SITE CHARACTERIZATION/REMEDIAL DESIGN

STUART OLVER HOLTZ SITE

FIELD ACTIVITIES PLAN

WORK ASSIGNMENT D004440-3

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 Broadway, Albany, New York

DIVISION OF ENVIRONMENTAL REMEDIATION

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FIELD ACTIVITIES PLAN
FOR THE
SITE CHARACTERIZATION AND REMEDIAL DESIGN AT THE
STUART OLVER HOLTZ SITE
SITE #8-28-079
HENRIETTA, MONROE COUNTY, NEW YORK
WORK ASSIGNMENT D004440-3

Prepared For

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION

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1.0 INTRODUCTION

This Field Activities Plan (FAP) is designed to provide step-by-step procedures for the field activities outlined in the Site Characterization Remedial Design Project Management Work Plan (URS, July 2006) for the Stuart Olver Holtz site. It will serve as the field procedures manual to be followed by all URS Corporation (URS) personnel. In addition to the field procedures outlined in this document, all personnel performing field activities will comply with: (1) the Quality Assurance/Quality Control Project Plan (Attachment 1); (2) the appropriate Health and Safety Plan (Attachment 2); and (3) the scope of work outlined in the Site Characterization/Remedial Design Project Management Work Plan.

The Stuart Olver Holtz (SOH) site is 3.8-acres in size. It is located at 39 Commerce Drive, a mixed commercial/industrial area, in Henrietta, Monroe County, New York (Figure 1). A manufacturing building, which formerly occupied the eastern half of the site, was demolished in 2005, and only the building slab remains. The rest of the site consists of a paved parking lot, driveways and grass-covered areas. Immediately to the west of the property is a swale that receives drainage from the facility. Ruby Gordon's Furniture Store is located south of the site, and several commercial/retail buildings that front West Henrietta Road are located east of the site (See Figure 2).

Originally known as Electro Chemical Products, Inc., SOH operated a specialty metals finishing business at this site from 1962 until 1986, when it applied for Chapter 11 bankruptcy protection (Shaw, 2002). The facility was transferred to Metalade, Inc., which conducted operations similar to SOH.

An uncontrolled release of plating and coating solutions occurred in 1974 during a fire that destroyed a portion of the facility (Shaw, 2002). In 1980, SOH began accumulating drums of solvents for processing in anticipation of receiving a permit to operate a solvent recovery unit at the site. The permit was never granted and in 1983, as many as 300 solvent drums were removed from the site, some of which reportedly had leaked. The SOH site was later listed as a Class 2 inactive hazardous waste site by the NYSDEC.

Previous investigations have found that chlorinated solvents occur in the groundwater and soil at the site at concentrations that exceed New York State groundwater quality standards. The potential source area for this contamination has been identified as a former loading dock located outside the southwestern portion of the building (Figure 2). The source area is thought to extend under the building slab (Shaw, 2002). Volatile organic compounds (VOCs) attributed to the SOH site have also been detected in groundwater collected in basement sumps at the Ruby Gordon facility.

The primary overburden groundwater contaminants of concern (COCs) at the site are the following VOCs (Shaw, 2002):

- 1,1,1-Trichloroethane (TCA)
- 1,1,1-Dichloroethane (DCA)
- 1,1-Dichloroethene (DCE)
- 1,2-DCA
- 1,2-DCE (total)
- Methylene Chloride
- Trichloroethene (TCE)
- Tetrachloroethene (Perchloroethene or PCE)
- Vinyl Chloride

In December 2000, TCE concentrations in groundwater were as high as 640,000 µg/L; the Class GA groundwater quality standard for TCE is only 5 µg/L, per NYSDEC *TOGs 1.1.1* (NYSDEC, 1998 and NYS Department of Health Part 5, Subpart 5-1 Public Water System Standards, 2004).

In 2000, Shaw found elevated VOC concentrations in soil samples beneath the loading dock during their permanganate injection Pre-Design Investigation. The contamination was found at the following depths: 16 to 24 feet, 30 feet, and 38 to 40 feet below ground surface (bgs). TCE was the most prevalent VOC detected with concentrations as high as 110 parts per million (ppm). The NYSDEC soil cleanup objective to protect groundwater quality is 0.47 ppm per the draft Remedial Programs Regulation (6 NYCRR Part 375, Table 6.8(b), NYSDEC, 2006). The NYSDEC soil cleanup objective for the protection of public health in commercial properties is 200 ppm.

1.1 Scope of Work

The Record of Decision (ROD)(NYSDEC, 1997) outlined four goals for the SOH site.

- Eliminate to the extent practicable the potential for direct human or animal contact with site contaminants
- Reduce, control, or eliminate to the extent practicable the contamination within the soils and waste on site.
- Reduce, control, or eliminate to the extent practicable any further migration of contaminated groundwater from the site, including migration into the Ruby Gordon basement sumps.
- Provide to the extent practicable, for attainment of groundwater Standards, Criteria, and Guidance (SCGs) in the area affected by the site.

