 756-0700
Fax 508 / 756-8859

RECEIVED
JUN 26 2003
BOARD OF SELECTMEN

Town Of Brookfield
C/O Christine McManus
6 Central Street
Brookfield, Ma. 01506

June 26, 2003

Subject: Closure report for the removal of one 20,000 gallon underground fuel storage tank located at 56 Mill Street, Brookfield, Ma.

Dear Ms McManus,

On June 25, 2003, Peak Environmental Services Inc. performed one underground tank removal which was located at 56 Mill Street, Brookfield, Ma. The size of the underground storage tank was believed to be 20,000 gallons and used for heating oil.

Upon the excavation, cleaning, removal and inspection of the said UST's, there were no visual signs of contamination, and no levels were detected according to PID meter (photo-ionization detection) readings. These readings were taken in three areas of the tank graves and were as follows: 0 ppm, 0ppm, and 0 ppm. The head space readings help determine if signs of contamination exists and in this case there were no significant signs of contamination and no remedial action will be taken to this site. Also, the Brookfield Fire Department was on site to witness the removal, inspect the tank for leakage and give permission to backfill the excavation area (if no contamination was detected), in which was the case. This was not a contaminated excavation area, and warrants no remedial action at this time.

In conclusion, all work is complete and closure to this site has been achieved.

Respectfully,

William T. Anthony, President
Peak Environmental Services Inc.

Residential Commercial Industrial

- Tank Removal
- Mold/Fungi Removal
- Excavating/Hauling
- Oil Spill Response/Clean up
- 21E Site Assessment
- Asbestos Abatements
- Hazardous Waste Disposal
- Ground Water Treatment
- Soil Remediation

Fire Department retains original application and issues duplicate as Permit.

Commonwealth of Massachusetts

Department of Fire Services – Board of Fire Prevention

APPLICATION and PERMIT

Fee: _____

for storage tank removal and transportation to approved tank disposal yard in accordance with the provisions of M.G.L. Chapter 148, Section 38A, 527 CMR 9.00, application is hereby made by:

Tank Owner

Tank Owner Name (please print) TOWN OF BROOKFIELD x William F. Lanthorne AGENT FOR (Signature (if applying for permit))

Address 56 Mill St. (Street) BROOKFIELD, MA. (City) 01506 (State, Zip)

Removal Contractor

Company Name PEAK ENVIRONMENTAL SER. INC (Print)

Address 200 MILLBURY ST. 71, WORC, MA. 01607 (Print)

Signature (if applying for permit) William F. Lanthorne

☐ IFCI Certified Other

Contamination Assessment

Co. or Individual _____ (Print)

Address _____ (Print)

Signature (if applying for permit) _____

☐ IFCI Certified ☐ LSP # _____ Other _____

Tank Information

Tank Location 56 Mill St. (Street Address) BROOKFIELD, MA. (City)

Tank Capacity (gallons) 20,000 UST Substance Last Stored #2

Tank Dimensions (diameter x length) 128" X 31'

Remarks: _____

Disposal Information

Firm transporting waste Allstate Power LLC State Lic. # _____

Hazardous waste manifest# MAQ396883 E.P.A. # _____

Approved tank disposal yard Grants Tank yard # 008 02137

Type of inert gas Dry-Ice Tank yard address Rear of 28 Walcott St. Reading, MA.

Approvals

City or Town Brookfield, MA. FDID# _____ Permit# _____

Date of issue 6/25/03 Date of expiration 6/27/03

Dig safe approval number: _____ Dig Safe Toll Free Tel. Number - 800-322-4844

Signature / Title of Officer granting permit [signature]

After removal(s) send Form FP-290R signed by Local Fire Dept. to UST Regulatory Compliance Unit, One Ashburton Place, Room 1310, Boston, MA 02108-1618.

FP 292 (Revised 9/96)

Form FP 291

Commonwealth of Massachusetts
Department of Fire Services - Office of the State Fire Marshal
RECEIPT OF DISPOSAL OF UNDERGROUND STEEL STORAGE TANK

NAME AND ADDRESS OF APPROVED TANK YARD

James G. Grant Co., Inc.
28 Wolcott St.
Readville, MA 02137

APPROVED TANK YARD NO. 008 Tank Yard Ledger 502 CMR 3.03 (4) Number: 200346996

I certify under penalty of law I have personally examined the underground steel storage tank delivered to this "approved tank yard" by firm, corporation or partnership PEAK ENV and accepted same in conformance with Massachusetts Fire Prevention Regulation 502 CMR 3.00 Provisions for Approving Underground Steel Storage Tank dismantling yards. A valid permit was issued by LOCAL Head of Fire Department. FDID# 2 7 0 4 5 to transport this tank to this yard.

Name and official title of approved tank yard owner or owners authorized representative:

Mike Cola — SIGNATURE | TITLE | 6/26/03 DATE SIGNED

This signed receipt of disposal must be returned to the local head of the fire department FDID# 2 7 0 9 5 pursuant to 502 CMR 3.00.

EACH TANK MUST HAVE A RECEIPT OF DISPOSAL

TANK DATA

Gallons 20,000

Previous Contents #2

Diameter 129" Length 31'

Date Received 6/26/03

Serial # (if available) —

Tank I.D. # (Form FP-290) —

TANK REMOVED FROM

56 MILL ST
(No. and Street)

BROOKFIELD
(City or Town)

Fire Department Permit # N/A

Owner/Operator to mail revised copy of Notification Form (FP290, or FP290R) to : UST Compliance, Office of the State Fire Marshal, P.O. Box 1025 State Road, Stow, MA 01775.

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS MATERIALS
One Winter Street Boston, Massachusetts 02108

Please print or type. (Form designed for use on elite (12-pitch) typewriter)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MA508867547717 Manifest Document No. 913813

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Town of Brookfield
56 Mill Street
Brookfield, MA 01506

4. Generator's Phone 508 867-5477

A. State Manifest Document Number MA Q 396883

B. State Gen. ID SAME

5. Transporter 1 Company Name Allstate Power Vac

6. US EPA ID Number MTD010381212047

C. State Trans. ID AE6111XW1

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone 508 393 2537

E. State Trans. ID

9. Designated Facility Name and Site Address
Zecco, Inc
345 West Main Street
Northboro, MA 01532

10. US EPA ID Number MAD052124415

F. Transporter's Phone ( )

G. State Facility's ID NOT REQUIRED

H. Facility's Phone (508) 351 9660

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	WASTE NO.
a. State Regulated Liquid Non-RCRA Non DOT Regulated	001	TT	18552	G	MA01
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above (include physical state and hazard code.)
(L) Oil/Water
a. Profile #
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
Emergency Contact Allstate Power Vac, Inc (508) 393-2537

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: William T. Anthony FOR Agent
Signature: William T. Anthony
Date: Month 06 Day 25 Year 13

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jason K Cahsis
Signature:
Date: Month 06 Day 25 Year 13

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Date: Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19
Printed/Typed Name:
Signature:
Date: Month Day Year

GENERATOR
TRANSPORTER
FACILITY

In case of emergency or spill, immediately call the National Response Center (800) 424-8802

MA Q 396883

COPY>6: GENERATOR MAILS TO DESTINATION STATE

Form Approved OMB No 2050-0039
EPA Form 8700-22 (Rev 9-96) Previous editions are obsolete

COPY>6: GENERATOR MAILS TO DESTINATION STATE

APPENDIX B

ANALYTICAL DATA SUMMARY TABLES (M&E, NOVEMBER 2002)

Table B-1.
Summary of Sampling Locations and Analyses

Sample ID		Parameters*					
		VOC	VPH*	EPH	PCBs	Total Metals	TCLP Metals
SURFACE SOIL FROM BORINGS:							
ME-1A	(0 to 4 ft bgs)		X	X		X	
ME-2A	(approx. 3 ft bgs)		X				
ME-4A	(0 to 4 ft bgs)		X	X		X	
SUBSURFACE SOIL FROM BORINGS:							
ME-1B	(4 to 12 ft bgs)		X	X		X	
ME-2B	(4 to 12 ft bgs)			X		X	
ME-3B	(4 to 12 ft bgs)		X	X		X	
ME-4B	(4 to 14 ft bgs)		X	X		X	
TEST PITS:							
TP-1-A	(0 to 4 ft bgs)		X	X	X	X	X
TP-2-A	(0 to 4 ft bgs)		X	X	X	X	X
TP-2-B	(4 to 7 ft bgs)		X	X	X	X	X
KTP-2-B[1]	(4 to 7 ft bgs)		X	X	X	X	X
TP-3-A	(0 to 4 ft bgs)		X	X	X	X	X
TP-3-B	(4 to 9 ft bgs)		X	X	X	X	X
TP-4-B	(0 to 7.5 ft bgs)		X	X	X	X	X
GROUNDWATER:							
ME-1	screened 2-12 ft bgs	X	X	X		X	
ME-2	screened 2-12 ft bgs	X	X	X		X	
KME-2[1]		X	X	X		X	
ME-3	screened 4-14 ft bgs	X	X	X		X	
ME-4	screened 5-15 ft bgs	X	X	X		X	
MW-5	Lycott well, estimated screened interval 5-25 ft bgs					X	

NOTES:
VOC - Volatile Organic Compounds
VPH - Volatile Petroleum Hydrocarbons
EPH - Extractable Total Petroleum Hydrocarbons
PCBs - Polychlorinated Biphenyls
Total Metals - EPA Target Analyte List Metals
TCLP Metals - TCLP extraction, with analysis of extract for the RCRA 8 metals

[1] Sample I.D.s beginning with "K" represent field duplicate samples of the sample location that follows
* Samples for VPH analysis were grab samples from within the depth interval stated.
Other analyses are composite samples of soils over the stated depth interval.

Table B-2. Summary Of Analytical Data -- Soil From Test Pits
TBA Investigation -- Mill Street Property -- June 2002

LOCATION NAME	TP-1-A	TP-2-A	TP-2-B	KTP-2-B	TP-3-A	TP-3-B	TP-4-B	MCP Reportable Concentrations **	DEP Background for Natural Soils **	DEP Background for Soil Containing Coal Ash or Wood Ash **
APPROXIMATE SAMPLE DEPTH (ft bgs)	0-4	0-4	4-7	0-4	0-4	4-9	0-7.5			
M&E SAMPLE ID	TP-1-A	TP-2-A	TP-2-B	KTP-2-B	TP-3-A	TP-3-B	TP-4-B			
DATE SAMPLED	6/10/02	6/10/02	6/10/02	6/10/02	6/10/02	6/10/02	6/10/02			
COMMENTS/VPH SAMPLE DEPTH	VPH, 2-4 ft	VPH, 3-3.5 ft	VPH, 6.5-7	FD	VPH, 3-3.5	VPH, 7 ft	VPH, 5.5 ft	RCS-1	**	**
VOLATILE PETROLEUM HYDROCARBONS - MADEP - VPH-98-1 (ug/kg)										
C_9-C_{12} Aliphatics (1)	5,500 U	6,300 U	6,500 UJ	6,800 UJ	4,600 U	6,000 U	12,000 J	1,000,000	--	--
EXTRACTABLE PETROLEUM HYDROCARBONS - MADEP-EPH-98-1 (ug/kg)										
C_9-C_{18} Aliphatics (1)	3,300 U	4,200	5,500	3,700 U	3,400 U	3,400 U	53,000	1,000,000	--	--
C_{19}-C_{36} Aliphatics (1)	47,000	98,000	190,000	150,000	86,000	24,000	530,000	2,500,000	--	--
C_{11}-C_{22} Aromatics (1)	9,200 U	25,000	38,000	28,000	22,000	12,000	85,000	200,000 1,000,000	--	--
Acenaphthene	540 U	570 U	630 U	620 U	560 U	570 U	770 U	20,000	500	2,000
Acenaphthylene	540 U	570 U	630 U	620 U	560 U	570 U	770 U	100,000	500	1,000
Anthracene	540 U	570 U	630 U	620 U	560 U	570 U	770 U	1,000,000	1,000	4,000
Benzo(a)anthracene	540 U	570 U	680	620 U	560 U	570 U	770 U	700 7000	2,000	9,000
Benzo(a)pyrene	540 U	570 U	690	620 U	560 U	570 U	770 U	700 2000	2,000	7,000
Benzo(b)fluoranthene	540 U	**920**	**1,300**	**1,200**	**1,100**	**960**	770 U	700 7000	2,000	8,000
Benzo(g,h,i)perylene	540 U	570 U	630 U	620 U	560 U	570 U	770 U	1,000,000	1,000	3,000
Benzo(k)fluoranthene	540 UJ	570 UJ	630 UJ	620 UJ	560 UJ	570 UJ	770 UJ	7,000 70,000	1,000	4,000
Chrysene	540 U	570 U	630 U	620 U	560 U	570 U	770 U	7,000	2,000	7,000
Dibenzo(a,h)anthracene	540 U	600	**860**	**780**	**710**	570 U	770 U	700	500	1,000
Fluoranthene	540 U	590	1,600	1,200	1,100	570 U	770 U	1,000,000	4,000	10,000
Fluorene	540 U	570 U	630 U	620 U	560 U	570 U	770 U	400,000	1,000	2,000
Indeno(1,2,3-cd)pyrene	540 U	600	**860**	**780**	**710**	570 U	770 U	700 7,000	1,000	3,000
Naphthalene	540 U	570 U	630 U	620 U	560 U	570 U	770 U	4,000	500	1,000
Phenanthrene	540 U	570 U	1,700	1,300	1,100	570 U	770 U	100,000	3,000	20,000
Pyrene	540 U	650	1,500	1,200	1,100	570 U	770 U	700,000 1,000,000	4,000	20,000
2-Methylnaphthalene	540 U	570 U	630 U	620 U	560 U	570 U	850	4,000	500	1,000
PCBs - SW-846, Method 8082 (µg/kg)										
Aroclor-1260	55 U	140	150	120	110	58 U	78 U	2,000	--	--
TCLP Metals (ug/L, in TCLP extract of soil)								**TCLP Regulatory Level (ug/L)**		
Arsenic	0.55 U	2.0 J	1.4 J	1.3 J	2.4 J	1.2 J	2.0 J	5,000	--	--
Barium	1,500	2,100	3,900	3,700	950	1,600	210	100,000	--	--
Cadmium	45 J	22 J	18 J	15 J	8.6 J	2.8 J	53 J	1,000	--	--
Chromium	13 UJ	21 UJ	32 U	28 U	17 UJ	21 UJ	43 U	5,000	--	--
Lead	2,300	940	**7,800**	**6,200**	860	1,300	**18,000**	5,000	--	--
Mercury	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	200	--	--
Selenium	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	1,000	--	--
Silver	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	5,000	--	--

Table B-2. Summary Of Analytical Data -- Soil From Test Pits
TBA Investigation -- Mill Street Property -- June 2002

