Environmental Restoration Program
Sewall's Island Site (#E623021)
400 Pearl Street
City of Watertown
Jefferson County, New York

Work Plan

Interim Remedial Measures

Prepared For:

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August 2009
(Revised August 31, 2009)

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1.0 Introduction

Lu Engineers has prepared this Interim Remedial Measures (IRM) Work Plan on behalf of the City of Watertown for submission to the New York State Department of Environmental Conservation (NYSDEC) Region 6 Division of Environmental Remediation in accordance with DER-10 "Technical Guidance for Site Investigation and Remediation," the NYSDEC "Municipal Assistance for Environmental Restoration Projects" Procedures Handbook, NYSDEC 6NYCRR Part 675 "Environmental Remediation Programs", and TAGM 4048 "Interim Remedial Measures-Procedures."

The City is currently working under a State Assistance Contract (SAC) from the NYSDEC to further characterize, and remediate the former Sewall's Island Site located in the City of Watertown. The City will use a portion of these funds to complete IRMs described in this Plan.

The work described herein is intended to address contaminated areas that have been identified to date as part of the Remedial Investigation (RI). The proposed IRM includes further delineation, removal and/or treatment of these identified areas. Figure 2 shows the Potential Areas of Concern and IRM activity areas. Along with geophysical investigations, additional soil sampling is proposed to further delineate the horizontal and vertical extent of contamination in the landfill area of the Site that has been impacted by drum disposal activities. Any hazardous soil identified as part of this investigation will be excavated and removed, as appropriate. The preliminary findings of the RI environmental reports are summarized below. Lu Engineers used this information to prepare this Work Plan.

1.1 Site Description

The Site is located at 400 Pearl Street in the City of Watertown, New York (Figure 1). The property consists of ten parcels covering approximately 25.46 acres and previously contained numerous buildings. All of the commercial buildings have been demolished and the majority of the construction demolition debris has been removed from the Site. Foundations, concrete slabs and two of the former dam structures remain on the property.

The relevant history of the Site has been detailed in the Remedial Investigation Work Plan (Lu Engineers - October 2007). Additional research into the long industrial history has been ongoing. It was recently discovered that the expansion of the factory to the south side of Pearl Street was initially used for munitions production during WWII. Further research on this subject is planned.

1.2 Previous Field Investigations

Since the early 2000s, the facility has undergone a series of environmental investigations. These investigations include:

- Phase I Environmental Site Assessment including subsurface sampling, GYMO, November, 2001.
- Phase I Environmental Site Assessment, Lu Engineers, March, 2007.

2.0 Summary of Environmental Conditions

2.1 Remedial Investigation

The RI began at the Site in September 2008 and was intended to identify the vertical and horizontal extent of contamination in order to develop remedial alternatives for the Site. The following tasks were completed during the RI:

- A geophysical survey to evaluate potential subsurface environmental concerns
- Forty-two surface soil samples across the Site
- Forty-eight test excavations
- Thirty-seven soil borings
- Installation and sampling of nine groundwater monitoring wells

Additional soil borings and test pits were planned for the Site in the landfill area. Due to the nature of the drums that were uncovered, further investigation work in this area was halted. Figures 3A and 3B show all of the RI soil sample locations. Figure 4 shows the groundwater well locations.

2.2 Preliminary RI Findings

The geophysical surveys indicated several anomalies, but none that indicate the presence of a tank. The Site is covered by a large number of scrap metal objects from building demolition and historical Site disposal. Many of the anomalies were attributed to these scrap metal pieces left onsite, either located at the surface or uncovered through test excavations.

The majority of the Sewall's Island Site includes varying depths of historical fill. Native soils were not identified at the Site. All subsurface investigation west of Pearl Street on the "triangle" portion of the property identified mainly building demolition debris that was apparently used to fill the basements of the previous buildings. Borings located in the central portion of this area were completed only one to two feet below ground surface (bgs) before bedrock was encountered. All subsurface investigation east of Pearl Street indicated the presence of building debris and foundry sand in the subsurface. Borings and test excavations located north of the former railroad bed and southeast of the railroad bed encountered bedrock at an average depth of 1-4 feet bgs. Borings and test excavations were advanced to greater depths around the perimeter of the Island indicating that more filling occurred in these areas.