In accordance with the NYSDEC approved work plan, while providing data necessary to attain the goals of the ROD, URS will further delineate the suspected source area at the former loading dock and under the former building slab. In addition, vapor intrusion samples will be taken from the adjacent Ruby Gordon's furniture building that has been impacted by offsite migration of contamination. Specific investigation activities are discussed in detail in following sections of the FAP. The investigation work will include:

- Mobilization (Section 2.0)
- Installation of monitoring wells (Section 3.1 – 3.6)
- Investigation Derived Waste sampling (Section 3.4)
- Slug Testing (Section 3.7)
- Surface soil sampling (Section 3.8)
- Geophysical survey (Section 3.9)
- Inspect the condition existing wells (Section 3.10)
- Documentation of field activities (Section 3.11)
- Groundwater sampling (Section 4.2)
- Sub-slab soil gas sampling (Section 4.4)
- Vapor intrusion at Ruby Gordon's furniture store (Section 4.5)
- Outside ambient air sampling at Ruby Gordon's furniture store (Section 4.5)

2.0 MOBILIZATION

The proposed drilling and sampling locations will be measured by URS field geologists from surveyed landmarks, staked, labeled, and flagged prior to drilling. Vehicle access routes to drilling locations will be determined and cleared of obstructions prior to any field activities.

Buried utilities in areas designated for intrusive activities will be cleared at least two working days prior to drilling through the Dig Safely New York underground facilities call center. The drilling contractor, Nothnagle Drilling, will contact Dig Safely New York prior to mobilizing their equipment to the SOH site.

A centralized decontamination area with a temporary decontamination pad will be constructed by Nothnagle Drilling at the site to decontaminate equipment used for the subsurface investigation. The decontamination area will be large enough to allow equipment and materials to be cleaned, and for the staging of drums of potentially contaminated material. Drums of decontamination fluids, soil cuttings and investigation-derived wastes will be stored in the decontamination area.

3.0 SUBSURFACE INVESTIGATION

This section includes a discussion of soil borings and subsequent monitoring well installation, surface soil sample collection, geophysical survey, and inspection of existing wells at the SOH site.

3.1 General Drilling Program

The proposed drilling program consists of advancing 35 soil borings at the site as shown on Figures 3 and 4. Monitoring wells will be installed in 15 of the borings to supplement the 23 existing monitoring wells. The remaining 20 soil borings (those not converted to monitoring wells) will be advanced in the source area as shown in Figure 4. The objective of the drilling program is to assist in geologic and hydrogeological interpretations, and further delineate the site source area and groundwater plume to aid in designing the permanganate injection program. Actual locations will be adjusted based on field conditions.

A list of applicable soil boring and monitoring well installation procedures, and the appropriate section where they are discussed, follows:

- hollow-stem auger drilling procedures (Section 3.2);
- split-spoon sampling procedures (Section 3.3);
- disposal of drill cuttings (Section 3.4);
- monitoring well construction procedures (Section 3.5) and;
- monitoring well development procedures (Section 3.6)

3.2 Hollow-Stem Auger Drilling Procedures

Summary: Hollow-stem augering is a standard method of subsurface drilling which enables the recovery of representative subsurface samples for identification and laboratory testing. Thirty five soil borings will be advanced to estimated depths ranging from 20 to 42 feet bgs using 4 ¼- inch inside diameter (ID) hollow-stem augers. The drilling contractor for this project is Nothnagle Drilling of Scottsville, New York (phone: 585-538-2328). Two-inch diameter groundwater monitoring wells will be installed in fifteen of the soil borings. Eight of the deeper borings (URS-01, -03, -07, -08, -09, -10, -11 and, -12) will be backfilled with bentonite chips to an estimated depth of 26 feet bgs and then screened in the upper till aquifer as illustrated in Figure 5.

Procedure:

1) Hollow stem augers, drill rods, and the drill rig will be thoroughly decontaminated prior to initial borehole installation and between each borehole. Augers, rods and tools will not be placed on the ground after they have been decontaminated. Decontamination liquids will be collected and placed in New York State Department of Transportation (DOT)-approved 55-gallon drums or in a portable tank. The drums (or tank) will be staged at the decontamination area.

2) The drill rig will be inspected for oil leaks and any leaks will be repaired prior to starting drilling operations.

3) The augers are rotated to advance the boring into the subsurface. The borings will be advanced incrementally (nominal 18-inch depths) to allow split-spoon sampling. Eight borings in the vicinity of the former SOH building (URS-01, -03, -07, -08, -09, -10, -11 and, -12) will be converted to monitoring wells. They will be advanced until the Vernon shale bedrock is reached at an estimated depths ranging from 34 to 42 feet bgs. Seven borings further away from the former SOH building (URS-02, -04, -05, -06, -13, -14, and-15) will be drilled through the upper till aquifer and a few feet into the underlying lower till layer at depths ranging from 20 to 25 feet bgs. Twenty borings will be advanced to a total depth

of 30 feet bgs in the source area (SB-01 through SB-20). Table 1 lists estimated depths to the upper till layer and depths to bedrock in each of the 15 boring/monitoring wells.