LOCATION NAME	TP-1-A	TP-2-A	TP-2-B	KTP-2-B	TP-3-A	TP-3-B	TP-4-B	MCP Reportable Concentrations **	DEP Background for Natural Soils **	DEP Background for Soil Containing Coal Ash or Wood Ash **
APPROXIMATE SAMPLE DEPTH (ft bgs)	0-4	0-4	4-7	0-4	0-4	4-9	0-7.5			
M&E SAMPLE ID	TP-1-A	TP-2-A	TP-2-B	KTP-2-B	TP-3-A	TP-3-B	TP-4-B			
DATE SAMPLED	6/10/02	6/10/02	6/10/02	6/10/02	6/10/02	6/10/02	6/10/02			
COMMENTS/VPH SAMPLE DEPTH	VPH, 2-4 ft	VPH, 3-3.5 ft	VPH, 6.5-7	FD	VPH, 3-3.5	VPH, 7 ft	VPH, 5.5 ft	RCS-1	**	**
RAS INORGANICS - Total Metals (mg/Kg)										
Aluminum	10,600 J	8,900 J	26,200 J	9,450 J	9,100 J	8,090 J	10,900 J	--	10,000	10,000
Antimony	0.85 UJ	1.0 UJ	5.1 UJ	4.0 UJ	0.86 UJ	0.88 UJ	3.7 UJ	10	1	7
Arsenic	2.0	8.6	7.1	6.5	6.6	4.2	5.9	30	20	20
Barium	143	317	3,250	2,350	85.6	287	2,230	1,000	50	50
Beryllium	0.27 U	0.27 U	0.19 U	0.28 U	0.21 U	0.25 U	0.19 U	0.7	0.4	0.9
Cadmium	0.11 U	0.51	0.70	0.46	0.41	0.12 U	1.7	30	2	3
Calcium	2,540 J	2,650 J	6,970 J	8,760 J	2,940 J	8,730 J	22,700 J	--	--	--
Chromium	16.2 J	17.0 J	25.5 J	20.4 J	33.1 J	11.0 J	19.4 J	1,000	30	40
Cobalt	5.2	4.7	7.7 J	7.1 J	4.3	3.3	6.9 J	--	4	4
Copper	19.6 J	106 J	6,380 J	308 J	95.6 J	41.2 J	1,680 J	1,000	40	200
Iron	15,100	15,100	34,800	34,500	16,000	13,000	63,900	--	20,000	20,000
Lead	277 J	277 J	546 J	362 J	190 J	51.0 J	1,250 J	300	100	600
Magnesium	2,850	2,240	2,540	3,960	2,070	1,490	3,480	--	5,000	5,000
Manganese	209	161	400	334	157	148	343	--	300	300
Mercury	0.06 U	0.09 J	0.12 J	0.08 U	0.11 J	0.10 J	0.09 J	20	0.3	1
Nickel	7.2 J	9.3 J	56.5 J	18.9 J	8.6 J	6.1 J	28.5 J	300	20	30
Potassium	2,740	1,790	1,470	1,270	1,440	888	1,140	--	--	--
Selenium	0.49 U	1.3	0.56 U	0.89 J	0.53 J	0.51 U	0.89 J	400	0.5	1
Silver	0.25 U	0.25 U	3.8	0.34 J	0.25 U	0.25 U	1.1	100	0.6	5
Sodium	539	645	2,630 J	1,690 J	575	554	2,900	--	--	--
Thallium	0.78 U	0.79 U	0.89 U	1.1 U	0.79 U	0.81 U	1.3 J	8	0.6	5
Vanadium	27.9	26.4	21.7	17.2	29.9	16.2	16.5	400	30	30
Zinc	82.8 J	143 J	1,690 J	788 J	104 J	171 J	1,600 J	2,500	100	300
LAB SAMPLE ID										
VPH, EPH, PCBs, TCLP Metals	TP-1-A	TP-2-A	TP-2-B	KTP-2-B	TP-3-A	TP-3-B	TP-4-B			
RAS - Total Metals	MALR30	MALR31	MALR33	MALR28	MALR29	MALR34	MALR32			

Table B-3. Summary Of Analytical Data -- Soil From Borings
TBA Investigation -- Mill Street Property -- June 2002

LOCATION NAME	ME-1A	ME-1B	ME-2A	ME-2B	ME-3B	ME-4A	ME-4B	MCP Reportable Concentrations ** RCS-1	DEP Background for Natural Soils **	DEP Background for Soil Containing Coal Ash or Wood Ash **
APPROXIMATE SAMPLE DEPTH (ft bgs)	0-4	4-12	3	4-12	4-12	0-4	4-14			
M&E SAMPLE ID	ME-1A-0-4	ME-1B-4-12	ME-2A-3	ME-2B-4-12	ME-3B-4-12	ME-4A-0-4	ME-4B-4-14			
DATE SAMPLED	6/11/02	6/11/02	6/11/02	6/11/02	6/12/02	6/12/02	6/12/02			
COMMENTS										
VOLATILE PETROLEUM HYDROCARBONS - MADEP - VPH-98-1 (ug/kg)										
C_9-C_{12} Aliphatics (1)	5,600 U	5,900 U	6,800 U	5,800 U	6,200 U	6,000 U	6,300 U	1,000,000	--	--
EXTRACTABLE PETROLEUM HYDROCARBONS - MADEP-EPH-98-1 (ug/kg)			Not Analyzed							
C_9-C_{18} Aliphatics (1)	4,300	3,500 U		3,400 U	3,300 U	3,200 U	3,500 U	1,000,000	--	--
C_{19}-C_{36} Aliphatics (1)	65,000	4,600 U		4,500 U	4,400 U	12,000	4,700 U	2,500,000	--	--
C_{11}-C_{22} Aromatics (1)	9,400 U	9,800 U		9,600 U	9,400 U	9,200 U	10,000 U	200,000 1,000,000	--	--
Acenaphthene	550 U	580 U		570 U	550 U	540 U	590 U	20,000	500	2,000
Acenaphthylene	550 U	580 U		570 U	550 U	540 U	590 U	100,000	500	1,000
Anthracene	550 U	580 U		570 U	550 U	540 U	590 U	1,000,000	1,000	4,000
Benzo(a)anthracene	550 U	580 U		570 U	550 U	540 U	590 U	700 7000	2,000	9,000
Benzo(a)pyrene	550 U	580 U		570 U	550 U	540 U	590 U	700 2000	2,000	7,000
Benzo(b)fluoranthene	550 U	580 U		570 U	550 U	540 U	590 U	700 7000	2,000	8,000
Benzo(g,h,i)perylene	550 U	580 U		570 U	550 U	540 U	590 U	1,000,000	1,000	3,000
Benzo(k)fluoranthene	550 UJ	580 UJ		570 UJ	550 UJ	540 UJ	590 UJ	7,000 70,000	1,000	4,000
Chrysene	550 U	580 U		570 U	550 U	540 U	590 U	7,000	2,000	7,000
Dibenzo(a,h)anthracene	550 U	580 U		570 U	550 U	540 U	590 U	700	500	1,000
Fluoranthene	550 U	580 U		570 U	550 U	540 U	590 U	1,000,000	4,000	10,000
Fluorene	550 U	580 U		570 U	550 U	540 U	590 U	400,000	1,000	2,000
Indeno(1,2,3-cd)pyrene	550 U	580 U		570 U	550 U	540 U	590 U	700 7000	1,000	3,000
Naphthalene	550 U	580 U		570 U	550 U	540 U	590 U	4,000	500	1,000
Phenanthrene	550 U	580 U		570 U	550 U	540 U	590 U	100,000	3,000	20,000
Pyrene	550 U	580 U		570 U	550 U	540 U	590 U	700,000 1,000,000	4,000	20,000
2-Methylnaphthalene	550 U	580 U		570 U	550 U	540 U	590 U	4,000	500	1,000
RAS INORGANICS - Total Metals (mg/Kg)			Not Analyzed							
Aluminum	10,100 J	5,870 J		7,500 J	11,400 J	9,080 J	7,190 J	--	10,000	10,000
Antimony	2.1 UJ	0.88 UJ		0.87 UJ	0.86 UJ	0.84 UJ	0.92 UJ	10 20	1	7
Arsenic	6.8	1.3 J		1.7	1.4	4.0	1.4 J	30 20	20	20
Barium	228	42.8		69.6	72.0	43.7	49.2	1,000	50	50
Beryllium	1.4	0.25 U		0.18 U	0.12 UJ	0.21 U	0.50	0.7	0.4	0.9
Cadmium	0.11 U	0.12 U		0.11 U	0.53	0.11 U	0.12 U	30 2	2	3
Calcium	12,700 J	1,780 J		1,410 J	650 J	442 J	442 J	--	--	--
Chromium	22.8 J	13.5 J		19.2 J	24.9 J	14.3 J	15.6 J	1,000 30	30	40
Cobalt	12.2 J	8.4		10.3	23.9	4.6	33.3	--	4	4
Copper	4,520 J	17.8 J		20.9 J	21.0 J	19.8 J	12.3 J	1,000	40	200
Iron	27,600	12,300		17,300	14,000	13,400	25,800	--	20,000	20,000
Lead	100 J	2.6 J		3.6 J	3.0 J	19.1 J	3.4 J	300 20	100	600
Magnesium	3,660	2,160		3,280	3,880	2,120	2,340	--	5,000	5,000
Manganese	209	63.8		112	103	159	284	--	300	300
Mercury	0.06 U	0.06 U		0.06 U	0.06 U	0.06 U	0.06 U	20	0.3	1
Nickel	16.5 J	14.7 J		19.3 J	51.9 J	7.1 J	13.3 J	300	20	30
Potassium	3,160	2,210		3,390	4,190	1,260	2,380	--	--	--
Selenium	0.50 U	0.63 J		0.50 U	0.50 U	0.77 J	0.53 U	400	0.5	1

Table B-3. Summary Of Analytical Data -- Soil From Borings
TBA Investigation -- Mill Street Property -- June 2002

LOCATION NAME	ME-1A	ME-1B	ME-2A	ME-2B	ME-3B	ME-4A	ME-4B	MCP Reportable Concentrations **	DEP Background for Natural Soils **	DEP Background for Soil Containing Coal Ash or Wood Ash **
APPROXIMATE SAMPLE DEPTH (ft bgs)	0-4	4-12	3	4-12	4-12	0-4	4-14			
M&E SAMPLE ID	ME-1A-0-4	ME-1B-4-12	ME-2A-3	ME-2B-4-12	ME-3B-4-12	ME-4A-0-4	ME-4B-4-14			
DATE SAMPLED	6/11/02	6/11/02	6/11/02	6/11/02	6/12/02	6/12/02	6/12/02			
COMMENTS								RCS-1		
Silver	1.2	0.25 U		0.25 U	0.25 U	0.24 U	0.27 U	100	0.6	5
Sodium	829 J	439		543	454	483	568	--	--	--
Thallium	0.80 U	0.81 U		0.80 U	0.79 U	0.77 U	1.1 J	8	0.6	5
Vanadium	29.0	19.0		27.8	29.7	18.9	22.5	400 600	30	30
Zinc	224 J	24.9 J		33.7 J	58.1 J	35.2 J	33.8 J	2,500	100	300
LAB SAMPLE ID										
Volatile Organic Compounds	81142002	81142004		81142003	81142004	81142001	81142004			
VPH, EPH	ME-1A-0-4	ME-1B-4-12	ME-2A-3	ME-2B-4-12	ME-3B-4-12	ME-4A-0-4	ME-4B-4-14			
RAS - Total Metals	MALR20	MALR24		MALR25	MALR26	MALR23	MALR27			

Table B-4. Summary Of Analytical Data -- Groundwater
Targeted Brownfields Assessment - Mill Street Property -- June 2002

LOCATION NAME	ME-1	ME-2		ME-3	ME-4	MW-5	Reportable Concentrations **
WELL SCREEN INTERVAL (ft bgs)	2-12	2-12		4-14	5-15	5-25***	
M&E SAMPLE ID	ME-1	ME-2	KME-2	ME-3	ME-4	ME-5	
DATE SAMPLED	6/18/02	6/18/02	6/18/02	6/18/02	6/19/02	6/18/02	
COMMENTS			FD			Lycott	RCGW-1
PARAMETER/ANALYTE							
VOLATILE PETROLEUM HYDROCARBONS - MADEP-VPH-98-1 (µg/l)						Not Analyzed	
None Detected (all analytes; all samples analyzed)							
VOLATILE ORGANIC COMPOUNDS - RAS (µg/l)						Not Analyzed	
Acetone	5.0 UJ	10 J	9.1 J	50 J	5.0 UJ		3,000
Methyl-t-butyl ether (MTBE)	1.1 J	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ		50,000 70
EXTRACTABLE PETROLEUM HYDROCARBONS - MADEP-EPH-98-1, AND TARGET PAHs BY GC/MS-SIM (µg/l)						Not Analyzed	
None Detected (all analytes; all samples analyzed)							
METALS - RAS (µg/l)							
Aluminum	101 U	616	574	38.1 U	19.4 U	49.4 U	--
Antimony	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	38.2 U	6
Arsenic	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	50 10
Barium	64.5	84.3	85.5	20.3	20.7	9.3	2,000
Beryllium	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	4
Cadmium	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	5 4
Calcium	134,000	21,500	21,700	9,220	14,100 J	16,600	--
Chromium	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	100
Cobalt	5.6 U	5.6 U	5.6 U	5.6 U	15.5	5.6 U	5,000
Copper	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	10,000
Iron	107 U	619	614	416	7.0 U	98.5 U	--
Lead	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	20 10
Magnesium	17,200	3,340	3,360	2,660	4,480	4,130	--
Manganese	140	381	382	672	189	24.1	--
Mercury	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	1 2
Nickel	10.2 U	10.2 U	10.2 U	10.2 U	10.2 U	10.2 U	80 100
Potassium	28,800	4,630	4,350	3,720	2,320	1,950	--
Selenium	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	50
Silver	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	7
Sodium	138,000	122,000	123,000	7,230	29,100	10,900	--
Thallium	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	2
Vanadium	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	50 30
Zinc	3.6 U	3.6 U	6.0 J	5.6 J	3.6 U	3.6 U	900
LAB SAMPLE ID							
Volatile Petroleum Hydrocarbons	ME-1	ME-2	KME-2	ME-3	ME-4	Not Analyzed	
Volatile Organic Compounds	A0BW5	A0BW6	A0BW7	A0BW8	A0BX0	Not Analyzed	
Extractable Petroleum Hydrocarbons	ME-1	ME-2	KME-2	ME-3	ME-4	Not Analyzed	
Inorganics (Metals Only)	MA02D6	MA02D7	MA02D8	MA02D9	MA02E1	MA02E0	

TABLE NOTES:

1. Hydrocarbon ranges are adjusted to exclude the concentration of target and QC (surrogate) analytes.

** - Values shown for standards are in the same units as the analytical data.

*** - Well screen interval is estimated based on down hole measurements, but could not be positively identified.

MADEP Criteria

MCP Reportable Concentrations, 310 CMR 40.0000 Subpart P Massachusetts Oil and Hazardous Material List

"--" indicates no MCP Reportable Concentration available

Background Levels - MADEP Technical Updatee, May 2002. Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil.

TCLP Regulatory Criteria: 310 CMR 30.125B, Maximum Concentration of Contaminants for Toxicity Characteristic.

"--" indicates no MCP Reportable Concentration, Background Level, or TCLP regulatory level available/applicable.

ft bgs - feet below ground surface

B - Organics: Analyte detected in a laboratory blank. Inorganics: The analyte was detected at a concentration greater than the Instrument Detection Limit (IDL) and less than the Contract Required Detection Limit (CRDL).

FD - Indicates Field Duplicate

J - Quantitation is approximate due to limitations identified in the quality control review.

U - Analyte was not detected. Value reported is the sample-specific detection limit.

UJ - Sample-specific detection limit is approximate due to limitations identified in the quality control review.

Bold - indicates value greater than applicable MCP reportable concentration, or TCLP regulatory level (where applicable).

Lycott - Well is a pre-existing well, assumed to have been installed as part of the site assessment performed by Lycott in 1991. Well is in the same approximate location as the Lycott well denoted as MW-5.