Off-island subsurface investigations indicated the same lack of native soils. Only fill appeared to be present on top of bedrock.

The area located southwest of the railroad bed on the Island has been historically used as a landfill for the Bagley & Sewall operations. This area essentially covers the entire tax parcel 4-12-103.001 and is slightly larger than 2 acres in size. The majority of the

landfill is composed of foundry sand. This sand was used to create molds for casting metal parts. After the parts had cooled, the molds were broken away. The sand was reused until it was considered spent. Spent foundry sand was placed in the landfill area. The landfill area also contains coke, cinders and slag, as well as large pieces of the hardened impurities from the forging of molten metals at the Site. This area is shown on Figure 2 as Potential Area of Concern 1 (PAOC1).

Historically, foundries have utilized a variety of hazardous materials, including petroleum products, solvents, phenols, polychlorinated biphenyls (PCBs), and heavy metals such as mercury, arsenic, lead, and copper. Most of the landfill portion of the Site was created by filling the area at different points in the Site's history. The fill materials used at the Site appear mainly to be foundry sand and may have included coal, ash of unknown origin, demolition debris, and industrial wastes. These materials were commonly used as fill throughout the City in past decades. Site investigations found metals and polycyclic aromatic hydrocarbons (PAHs) contamination in most of the soil samples collected throughout the Site. Elevated concentrations of lead, mercury, copper and arsenic are consistent with historical Site uses. Volatile organic compounds (VOCs) and PCB contamination were found in relatively limited areas.

2.3 Contaminant Results Summary

Analytical data and applicable regulatory criteria are included in the attached Sample Result Tables.

The investigations in the landfill area identified fill materials up to 30 feet deep. Two waste drums were uncovered during this time. The drums were accidentally punctured during the test pit excavation and a portion of the materials were released. The drum contents were sampled and then over-packed for disposal. Soils affected as a result of the drum punctures were staged on poly sheeting, sampled and covered for disposal. The waste in Drum 1 was identified as a mixture of gasoline and lube oil and Drum 2 as mineral spirits. Drum 1 soils were found to contain hazardous waste concentrations of chromium and lead and TCE. Drum 2 soils were hazardous for chromium, lead, mercury, flashpoint and TCE. Further subsurface investigation of the landfill area was halted due to the discovery of the drums. The landfill and drum discovery area is one of the subjects of this IRM.

Groundwater monitoring wells installed and sampled at the Site detected only VOC contamination at two of the nine well locations. Chloroform was detected at MW-7, and six different VOCs at MW-2S. Other groundwater contaminants of concern were not identified above applicable standards. The VOC contamination detected at MW-2S is a result of a historical fuel oil spill. Evidence of this spill was also observed in the adjacent soil borings and test pit but the soil samples collected from this area did not exceed Soil Cleanup Objectives (SCOs). Evidence of the historic spill can also be observed by a visible sheen on groundwater seeping from the river bank at this location, as referenced on Figure 4. A nested well pair was installed at this location; MW 2S is a bedrock

interface well screened from 15 to 28 feet bgs, while MW-2D is a bedrock well screened from 32 to 47 feet bgs. MW-2D did not appear to be impacted by contamination present at MW-2S. VOC contamination in the shallow groundwater in the vicinity of MW-2S is one of the subjects of this IRM. Figure 5 depicts the contaminant concentrations for VOCs in groundwater.

Surface soil samples collected at the Site were taken from areas of the Site east of Pearl Street. Generally surface soils consist of fill; primarily spent foundry sand. There were no VOCs detected in surface soils. The main constituents of concern in surface soils were PCBs that were detected in an apparently small pocket at concentrations above SCOs. Detected metals include arsenic, cadmium, chromium, copper, mercury, nickel, and selenium. Semi-Volatile Organic Compounds (SVOCs) were also detected in surface soils, specifically polycyclic aromatic hydrocarbons (PAHs). Figures 6A, 6B and 6C show contaminant concentrations in surface soils.