4) Remove the rods and center plug from the augers and attach a split-spoon sampler (also referred to as a split-barrel sampler) to the drill rods. Sampling methods are presented in Section 3.3.

Reference: American Society for Testing and Materials (ASTM) Standard Practice for Soil Investigation and Sampling by Auger Borings D1452-80, and Standard Method for Penetration Test and Split Barrel Sampling of Soils D1586-84.

3.3 Split-Spoon Sampling Procedures

Summary: Split-spoon sampling is a standard method of soil sampling to obtain representative samples for identification and laboratory testing as well as to serve as a measure of resistance of soil to sampler penetration. Split-spoon soil samples will be collected from the ground surface to total depth (an estimated depth of 20 to 42 feet bgs) at all 35 soil borings. This sampling method will allow the collection of a continuous subsurface soil section in each boring.

Procedure:

1) Measure the split-spoon sampler lengths to ensure that they conform to specifications. Confirm the weight of the sliding hammer is 140 pounds.

2) Clean out the auger flight to the bottom depth prior to sampling. Select additional components if required (i.e., leaf spring core retainer for clays or a sand trap for loose sands).

3) Lower the decontaminated sampler to the bottom of the auger column and check the depth against length of the rods and the sampler.

4) Attach the drive head and hammer to the drill rods without the weight of the hammer resting on the rods.

5) Lower the weight and allow the sampler to settle up to 6 inches. If it settles more, consider the use of a larger diameter sampler.

6) Mark four 6-inch intervals on the drill rods relative to a drive reference point on the rig. With the sampler resting on the bottom of the hole, drive the sampler with the 140-pound hammer falling freely over its 30-inch fall until 24-inches have been penetrated or 100 blows applied.

7) Record the number of blows per 6-inch interval. Determine the "N" value by adding the blows for the 6-to 12-inch and 12-to 18-inch interval of each sample attempt.

8) After penetration is complete, remove the sampler.

9) Open the sampler and screen the soil with a photoionization detector (PID) for volatile organic vapors. The sample can be split into small increments and scanned or pieces of the sample can be stored in sample jars or sealable plastic (Ziploc-type) bags. The headspace in these sample containers can be scanned for volatile organic vapors.

10) Determine the sample recovery percentage, and describe the soil.

11) Document all soil properties and sample locations in the field notebook, and later on the Boring Log form (Appendix A).

12) Two samples will be selected from each boring for analysis. One sample will be collected from the vadose zone and a second sample will be collected from an interval below the groundwater table. A total of 30 samples will be collected for analysis from the 15 soil borings/monitoring wells. Ten of the samples (from URS -02, -05, -06, -13, -15) will be analyzed for the full TCL (Target Compound List) parameters (i.e., VOCs, semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals,

Total mercury and Total cyanide. The remaining 20 samples (from URS -01, -03, -04, -07, -08, -09, -10, -11, -12, and -14) will be analyzed for VOCs only. A total of 40 samples from 20 soil borings in the source area (SB-01 through SB-20) will be sampled for VOCs with one sample from each boring collected from the vadose zone and a second sample collected from an interval below the groundwater table.

Sample intervals will be field selected using elevated PID readings and visual identification of discolored soil. In addition to the 30 samples collected from URS-01 through URS-15, up to fifteen samples (one sample per monitoring well) will be collected below the water table in the upper glacial till aquifer for natural oxidant demand. Table 2 summarizes the summary of samples and analytical parameters. Table 3 lists appropriate sample bottles required for each parameter.

13) Place the samples selected for laboratory analysis in appropriate laboratory sample bottles, label (Section 7.0), and store in a cooler containing bagged ice. Log each sample submitted for analysis on the chain of custody form.

14) Portions of the samples not needed for analysis will be placed in a drum containing drill cuttings.

Reference: ASTM Standard Method for Penetration Test and Split Barrel Sampling of Soils D1586-84, and Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) D2488-90.

3.3.1 Unified Soil Classification System

Soils are classified for engineering purposes according to the Unified Soil Classification System (USCS) adopted by the U.S. Army Corps of Engineers and U.S. Department of the Interior Bureau of Reclamation. Soil properties, which form the basis for the USCS, are:

- Percentage of gravel, sand, and fines;
- Shape of the grain-size distribution curve; and

- Plasticity and compressibility characteristics.

The USCS divisions and symbols are discussed in Appendix B.

3.3.2 Visual Identification

Soil collected from each split-spoon sample taken from the 35 soil borings will be visually identified. Soil properties needed to classify the soil under USCS and other characteristics typically recorded when describing a soil are defined below:

a. Color
b. Moisture conditions
c. Grain size (estimated maximum and minimum)
d. Gradation
e. Grain shape
f. Plasticity
g. Predominant soil type (e.g., clay, silt, sand, or gravel)
h. Secondary components of soil (e.g., *clayey* silt, *silty* sand, or *gravelly* clay)
i. Classification symbol (e.g., GW, SP, ML, CL, or PT)
j. Other features such as:
    - organic, chemical, or metallic content;
    - compactness;
    - consistency;
    - cohesiveness near plastic limit;
    - dry strength; and source - residual, or transported (aeolian, water borne, glacial deposit, etc.).