APPENDIX C

MADEP SITE SCORING MAP

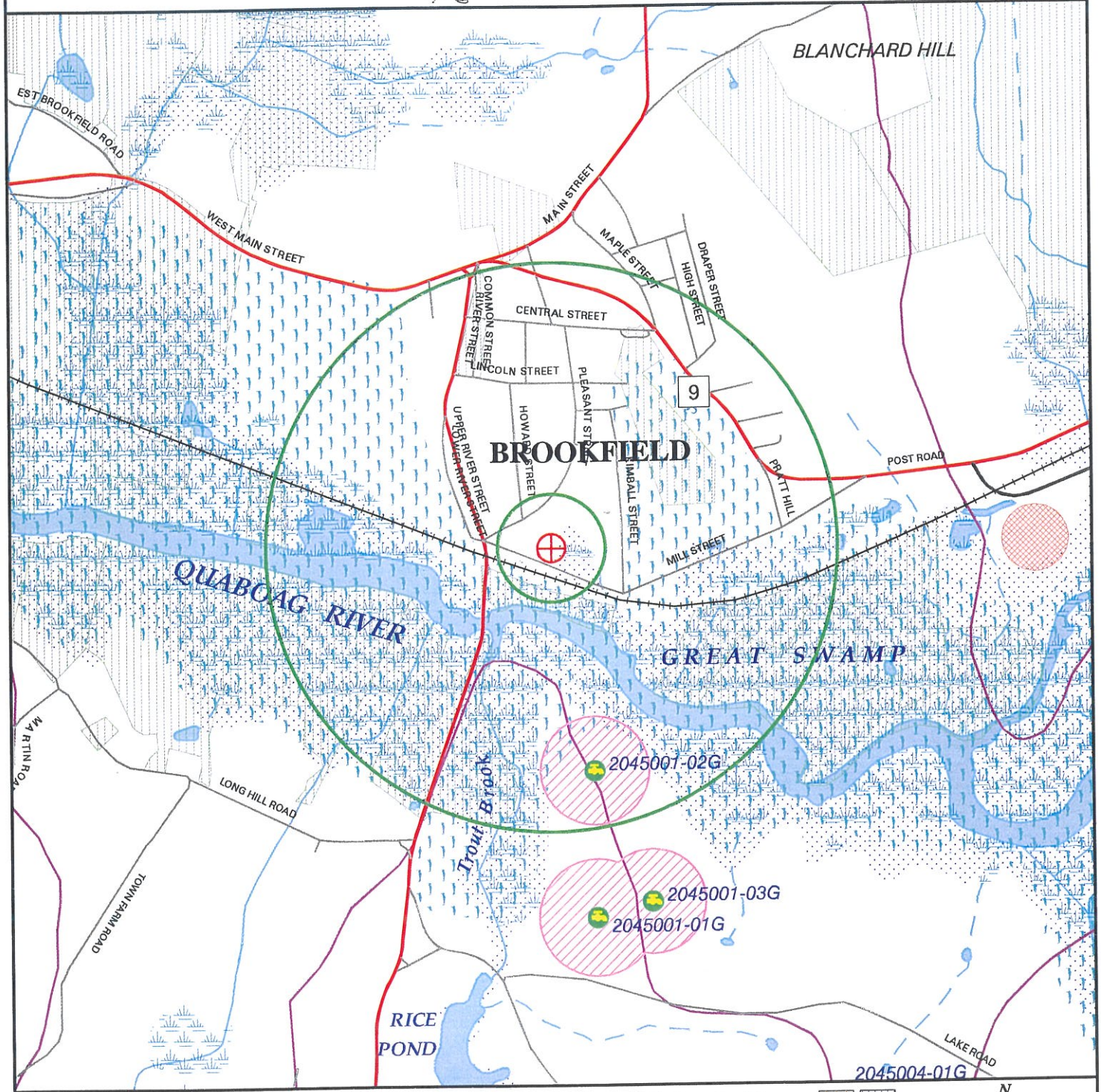
MA DEP - Bureau of Waste Site Cleanup

Site Scoring Map: 500 feet & 0.5 Mile Radii

SITE NAME:
Former Mill Building
67 Mill Street
BROOKFIELD, MA 01506
421233n 720602ew

The information shown on this map is the best available at the date of printing. Please refer to the data source descriptions document.

MASS GIS
Massachusetts Geographic Information System
Massachusetts Executive Office of Environmental Affairs - 2003



Roads: Limited Access, Divided, Major Road, Connector, Street, Track, Trail
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct
Basins: Major, Sub; Streams: Perennial, Intermittent, Man Made Shore, Dams
Potentially Productive Aquifers: Medium, High Yield
Non-Potential Drinking Water Source Area: Medium, High Yield

EPA Sole Source Aquifer; FEMA 100-year floodplain
Public Water Supplies: Ground, Surface, Non Community
Approved Zone2; IWPA; Surface Water Supply Zone A
Hydrography: Water Features, Public Surface Water Supply
Wetlands: Fresh, Salt, NHESP Wetlands Habitat
Protected Open Space; ACEC
DEP Permitted Solid Waste Facilities; Certified Vernal Pools

N NW NE W E SW SE S

SCALE 1:15000

0 1/2 1 MILES
0 1/2 1 KILOMETERS

November 14, 2003

APPENDIX D

BORING LOGS
AUGUST 2003 INVESTIGATION

Metcalf & Eddy

SOIL BORING LOG

Former Mill Street Prop.
64-67 Mill Street
Brookfield, Massachusetts

Location/ID:	Soil Boring 1 (SB-1)	Direct Push Operator:	Geologic Services
Date:	August 5, 2003	M&E Geologist:	W. Abrahams-Dematte
Coordinates:	See separate figure	Total Depth:	10.5 feet bgs

0 to 4 FEET	4 to 10.5 FEET
Brick, rock, sandy loam soils.	Approximately 3 feet of clean sandy fill followed by a mix of silty sands, brick and burnt materials. Water table ~7 ft.

Location/ID:	Soil Boring 2 (SB-2)	Direct Push Operator:	Geologic Services
Date:	August 5, 2003	M&E Geologist:	W. Abrahams-Dematte
Coordinates:	See separate figure	Total Depth:	12 feet bgs

0 to 4 FEET	4 to 12 FEET
Dark brown sandy loam, brick and rock.	Approximately 0.5 feet of clean fill. Perched water table at 6.75 feet; soils denser with higher clay content. From 8.0 to 8.5 feet soil was dry and from 8 to 12 feet soils were silty sand; with less brick than SB-1. Water table ~9 ft.

Location/ID:	Soil Boring 3 (SB-3)	Direct Push Operator:	Geologic Services
Date:	August 5, 2003	M&E Geologist:	W. Abrahams-Dematte
Coordinates:	See separate figure	Total Depth:	12 feet bgs

0 to 4 FEET	4 to 12 FEET
Brick, wood, burnt material, some slag like pieces and possibly coal chips.	No clean fill, brick, burnt material, some wood, rock. Water table ~9.5 ft.

Location/ID:	Soil Boring 4 (SB-4)	Direct Push Operator:	Geologic Services
Date:	August 5, 2003	M&E Geologist:	W. Abrahams-Dematte
Coordinates:	See separate figure	Total Depth:	8 feet bgs

0 to 4 FEET	4 to 8 FEET
Half tan, half black, burnt odor, wood, little brick.	Same as 0 to 4 feet, less stone. Water table ~7.5 ft.

METCALF & EDDY	SITE LOCATION	BORING NUMBER
701 Edgewater Drive Wakefield, MA 01880 (781)-246-5200	Former Mill Street Property 64-67 Mill Street Brookfield, Massachusetts	P1

CONTRACTOR: Earth Exploration / Geologic
DRILLER: Emil
INSPECTOR: William Abrahams-Dematte
START DATE: 8/6/03
FINISH DATE: 8/6/03

DRILLING METHOD: Direct Push
WELL INSTALLED: Piezometer
SAMPLING METHOD: Ded. Polyethylene Sleeves
SIZE I.D.: 2
TOTAL DEPTH: 8 ft.

Depth	No.	Range (ft.)	Sample Blows	Recovery (ft.)	PID* (ppm)	Water Table	Interval (ft.)	Sample Description [1]	Stratigraphic Description
0.0			NA			WT	0.0-0.7	Black, organic, topsoil.	Topsoil
	1	0-4		4	NS	~1.2 ft	0.7-1.0	Brown, silt loam, roots.	Loams
							1.0-4.0	Orange, silt loam, roots.	
2.0									
								END OF BORING 8.0 FEET [1]	
4.0								PIEZOMETER SCREENED 0.5 TO 7.5 FEET.	
	2	4-8							
6.0									
8.0									
	3	8-12							
10.0									
12.0									
	4	12-16							
14.0									
16.0									

NA - Not Applicable, NS - Not Sampled.

1 - Soil description from first attempt by air hammer jacking, which failed. Direct push eventually used, but time limited access meant no sample c

METCALF & EDDY
701 Edgewater Drive
Wakefield, MA 01880
(781)-246-5200

SITE LOCATION
Former Mill Street Property
64-67 Mill Street
Brookfield, Massachusetts

BORING NUMBER
P2

CONTRACTOR: Earth Exploration / Geologic
DRILLER: Emil
INSPECTOR: William Abrahams-Dematte
START DATE: 8/6/03
FINISH DATE: 8/6/03

DRILLING METHOD: Direct Push
WELL INSTALLED: Piezometer
SAMPLING METHOD: Ded. Polyethylene Sleeves
SIZE I.D.: 2
TOTAL DEPTH: 11 ft.

Depth	No.	Range (ft.)	Sample Blows	Recovery (ft.)	PID* (ppm)	Water Table	Interval (ft.)	Sample Description	Stratigraphic Description
0.0	1	0-4	NA	2.3	NS	WT ~2.5 ft.	0.0-1.7	Void	Topsoil
							1.7-1.8	Cinders	Loams
							1.8-2.6	Yellow/Orange-brown, FINE-MEDIUM SAND some silt, little gravel, slightly moist.	
2.0							2.6-3.2	Same As 1.8-2.6 ft., but grey and moist.	
							3.2-3.8	Black, MEDIUM-VC SAND, saturated, slight marshy odor..	Sands
4.0							3.8-4.0	Grey, FINE SAND AND SILT, some to little clay, firm, mottled.	
	2	4-8		4.0			4.0-4.3	Same As 3.8-4.0 feet.	
							4.3-4.6	Same As 32.-3.8 feet.	
6.0							4.6-5.3	Yellow-brown, FINE SAND, little pebbles.	
							5.3-7.0	Same As 4.6-5.3, but orange-brown.	
							7.0-8.0	Yellow-brown till like material.	
8.0							8.0-9.6	Void	
							9.6-10.3	Grey, FINE-MEDIUM SAND, wet.	
	3	8-12		1.4			10.3-11.0	Orange, MEDIUM SAND, trace pebble, wet.	
							11.0-12.0	Not Sampled - refusal.	
10.0								END OF BORING 11 FEET	
								PIEZOMETER SCREENED 1 TO 11 FEET.	
12.0									
	4	12-16							
14.0									
16.0									

NA - Not Applicable, NS - Not Sampled.

METCALF & EDDY	SITE LOCATION	BORING NUMBER
701 Edgewater Drive Wakefield, MA 01880 (781)-246-5200	Former Mill Street Property 64-67 Mill Street Brookfield, Massachusetts	P3

CONTRACTOR: Earth Exploration / Geologic
DRILLER: Emil
INSPECTOR: William Abrahams-Dematte
START DATE: 8/6/03
FINISH DATE: 8/6/03

DRILLING METHOD: Direct Push
WELL INSTALLED: Piezometer
SAMPLING METHOD: Ded. Polyethylene Sleeves
SIZE I.D.: 2
TOTAL DEPTH: 12 ft.

Depth	No.	Range (ft.)	Sample Blows	Recovery (ft.)	PID* (ppm)	Water Table	Interval (ft.)	Sample Description	Stratigraphic Description
0.0	1	0-4	NA	2.2	NS	WT ~2.5 ft.	0.0-1.8	Void	Sands little-trace silt & clay
							1.8-1.9	Cinders	
							1.9-2.4	Orange-brown, FINE-MEDIUM SAND, trace silt and fine gravel.	
2.0							2.4-3.6	Black, FINE-MEDIUM SAND, organic layer, loose, wet.	
4.0							3.6-4.0	Dark orange-brown, FINE-MEDIUM SAND, little fine-coarse gravel, firm to dense, dry, mottled.	
6.0	2	4-8		3.6			4.0-4.4	Void	
							4.4-6.0	Black/tan/grey, mottled, FINE-MEDIUM SAND, saturated.	
8.0							6.0-7.5	Orange-brown, till like material, very dense, moist.	
							7.5-8.0	Grey, CLAY, shattered rock at 7.5 ft.	
10.0	3	8-12		4.0			8.0-8.4	FINE-MEDIUM SAND, little fine-coarse gravel, trace clay, dense, moist.	
							8.4-10.0	Grey, CLAY, trace medium sand, very dense, moist.	
							10.0-12.0	Grey, FINE-COARSE SAND AND GRAVEL, trace silt, till like, loose, saturated.	
12.0								END OF BORING 12 FEET	
14.0	4	12-16						PIEZOMETER SCREENED 2 TO 12 FEET.	
16.0									

NA - Not Applicable, NS - Not Sampled.

METCALF & EDDY	SITE LOCATION	BORING NUMBER
701 Edgewater Drive Wakefield, MA 01880 (781)-246-5200	Former Mill Street Property 64-67 Mill Street Brookfield, Massachusetts	P4

CONTRACTOR: Earth Exploration / Geologic
DRILLER: Emil
INSPECTOR: William Abrahams-Dematte
START DATE: 8/5/03
FINISH DATE: 8/5/03

DRILLING METHOD: Direct Push
WELL INSTALLED: Piezometer
SAMPLING METHOD: Ded. Polyethylene Sleeves
SIZE I.D.: 2
TOTAL DEPTH: 12 ft.

Depth	No.	Range (ft.)	Sample Blows	Recovery (ft.)	PID* (ppm)	Water Table	Interval (ft.)	Sample Description	Stratigraphic Description
0.0	1	0-4	NA	1.5	NS		0.0-2.5 2.5-3.0 3.0-4.0	Void Fill Concrete, Wet at 4 feet.	Fill
2.0							4.0-6.2 6.2-6.8 6.8-7.2 7.2-8.0	Void Gravel. Orange-brown, FINE-MEDIUM SAND, some coarse sand, saturated. Grey/brown, FINE SAND, wet-moist.	Sands little-trace silt & gravel
4.0						WT ~4.0 ft.			
6.0	2	4-8		1.8			8.0-8.5 8.5-9.0 9.0-12.0	Void Natural, FINE-VC SAND AND FINE GRAVEL Grey, FINE SAND, some silt, saturated below 10.0 feet, wet above.	
8.0									
10.0	3	8-12		3.5					
12.0								END OF BORING 12 FEET	
14.0	4	12-16						PIEZOMETER SCREENED 4.5 TO 12 FEET. Bentonite Plug spans concrete flooring, separating water perched on concrete floor form ground water beneath the floor.	
16.0									

NA - Not Applicable, NS - Not Sampled.

METCALF & EDDY	SITE LOCATION	BORING NUMBER
701 Edgewater Drive Wakefield, MA 01880 (781)-246-5200	Former Mill Street Property 64-67 Mill Street Brookfield, Massachusetts	P5

CONTRACTOR: Earth Exploration / Geologic
DRILLER: Emil
INSPECTOR: William Abrahams-Dematte
START DATE: 8/6/03
FINISH DATE: 8/6/03

DRILLING METHOD: Direct Push
WELL INSTALLED: Piezometer
SAMPLING METHOD: Ded. Polyethylene Sleeves
SIZE I.D.: 2
TOTAL DEPTH: 12 ft.