Investigation of subsurface soils at the Site yielded no evidence of VOC contamination. As with surface soils, subsurface soils were also comprised of fill material; primarily spent foundry sand. Contaminants of concern included metals and SVOCs in subsurface soils. SVOCs present above SCOs were PAHs. The metals consisted of arsenic, barium, chromium, lead and mercury. The most prevalent of these metals was mercury with a relatively high concentration encountered at TP-26 of 714 ppm. There was a distinct layer of ash present in this test pit soil sample. The source of this ash is unknown, but it appeared to be present only in the area of TP-26. The area of TP-26 is one of the subjects of this IRM. Figures 7A and 7B depict contaminant results for subsurface soils.

2.4 Contamination Related to Coal and Combustion

Historically, the Site has been used for industrial purposes which included a rail line with multiple spurs from the late 1800s until the early-1990s. Photographs and maps from that time show a large coal platform located on the Site. Historical photographs and Sanborn maps from the Site have shown numerous rail spurs leading to the various factories on the Island and indicated a turnstile located near the central portion of the property.

Coal and coal by-products, including ash, contain many of the metals found during this investigation including arsenic, lead, mercury, cadmium, barium, chromium and PAH compounds.

The Site was used as a foundry which used coal and coke for the facility boilers and for the cupolas that were used for the smelting of the steel, iron and copper. The emissions from the burning of coal and from the forging of steel and iron may account for the widespread contamination of metals and PAH compounds.

The majority of the widespread contamination can be attributed to the railroad, the burning of fossil fuels and the smelting and casting of molten metals. This contamination is also located in subsurface soils due to the historic filling that occurred at the Site.

Many of the subsurface locations of samples were formerly ground surface soils prior to further filling and subject to contamination from the above processes.

2.5 Preliminary Areas of Concern

The findings of this investigation show that there are three areas of concern that require remedial measures. Analytical results from all soil samples taken were used to generate contaminant contours based on anticipated future use Soil Cleanup Objectives. These areas were further defined based on observations made in the field during Remedial Investigation Tasks in order to generate the IRM Work Plan Preliminary Areas of Concern Map, Figure 2 which depicts the following areas:

- **PAOC 1** – This area is located on the Island southwest of the rail bed, essentially the entire tax parcel 4-12-103.001, which is slightly larger than 2 acres in size. This area has been historically used as a landfill for the Bagley & Sewall operations. The majority of the landfill is composed of foundry sand. The landfill area also contains slag, and large pieces of the hardened impurities from the molten metals that were used at the Site. The discovery of drums containing hazardous waste prevented further investigation of this area. Further investigation first through geophysical methods followed by mechanical methods is planned for this area.
- **PAOC 2** – This area of the Site is located around the MW-2 well cluster and is the site of a historic fuel oil spill. Low level VOC contamination in groundwater was found here. The soils in the area have been sampled and have not exceeded SCOs. Further investigation and remediation is planned for this area to define the source area.
- **PAOC 3** – This area of the Site is located off the island to the north. Mercury was found at the location of TP-26, at a depth of 5 feet bgs, that was above applicable SCOs. This area will be further investigated and contaminated soils removed and disposed of.

The Contaminant Maps, used to define the areas of contamination, are included as Figures 5 through 7C. The maps were produced using all analytical soils data generated to date compared against the soil cleanup objectives from Part 375 for restricted residential property. Figures 6A and 6C used ArcGIS Spatial Analyst to generate contours using the Inverse Distance Weighted Interpolation method. Only those contaminants and areas that exceeded the cleanup objectives are depicted. The Tables attached to this report show all the analytical results generated from the Remedial Investigation compared to the Restricted Residential Soil Cleanup Objectives.

2.6 Conceptual Site Model

Contamination is related to many years of industrial operations that occurred on Sewall's Island. Known operations include: iron, steel, copper, brass and aluminum casting; pulp grinding; machining; painting; sanding; and paper milling. These operations included the use of fuels such as coal, coke and fuel oil to fire foundry furnaces and facility boilers. According to an environmental report dated November 2001, the facility used a variety of

chemicals including sodium hydroxide, various silicas, resins, paints, fuels, transformer fluids, waste oils and cleaning materials. This report also states that all documented chemicals on Site had been removed and properly disposed of.