3.4 Disposal of Drill Cuttings

Summary: Disposal of drill cuttings will be performed in accordance with New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum (TAGM) HWR-89-4032, November 21, 1989.

Procedure:

1) Cuttings will be stored in DOT-approved 55-gallon drums that are staged at the decontamination pad.

2) The soil cuttings generated during drilling activities will be sampled for IDW (investigation derived waste) characterization. The analytical parameters for IDW sampling are listed in Table 2. Based on the IDW analytical results, the drums will be disposed of at either a licensed non-hazardous waste landfill or a hazardous waste landfill.

3.5 Monitoring Well Construction Procedures

Summary: A method for construction of groundwater monitoring wells within unconsolidated material that enables monitoring of groundwater elevation and acquisition of groundwater samples for laboratory testing. Each of the 15 soil borings/monitoring wells installed during the drilling program will be screened in the upper till aquifer. Eight borings (URS-01, -03, -07, -08, -09, -10, -11 and,-12) will be drilled below the upper till aquifer to the top of Vernon shale bedrock. In the borings drilled to the top of the Vernon shale, a portion of the borehole will be backfilled with bentonite. Seven borings will be drilled to the top of the lower till layer. The shallower borings will not require backfilling with bentonite. A typical well construction diagram showing a bentonite backfilled boring is presented in Figure 5.

Procedure:

1) Advance the boring to the appropriate depth listed in Table 1 by means of 4 ¼-inch ID hollow-stem auger drilling.

2) Remove the center-plug from the auger-string and verify borehole depth using a weighted measuring tape.

3) Backfill the deep borings (URS-01, -03, -07, -08, -09, -10, -11 and,-12) with bentonite chips from 42 feet bgs (or less if bedrock is encountered at a shallower depth) to an estimated depth of 26 feet bgs in the upper till layer. The bentonite

chips will be added in 6-inch lifts followed by a sufficient amount of water to hydrate the chips. The after the final lift of bentonite is added, allow a minimum of one-half hour time to elapse to complete the bentonite hydration.

3) Add a two-foot cushion layer of Ricci 00N sand (or equivalent) to the top of the bentonite backfill in the boring.

4) Insert a 2-inch diameter, 10 foot long, 10-slot, Schedule 40 PVC (poly vinyl chloride) well screen connected to threaded sections of riser pipe into borehole through the hollow stem augers. No portion of the well riser or screen will be glued. Cap the riser to prevent well construction materials from entering the well. The well is designed to screen a sand layer in the upper till layer. The upper till, which is continuous across the site, appears to be the primary water-bearing unit. The water-bearing interval in the upper till layer varies in thickness and depth below surface across the site. The determination of the screened interval in each boring will be based on the well site geologist's observations.

5) Add Ricci 00N sand (or equivalent) to the screen section of the well while slowly removing the augers. The sand pack should extend at least two feet above the top of the screen section. Measure with a weighted tape.

6) Slowly add bentonite chips to seal the borehole as the augers are slowly removed. Add water to hydrate the chips. The bentonite seal should extend at least two feet above the top of the sand pack section. Measure with a weighted tape.

Note: The rate of removal of the auger sections from the borehole should closely follow the rate that the sand pack and bentonite pellets fill the borehole.

7) If the bentonite seal is placed above the groundwater level within the borehole, add water to the borehole to hydrate the bentonite pellets. Allow the pellets to hydrate for at least 30 minutes.

8) Mix cement/bentonite grout per the manufacturer's specifications.

9) Add grout to the borehole through a tremie pipe or hose from the top of the bentonite seal to approximately two feet below the ground surface.

10) Remove the remaining augers from the borehole.

11) Top off the grout in the borehole. The grout should extend to approximately 2 feet below the ground surface.

12) The top of well risers will extend approximately 2.5 feet above the ground surface. Prior to installing the riser in the hole, use a saw to cut a "v" notch in the top of the riser. This notch will act as a reference point for water level measurements.

13) Backfill to grade with concrete. Install a 24-inch diameter well pad around the well riser.

14) Install an above-grade metal protective casing (stick-up) over the well riser pipe and set it into the concrete backfill.

15) Lock the protective casing cover.

16) Document well construction in the field notebook and later on a Monitoring Well Construction Detail diagram (Appendix A).

Reference: ASTM Standard Practice for Design and Installation of Groundwater Monitoring Wells in Aquifers D5092-90.

3.6 Monitoring Well Development Procedures

Summary: Following completion of drilling and well installation, each new monitoring well and existing monitoring wells will be developed using the over-pumping technique by URS field personnel until the discharged water indicator parameters (pH, temperature, turbidity, and specific conductivity) have reached steady state. Development logs from GZA's 1994 drilling program at SOH show that well water turbidity generally remained high (>200 Nephelometric Turbidity Units (NTU) after developing the 11 monitoring wells installed in the overburden. The overburden wells typically were pumped dry quickly. The amount of water removed during development of the wells ranged from 7.3 gallons to 56 gallons per well. The effectiveness of the development measures will be closely monitored to determine the effectiveness of development. A steady state pH, temperature, turbidity and specific conductivity readings will be used as a guide for discontinuing well development. The 15 groundwater monitoring wells installed during field work activities and the existing monitoring wells will be developed as described below.