Depth	No.	Range (ft.)	Sample Blows	Recovery (ft.)	PID* (ppm)	Water Table	Interval (ft.)	Sample Description	Stratigraphic Description
0.0	1	0-4	NA	3	NS		0.0-1.0 1.0-1.2 1.2-2.8 2.8-3.1 3.1-4.0	Void Asphalt Dark brown/brown FINE SANDY LOAM Light brown, FINE-MEDIUM SAND. Orange/yellow-brown, MEDIUM SAND, quartz stone at 4 feet.	Fill
2.0									
4.0							4.0-4.8 4.8-5.5	Void Natural, MEDIUM-COARSE SAND, broken gravel.	Sands little-trace silt & clay
6.0	2	4-8		3.2			5.5-8.0	Orange-brown, FINE SAND, little medium sand, white rock at 6.0 & 7.2 feet, grey clay lens at 6.8-7.0 feet., variably moist.	
8.0						WT ~8.0	8.0-11.0 11.0-12.0	Same As 5.5-8.0 feet, but more silt and clay content. Top 0.4' saturated, rest wet, slightly firm. Orange-brown, SANDY TILL	
10.0	3	8-12		4.0					
12.0								END OF BORING 12 FEET	
14.0	4	12-16						PIEZOMETER SCREENED 2 TO 12 FEET.	
16.0									

NA - Not Applicable, NS - Not Sampled.

METCALF & EDDY	SITE LOCATION	BORING NUMBER
701 Edgewater Drive Wakefield, MA 01880 (781)-246-5200	Former Mill Street Property 64-67 Mill Street Brookfield, Massachusetts	P6

CONTRACTOR: Earth Exploration / Geologic
DRILLER: Emil
INSPECTOR: William Abrahams-Dematte
START DATE: 8/5/03
FINISH DATE: 8/5/03

DRILLING METHOD: Direct Push
WELL INSTALLED: Piezometer
SAMPLING METHOD: Ded. Polyethylene Sleeves
SIZE I.D.: 2
TOTAL DEPTH: 12 ft.

PAGE 1 of 1

Depth	No.	Range (ft.)	Sample Blows	Recovery (ft.)	PID* (ppm)	Water Table	Interval (ft.)	Sample Description	Stratigraphic Description
0.0	1	0-4	NA	2.0	NS		0.0-2.0 2.0-2.8 2.8-4.0	Void Topsoil, dark brown-black, loamy. Yellow-brown FINE-MEDIUM SAND, some some silt.	Topsoil
2.0							4.0-6.5 6.5-8.0	Same As 2.4-4.0, but becomes more orange and dense, with a trace of gravel, and moist to wet from 5.5-6.5 feet. Orange-red variable, stratified FINE SAND, some medium sand, dense pebble lens at 7.5 ft.	Sands little-trace silt & clay
4.0									
6.0	2	4-8		4.0			8.0-10.0	Same As 6.5-8.0, but saturated from 8 to 9 ft. and coarser (medium sand, some fine sand) from 9.0-10.0 feet.	
8.0						WT ~8.0	10.0-11.3 11.3-12.0	Orange/red-brown FINE SAND AND SILT, trace clay, dense. Dense Till.	Till
10.0	3	8-12		4.0					
12.0								END OF BORING 12 FEET	
14.0	4	12-16						PIEZOMETER SCREENED 2 TO 12 FEET.	
16.0									

NA - Not Applicable, NS - Not Sampled.

METCALF & EDDY	SITE LOCATION	BORING NUMBER
701 Edgewater Drive Wakefield, MA 01880 (781)-246-5200	Former Mill Street Property 64-67 Mill Street Brookfield, Massachusetts	P7

CONTRACTOR: Earth Exploration / Geologic
DRILLER: Emil
INSPECTOR: William Abrahams-Dematte
START DATE: 8/5/03
FINISH DATE: 8/5/03

DRILLING METHOD: Direct Push
WELL INSTALLED: Piezometer
SAMPLING METHOD: Ded. Polyethylene Sleeves
SIZE I.D.: 2
TOTAL DEPTH: 8.5 ft.

PAGE 1 of 1

Depth	No.	Range (ft.)	Sample Blows	Recovery (ft.)	PID* (ppm)	Water Table	Interval (ft.)	Sample Description	Stratigraphic Description
0.0	1	0-4	NA	4.0	NS		0.0-0.5 0.5-4.0	Topsoil Yellow/orange-brown, FINE-MEDIUM SAND little-trace coarse sand, trace pebble, firm.	Topsoil
2.0							4.0-4.8	Same As 0.5-4.0 feet.	
4.0							4.8-5.3 5.3-7.0	Yellow-brown, MEDIUM SAND, some silt, trace gravel, dense. Grey-brown, FINE SAND, trace gravel, very dense	Sands
6.0	2	4-8		4.0		WT ~5 ft.	7.0-8.0	Brown-red FINE-MEDIUM SAND, and black micacious rock fragments - phyllite - at 7 & 8 ft.	
8.0							8.0-8.5	Refusal, no recovery.	
10.0	3	8-12							
12.0								END OF BORING 8.5 FEET	
14.0	4	12-16						PIEZOMETER SCREENED 2 TO 8 FEET.	
16.0									

NA - Not Applicable, NS - Not Sampled.

METCALF & EDDY
701 Edgewater Drive
Wakefield, MA 01880
(781)-246-5200

SITE LOCATION
Former Mill Street Property
64-67 Mill Street
Brookfield, Massachusetts

BORING NUMBER
P8

CONTRACTOR: Earth Exploration / Geologic
DRILLER: Emil
INSPECTOR: William Abrahams-Dematte
START DATE: 8/5/03
FINISH DATE: 8/5/03

DRILLING METHOD: Direct Push
WELL INSTALLED: Piezometer
SAMPLING METHOD: Ded. Polyethylene Sleeves
SIZE I.D.: 2
TOTAL DEPTH: 12 ft.

Depth	No.	Range (ft.)	Sample Blows	Recovery (ft.)	PID* (ppm)	Water Table	Interval (ft.)	Sample Description	Stratigraphic Description
0.0	1	0-4	NA	3.2	NS		0.0-0.8	Void	Topsoil
							0.8-1.5	Topsoil	
							1.5-2.2	Orange-brown FINE-MEDIUM SAND.	
2.0							2.2-3.3	Yellow-brown SILT-CLAY, very moist.	
							3.3-4.0	Orange-brown FINE-MEDIUM SAND, little to trace coarse sand, trace gravel, dense.	Sands little-trace silt & clay
4.0							4.0-4.9	Yellow-brown SANDY SILT CLAY, saturated	
							4.9-5.7	Black, coarse grained, micacious phyllite with quartz, feldspar, and copper colored mica	
	2	4-8		4.0			5.7-8.0	Orange/red-brown, MEDIUM-COARSE SAND little VC sand, little-trace gravel, dense ground water flow zones (wet).	
6.0						WT ~6 ft			
							8.0-8.7	Brown/Natural, FINE-VC SAND, little fine gravel, moist.	
							8.7-9.2	Red-brown, FINE-MEDIUM SAND AND GRAVEL, dense.	Till
8.0									
	3	8-12		4.0			9.2-9.8	Orange FINE SAND, little-trace fine gravel.	
							9.8-12.0	Black/grey TILL, predominantly fine sand and silt, very dense.	
10.0									
12.0								END OF BORING 12 FEET PIEZOMETER SCREENED 2 TO 12 FEET.	
	4	12-16							
14.0									
16.0									

NA - Not Applicable, NS - Not Sampled.

APPENDIX E

FIELD WORKSHEETS

Mill Street, Brookfield, MA 8/6/03 - FIELD SURVEY NOTES

Shot #	Hor. Angle (Az. Angle)	Rod (Ft.)	Stadia (Ft.) High	Stadia (Ft.) Low	Stadia Difference	Shot Dist. (ft.)	Comments	Elevation ft	GW depth below top pvc (ft)	GW depth below top pvc (ft)	GW Elev. (ft) 8/6/2003	GW Elev. (ft) 9/12/2003
1	0	4.74	5.1	4.38	0.72	72	UP 30 - BM (Arbitrary 100 ft)	100.00	8/6/2003	09/12/03		
2	137	12.98	13.165	12.784	0.381	38.1	ME-1 TOP PVC - ALL WELLS	91.76	1.44	2.27	90.32	89.49
3	78.5	13.07	13.69	12.44	1.25	125	ME-2	91.67	0.36	1.22	91.31	90.45
4	50	8.05	8.9	7.2	1.7	170	ME-3	96.69	2.77	4.33	93.92	92.36
5	265	5.24	6.102	4.367	1.735	173.5	ME-4	99.50	6.61	7.76	92.89	91.74
6	18	0.35	2.875	1.11	1.765	226.5	LYCOTT-5 - VERTICAL EST. ONLY	104.39				
7	243	13.12	13.642	12.638	1.004	100.4	P1	91.62	1.71	2.5	89.91	89.12
8	177	14.33	14.562	14.08	0.482	48.2	P2	90.41	2.86	3.07	87.55	87.34
9	118.5	15.05	15.52	14.575	0.945	94.5	P3	89.69	0.65	1.52	89.04	88.17
10	93	10.93	11.165	10.7	0.465	46.5	P4	93.81	2.99	3.65	90.82	90.16
11	319	4.395	4.692	4.19	0.502	50.2	P5	100.35	5.82	7.99	94.53	92.36
12	321	2.43	2.93	1.91	1.02	102	P6	102.31	4.62	8.11	97.69	94.20
13	8.25	3.82	4.122	3.265	0.857	85.7	P7	100.92	4.76	7.14	96.16	93.78
14	43	6.7	7.21	6.05	1.16	116	P8	98.04	3.21	5.38	94.83	92.66
15	311	2.96	3.47	2.44	1.03	103	UP 31	101.78				
16	359	4.75	4.86	4.64	0.22	22	1 - BLDG CRN EAST	99.99				
17	358	4.76	4.92	4.62	0.3	30	2 - BLDG CRN WEST	99.98				
18	68	7.15	7.59	6.72	0.87	87	3 - BLDG CRN SUB WEST (IE SO.)	97.59				
19	270	4.32	4.68	3.96	0.72	72	SB-1	100.42				
20	268	4.65	4.87	4.43	0.44	44	SB-2	100.09				
21	293	4.56	4.6	4.51	0.09	9	SB-3	100.18				
22	56.5	5.54	5.72	5.35	0.37	37	SB-4	99.20				

AFTER SHOTS 1-15 BM CHECKED - VERT SAME AZIMUTH OFF 2.6 READ. CORRECTED AND SHOTS 16-22 COMPLETED, BM CHECKED OFF READ 1.6

LYCOTT WAS NOT VISIBLE DUE TO ITS LOCATION, ELEVATION ESTIMATED ONLY - WATER LEVEL NOT TAKEN

Mill Street, Brookfield
Groundwater Monitoring

Date	Time	Location	Depth to Water	From TOC/TOPVC	Well Secure Yes/No	Comments
9/12/03	1130	P-1	2.50 ft	TOPVC	yes	no stake
	1135	P-2	3.07 ft	TOPVC	yes	
	1137	P-3	1.52 ft	TOPVC	yes	slight obs at 1.49 ft - orange staining
	1143	P-4	3.65 ft	TOPVC	yes	
	1150	P-5	7.99 ft	TOPVC	yes	stake broken
	1156	P-6	8.11 ft	TOPVC	yes	silt/mud in probe
	1200	P-7	~ 7.14 ft	TOPVC	yes	silt (~~f. orange/brown~~) covering probe + blocking signal
	1205	P-8	5.38 ft	TOPVC	yes	signal not clear; trace silt
	1140	ME-1	2.27 ft	TOPVC	yes	
	1145	ME-2	1.22 ft	TOPVC	yes	
	1210	ME-3	4.33 ft	TOPVC	yes	
	1153	ME-4	7.76 ft	TOPVC	yes	
	1213	MW-5	10.80 ft	TOC	yes	

APPENDIX F

DATA VALIDATION MEMORANDA
AUGUST 2003 INVESTIGATION

Memorandum

PROJECT NO:	036200100.0006.00115	**DATE:**	October 27, 2003
TO:	Mill Street Site File (BTSA)	**OFFICE:**	Wakefield
FROM:	S. Harvey	**COMPANY:**	Metcalf & Eddy, Inc.
REVIEWED BY:	D. Truini		
CC:	B. Weir, N. Thurber, D. Laferte (memo only)		

SUBJECT: Limited QC Review/Modified Tier II-Like Review
SPLP Metals Analytical Results
Mitkem Corporation, Warwick, Rhode Island
Project No. B1264

On August 5, 2003, nine soil samples were collected at the Mill Street Brownfields Targeted Site Assessment (BTSA) site, located in Brookfield, Massachusetts by Metcalf & Eddy, Inc. (M&E) field personnel. The sampling was performed as part of the BTSA Response Action Contract (RAC) Work Assignment (WA) #106-SIBZ-01ZZ. The samples were submitted to Mitkem Corporation, located in Warwick, Rhode Island for the analysis of Synthetic Precipitation Leaching Procedure (SPLP) Metals using SW-846 Method 1312 . All samples were received by the laboratory on August 6, 2003. The data package was received in the M&E office on August 27, 2003.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site, and the guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to former M&E Work Assignment Manager, Barb Wyskowski. The data review included:

	•	Data Completeness
*	•	Preservation and Technical Holding Times
*	•	Initial and Continuing Calibrations
	•	Blank Analysis Results
*	•	Inductively Coupled Plasma (ICP) Interference Check Sample
*	•	Matrix Spike (MS) Recoveries
*	•	Laboratory Duplicate Sample Results
*	•	Field Duplicate Sample Results
*	•	Laboratory Control Sample (LCS) Results
*	•	ICP Serial Dilution Analysis Results
	•	Compound Quantitation and Reported Quantitation Limits
NA	•	Performance Evaluation (PE) Sample Results

*	=	All criteria met for this parameter
NA	=	Not applicable and/or no information was provided by the laboratory

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to the method and/or to the modified Tier II-like review.

Included in Attachment I is a copy of the chain-of-custody (COC) record. Included in Attachment II are the result summary sheets, annotated with qualifiers, if necessary, as detailed in this memorandum. Included in Attachment III are the data validation worksheets.

Data Competeness

Copper was inadvertently not reported by the laboratory in the original submission of the data package. M&E requested that copper results be reported for all SPLP samples on October 2, 2003. A resubmittal response was received at M&E on October 17, 2003.

Blanks

The following table summarizes the SPLP metals detected in the laboratory blanks and the resulting actions:

Analyte	Max. Concentration (µg/L)	BAL (µg/L)	Affected Samples
silver	6.630	33.2	Qualify the reported results as nondetect (U) in samples SB-1-D, SB-1-S, SB-2-D, and SB-2-S. All other sample results are nondetect.

The blank contamination validation actions include:

* concentration ≤ blank action level; qualify the value as nondetect (U) at the reported value.
* concentration > blank action level; report the value unqualified.

Compound Quantitation and Reported Quantitation Limits

The following table summarizes the positive and blank-qualified nondetect sample results which are estimated (and UJ, respectively) due to reported concentrations being less than two times the instrument detection limits (IDL). There is uncertainty in the quantitation near the IDL:

Analyte	Affected Sample
arsenic	SB-1-S, SB-2-S, SBK-4-D
antimony	SB-4-D
chromium	SB-1-D, SB-2-S
copper	SB-3-S
lead	SB-2-S, SB-3-D
nickel	SB-4-D
silver	SB-1-D, SB-1-S, SB-2-D, SB-2-S
vanadium	SB-1-D
zinc	SB-1-D, SB-1-S, SB-2-D

The positive results for silver in the above listed samples were previously reported "U" due to blank contamination and are further qualified as estimated (UJ) detection limits.