Remedial investigation activities completed to date indicate that there are still chemical wastes present at the site. Due to the heterogeneity of the landfill area the compounds and volumes are unknown.

A conceptual site model for the project is outlined in the table below.

Media	Known or Suspected Source of Contamination	Type of Contamination (General)	Contaminants of Potential Concern (Specific)	Primary or Secondary Source Release Mechanism	Migration Pathways	Potential Receptors
Soil	1) Buried Drums 2) Fuel Oil Spill 3) Foundry sand 4) Slag, Ash and Cinders 5) Coke Storage 6) Railroad 7) Munitions production	SVOCs, Metals, PCBs, Petroleum	selenium, cadmium, arsenic, chromium, barium, lead, silver, xylenes, n-Butylbenzene, sec-Butylbenzene, Isopropylbenzene, 4-Isopropyl toluene, Napthalene, N-Propylbenzene, 1,2,4-Trimethylbenzene, Fluorene, Phenanthrene	Leaks, spills, dumping	Infiltration/ percolation	Human: direct contact if excavation occurs in contaminated areas
Groundwater	Contaminated Soil (secondary source)	Petroleum, VOCs, SVOCs, metals	Potentially same as soil contaminants	Infiltration /percolation from soils	Groundwater flow	Human or ecological receptors are not expected to be exposed
Air/Soil Vapor	Contaminated soil or groundwater	Petroleum, VOCs, SVOCs	Xylenes, n-Butylbenzene, sec-Butylbenzene, Isopropylbenzene, 4-Isopropyl toluene, Napthalene, N-Propylbenzene, 1,2,4-Trimethylbenzene, Fluorene, Phenanthrene	Volatilization of contaminated groundwater and/or soil	Migration into buildings	Human: Inhalation during investigation and cleanup
Building	Building materials	Asbestos	Asbestos	Disturbance of building materials	Dispersion by human activity	Human: direct contact with site workers /visitors, inhalation

A previous environmental investigation conducted in 2001 revealed the presence of volatile organic compounds (VOCs), petroleum, semi-volatile organic compounds (SVOCs) and several metals in the soils. Metals found in the soil samples were compared to the eastern coast and New York State average background levels. At the time the majority of the levels of metals fall within the parameters of the Eastern USA or New York background levels. The additional more recent soils sampling has found widespread low level metals and PAH contamination. There are many samples that exceed the new 6 NYCRR Part 375-6 recommended soil cleanup objectives.

A particular area of concern is the presence of foundry sand located on the east side of the Island, a waste product of past foundry operations which are found throughout the Site. These sands were mixed with resin to form molds in which to pour the molten metals to cast machinery. Once these machine pieces were cooled, the molds were broken away. These sands were used for molding until they were considered spent and then disposed of onsite. The main area for this disposal was the "landfill" area southwest of the rail bed (see Figure 2). Approximately 1 ton of foundry sand is required for each ton of iron or steel produced. Due to the extreme heat these foundry sands contain heavy metals and phenols that are absorbed into the sand during the casting process. Phenolic compounds, selenium, cadmium, arsenic, chromium, barium, lead and silver are all possible contaminants found in the sand. Initial sampling in 2001 concluded that the sand was not hazardous for toxicity characteristics based on TCLP analytical results. Slag, ash and cinder materials may also be a source of soil contamination.

There are two active petroleum spills located at the site. The spill was reported on November 19, 1998 and was located south of Pearl Street and southwest of the main building. The spill was given ID #9810485. The laboratory analysis performed identified the petroleum as #2 fuel oil. During the RI two drums of hazardous waste were uncovered and some of the contents spilled at the site. The contents were contained but a NYSDEC spill was called in to document the drum discovery. The spill was given ID # 0806564.

Small amounts of building materials remain on the Site. It is possible that some of these materials may be asbestos containing materials including the remains of two hydro-electric plants.

Groundwater well installation and sampling revealed some low level VOC contamination exceeding recommended groundwater cleanup standards in the area of the reported fuel soil spill.

The site is currently vacant and securely fenced. Exposure concerns at the Site are considered minimal at this time.