Procedure:

1) The specific well development method will be dependent on water level depth, well productivity, and sediment content of the groundwater. Well development options include: (a) manual pumping using a submersible pump (i.e., Grundfos or Whale pumps); (b) hydrolift pumping (i.e., Waterra pump); (c) raising and lowering a solid surge block in the well, then pumping the resulting turbid water.

2) Equipment will be assembled, decontaminated (if necessary), and installed in the well. Care should be taken not to introduce contaminants to the equipment during installation.

3) Well development will proceed until several borehole volumes of water have been removed. Pumping speed will be adjusted so the water level does not decrease rapidly. If the well is pumped to near dryness water levels, the well will be allowed to recharge before development continues. This pumping and recharging method will continue if the indicator parameters have not reached steady state. All development waters will be containerized in 55-gallon drums or in a dedicated plastic tank staged in the decontamination area. Effectiveness of development will be monitored at regular intervals by measuring the indicator parameters (e.g., pH, temperature, turbidity and specific conductivity readings). The volume of water removed and turbidity, pH, temperature, and conductivity measurements will be recorded on a Well Development/Purging Log form (Appendix A).

4) Well development will be discontinued when the turbidity of the discharged water is below 50 NTU (if possible) and pH, temperature, and specific conductivity readings have reached steady state.

Reference: ASTM Standard Practice for Design and Installation of Groundwater Monitoring Wells in Aquifers D5092-90.

3.7 Slug Test Procedures

All new monitoring wells and existing monitoring wells will have slug testing performed to evaluate the permeability of the upper till aquifer, lower till layer and Vernon Shale bedrock.

Falling Head Test Procedure:

1) Record the initial water level in the well (static water level);
2) Lower the pressure transducer/data logger into the well to the well bottom. Pull the transducer up one foot and secure it;
3) Connect the transducer/data logger to the laptop computer, and begin monitoring the water level with the computer;
4) Insert a slug into the well above the water table, with nylon rope;
5) Begin a testing event on the computer and quickly lower the entire slug into the water column and secure it;
6) Allow the water level in the well to return to static condition by monitoring with the computer;
7) When the water level has returned to the static level, stop the testing event and save the data.
8) Review the data briefly to verify that the slug test was successful.

Rising Head Test Procedure:

1) With the slug in the water column and the water level at static level, begin a new testing event on the computer;
2) Remove the slug from the water column quickly by pulling up on the nylon rope;
3) Allow the water level in the well to return to static condition;

4) Stop the testing event and save the data;
5) Review the data briefly to verify that the slug test was successful.

3.8 Surface Soil Sampling

Ten surface soil samples will be collected at locations to be determined in the field after discussions between the URS field coordinator and the NYSDEC project manager. These locations will be staked and labeled for subsequent surveying after the sampling is completed. Pre-cleaned stainless steel trowels will be used to collect the samples from 0 to 2-inches bgs. Vegetation at each sample location will be removed before sampling. The trowel will be thoroughly cleaned between sample locations by scrubbing with an alconox and water solution. The trowels will be rinsed in deionized water then wiped dry with paper towels. Aluminum foil will be wrapped around the cleaned trowels if there is a delay before taking the next sample. Three (30%) of the soil samples will be analyzed for VOCs, SVOCs, pesticides/PCBs and metals (Table 2). Seven (70%) of the soil samples will be analyzed for VOCs only.

3.9 Existing Well Inspections

There are 23 existing monitoring wells and piezometers installed during previous investigations at the SOH site as shown on Figure 3. The condition of these wells is unknown. URS intends to sample groundwater from all intact existing wells. A well inspection form is included in Appendix A.

The inspection of the existing wells will include:

- Well ID;
- Label wells if necessary;
- Depth to bottom (using a weighted tape or water level indicator probe);
- Depth to water;

- Record original depth to bottom from well construction diagram;
- Condition of protective casing;
- Condition of well pad and;
- replacement of all well locks with keyed-alike locks

The water level indicator probe or weighted tape will be decontaminated with an alconox solution rinse, followed by a deionized water rinse and wiped dry after sounding the depth to bottom of each well.

3.10 Documentation

Subsurface boring information will be logged in a bound field notebook during drilling by the supervising geologist. Field notes will include descriptions of subsurface materials encountered during drilling, sample numbers, and types of samples recovered from the borehole. Additionally, the geologist will note time and material expenditures for later verification of contractor invoices. A field notebook will be initiated at the start of on site work and will be maintained by the leader of each field crew. The field notebook will include the following daily information, regardless of what activity is being performed:

- Date;
- Meteorological conditions;
- Crew members;
- Brief descriptions of proposed field activities;
- Locations where work is being performed;
- Problems and corrective actions taken;
- All field measurements or descriptions recorded;

- Calibration of field equipment used; and
- All modifications of the field activities plan.