Attachment I

Chain-of-Custody

EPA Metcalf and Eddy DAS Chain of Custody Form
Generic Chain of Custody

Reference Case: 32006
Client No:
R

Region:	1	Date Shipped:	8/6/03	**Chain of Custody Record**	Sampler Signature:
Project Code:		Carrier Name:	Courier - Mitkem	Relinquished By (Date / Time)	Received By (Date / Time)
Account Code:	036200100.0006.00115	Airbill:		1 [signature] 8/6/03 1200	
CERCLIS ID:		Shipped to:	Mitkem Corporation 175 Metro Center Blvd. Warwick RI 02886 (401) 732-3400	2	
Spill ID:				3	
Site Name/State:	Mill Street, Brookfield 2003/MA			4	
Project Leader:	Bill Abrahams-DeMatte				
Action:	Brownfields Site				
Sampling Co:	Metcalf & Eddy, Inc.				

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		QC Type
SB-1-D	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-1-D	S: 8/5/03	12:10	--
SB-1-S	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-1-S	S: 8/5/03	12:00	--
SB-2-D	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-2-D	S: 8/5/03	12:30	--
SB-2-S	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-2-S	S: 8/5/03	12:20	--
SB-3-D	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-3-D	S: 8/5/03	12:40	--
SB-3-S	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (2)	SB-3-S	S: 8/5/03	12:35	--
SB-4-D	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-4-D	S: 8/5/03	12:55	FD 1

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC: SB-3-S	Additional Sampler Signature(s): [signature]	Chain of Custody Seal Number:
Analysis Key: SPLP Metal = SPLP Metals	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____

TR Number: 1-502446878-080503-0002

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

EPA Metcalf and Eddy DAS Chain of Custody Form
Generic Chain of Custody

Reference Case: 32006
Client No:
R

Region:	1	Date Shipped:	8/6/03	Chain of Custody Record	Sampler Signature:
Project Code:		Carrier Name:	Courier - Mitkem	Relinquished By (Date / Time)	Received By (Date / Time)
Account Code:	036200100.0006.00115	Airbill:		1 8/6/03 1200	
CERCLIS ID:		Shipped to:	Mitkem Corporation 175 Metro Center Blvd. Warwick RI 02886 (401) 732-3400	2	
Spill ID:				3	
Site Name/State:	Mill Street, Brookfield 2003/MA			4	
Project Leader:	Bill Abrahams-DeMatte				
Action:	Brownfields Site				
Sampling Co:	Metcalf & Eddy, Inc.				

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		QC Type
SB-4-S	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-4-S	S: 8/5/03	12:50	--
SBK-4-D	SOIL/ Bill Abrahams-DeMatte	L/G	SPLP Metal (21)	(Ice Only) (1)	SBK-4-D	S: 8/5/03	13:00	FD 1

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC: SB-3-S	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: SPLP Metal = SPLP Metals	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C Grab = G	Shipment Iced?

TR Number: 1-502446878-080503-0002

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

Attachment II

Sample Result Summary Sheets

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-1-D

ab Name: MITKEM_CORPORATION_____ Contract: _____

ab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: B1264__

latrix (soil/water): WATER_ Lab Sample ID: B1264-01A_____

evel (low/med): MED____ Date Received: 08/06/03____

Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

8A 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	134	~~B~~		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.83	~~B~~	J	P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	4.0	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	3.9	~~B~~	UJ	P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	1.3	~~B~~	J	P
7440-66-6	Zinc	8.7	~~B~~	J	P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

FORM I - IN SW846

0004R

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-1-S

ab Name: MITKEM_CORPORATION_____ Contract: _____

ab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: B1264__

latrix (soil/water): WATER_ Lab Sample ID: B1264-02A_____

evel (low/med): MED____ Date Received: 08/06/03____

Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

SM 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.6	~~B~~	J	P
7440-39-3	Barium	124	~~B~~		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1.4	~~B~~		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	15.3	~~B~~		P
7439-89-6	Iron				NR
7439-92-1	Lead	29.1			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	3.4	~~B~~	UJ	P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	2.8	~~B~~		P
7440-66-6	Zinc	12.7	~~B~~	J	P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

FORM I - IN SW846

0005R

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-2-D

ab Name: MITKEM_CORPORATION_____ Contract: _____

ab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: B1264__

atrix (soil/water): WATER_ Lab Sample ID: B1264-03A_____

evel (low/med): MED____ Date Received: 08/06/03____

Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	136	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	4.0	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.9	B	UJ	P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	7.8	B	J	P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

FORM I - IN SW846

0006R

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-2-S

ab Name: MITKEM_CORPORATION Contract:

ab Code: MITKEM Case No.: SAS No.: SDG No.: B1264

latrix (soil/water): WATER Lab Sample ID: B1264-04A

evel (low/med): MED Date Received: 08/06/03

Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	B	J	P
7440-39-3	Barium	168	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1.0	B	J	P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	4.8	B	J	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.4	B	UJ	P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	1.5	B		P
7440-66-6	Zinc	21.7	B		P
	Cyanide				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

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1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-3-D

ab Name: MITKEM_CORPORATION_____ Contract: _____

ab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: B1264__

latrix (soil/water): WATER_ Lab Sample ID: B1264-05A_____

evel (low/med): MED____ Date Received: 08/06/03____

; Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	141	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	5.1	B	J	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	7.0	U		P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

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1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-3-S

ab Name: MITKEM_CORPORATION Contract:

ab Code: MITKEM Case No.: SAS No.: SDG No.: B1264

atrix (soil/water): WATER Lab Sample ID: B1264-06A

evel (low/med): MED Date Received: 08/06/03

Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

SA 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	101	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1.3	B		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.8	B	J	P
7439-89-6	Iron				NR
7439-92-1	Lead	8.3	B		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	2.0	B		P
7440-66-6	Zinc	18.6	B		P
	Cyanide				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-4-D

ıb Name: MITKEM_CORPORATION_____ Contract: _____

ıb Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: B1264__

atrix (soil/water): WATER_ Lab Sample ID: B1264-07A_____

ɜvel (low/med): MED____ Date Received: 08/06/03____

Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

SU 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.1	B	J	P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	175	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	17.2	B		P
7439-89-6	Iron				NR
7439-92-1	Lead	9.4	B		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	1.1	B	J	P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	24.2	B		P
	Cyanide				NR

ɔlor Before: _____ Clarity Before: _____ Texture: _____

ɔlor After: _____ Clarity After: _____ Artifacts: _____

ɔmments:

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1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-4-S

ıb Name: MITKEM_CORPORATION_____ Contract: _____

ıb Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: B1264__

atrix (soil/water): WATER_ Lab Sample ID: B1264-08A_____

:vel (low/med): MED____ Date Received: 08/06/03____

Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	62.0	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1.2	B		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	4.0	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	3.9	B		P
7440-66-6	Zinc	7.0	U		P
	Cyanide				NR

ɔlor Before: _____ Clarity Before: _____ Texture: _____

ɔlor After: _____ Clarity After: _____ Artifacts: _____

ɔmments:

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1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBK-4-D

ab Name: MITKEM_CORPORATION_____ Contract: _____

ab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: B1264__

atrix (soil/water): WATER_ Lab Sample ID: B1264-09A_____

evel (low/med): MED____ Date Received: 08/06/03____

Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

SK 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.2	~~B~~	J	P
7440-39-3	Barium	178	~~B~~		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.1	~~B~~		P
7439-89-6	Iron				NR
7439-92-1	Lead	18.6			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.16	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	20.1	~~B~~		P
	Cyanide				NR

olor Before: _____ Clarity Before: _____ Texture: _____

olor After: _____ Clarity After: _____ Artifacts: _____

omments:

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Attachment III

Data Validation Worksheets

Region I
Data Review Worksheet

Site Name: TBSA Site Mill Street Brookfield, MA
Reference Number: 200100.0006.00115

REGION I REVIEW OF INORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) Mitkem Corp. data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No.	—	SAS No.		Sampling Date (s)	8/5/03
SDG No.	~~B1261~~ B1214	Matrix		Shipping Date (s)	8/6/03
No. of Samples	9 / soils			Date(s) rec'd by lab	8/6/03

Traffic Report Numbers: SB-1-D, SB-1-S, SB-2-D, SB-2-S, SB-3-D, SB-3-S, SB-4-D, SB-4-S, SBK-4-D

Trip Blank No.: —
Equipment Blank Number: —
Field Duplicate Numbers: SB-4-D / SBK-4-D

SOW No. SPLP Metals SW 1312, 6010B, 7471A requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- OK -Data Completeness
- OK -Holding Times
- ✓ -Calibrations
- ✓ -Blanks
- OK -ICP Interference Check Results
- OK -Matrix Spike Recoveries
- OK -Laboratory Duplicates
- OK -Field Duplicates
- OK -Lab Control Sample Results
- NA -Furnace AA results
- OK -ICP Serial Dilution Results
- OK -Detection Limit Results
- ✓ -Sample Quantitation

Overall Comments: Cooler temp 3°c

Definitions and Qualifiers:
- A - Acceptable data
- J - Approximate data due to quality control criteria
- R - Reject data due to quality control criteria
- U - Analyte not detected

Reviewer: Sheila Harvey Date: 9/3/03

Region I
Inorganic Data Review Worksheets

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: SPLP Soil

DATE:	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS ug/L
	ICB		Ag	4.5
		✓	Ag	6.630

2. Equipment/Trip Blanks None

DATE:	EQUIP BL #	ANALYTE	CONC./UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? **Yes or No**

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? **Yes or No**

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

Region I
Inorganic Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Level for any analyte is equal to 5X the highest concentration of that analyte found in any blank. (Use 5X the absolute value for any negative blank results). The Action Level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL) for that analyte. Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

Matrix: Soil - TCLP

ELEMENT	MAX. CONC. /UNITS ug/L	AL /UNITS (SP)	Matrix: ELEMENT	MAX. CONC/ UNITS	AL/ UNIT
Ag	6.63	~~33.15~~ 33.2 ug/L			

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{conc. in ug/l} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1\text{L}}{1000\text{ml}} \times \frac{1000\text{g}}{1\text{kg}} \times \frac{1\text{mg}}{1000\text{ug}} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the Action Level gives a final result in mg/kg which can then be compared to sample results

Ag: "U" positive results in samples: SB-1-D, SB-1-S, SB-2-D, SB-2-S; all others ND

Region I
Inorganic Data Review Worksheets

XIII. SAMPLE QUANTITATION (continued)

List the positive sample results that were reported at concentrations less than 2xIDL and have not already been qualified. The positive results have been estimated (J) due to uncertainty in the quantitation near the IDL.

Analyte	Samples Affected
Cr	SB-1-D, SB-2-S
Ag*	SB-1-D, SB-1-S, SB-2-D, SB-2-S
Vn	SB-1-D,
Zn	SB-1-D, SB-1-S, SB-2-D,
As	SB-1-S, SB-2-S, SBK-4-D
Pb	SB-2-S, SB-3-D
Sb** DAT 10/1/03	SB-4-D
Ni	SB-4-D
Cu	SB-3-S

* results "U" due to blank contamination. Therefore, UJ.

~~** result previously "J" due to ICV %R > 110%. No further action taken.~~
DAT 10/1/03

Metcalf & Eddy

701 Edgewater Drive
Wakefield, MA 01880

Tel: 781-246-5200
Fax: 781-245-6293
www.m-e.com

036200100.0006.00115

October 29, 2003

Ms. Christine Clark
USEPA - New England
OEME - QA Unit
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

Re: Work Assignment No. 106-SIBZ-0100
Case No. 32006, SDG No. MA1357
Liberty Analytical Corp., Cary, North Carolina
Targeted Brownfields Site Assessment: Mill Street, Brookfield, Massachusetts
Modified Tier II Inorganic Data Validation

Metals: 9/Soil/MA1357, MA1358, MA1359, MA1360, MA1361, MA1362, MA1363, MA1364, MA1365
(Field Duplicates/MA1363 and MA1365)

Dear Ms. Clark:

A modified Tier II data validation was performed by Metcalf & Eddy, Inc. (M&E) on the inorganic analytical data for nine soil samples collected from the Mill Street Targeted Brownfields Assessment (TBA) site, located in Brookfield, Massachusetts by M&E field personnel on August 5, 2003. The samples were analyzed for metals under the Contract Laboratory Program Routine Analytical Services (RAS) using the EPA *Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, ILM04.1*. M&E evaluated the data using the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, February 1989 criteria, and incorporated new organic data validation guidance from *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria, as deemed appropriate. All samples were received by the laboratory on August 6, 2003. The data package was received in the M&E office on September 4, 2003.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site, and the guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to former M&E Work Assignment Manager, Barb Wyskowski. The format of the validation memoranda underwent modification as of July 2001 at the request of the EPA Project Chemist, Alan Peterson, with the approval of Mr. Byrne. The data review included the following:

*	•	Data Completeness
*	•	Preservation and Technical Holding Times
	•	Initial and Continuing Calibrations
	•	Blank Analysis Results
	•	Inductively Coupled Plasma (ICP) Interference Check Sample Results
	•	Matrix Spike (MS) Recoveries
	•	Laboratory Duplicate Sample Results
*	•	Field Duplicate Sample Results
*	•	Laboratory Control Sample (LCS) Results
*	•	Furnace Atomic Absorption Results
	•	ICP Serial Dilution Results
*	•	Instrument Detection Limits (IDL)
	•	Sample Quantitation Results
NA	•	Performance Evaluation Sample

*	=	All criteria met for this parameter
NA	=	Not applicable and/or no information was provided by the laboratory

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to the method and/or to Tier II data validation.

Initial and Continuing Calibrations

The following table summarizes the CRDL standard recoveries that did not meet acceptable percent recovery criteria of 80-120%:

Analyte	Percent Recovery	Action
thallium	129.8%	Estimate (J) the positive result <3xCRDL (6 mg/kg) in sample MA1357.
arsenic	120.6%	Estimate (J) the positive results <3x CRDL (6 mg/kg) in samples MA1357, MA1358, MA1359, MA1360, MA1361, MA1362, MA1364, and MA1365.

The positive thallium result in sample MA1357and the positive arsenic results in samples MA1357, MA1358, MA1359, and MA1364 were qualified as nondetect (U) due to blank contamination. Therefore, these results are further qualified as estimated, nondetect (UJ) due to blank contamination and high CRDL standard recovery.

Blank Analysis Results

A review of laboratory blank analysis results indicates the presence of laboratory contamination for the analytes listed below. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results. Positive sample results reported with concentrations less than the blank action level (BAL) for that compound are considered to be false positive results.

Analyte	Max. Conc. Contaminant (µg/L)	BAL* (mg/kg)	Affected Samples/Action
arsenic	2.8	2.8	Qualify the reported value as nondetect (U) in samples MA1357, MA1358, MA1359, and MA1364.
barium	4.4	4.4	None. All sample results >BAL.
beryllium	0.1	0.1	None. All sample results >BAL.
potassium	208.0	208.0	None. All sample results >BAL
thallium	5.1	5.1	Qualify the reported value as nondetect (U) in sample MA1357.
vanadium	-0.7	0.7	None. All sample results >BAL.

* The sample-specific preparation factors and percent solids were taken into account when evaluating blank contamination.

For positive blank contamination, sample results were qualified as follows:

* concentration ≤ BAL; report value on summary table as U.
* concentration > BAL; report value unqualified.