3.0 Field Activities/Scope of Work

3.1 Goal of the IRM

The goal of the planned IRM actions will be to address the landfill and drum discovery area including detection and removal of all hazardous materials present along with hazardous soils associated with the leaking solvent-containing drums. The IRM will also address low level VOC contamination in groundwater in the vicinity of MW-2S. Mercury contamination at TP-26 will also be further investigated and mitigated.

SVOC PAHs and metals contamination that were associated with past coal/coke burning operations and the metals smelting and forging are present on the majority of the Site. These contaminated soils are above unrestricted Soil Cleanup Objectives (SCOs) but will not be addressed as a subject of this IRM.

3.2 Site Preparation

The areas planned for IRM activities will require additional clearing and stormwater pollution prevention measures. The drum investigation area will be cleared of all large trees and brush and the debris will be chipped and left stockpiled onsite. The clearing will continue to the top of bank along the south fork of the river; silt fencing will then be installed along the top of bank. The Site will only be cleared and investigated to the top of bank. There will be no intrusive measures undertaken to explore the river banks.

3.3 PAOC 1 - Drum Investigation/Removal Area

Geophysical methods will be used to further investigate the landfill area. Once the area is cleared of brush, three different geophysical methods will be utilized. The area will be broken down into grids and scanned individually to obtain more specific responses. The EM-61 geophysical unit, the G-856 magnetometer and the EM-31 conductivity meter will all be employed. Using the three methods will provide ample information to locate subsurface anomalies that may indicate the presence of buried drums or other potentially significant materials.

Once the anomalies in each grid area are located, they will be further investigated using an excavator. Excavation will continue until a source for each anomaly is located. If buried drums are discovered, the remediation contractor will be prepared to over-pack each drum and stage any associated soils that exhibit signs of contamination. Drum waste and contaminated soils will be sampled and characterized for disposal. Each drum and associated soil that is uncovered will be further referenced by the grid area of the landfill from which it is uncovered.

Standards for removal and disposal of soils from the landfill will use waste characterization parameters including TCLP analysis for VOC's, SVOC's and metals

along with reactivity, corrosivity and ignitability. All hazardous waste will be removed and disposed of.

Additional samples in PAOC 1 will also be taken at the discretion of the field team leader in order to fill data gaps encountered during the initial investigation of the landfill area.

Once soils removal has taken place, the bottom and side walls of the excavated area will be sampled for closure. The heterogeneity of the materials within the landfill prevents attempts to quantify materials that may be encountered.

3.4 PAOC 2 – VOCs in Groundwater

Three additional groundwater monitoring wells will be installed in the area of PAOC 2. The wells will be bedrock/overburden interface, 4-inch diameter wells and will be installed using hollow steam auger techniques, and coring at least 5 feet into bedrock.

Field observations including PID readings and free phase oil will be used to define a potential source area. If during the course of the installation a source area of the contamination is defined, additional measures will be assessed to address the source area in order to make use of onsite labor and equipment at that time.

The wells will be sampled to determine the extent of the VOC contamination in groundwater. All Groundwater data will be compared to 6 NYCRR 703.5 standards and TOGS 1.1.1 Standards. Once sampling results are evaluated, two of the 4-inch wells can be utilized for remedial access to the affected area. Remedial options, such as in-situ chemical oxidation, vapor extraction and/or total fluids extraction will be considered and reviewed with project stakeholders. Two of the wells will remain for future groundwater sampling purposes.

3.5 PAOC 3 – Mercury in Soils

This area of mercury contamination will be excavated and disposed of as necessary. Further sampling will be conducted to determine the extent of the mercury contamination. Field test kits for the presence of mercury will be utilized as necessary. The samples will be sent for direct analysis of mercury in soils. The hazardous waste regulatory level for mercury when TCLP is performed is 0.2 ppm, using the 20 times rule for mercury a direct result of 4 ppm or higher will be considered hazardous. All soils that are hazardous for mercury will be removed from PAOC 3. It is estimated that 400 tons of Hg contaminated soil will require removal. Closure samples will be taken of the bottom of the excavation and all sidewalls.