Upon completion of daily drilling activities, the geologist will complete the daily drilling record form and initiate chain-of-custody documentation on any samples recovered for chemical laboratory testing. Following completion of the drilling program, the geologist will transfer field notes onto standard forms for the field activities report.

On a weekly basis the project geologist will submit a summary report to the URS project manager containing at a minimum the following: (1) a summary of the daily drilling records; (2) progress report on field activities; and (3) a record of site visitors.

The proper completion and retention of the following forms/logs will be considered correct procedure for documentation during the drilling and sampling program:

1) Field Log Book - weather-proof hard-bound field book

2) Daily Drilling Records (Appendix A)

3) Boring Logs (Appendix A)

4) Monitoring Well Construction Detail Diagrams (Appendix A)

5) Purging/low flow sampling logs (Appendix A)

6) Chain of custody forms

4.0 GROUNDWATER, SOIL GAS AND VAPOR INTRUSION SAMPLING PROCEDURES

Summary: To collect representative groundwater samples, groundwater wells must be adequately purged prior to sampling. New monitoring wells will not be purged and sampled until a minimum of two weeks after development of each well has been completed. Water level measurements will be taken at all existing intact monitoring wells and the 15 newly installed monitoring wells on the site as described in Section 4.1. Low-flow purging techniques will be used, as described in Section 4.2. Sampling should commence immediately after purging as soon as adequate recharge has occurred.

Fifteen new and 23 existing groundwater monitoring wells will be sampled, as defined in the PMWP. The wells will be sampled following procedures found in Section 4.3. The samples will be labeled, preserved and shipped following procedures outlined in Sections 7.0 and 8.0 and analyzed for the parameters indicated in Table 2.

The Ruby Gordon's furniture store, located adjacent to the SOH site, has had VOCs detected in the basement sump pump water. Because of this, a basement sub-slab soil gas sample will be collected using the procedures described in Section 4.4. In addition, air samples will be collected from the basement, first floor and outside the building as described in Section 4.5.

4.1 Water Level Monitoring Procedures

Summary: Determination of groundwater depths in monitoring wells is necessary to calculate required purge volumes prior to groundwater sampling, and to determine the direction of groundwater flow.

Water levels in the new and existing monitoring wells will be measured using an electronic water level indicator. Initially, measurements will be taken following well development when the well has recovered to static conditions. To determine the direction of groundwater flow, water levels measurements will be measured in all the monitoring wells on the same day. Water level measurement procedures are presented below.

Procedure:

1) Clean the water level probe and the lower portion of cable following standard decontamination procedures (Section 7.0) and test water level meter to ensure that the batteries are charged.

2) Lower the probe slowly into the monitoring well until the audible alarm indicates water has been reached.

3) Read the depth to the nearest hundredth of a foot from the graduated cable using the V-notch or mark on the riser pipe as a reference.

4) Repeat the measurement for confirmation and record the water level.

5) Remove the probe from the well slowly, drying the cable and probe with a clean paper towel.

6) Replace the well cap and lock protective cap in place.

7) Decontaminate the water level meter (Section 7.0) if additional measurements are to be taken.

Reference: USEPA Environmental Response Team, Standard Operating Procedures for Manual Water Level Measurements, SOP 2043, February 11, 2000.

4.2 Monitoring Well Purging Procedures

1) The well cover will be unlocked and carefully removed to avoid having any foreign material enter the well. The interior of the riser pipe will be monitored for organic vapors using PID. If a reading of greater than 5 ppm is recorded, the well will be vented until levels are below 5 ppm before purging begins.

2) Using an electronic water level indicator, the water level below top of casing will be measured. Measure the total depth of the well and calculate the volume of water in the well. The end of the probe will be soap-and-water-washed and deionized-water-rinsed between wells.

3) Calibrate field instruments per manufacturers instructions (e.g., pH, specific conductance, PID, turbidity) and install in the flow-through cell.

4) Purge the required water volume (i.e., until stabilization of pH, temperature, specific conductivity, and turbidity) using a peristaltic pump (Solinst or Geopump) and dedicated HDPE tubing. New dedicated tubing will be used for each well.

5) Purge the well until the water quality parameters have stabilized between consecutive measurements. The stabilization criteria are: specific conductivity - 3% full scale range; pH - 0.10 pH unit; temperature - 0.2°C, and turbidity <50 NTU.

6) Purging of three well volumes is not necessary if the indicator parameters are stable. However, at least one (1) well volume must be purged before sampling can begin. During purging, it is permissible to by-pass the flow cell until the groundwater has cleared.

7) Indicator parameters of pH, conductivity, dissolved oxygen, oxidation/reduction (redox) potential, turbidity, and temperature must be measured continuously using the flow cell. The data will be recorded in the field notebook after each consecutive1/10^{th} well volume has been removed.

8) Well purging data are to be recorded in the field notebook and on the Well Purge Log .