For negative blank contamination, sample results were qualified as follows:

* concentration ≤ negative BAL; report value on summary table as UJ
* concentration > negative BAL; report value unqualified.

ICP Interference Check Sample Results

The following sample results have been affected by spectral interference from iron as indicated by interference check solution (ICS) A exceedances:

Sample	Interferent/Conc. (µg/L)	Analyte	% Estimated Interference	Action
MA1363	Iron 141473	arsenic	19.6	Estimate (J) positive result in this sample due to positive spectral interference. Interference is >10% but <90% of the sample concentration. Therefore, the positive result may be biased high due to the high concentration of iron.
		barium	0.09	No action since the estimated interference is <10% of sample result.
		cobalt	13.2	Estimate (J) positive result in this sample due to negative spectral interference. Interference is >10% but <90% of the sample concentration. Therefore, the positive result may be biased low due to the high concentration of iron.
		potassium	4.7	No action since the estimated interference is <10% of sample result.
		manganese	0.07	No action since the estimated interference is <10% of sample result.
		selenium	not calculable	Estimate (UJ) the nondetect result in this sample due to negative spectral interfernce. Therefore, the nondetect result may be biased low due to high iron concentration.
		vanadium	1.6	No action since the estimated interference is <10% of sample result.
MA1365	Iron 107702	arsenic	21.1	Estimate (J) positive result in this sample due to positive spectral interference. Interference is >10% but <90% of the sample concentration. Therefore, the positive result may be biased high due to the high concentration of iron.
		barium	0.06	No action since the estimated interference is <10% of sample result.

Sample	Interferent/Conc. (µg/L)	Analyte	% Estimated Interference	Action
MA1365	Iron 107702	cobalt	14.6	Estimate (J) positive result in this sample due to negative spectral interference. Interference is >10% but <90% of the sample concentration. Therefore, the positive result may be biased low due to the high concentration of iron.
		potassium	4.3	No action since the estimated interference is <10% of sample result.
		manganese	1.5	No action since the estimated interference is <10% of sample result.
		selenium	not calculable	Estimate (UJ) the nondetect result in this sample due to negative spectral interfernce. Therefore, the nondetect result may be biased low due to high iron concentration.
		vanadium	0.06	No action since the estimated interference is <10% of sample result.

The positive arsenic result in sample MA1365 was previously qualified as estimated (J) due to low CRDL standard recovery. Therefore, no further action is taken due to interference from a high iron concentration.

Matrix Spike Recoveries

The matrix spike recoveries for soil sample MA1362 that did not meet acceptance criteria of 75-125 percent recovery (%R), indicating possible matrix interference, are summarized below:

Analyte	Spiked Sample Result (mg/kg)	Sample Result (mg/kg)	Matrix Spike %R	Affected Samples/Action
antimony	51.0527	0.6452 U	44.3	Estimate (J) positive results in samples MA1363 and MA1365. Estimate (UJ) nondetect results in samples MA1357, MA1358, MA1359, MA1360, MA1361, MA1362, and MA1364. Samples results may be biased low.
copper	97.1811	56.7061	70.3	Estimate (J) positive results in all samples. Sample results may be biased low.
mercury	0.7419	0.3522	67.2	Estimate (J) positive results in samples MA1360, MA1361, MA1362, MA1363, MA1364, and MA1365. Estimate (UJ) the nondetect results in samples MA1357, MA1358, and MA1359. Sample results may be biased low.
zinc	212.2284	204.0819	7.1	Estimate (J) positive results in all samples. Samples results may be biased low.

Laboratory Duplicate Sample Results

The analytes that did not meet acceptance criterion of relative percent difference (%RPD) < 35% in soil sample MA1362 are summarized in the following table:

Analyte	Sample Result (mg/kg)	Duplicate Sample Result (mg/kg)	%RPD	Affected Samples/Action
barium	235.9466	155.47	41.1	Estimate (J) positive results in all samples. A bias could not be determined.
iron	19108.4492	41533.6445	74.0	Estimate (J) positive results in all samples. A bias could not be determined.
lead	250.0751	164.7310	41.1	Estimate (J) positive results in all samples. A bias could not be determined.

ICP Serial Dilution Results

The analyte that did not meet acceptance criterion for percent difference (%D) of ≤15% in the serially diluted sample MA1362 is summarized in the following table :

Analyte	Sample Result (mg/kg)	Duplicate Sample Result (mg/kg)	%RPD	Affected Samples/Action
copper	246.10	301.29	22.4	Estimate (J) positive results in all samples. Sample results may be biased low.

The positive copper results in all samples were previously qualified as estimated (J) due to low matrix spike recovery. Therefore, no further action is taken due to poor serial dilution results.

Sample Quantitation Results

The following table summarizes the positive sample results and the blank-qualified nondetect sample results that are less than two times the instrument detection limit (IDL) and were not previously qualified as estimated (J) due to quality control parameters discussed above. The listed results are qualified as estimated (J) due to uncertainty in the quantitation near the IDL:

Analyte	Affected Samples
sodium	MA1357, MA1359, MA1360, MA1362, MA1363, MA1365
cadmium	MA1364

Please contact Constance Lapite at (781) 224-6628 or constance.lapite@m-e.com if you have any questions regarding this information.

Very truly yours,

Sheila Harvey
Initial Data Validator

Deborah Truini
Senior Reviewer

Constance Lapite
RAC Lead Chemist

cc: Barbara Weir, Project Manager (memo only)
Denise Laferte, Project Chemist (entire package)
S. Harvey, Data Validator (entire package)
TBA Mill Street Project File (WA No. 106-SIBZ-0100)

Attachments: IRDA Form
Chain-of-Custody Forms
Validated Sample Result Summary Sheets (Form Is)
Data Validation Worksheets
Copies of Telephone Logs/Communication Forms (not applicable)
CSF Audit (DC-2 Form)
DQO Summary Form

Attachment I

IRDA Form

Region I
Inorganic Data Review Worksheets

Region I

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 32006 SITE Targeted Brownfield Site Assessment Hill Street, Brookfield, MA

LABORATORY Liberty Analytical Corp. NO OF SAMPLES/MATRIX 9/soil

SDG # MA1357 REVIEWER(IFNOT ESD) M+E, Inc.

SOW # ILM04.1 REVIEWER'S NAME S. Harvey

DPO:ACTION _____ FYI X COMPLETION DATE 9/9/03

DATA ASSESSMENT SUMMARY

		ICP	AA	HG	CYANIDE
1.	HOLDING TIMES	O	NA	O	NA
2.	CALIBRATIONS	O[1]		O	
3.	BLANKS	O[2]		O	
4.	ICS	O[3]		O	
5.	LCS	O		O	
6.	DUPLICATE ANALYSIS	O[4]		O	
7.	MATRIX SPIKE	O[5]		O	
8.	MSA	NA		NA	
9.	SERIAL DILUTION	O[6]		O	
10.	SAMPLE VERIFICATION	O		O	
11.	OTHER QC	O[7]		O	
12.	OVERALL ASSESSMENT	O	✓	O	✓

O = Data had no problems, or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: 01 Several As and Tl results were qualified as estimated (J) due to ICRX standard recovery 02 Several As results were considered to be nondetect (U) due to blank contamination 03 Several As, Co, Se results were qualified (J) as estimated due to spectral interference from high concentrations of iron

AREAS OF CONCERN: 04 All Ba, Fe, Pb results were estimated (J) due to laboratory duplicate imprecision 05 All Sb, Cu, Hg Zn results were qualified as estimated (J) due to ↓ MS recoveries 06 All Cu results were qualified as estimated (J) due to serial dilution %D exceedance

NOTABLE PERFORMANCE: 07 Several Na and Cd results were qualified as estimated (J) due to qualitation below the IDL.

Attachment II

Chain-of-Custody

EPA Metcalf and Eddy DAS Chain of Custody Form
Inorganic Traffic Report & Chain of Custody Record

Case No: 32006
DAS No:
R

Region:	1	Date Shipped:	8/5/03
Project Code:		Carrier Name:	FedEx
Account Code:	036200100.0006.00115	Airbill:	838301929482
CERCLIS ID:		Shipped to:	Liberty Analytical Corporation 501 Madison Avenue Cary NC 27513 (919) 379-4100
Spill ID:			
Site Name/State:	Mill Street, Brookfield 2003/MA		
Project Leader:	Bill Abrahams-DeMatte		
Action:	Brownfields Site		
Sampling Co:	Metcalf & Eddy, Inc.		

Chain of Custody Record

Sampler Signature:

Relinquished By	(Date / Time)	Received By	(Date / Time)
1	8/5/03 17:00		
2			
3			
4			

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MA1357	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195135 (Ice Only) (1)	SB-1-D	S: 8/5/03	12:10		--
MA1358	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195136 (Ice Only) (1)	SB-1-S	S: 8/5/03	12:00		--
MA1359	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195137 (Ice Only) (1)	SB-2-D	S: 8/5/03	12:30		--
MA1360	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195138 (Ice Only) (1)	SB-2-S	S: 8/5/03	12:20		--
MA1361	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195139 (Ice Only) (1)	SB-3-D	S: 8/5/03	12:40		--
MA1362	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195140 (Ice Only), 195141 (Ice Only) (2)	SB-3-S	S: 8/5/03	12:35		--
MA1363	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195142 (Ice Only) (1)	SB-4-D	S: 8/5/03	12:55		FD 1

Shipment for Case Complete? N KO 8/5/03	Sample(s) to be used for laboratory QC: MA1362	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: RAS Metals = RAS Metals	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____

TR Number: 1-502446878-080503-0001

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

EPA Metcalf and Eddy DAS Chain of Custody Form
Inorganic Traffic Report & Chain of Custody Record

Case No: 32006
DAS No:
R

Region:	1	Date Shipped:	8/5/03	Chain of Custody Record	Sampler Signature:
Project Code:		Carrier Name:	FedEx	Relinquished By (Date / Time)	Received By (Date / Time)
Account Code:	036200100.0006.00115	Airbill:	838301929482	[signature] 8/5/03 17:00	
CERCLIS ID:		Shipped to:	Liberty Analytical Corporation 501 Madison Avenue Cary NC 27513 (919) 379-4100	2	
Spill ID:				3	
Site Name/State:	Mill Street, Brookfield 2003/MA			4	
Project Leader:	Bill Abrahams-DeMatte				
Action:	Brownfields Site				
Sampling Co:	Metcalf & Eddy, Inc.				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MA1364	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195143 (Ice Only) (1)	SB-4-S	S: 8/5/03	12:50		–
MA1365	SOIL/ Bill Abrahams-DeMatte	L/G	RAS Metals (21)	195144 (Ice Only) (1)	SBK-4-D	S: 8/5/03	13:00		FD 1

Shipment for Case Complete? N PKO 8/5/03	Sample(s) to be used for laboratory QC: MA1362	Additional Sampler Signature(s): [signature]	Chain of Custody Seal Number:
Analysis Key: RAS Metals = RAS Metals	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced?

TR Number: 1-502446878-080503-0001

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

Attachment III

Validated Sample Result Summary Sheets

U. S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1357

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40601

Level (low/med): LOW Date Received: 08/06/03

% Solids: 89.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SAA 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000			P
7440-36-0	Antimony	0.60	UJ	~~N~~	P
7440-38-2	Arsenic	2.7	UJ		P
7440-39-3	Barium	106	J	~~*~~	P
7440-41-7	Beryllium	0.34	~~B~~		P
7440-43-9	Cadmium	0.11	U		P
7440-70-2	Calcium	1780		~~*~~	P
7440-47-3	Chromium	21.3			P
7440-48-4	Cobalt	3.4	~~B~~		P
7440-50-8	Copper	17.6	J	~~N+B~~	P
7439-89-6	Iron	15100	J	~~*~~	P
7439-92-1	Lead	13.2	J	~~*~~	P
7439-95-4	Magnesium	3140			P
7439-96-5	Manganese	228		~~*~~	P
7439-97-6	Mercury	0.049	UJ	~~N~~	CV
7440-02-0	Nickel	8.1	~~B~~		P
7440-09-7	Potassium	2640			P
7782-49-2	Selenium	0.68	U		P
7440-22-4	Silver	0.28	U		P
7440-23-5	Sodium	121	~~B~~ J		P
7440-28-0	Thallium	0.73	~~B~~	UJ	P
7440-62-2	Vanadium	27.6			P
7440-66-6	Zinc	38.1	J	~~N~~	P

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000011

U. S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1358

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40602

Level (low/med): LOW Date Received: 08/06/03

% Solids: 94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4170			P
7440-36-0	Antimony	0.57	UJ	~~N~~	P
7440-38-2	Arsenic	1.0	~~B~~	UJ	P
7440-39-3	Barium	13.8	~~B~~	J	P
7440-41-7	Beryllium	0.11	~~B~~		P
7440-43-9	Cadmium	0.10	U		P
7440-70-2	Calcium	277	~~B~~	~~*~~	P
7440-47-3	Chromium	3.3			P
7440-48-4	Cobalt	1.3	~~B~~		P
7440-50-8	Copper	3.0	~~B~~ J	~~N~~	P
7439-89-6	Iron	4200	J	~~*~~	P
7439-92-1	Lead	3.5	J	~~*~~	P
7439-95-4	Magnesium	270	~~B~~		P
7439-96-5	Manganese	30.9		~~*~~	P
7439-97-6	Mercury	0.042	UJ	~~N~~	CV
7440-02-0	Nickel	2.3	~~B~~		P
7440-09-7	Potassium	217	~~B~~		P
7782-49-2	Selenium	0.65	U		P
7440-22-4	Silver	0.26	U		P
7440-23-5	Sodium	69.2	U		P
7440-28-0	Thallium	0.70	U		P
7440-62-2	Vanadium	6.3	~~B~~		P
7440-66-6	Zinc	6.8	J	~~N~~	P

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000012

U. S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1359

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40603

Level (low/med): LOW Date Received: 08/06/03

% Solids: 87.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10800			P
7440-36-0	Antimony	0.59	UJ	~~N~~	P
7440-38-2	Arsenic	2.8	UJ		P
7440-39-3	Barium	132	J	~~*~~	P
7440-41-7	Beryllium	0.34	~~B~~		P
7440-43-9	Cadmium	0.10	U		P
7440-70-2	Calcium	1090		~~E~~	P
7440-47-3	Chromium	17.1			P
7440-48-4	Cobalt	3.7	~~B~~		P
7440-50-8	Copper	21.7	J	~~N+E~~	P
7439-89-6	Iron	19100	J	~~*~~	P
7439-92-1	Lead	7.8	J	~~*~~	P
7439-95-4	Magnesium	2920			P
7439-96-5	Manganese	282		~~*~~	P
7439-97-6	Mercury	0.048	UJ	~~N+~~	CV
7440-02-0	Nickel	7.4	~~B~~		P
7440-09-7	Potassium	2670			P
7782-49-2	Selenium	0.67	U		P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	134	~~B~~	J	P
7440-28-0	Thallium	0.71	U		P
7440-62-2	Vanadium	27.8			P
7440-66-6	Zinc	39.4	J	~~N~~	P

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000013

U. S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1360

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40604

Level (low/med): LOW Date Received: 08/06/03

% Solids: 86.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SH 12/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9970			P
7440-36-0	Antimony	0.64	UJ	~~N~~	P
7440-38-2	Arsenic	5.4	J		P
7440-39-3	Barium	166	J	~~*~~	P
7440-41-7	Beryllium	0.34	~~B~~		P
7440-43-9	Cadmium	0.11	U		P
7440-70-2	Calcium	3900		~~*~~	P
7440-47-3	Chromium	18.3			P
7440-48-4	Cobalt	3.2	~~B~~		P
7440-50-8	Copper	38.7	J	~~N*E~~	P
7439-89-6	Iron	17300	J	~~*~~	P
7439-92-1	Lead	84.6	J	~~*~~	P
7439-95-4	Magnesium	2400			P
7439-96-5	Manganese	152		~~*~~	P
7439-97-6	Mercury	0.084	~~K~~J	~~N*~~	CV
7440-02-0	Nickel	8.1	~~B~~		P
7440-09-7	Potassium	1800			P
7782-49-2	Selenium	0.73	U		P
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	78.6	~~B~~	J	P
7440-28-0	Thallium	0.77	U		P
7440-62-2	Vanadium	26.4			P
7440-66-6	Zinc	148	J	~~N~~	P

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000014

FORM I - IN

ILM04.