3.6 Excavation Procedures

Lu Engineers will provide continuous perimeter and work zone air monitoring during all soil removal and staging activities using a MiniRAE 2000 PID to ensure that workers and the public are not exposed to elevated concentrations of volatile organic compounds

(VOCs). A TSI Dustrak Aerosol Monitor Model 8520 or equivalent will also be used continually during all intrusive work activities to measure airborne particulate levels. A site specific Community Air Monitoring Plan (CAMP) is included in Appendix B. To address potential fugitive dust, odors, and vapors, the contractor will have emergency controls (dust and vapor suppression equipment) available for use during excavation activities. The requirements and procedures for use of these controls are established in the CAMP.

During excavation, all applicable OSHA standards (1910 and 1926) will be strictly followed. The excavation contractor will be responsible for using safe excavation techniques (sloping, stepping, etc.) to complete the excavation.

Excavated soil/fill during this phase of the project will be staged to await waste characterization sampling for disposal purposes. Soil containing free liquids will not be removed from the Project Site. Due to the nature of the fill at the Site, it is not feasible to fully characterize an area for anticipated waste profiling. Excavated material that is staged on-site awaiting off-site disposal shall be properly secured and covered at the end of each workday.

Field screening with the PID and observations made during excavation activities will be used to isolate any VOC contamination boundaries. Once it has been determined through field observations that all impacted soil has been removed, confirmation soil samples will be collected from excavation sidewalls and floors to confirm removal of all contaminated areas. The confirmation soil samples will be sent to an accredited laboratory for analysis.

3.6.1 Erosion and Sediment Control

Erosion sediment control measures will be employed at the Site. These measures will be adequately maintained in accordance with the SWPPP for the Site. Stormwater pollution prevention measures were employed at the Site prior to the removal of building slabs. Silt fencing is installed along the shore. These measures will be periodically inspected and maintained.

3.6.2 Dewatering

It is considered unlikely that overburden groundwater will be encountered at the Site. If encountered, the excavation contractor shall minimize liquid wastes through proper use of erosion and sediment control measures to mitigate surface water runoff into the excavation area, and covering an open excavation area to minimize the generation of potentially VOC impacted precipitation, etc. Water that is generated during the excavation activities, dewatering activities, and decontamination activities shall be collected and containerized by the excavation contractor. The water will be sampled/characterized as necessary based on observations by Lu Engineers onsite representative. Temporary water storage capacity will be available if necessary.

3.6.3 Decontamination

As part of the excavation contractor's mobilization activities, a decontamination area for trucks, equipment, and personnel will be constructed on the building foundation pad. The decontamination area will serve to prevent tracking of contaminated residuals from the Project Site. The decontamination area is depicted in Figure 7.

To further eliminate the tracking of petroleum contaminated soils, the excavation contractor will follow designated truck routes to contain traffic within a limited area. If materials accumulate outside the excavation and staging areas, they will be addressed to the satisfaction of the Field Team Leader.

Upon completion of work activities, the contractor will remove the decontamination facilities and associated materials, decontamination fluids, equipment, etc. All decontamination wastes will be disposed of properly.

The excavator and associated equipment will be decontaminated as necessary using steam-cleaning methods at the designated location. All decontamination residues will be collected in a decontamination pad lined with 6-mil polyethylene sheeting. Clean soil and/or lumber will be used to prevent runoff and run-on. Prior to completion of the project, all decontamination wastes will be transferred into drums for appropriate staging and disposal by the City of Watertown.

3.7 Post-Excavation Confirmatory Sampling

Confirmatory sampling will take place in PAOC 3 and on an as needed basis in PAOC 1.

We propose to collect grab samples in order to represent discrete areas of the excavation. Therefore, if certain sample results are unfavorable, additional excavation activities can be limited to specific sections of the original excavation. Samples will be collected from the bottom of the excavation (unless bedrock in encountered) and all sidewalls.

Side wall samples will be collected every 30 feet from the top of the wall to the bottom and then composite to form one sample for laboratory analysis (18 to 20 samples). Composite samples will be collected with as little agitation to soils as possible to avoid volatilization. Samples from the bottom of the excavation will be taken in a grid pattern at intervals of approximately every 30 linear or 900 square feet of area. In addition, one grab sample will be collected from a discrete location based on visual and PID field screening.