4.3 Groundwater Sampling Procedures

The following groundwater sampling procedures will be used for new and existing monitoring wells after purging has been conducted as described above in Section 4.1:

Procedure:

1) After well purging is completed, a sample will be collected into the appropriate containers using the same pump and dedicated tubing that was used for purging each well. All sample containers (listed in Table 3) will be labeled using a laboratory supplied adhesive paper label. The attached, completed sample label will then be covered with clear tape. The samples will be collected and analyzed for the parameters specified in Table 2.

2) Direct water flow toward the inside wall of the sample container to minimize volatilization. Fill volatile sample containers so no headspace (air) is present. If containers are pre-preserved, do not overfill sample containers. Note if effervescence is observed.

3) Samples will be placed into sample containers (as listed in Table 3) and stored immediately on ice in coolers for processing (preservation and packing) prior to shipment to the analytical laboratory. A chain-of-custody record will be initiated.

4) Remove dedicated/disposable HDPE tubing from each well and discard as IDW as described in Section 3.4.

5) Well sampling data will be recorded in the field notebook and on the Well Purging Log (Appendix A).

4.4 <u>Sub-Slab Air Sampling Procedures</u>

Summary: Because VOCs have been detected in groundwater samples taken from a basement sump in an adjacent business (Ruby Gordon's Furniture), indoor air and soil gas from below the basement concrete slab will be sampled and analyzed. The sub-slab air sampling procedures are summarized below:

1) Drill a 5/8-inch diameter hole about one-inch (1'') deep into the concrete using an electric hammer drill. Extend the hole through the remaining thickness of the

slab using a 3/8-inch or ½-inch drill bit. Lengthen the hole about three inches (3") into the sub-slab material using either a drill bit or steel probe rod. After drilling is completed, remove concrete dust/cuttings from the hole using a small wire brush.

2) Insert one end of a ¼-inch outside diameter by 1/8-inch inside diameter polyethylene tube through a 5/8-inch diameter by 1/2 -inch thick rubber stopper. Insert the stopper into the 5/8-inch hole. A rubber stopper manufactured with a suitable-sized hole will be used for the sub-slab air sampling.

3) Seal the annular space between the stopper and the wall of the 5/8-inch hole with melted beeswax. The wax can be melted in a saucepan using a small electric cooker.

4) After the wax has hardened, connect the ¼-inch polyethylene sample tubing to an air-sampling pump (GilAir 3 or similar) with silicon tubing. Then attach a 1-liter Tedlar bag to the air-sampling pump. Purge approximately one liter (1L) of soil vapor from the sub-slab sampling point and sample tubing into the Tedlar bag using the air-sampling pump. A low flow rate (less than 0.2 liters per minute) must be used during purging. Analyze the 1-liter Tedlar bag containing the sub-slab purged air with a PID when outside the building. Do not release the contents of the Tedlar bag inside the building.

5) Record the Summa canister and flow controller serial numbers on the Summa Canister Sampling Field Data Sheet (Appendix A), and the Chain of Custody form (COC) (Appendix A).

6) Assign a sample identification number to the canister identification tag and record on the COC and the Summa Canister Sampling Field Data Sheet.

7) Remove the brass plug from the Summa canister fitting and save it.

8) Attach the flow controller/vacuum gauge provided by the laboratory to the Summa canister inlet. Do not reuse flow controllers between locations.

9) After purging the sub-slab sampling point and tubing into the Tedlar bag, remove the sampling pump from the poly tubing and attach the tube to the Summa canister, using a dedicated Swagelok fitting.

10) Open canister valve to initiate sample collection and record start time, date, and gauge vacuum reading on the canister identification tag, the COC, and on the Summa Canister Sampling Field Data Sheet.

11) Take a photograph of the canister setup and surrounding area.

12) Clean up any dust/debris with a brush and dustpan. Do not use a vacuuming device.

13) Prior to the elapse of 24 hours (i.e., a period of time where the gauge indicates a slight vacuum exists in the Summa canister), record the gauge vacuum reading, close the Summa canister valve completely and record the end time on the Summa Canister Sampling Field Data Sheet. There should still be a slight vacuum in the Summa canister. If no vacuum remains in the canister, or the canister does not show a significant net loss in vacuum after sampling, call the URS project manager to discuss possible re-sampling of the building with a fresh canister.

14) Disconnect the tubing from the Summa canister and remove the flow controller.

15) Seal the sampling point by discarding the sample tubing and using a Swagelok "plug" screwed tightly to the Swagelok union. The remainder of the 1-inch diameter recessed hole will be left open between sampling visits.

16) Ship Summa canister, with COC, via standard overnight courier delivery to the Con-Test Analytical laboratory for TO-15 analysis.

17) At the conclusion of the sampling program, the rubber stopper should be removed from the drilled hole and the hole filled with hydraulic cement.

18) Record the sample identification number and measure sample location offset from the interior walls. Record the data in the field book.

4.5 Vapor Intrusion Sampling Procedure

The procedures for the Ruby Gordon's vapor intrusion sampling for the first floor, basement and outdoor ambient air sampling are summarized below:

1) Inventory all cleaning products, paint, solvents, and fuel stored in the basement. Move the containers out of the basement at least 24 hours prior to sampling.