U. S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1361

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40605

Level (low/med): LOW Date Received: 08/06/03

% Solids: 86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12200			P
7440-36-0	Antimony	0.60	UJ	~~N~~	P
7440-38-2	Arsenic	4.1	J		P
7440-39-3	Barium	141	J	~~*~~	P
7440-41-7	Beryllium	0.40	~~B~~		P
7440-43-9	Cadmium	0.11	U		P
7440-70-2	Calcium	3290		~~*~~	P
7440-47-3	Chromium	19.6			P
7440-48-4	Cobalt	4.8	~~B~~		P
7440-50-8	Copper	42.8	J	~~N+E~~	P
7439-89-6	Iron	18900	J	~~*~~	P
7439-92-1	Lead	141	J	~~*~~	P
7439-95-4	Magnesium	3030			P
7439-96-5	Manganese	308		~~*~~	P
7439-97-6	Mercury	2.2	J	~~N~~	CV
7440-02-0	Nickel	8.1	~~B~~		P
7440-09-7	Potassium	2650			P
7782-49-2	Selenium	0.68	U		P
7440-22-4	Silver	0.28	U		P
7440-23-5	Sodium	223	~~B~~		P
7440-28-0	Thallium	0.72	U		P
7440-62-2	Vanadium	30.8			P
7440-66-6	Zinc	66.3	J	~~N~~	P

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000015

U. S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1362

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40606

Level (low/med): LOW Date Received: 08/06/03

% Solids: 86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11700			P
7440-36-0	Antimony	0.64	UJ	~~N~~	P
7440-38-2	Arsenic	4.5	J		P
7440-39-3	Barium	236	J	~~*~~	P
7440-41-7	Beryllium	0.39	~~B~~		P
7440-43-9	Cadmium	0.45	~~B~~		P
7440-70-2	Calcium	6290		~~*~~	P
7440-47-3	Chromium	21.3			P
7440-48-4	Cobalt	3.0	~~B~~		P
7440-50-8	Copper	56.7	J	~~N*E~~	P
7439-89-6	Iron	19100	J	~~*~~	P
7439-92-1	Lead	250	J	~~*~~	P
7439-95-4	Magnesium	2690			P
7439-96-5	Manganese	191		~~*~~	P
7439-97-6	Mercury	0.35	J	~~N*~~	CV
7440-02-0	Nickel	8.1	~~B~~		P
7440-09-7	Potassium	1800			P
7782-49-2	Selenium	0.74	U		P
7440-22-4	Silver	0.96	~~B~~		P
7440-23-5	Sodium	78.8	~~B~~	J	P
7440-28-0	Thallium	0.78	U		P
7440-62-2	Vanadium	28.4			P
7440-66-6	Zinc	204	J	~~N~~	P

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000016

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1363

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40607

Level (low/med): LOW Date Received: 08/06/03

% Solids: 77.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8530			P
7440-36-0	Antimony	1.8	~~B~~ J	~~N~~	P
7440-38-2	Arsenic	8.0	J		P
7440-39-3	Barium	1140	J	~~*~~	P
7440-41-7	Beryllium	0.29	~~B~~		P
7440-43-9	Cadmium	0.53	~~B~~		P
7440-70-2	Calcium	9740		~~*~~	P
7440-47-3	Chromium	17.0			P
7440-48-4	Cobalt	5.3	~~B~~	J	P
7440-50-8	Copper	1210	J	~~N*E~~	P
7439-89-6	Iron	34600	J	~~*~~	P
7439-92-1	Lead	468	J	~~*~~	P
7439-95-4	Magnesium	1980			P
7439-96-5	Manganese	256		~~*~~	P
7439-97-6	Mercury	0.15	J	~~N*~~	CV
7440-02-0	Nickel	18.4			P
7440-09-7	Potassium	1120	~~B~~		P
7782-49-2	Selenium	0.78	U J		P
7440-22-4	Silver	0.32	U		P
7440-23-5	Sodium	141	~~B~~	J	P
7440-28-0	Thallium	0.83	U		P
7440-62-2	Vanadium	21.8			P
7440-66-6	Zinc	670	J	~~N~~	P

Color Before: BLACK Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000017

U. S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1364

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40608

Level (low/med): LOW Date Received: 08/06/03

% Solids: 81.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9070			P
7440-36-0	Antimony	0.68	UJ	~~N~~	P
7440-38-2	Arsenic	2.4	~~B~~	UJ	P
7440-39-3	Barium	766	J	~~N~~	P
7440-41-7	Beryllium	0.28	~~B~~		P
7440-43-9	Cadmium	0.21	~~B~~	J	P
7440-70-2	Calcium	29900		~~N~~	P
7440-47-3	Chromium	16.5			P
7440-48-4	Cobalt	2.5	~~B~~		P
7440-50-8	Copper	247	J	~~N*E~~	P
7439-89-6	Iron	17700	J	~~N~~	P
7439-92-1	Lead	524	J	~~N~~	P
7439-95-4	Magnesium	3450			P
7439-96-5	Manganese	205		~~N~~	P
7439-97-6	Mercury	0.15	J	~~N~~	CV
7440-02-0	Nickel	10.0			P
7440-09-7	Potassium	2570			P
7782-49-2	Selenium	0.77	U		P
7440-22-4	Silver	0.31	U		P
7440-23-5	Sodium	264	~~B~~		P
7440-28-0	Thallium	0.82	U		P
7440-62-2	Vanadium	23.0			P
7440-66-6	Zinc	420	J	~~N~~	P

Color Before: BLACK Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000018

U. S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1365

Lab Name: COMPUCHEM Contract: 68W00082

Lab Code: LIBRTY Case No.: 32006 SAS No.: SDG No.: MA1357

Matrix (soil/water): SOIL Lab Sample ID: 40609

Level (low/med): LOW Date Received: 08/06/03

% Solids: 77.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SM 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8340			P
7440-36-0	Antimony	2.8	~~B~~ J	~~N*~~	P
7440-38-2	Arsenic	5.4	J		P
7440-39-3	Barium	1220	J	*	P
7440-41-7	Beryllium	0.23	~~B~~		P
7440-43-9	Cadmium	1.0	~~B~~		P
7440-70-2	Calcium	10100		*	P
7440-47-3	Chromium	16.4			P
7440-48-4	Cobalt	3.5	~~B~~	J	P
7440-50-8	Copper	1260	J	~~N*E~~	P
7439-89-6	Iron	25400	J	*	P
7439-92-1	Lead	686	J	*	P
7439-95-4	Magnesium	1760			P
7439-96-5	Manganese	214		*	P
7439-97-6	Mercury	0.32	J	~~N*~~	CV
7440-02-0	Nickel	14.1			P
7440-09-7	Potassium	902	~~B~~		P
7782-49-2	Selenium	0.76	UJ		P
7440-22-4	Silver	2.6			P
7440-23-5	Sodium	126	~~B~~	J	P
7440-28-0	Thallium	0.80	U		P
7440-62-2	Vanadium	16.8			P
7440-66-6	Zinc	782	J	~~N~~	P

Color Before: BLACK Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

0000019

Attachment IV

Data Validation Worksheets

Region I
Data Review Worksheet

Site Name: Mill Street Brookfield, MA
Reference Number: 2010.0006.00115

REGION I REVIEW OF INORGANIC
CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) Liberty Cary, NC data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No.	32006	SAS No.		Sampling Date (s)	8/5/03
SDG No.	MA1357	Matrix	Soil	Shipping Date (s)	8/5/03
No. of Samples	9			Date(s) rec'd by lab	8/6/03

Traffic Report Numbers: MA1357, MA1358, MA1359, MA1360, MA1361, MA1362, MA1363, MA1364, MA1365

Trip Blank No.: —
Equipment Blank Number: —
Field Duplicate Numbers: MA1363/MA1365

SOW No. ILM04.1 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -Calibrations
- -Blanks
- -ICP Interference Check Results
- -Matrix Spike Recoveries
- -Laboratory Duplicates
- -Field Duplicates
- -Lab Control Sample Results
- -Furnace AA results
- -ICP Serial Dilution Results
- -Detection Limit Results
- -Sample Quantitation

Overall Comments: Cooler temp 3.2°C

Definitions and Qualifiers:

A - Acceptable data
J - Approximate data due to quality control criteria
R - Reject data due to quality control criteria
U - Analyte not detected

Reviewer: Sheila Kearney

Date: 9/5/03

Region I
Inorganic Data Review Worksheets

III A. Instrument Calibration (Section I continued)

CRDL Recovery Criteria (Custom Worksheet)

Matrix: Soil

Please list below all analytes not meeting percent criteria in the CRDL standard.

Analyte	Percent Recovery (%)	Actions/Samples Affected
Thallium	#3 130.6% #3 129.8% *	J(+) < 3xCRDL (6mg/kg); MA1357 all others ND
As	all 120.6% *	J(+) < 3xCRDL (6mg/kg); all samples except MA1363 which is > 3xCRDL

Actions:

1. If %R < 80%, J (+) results, UJ (ND)
2. If %R > 120%, J (+) only
3. J (+) and (UJ) ND samples < 3xCRDL
4. No actions for those samples > 3xCRDL

* apply to ~~MA1343~~ All samples SH

Region I
Inorganic Data Review Worksheets

pg 1 of 2

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: Soil

DATE:	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS
	CCB#7		As	2.8 µg/L
	ICB/CCB1-3	✓	Ba	4.3 µg/L, 4.3 µg/L, 4.3 µg/L, 4.4 µg/L
				0.869 mg/Kg
	CCB4-7			4.4 µg/L; 4.2 µg/L; 4.3 µg/L, 4.4 µg/L;
	CCB8-11			4.2 µg/L; 4.4 µg/L; 4.4 µg/L; 4.4 µg/L
	CCB4+10		Be	0.1 µg/L, 0.1 ug/L
	CCB5,6,7,9		K	189.2 µg/L; 144.0 µg/L; 140.3 µg/L; 193.9
	CCB10,11			208.0 µg/L; 149.1 µg/L

2. Equipment/Trip Blanks None

DATE:	EQUIP BL #	ANALYTE	CONC./UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: Soil

DATE:	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS
	CCB 1,2,4,7		TL	3.9 µg/L; 5.1 µg/L; 4.8 µg/L; 5.0 µg/L
		✓	TL	0.7100 mg/kg
	CCB 10,11		TL	5.0 µg/L; 5.0 µg/L

2. Equipment/Trip Blanks

DATE:	EQUIP BL #	ANALYTE	CONC./UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? **Yes or No**

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? **Yes or No**

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

Region I
Inorganic Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Level for any analyte is equal to 5X the highest concentration of that analyte found in any blank. (Use 5X the absolute value for any negative blank results). The Action Level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL) for that analyte. Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

Matrix: Soil

ELEMENT	MAX. CONC. /UNITS	AL /UNITS ug/L	Matrix: ELEMENT	MAX. CONC/ UNITS	AL/ UNIT
As	2.8 ug/L ✓	14.0			
Ba	4.4 ug/L ✓	22.0			
Be	0.1 ug/L ✓	0.5			
K	208.0 ug/L ✓	1040			
Tl	5.1 ug/L ✓	25.5			
V	-0.7 ug/L				

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{conc. in ug/l} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1\text{L}}{1000\text{ml}} \times \frac{1000\text{g}}{1\text{kg}} \times \frac{1\text{mg}}{1000\text{ug}} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the Action Level gives a final result in mg/kg which can then be compared to sample results

As: "U" (+) result in samples MA1357, MA1358, MA1359, MA1364
Ba: none
Be: none
K: none
Tl: "U" (+) result as nondetect in sample MA1357

Region I
Inorganic Data Review Worksheets

V B. ICP INTERFERENCE CHECK SAMPLE (Section 3)

3. Report the concentration of any elements detected in the ICS A solution > 2X IDL that should not be present.

IDL	ELEMENT	highest CONC. DETECTED IN THE ICS initial or Final µg/L	lowest CONC. OF INTERFERENTS IN THE ICS initial or Final µg/L			
			AL	CA	FE	MG
2.2	As	9			199101	
6.0	Ba	6				
0.7	Co	-4				
128.9	K	306				
0.6	Vn	-2				
0.4	mn	-1				
3.2	Se	-7				

Estimate the concentration produced by the interfering element in all affected samples. See the guidelines for examples. List the samples affected by the interferences below:

See attached

SAMPLE AFFECTED	ELEMENT AFFECTED	SAMPLE CONC. (µg/L)	SAMPLE INTERFERENT CONC. (µg/L)				ESTIMATED. INTERF (µg/L)
			AL	CA	FE	MG	
MA1363 + MA1365							

ACTIONS:

1. In general, the sample data can be accepted without qualification if the sample concentrations of Al, Ca, Fe, and Mg are less than 50% of their respective levels in the ICS solution.
2. Estimate (J) positive results for affected elements for samples with levels of interferents 50% or more of that in the ICS solution.
3. Reject (R) positive results if the reported concentration is due entirely to the interfering element.
4. Estimate (UJ) non-detected results for which false negatives are suspect.

Give an explanation for any actions taken below:

Sample ID: MA1363

Analyte	Average Fe in ICSA (ug/L)	Fe in sample (ug/L)	Highest Conc. of analyte in ICSA (ug/L)	Conc. of analyte in sample (ug/L)	Conc. Attributableto interference	% Estimated interference	Actions
Arsenic	199101.0	141473.0	9	32.6	6.40	19.62%	J
Barium	199101.0	141473.0	6	4678	4.26	0.09%	No Action
Cobalt	199101.0	141473.0	-4	21.6	-2.84	-13.16%	J
Potassium	199101.0	141473.0	306	4603	217.43	4.72%	No Action
Vanadium	199101.0	141473.0	-2	89	-1.42	-1.60%	No Action
Manganese	199101.0	141473.0	-1	1046	-0.71	-0.07%	No Action
Se			-7	1.14	#DIV/0!	#DIV/0!	UJ
					#DIV/0!	#DIV/0!	