All soil samples will be screened as previously described during excavation. The number and location of confirmatory samples will be taken as described above. Additional samples will be collected at the discretion of the Field Team Leader based on observations in the field. All samples selected for potential analysis will be containerized, labeled, and immediately stored on ice in a cooler in accordance with the site Quality Assurance Project Plan (QAPP).

Due to the extensive analytical information obtained from the Site, we propose a target analyte list for confirmatory sample analysis that includes only compounds detected to date. This analyte list will consist of TAL VOCs (USEPA Method 8260), semi-volatile organic compounds (USEPA Method 8270) and TAL metals (7000 series).

All samples will be obtained, handled and characterized in accordance with NYSDEC Analytical Services Protocol methods. Samples will be relinquished to Lu Engineers' contract accredited (NYSDOH ELAP CLP) and certified analytical laboratory. All chain of custody requirements will be strictly adhered to for designated analyses.

In the event that residual contamination exists that will not be removed, the area will be physically marked and located with a GPS unit. The location, depth and concentrations of residual contamination will be documented. Residual contamination will either be delineated at the time with excavation equipment or after the IRM with supplemental soil sampling.

Lu Engineers will also evaluate the use of field screening methods with respect to metals. If determined to be effective, such methods will be used to save time and analytical costs to the extent possible.

3.8 Off-Site Disposal of Contaminated Soils

The excavation contractor will be responsible for loading, transporting, and disposing of hazardous soils generated during the removal. Loaded roll-off containers will be lined and covered with a tarp prior to departing the Project Site and during precipitation events. Tarps will also be required if a loaded truck is to remain on-site overnight.

Appropriate shipping documents will be prepared for each waste shipment, for execution by Lu Engineers. Copies of disposal documentation will be maintained by the Field Team Leader and will be available for on-site review. All documentation from the disposal facility for the weight of each shipment will be obtained by the excavation contractor. It is currently estimated that at least five weeks will be required for IRM activities.

3.9 Restoration

Crushed stone will be placed to create temporary road surfaces within the work area to facilitate movement of heavy equipment. Select fill will be used for backfilling of excavations. Compaction will be done using excavation and grading equipment, as necessary. Six inches of topsoil will be placed in excavated areas to complete backfilling.

Once all backfilling has been completed, the ground surface will then be graded level and raked free of cobbles. The affected area, approximately 2 acres in size, will be hydro-seeded. If time and budget allow in the final grading process a small area of the bank

near the rail trestle will also be graded to allow more established river access. If contaminated materials and/or drummed wastes are encountered in this area of the site, cleanup will be conducted in accordance with the procedures outlined in Section 3.3 of this Plan.

3.10 Additional Remedial Investigation Field Work

3.10.1 Ground Water Sampling

Once the landfill area is cleared of potential anomalies, one additional groundwater monitoring well will be installed in the central portion of this area. After soil removal is complete, post-excavation groundwater sampling will be conducted. Post-excavation sampling of groundwater in the excavated areas will be used to assess the effectiveness of the remedy. This well will be installed and developed immediately following final backfilling of the excavations.

A complete round of groundwater sampling will take place within two weeks of well installation. It is anticipated that this will be the final round of groundwater sampling. Analyses will be completed using Category B deliverables and the data will be collected and validated as outlined in the QAPP for the Site.

3.11 Anticipated Remedy

Due widespread presence of fill materials located at the site and the associated PAH and metals contamination it is proposed that clean cover and a soils management plan be considered as a future remedy for the site.

A Site Management Plan (SMP) would be prepared for submission to and approval by NYSDEC prior to construction. The SMP is designed to protect the public from exposure to hazardous materials as a result of future activities on the parcel and establish procedures for the following activities:

1. Erosion and dust control during construction;
2. Soil disturbance beyond that undertaken for the remediation activities (including notification to NYSDEC, restriction of access to site, and characterization and disposal of excavated material);
3. Groundwater dewatering and treatment;
4. Placement and maintenance of cover over the entire parcel (in the form of at least two feet of clean fill soil, building structures, and/or paving);
5. Management of new imported fill material;
6. Implementation of site-specific health and safety requirements during construction activities (including a Community Air Monitoring Plan);
7. Notification of NYSDEC prior to transferring ownership of the site; and

8. Submission of annual reports to NYSDEC certifying compliance with the SMP and describing in detail any soil or groundwater disturbance undertaken during the reporting period and the source of backfill.

Based on the additional characterization proposed herein, a remedial approach for the petroleum spill area will be presented to project stakeholders. This remedial approach will be proposed as an addendum to the current IRM Work Plan once review of applicable data has been completed. It is noted that the presence of the nearby bridge wingwall and steep river bank adjacent to this portion of the site would complicate the use of remedial excavation methods in this portion of the site. At the present time, Lu Engineers is evaluating various in-situ methods such as total fluids extraction and in-situ chemical oxidation.

4.0 Health and Safety Plans

Monitoring of the work area and screening of soil and groundwater will be conducted throughout the duration of field activities to assure the safety of on-site workers. A temporary job trailer will be placed onsite and will serve as the project command center. A copy of the Site-Specific Health and Safety Plan (HASP) is provided as Appendix A.

Air monitoring of the work areas will be conducted using the following (or equivalent) instrumentation:

- A PID equipped with a 10.2 eV lamp (or equivalent)
- An aerosol particulate meter
- An explosimeter

A Community Air Monitoring Plan (CAMP) for the Site work is attached as Appendix B.

Although mercury vapor emissions are not anticipated, CAMP efforts will be augmented with at least one sample to be obtained for OSHA Method ID-140/NIOSH Method No. 6009 analysis for mercury.

5.0 QA/QC

To ensure that suitable and verifiable data results are obtained from the information collected at the Site, quality assurance procedures are detailed in a Quality Assurance Project Plan (QAPP). The QAPP was developed as part of the RI Work Plan, Appendix C and further details the activities and how they are designed to achieve the data quality objectives.

All samples will be obtained, handled and characterized in accordance with NYSDEC Analytical Services Protocol (ASP) methods. Once obtained, samples will be immediately labeled and stored on ice in a cooler. Samples will be relinquished to Mitkem Laboratories, Inc., an accredited (NYSDEC ELAP CLP) and appropriately certified analytical laboratory. All chain of custody requirements will be strictly adhered to for designated analyses.

The NYSDEC Division of Environmental Remediation *Guidance for the Development of Quality Assurance Plans and Data Usability Summary Reports* will be followed. Lu Engineers' Quality Assurance Officer for this project will be Susan Hilton. Steve Campbell will be the Project Manager and Greg Andrus will be the Field Team Leader for this project. Category B deliverables will be required for all analytical reporting in order to provide the necessary documentation to be reviewed to evaluate the usability of the data and to provide calibration data needed to verify results, as necessary.

One duplicate sample will be obtained for each sample type for each week that sampling occurs. Also, one matrix spike (MS) and matrix spike duplicate (MSD) will be collected for samples of each media for each week that sampling occurs. Samples duplicated will be selected at the discretion of the Field Team Leader (geologist).

6.0 Project Organization

The personnel for this project are anticipated as follows:

Steve Campbell, CHMM	Project Director
Greg Andrus, CHMM	Project Manager
Susan Hilton, P.E.	Quality Assurance Officer
Eric Detweiler	Field Team Leader/Geologist
Laura Smith	Site Safety Officer/ Field Technician

Subcontractors

Mitkem Laboratories	Analytical Laboratory
Op-Tech Environmental	Environmental Waste Contractor
Hickory Hill Construction	Excavation Contractor
On-Site Technical Services	Data Validation (as necessary)

7.0 Report

Once the contract laboratory has provided all analytical data and information has been evaluated, Lu Engineers will develop a report on the completed interim remedial measures. The report will be prepared as indicated by the following outline:

1.0 Summary of Field Activities
2.0 Contamination Evaluation
- 2.1 Findings
- 2.2 Data Evaluation
- 2.3 Regulatory Review
- 2.4 Exposure Pathways

3.0 Conclusions and Recommendations

The report will carefully document all cleanup activities and analytical results and will be supplemented with photographic documentation.

8.0 Schedule

A detailed project schedule including all anticipated field work and report submissions is included in Appendix D. Field activities and laboratory analysis will require three

months to complete. Results from this IRM will be included with the final RI Report and submitted to the NYSDEC and the NYSDOH for review in the Winter of 2010.