Sample ID: MA1365

Analyte	Average Fe in ICSA (ug/L)	Fe in sample (ug/L)	Highest Conc. of analyte in ICSA (ug/L)	Conc. of analyte in sample (ug/L)	Conc. Attributableto interference	% Estimated interference	Actions
Arsenic	199101.0	107702.0	9	23.1	4.87	21.08%	J
Barium	199101.0	107702.0	6	5153.7	3.25	0.06%	No Action
Cobalt	199101.0	107702.0	-4	14.8	-2.16	-14.62%	J
Potassium	199101.0	107702.0	306	3820	165.53	4.33%	No Action
Vanadium	199101.0	107702.0	-2	71.1	-1.08	-1.52%	No Action
Manganese	199101.0	107702.0	-1	904.5	-0.54	-0.06%	No Action
Se	199101	107702	-7	1.25	#DIV/0!	#DIV/0!	UJ
					#DIV/0!	#DIV/0!	
					#DIV/0!	**#DIV/0!**	

Region I
Inorganic Data Review Worksheets

VI. MATRIX SPIKE

TR # MA1362 Matrix: Soil

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spiked sample result
SR - sample result

ANALYTE	SSR	SR	S	%R	ACTION
Sb	51.0527	0.6452K	115.21	44.3 ✓	J(+)/UJ(ND)
Cu	97.1811	56.7061	57.60	70.3 ✓	J(+)/UJ(ND)
Hg	0.7419	0.3522	0.58	67.2 ✓	J(+)/UJ(ND)
Zn	212.2284	204.0819	115.21	7.1	J(+)/R(ND)

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceed the spike concentration by a factor of 4 or more, no action is taken.
2. If any analyte does not meet the %R criteria, follow the actions stated below:

	PERCENT RECOVERY		
	< 30%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No
B. Was a post digestion spike analyzed for elements that did not meet the required criteria for matrix spike recovery? Yes or No

A separate worksheet should be filled out for each matrix spike pair.

Sb = 93.8%
Cu = 106.8
Zn = 93

Region I
Inorganic Data Review Worksheets

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

Matrix: Soil

ELEMENT	CRDL WATER ug/L	CRDL SOIL mg/kg	SAMPLE # HA362	DUPLICATE # HA362D	RPD	ACTION
Aluminum	200		~~235.9466~~	~~155.47~~ (SW)	2/8/03	
Antimony	60					
Arsenic	10					
Barium	200		235.9466	155.47	41.1 ✓	J(4) all samples
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100		19108.4492	41533.6445	74.0 ✓	J(4) all samples
Lead	5		250.0751	164.7310	41.1 ✓	" "
Magnesium	5000					
Manganese	15					
Mercury	0.2	0.1mg/kg	0.3522	0.1688	70.4	~~J(4) all samples~~
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

DMT 10/10/03

OK 2x CRDL

Laboratory duplicate actions should be applied to all other samples of the same matrix type.

ACTION:

1. Estimate (J) positive results for elements which have an RPD > 20% for waters and > 35% for soils.
2. If sample results are less than 5X the CRDL, estimate (J) positive results for elements whose absolute difference is > CRDL (2X CRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

_____ Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ± 10% of the original undiluted analysis.

_____ Serial dilution was not performed for the following:

_____

✓ Serial dilutions were performed, but analytical results did not agree within ± 10% for analyte concentrations greater than 50X the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

Matrix: Soil MA1362

ELEMENT	IDL	50X IDL	SAMPLE RESULT	SERIAL DILUTION	% D	ACTION
Aluminum						
Antimony						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper			246.10	301.29	22.4	J(+)
Iron						
Lead						
Magnesium						
Manganese						
Nickel						
Potassium						
Silver						
Sodium						
Vanadium						
Zinc						

Actions apply to all samples of the same matrix

ACTIONS:

1. Estimate (J) all positive results and (UJ) all nondetects if the % D > 15%.

Region I
Inorganic Data Review Worksheets

XIII. SAMPLE QUANTITATION (continued)

List the positive sample results that were reported at concentrations less than 2xIDL and have not already been qualified. The positive results have been estimated (J) due to uncertainty in the quantitation near the IDL.

Analyte	Samples Affected
Na	MA1357, MA1359, MA1360, MA1362, MA1363, MA1365
K	MA1357 - already (UJ) for blank cont. and ↑CRDL recovery
Hg	~~0.08~~ (8) MA1360
Cd	MA1364 already (J) for ↓ MS recovery

Attachment V

Copies of Telephone Logs/Communications Forms
(NOT APPLICABLE)

Attachment VI

CSF Completeness Evidence Audit (DC-2)

DG/ESAT
8/20/03

J4-G7/Mill Street
0308004-IA
M&E/RI

FULL INORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET

LABORATORY NAME Liberty
CITY/STATE Cary, NC

CASE NO. 32006 SDG NO. MA1357
SDG NOS. TO FOLLOW
SAS NO.

CONTRACT NO. 68W00082
SOW NO. ILM04.1

Received
AUG 20 2003
CERCLA Chemistry

All documents delivered in the Complete SDG File must be original documents where possible. (Reference Exhibit B, Section II F and Section III U.)

		PAGE NOs. FROM	TO	(Please Check:) LAB	REGION
1.	Inventory Sheet (DC-2) (Do not number)			✓	BH 9/5/03
2.	Cover Page	1	3	✓	✓
3.	SDG Narrative	4	8	✓	✓
4.	Inorganic Analysis Data Sheet (Form I-IN)	9	19	✓	✓
5.	Initial & Continuing Calibration Verification (Form IIA-IN)	20	31	✓	✓
6.	CRDL Standards For AA and ICP (Form IIB-IN)	32	39	✓	✓
7.	Blanks (Form III-IN)	40	47	✓	✓
8.	ICP Interference Check Sample (Form IV-IN)	48	55	✓	✓
9.	Spike Sample Recovery (Form VA-IN)	56	56	✓	✓
10.	Post Digest Spike Sample Recovery (Form VB-IN)	57	57	✓	✓
11.	Duplicates (Form VI-IN)	58	58	✓	✓
12.	Laboratory Control Sample (Form VII-IN)	59	59	✓	✓
13.	Standard Addition Results (Form VIII-IN)	N/A	N/A	N/A	✓
14.	ICP Serial Dilutions (Form IX-IN)	60	60	✓	✓
15.	Instrument Detection Limits (Form X-IN)	76	78	✓	✓
16.	ICP Interelement Correction Factors (Form XIA-IN)	79	79	✓	✓
17.	ICP Interelement Correction Factors (Form XIB-IN)	80	83	✓	✓
18.	ICP Linear Ranges (Form XII-IN)	84	84	✓	✓
19.	Preparation Log (Form XIII-IN)	61	62	✓	✓
20.	Analysis Run Log (Form XIV-IN)	63	75	✓	✓
21.	ICP Raw Data	85	431	✓	✓
22.	Furnace AA Raw Data	N/A	N/A	N/A	✓
23.	Mercury Raw Data	432	~~445~~ 444	✓	✓
24.	Cyanide Raw Data	N/A	N/A	N/A	✓
25.	Preparation Logs Raw Data	445	446	✓	✓
26.	Percent Solids Determination Log	447	447	✓	✓
27.	Traffic Report	448	451	✓	✓
28.	EPA Shipping/Receiving Documents	N/A	N/A	N/A	✓
	Airbill (No. of Shipments 1)	452	452	✓	✓
	Chain-of-Custody Records	453	454	✓	✓
	Sample Tags	455	455	✓	✓
	Sample Log-In Sheet (Lab & DC1)	456	459	✓	✓
	SDG Cover Sheet	460	460	✓	✓
29.	Misc. Shipping/Receiving Records (list all individual records)				
	Telephone Logs	N/A	N/A	N/A	✓
		✓	✓	✓	✓
		✓	✓	✓	✓
30.	Internal Lab Sample Transfer Records & Tracking Sheets (describe or list) Internal	461	463	✓	✓

	PAGE NOs. FROM	TO	(Please Check:) LAB	REGION
	N/A	N/A	N/A	9/5/03
31. Internal Original Sample Prep & Analysis Records (describe or list)				
Prep Records				
Analysis Records				
Description				
32. Other Records (describe or list)				
Telephone Communications Log	✓	✓	✓	✓

33. Comments:

Completed by (CLP Lab): Joan Pardie 8-18-03
(Signature) (Print Name & Title) (Date)

Audited by (EPA): Sheila Harvey, Metcalf & Eddy, Inc. Sheila Harvey / Chemist 9/5/03
(Signature) (Print Name & Title) (Date)

~~WA #~~ Contract #

Attachment VII

DQO Summary Form

EPA-NE - DQO SUMMARY FORM

A separate Form should be completed for each sampling event. Refer to Attachment A for instructions on completing this form, Attachment B for a complete list of the parameter codes and Attachment C for an example of a completed form.

1. EPA Program: ~~TSCA CERCLA RCRA DW NPDES CAA~~
Other: **Targeted Brownfields Assessment (TBA)**
Projected Date(s) of Sampling: **4-8 August 2003**
EPA Site Manager: **Jim Byrne /.James Chow**
EPA Case Team Members_____

Site Name: **54-67 Mill Street**
Site Location: **Brookfield, MA**
Assigned Site Latitude/Longitude: **Unknown**
CERCLA Site/Spill Identifier No. 01 _____(Include Operable Unit)
Phase: ~~ERA SA/SI pre-RI RI (phase I, etc.) FS RD RA post-RA~~
(circle one) Other: **TBA**

2. QAPjP Title and Revision Date: Generic Sampling and Analysis Plan for Brownfield Targeted Site Assessments (M&E, June 1999) and Amended Field Task Work Plan for 54-67 Mill Street, Brookfield, MA (M&E, June 2003)
Approved by: Jim Byrne / James Chow Date of Approval: July 14, 2003
Title of Approving Official: EPA Work Assignment Manager Organization*: EPA Region I
*If other than EPA, record date approval authority was delegated:_____

EPA Oversight Project (circle one) ~~Y~~ N
Confirmatory Analysis for Field Screening ~~Y~~ N
Are comparability criteria documented? ~~Y~~ N

Type of EPA Oversight (circle one) PRP or FF Other:_____
If EPA Oversight or Confirmatory: % splits_____

3. a.	Matrix Code[1]	SO	SO		
b.	Parameter Code[2]	13126010	ILM04.1MT		
c.	Preservation Code[3]	5	5		
d.	Analytical Services Mechanism	Sub.*	RAS		
e.	No. of Sample Locations	8	8		
	Field QC:				
f.	Field Duplicate Pairs	1	1		
g.	Equipment Blanks	0	0		
h.	VOA Trip Blanks	0	0		
i.	Cooler Temperature Blanks	1 per cooler	1 per cooler		
j.	Bottle Blanks	0	0		
k.	Other:_____				
l.	PES sent to Laboratory	0	0		
	Laboratory QC:				
m.	Reagent Blank	1	1		
n.	Duplicate	0	0		
o.	Matrix Spike	1	1		
p.	Matrix Spike Duplicate	1	1		
q.	Other:_____				

4. Site Information
Site Dimensions: Unknown
List all potentially contaminated matrices SO
Range of Depth to Groundwater 5-10 feet below ground surface
Soil Types: Surface and Subsurface
Other:_____
Sediment Types: Stream ~~Pond Estuary~~ ~~Wetland~~ Other:___
Expected Soil/Sediment Moisture Content: ~~High~~ Low

When multiple matrices will be sampled during a sampling event, complete Sections 5-10 for each matrix. Matrix Code[1] **SO**

5. Data Use (circle all that apply) **Site Investigation/Assessment** ~~PRP Determination~~ **Removal Actions**
Nature and Extent of Contamination **Human and/or Ecological Risk Assessment** **Remediation Alternatives**
~~Engineering Design~~ ~~Remedial Action~~
~~Post-Remedial Action (quarterly monitoring)~~
Other: **TBA**

6. Summarize DQOs: To provide data for characterizing and assessing current environmental and site conditions as needed to support a preliminary evaluation of risks and remedial alternatives.

Complete Table if applicable

COCs	Action Levels	Analytical Method-Quantitation Limits
Refer to Amended Field Task Work Plan for 54-67 Mill Street, Brookfield, MA (TBA), M&E, June 2003	Refer to Amended Field Task Work Plan for 54-67 Mill Street, Brookfield, MA (TBA), M&E, June 2003	Subcontract Methods - per SOP with approved TBA laboratories (Mitkem, Amro, or Woods Hole Group)

7. Sampling Method (circle technique) ~~Bailer~~ ~~Low flow pump (Region I method: Yes No)~~ ~~Peristaltic Pump~~ ~~Positive Displacement Pump~~ ~~Faucet or Spigot~~ ~~Other:~~ **Split Spoon** ~~Dredge~~ **Trowel** Other:

Sampling Procedures (SOP name, No., Rev. #, and date)
List Background Sample Locations
Circle: **Grab** or ~~Composite~~
"Hot spots" sampled: **Yes** ~~No~~

8. Field Data (circle) ~~ORP~~ ~~pH~~ ~~Specific Conductance~~ ~~Dissolved O_2~~ ~~Temperature~~ ~~Turbidity~~

Other:

9. Analytical Methods and Parameters

Method title/SOP name	Method/SOP Identification number	Revision Date	Target Parameters (VOA, SV, Pest/PCB, Metals, etc.)
See Section 3			

10. Validation Criteria (circle one) 1. Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, Part II, III or IV
2. Other Approved Validation Criteria: Approved Validation Criteria: Tier II-like validation memorandum

Validation Tier (circle one) I II III Partial Tier III Modified Tier II

Company/Organization Performing Data Validation: Metcalf & Eddy, Inc. Prime or ~~Subcontractor~~ (circle one)

11. Company Name: Metcalf & Eddy, Inc.
Contract Name (e.g. START, RAC, etc.): RAC
Person Completing Form/Title: Denise Laferte, Project Chemist

Contract Number: 68-W6-0042
Work Assignment No. 106-SISI-01ZZ
Date of DQO Summary Form Completion: June 9, 2003

Matrix Codes[1] - Refer to Attachment B, Part I
Parameter Codes[2] - Refer to Attachment B, Part II

Preservation Codes[3]

1.	HCl to pH ≤ 2	7.	$K_2Cr_2O_7$
2.	HNO_3	8.	Freeze
3.	$NaHSO_4$	9.	Room Temperature (avoid excessive heat)
4.	H_2SO_4	10.	Other (Specify)
5.	Cool @ 4°C (± 2°)	N.	Not preserved
6.	NaOH		

* - To supplement Matrix Codes and/or Parameter Codes contact the QA Unit

Notes:

* SUB = Directly Subcontracted Laboratory.

ILM04.1 = RAS Total Metals/Hg.

13116010 = SPLP Metals.

APPENDIX G

LIMITATIONS

Metcalf & Eddy

STATEMENT OF LIMITATIONS

The data presented and the opinions expressed in this report are qualified as follows:

1. The sole purpose of the investigation and of this report is to assess the physical characteristics of the Site with respect to the presence or absence in the environment of oil or hazardous materials and substances as defined in the applicable state and federal environmental laws and regulations and to gather information regarding current and past environmental conditions at the Site.

2. Metcalf & Eddy (M&E) derived the data in this report primarily from visual inspections, examination of records in the public domain, interviews with individuals with information about the Site, and a limited number of subsurface explorations made on the dates indicated. The passage of time, manifestation of latent conditions or occurrence of future events may require further exploration at the Site, analysis of the data, and reevaluation of the findings, observations, and conclusions expressed in the report.

3. In preparing this report, M&E has relied upon and presumed accurate certain information (or the absence thereof) about the Site and adjacent properties provided by governmental officials and agencies, the Client, and others identified herein. Except as otherwise stated in the report, M&E has not attempted to verify the accuracy or completeness of any such information.

4. The data reported and the findings, observations, and conclusions expressed in the report are limited by the Scope of Services, including the extent of subsurface exploration and other tests. The Scope of Services was defined by the requests of the Client, the time and budgetary constraints imposed by the Client, and the availability of access to the Site.

5. Because of the limitations stated above, the findings, observations, and conclusions expressed by M&E in this report are not, and should not be considered, an opinion concerning the compliance of any past or present owner or operator of the site with any federal, state or local law or regulation. No warranty or guarantee, whether express or implied, is made with respect to the data reported or findings, observations, and conclusions expressed in this report. Further, such data, findings observations, and conclusions are based solely upon site conditions in existence at the time of investigation.

6. This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the Agreement and the provisions thereof.