2) Place the vapor intrusion Summa canister inlet at breathing height (4 to 6 feet above the floor) in the approximate center of the structure, or, for the outdoor air sample, elevated on a table or other object in a location upwind of the building being sampled. As an option, a length of Teflon-lined polyethylene tubing can be attached to the Summa canister inlet and raised to breathing zone height.

3) Record the canister and flow controller serial numbers on the canister identification tag, COC, and the Summa Canister Sampling Field Data Sheet

4) Assign a sample identification number to the canister identification tag, and record on the COC and the Summa Canister Sampling Field Data Sheet.

5) Remove the brass plug from canister fitting and save it.

6) Attach the flow controller/vacuum gauge provided by the laboratory to the Summa canister inlet. Do not reuse flow controllers between locations.

7) Open the canister valve to initiate sample collection and record start time, date and gauge vacuum reading on the canister identification tag and on the Summa Canister Sampling Field Data Sheet (Appendix A).

8) Take a photograph of canister setup and surrounding area.

9) Prior to the elapse of 24 hours (a period of time where the gauge indicates a slight vacuum exists in the Summa canister), record the gauge vacuum reading, close the Summa canister valve completely and record the end time on the Summa Canister Sampling Field Data Sheet. There should still be a slight

vacuum in the Summa canister. If no vacuum remains in the canister, or the canister does not show a significant net loss in vacuum after sampling, call the URS project manager to discuss possible re-sampling of the facility with a fresh canister.

10) Disconnect the tubing from the Summa canister and remove the flow controller.

11) Replace the brass plug on the canister.

12) Record the sample identification number and measure sample location offset from the interior walls. Record the data in the field book.

13) Ship the canister, with COC, via standard overnight courier delivery to the Con-Test Analytical laboratory for TO-15 analysis.

5.0 SURVEYING AND MAPPING

Project surveying will provide data necessary to plot remedial design surface sample, well and boring locations on the existing base map. All surveying will be performed following the requirements of the Remedial Design Project Management Work Plan, and the HASP.

5.1 Establishing Horizontal Primary Project Control

To determine the horizontal locations of newly installed monitoring wells and surface sampling points, measurements from site features previously surveyed (by Shaw and GZA) to the monitoring well locations will be performed with a graduated tape and a portable Global Positioning System (GPS) receiver. Horizontal control will be referenced to the North American Datum 1983 (NAD 83).

5.2 Establishing Vertical Primary Project Control

To determine newly installed monitoring well riser and ground elevations, URS will use an optical level instrument and survey rod. Elevations will be referenced to site features previously surveyed by Shaw and GZA. Vertical control will be referenced to the North American Vertical Datum 1988 (NAVD 88). All existing monitoring wells will also be surveyed to verify their ground and riser elevations.

6.0 SAMPLING EQUIPMENT CLEANING PROCEDURES

Summary: To ensure that no outside contamination will be introduced into the samples/data, thereby invalidating the samples/data, the following cleaning protocols will apply for all equipment used to collect samples/data during the field investigations. Drilling equipment and heavy machinery will be steam cleaned on the decontamination pad.

Procedures:

1) Thoroughly clean equipment with laboratory-grade soap (e.g. Alconox) and water, until all visible contamination is gone.

2) Rinse with tap water, until all visible evidence of soap is removed.

3) Rinse several times with deionized water.

4) Air dry before using. If equipment will not be used immediately, wrap in aluminum foil.

7.0 SAMPLE LABELING

Summary: To prevent misidentification and to aid in the handling of environmental samples collected during the field investigation, the following procedures will be used:

Procedure:

1) Affixed to each sample container will be a non-removable (when wet) label. Apply label and wrap with 2-inch clear plastic tape to cover the label. The following information will be written on each label with permanent marker:

   - Site name
   - Sample identification
   - Project number
   - Date/time
   - Sampler's initials
   - Sample preservation
   - Analysis required

2) Each sample of each matrix will be assigned a unique identification alpha-numeric code. An example of this code and a description of its components is presented below:

Examples

1. MW1-GW
   MW1 = Monitoring Well 1
   GW = Groundwater

2. OW1-GW
   OW1= Observation Well 1
   GW = Groundwater

3. URS1-GW

URS1= URS Monitoring Well 1

GW = Groundwater

4. SB1 - 2'-4'

SB1 = Soil Boring 1

2' - 4' = Two-foot to four-foot soil sample

List of Abbreviations

Monitor Type

MW = Monitoring Well

PZ= Piezometer

OW=Observation Well

Sample Type

GW	=	Groundwater
SVEA	=	Soil Vapor Extraction Air
SB	=	Soil Boring
MSB	=	Matrix Spike Blank
EB	=	Equipment Rinse Blank
TB	=	Trip Blank
RB	=	Rinse Blank
MS	=	Matrix Spike
MSD	=	Matrix Spike Duplicate

Note: Sample IDs should continue from the last unique ID used during the immediate past field event. For example, do not identify the first well of this drilling investigation event as MW-1.

8.0 SAMPLE SHIPPING

Summary: Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presentation of sample analytical chemistry results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The procedures used in this Remedial Design follow the chain-of-custody guidelines outlined in ASTM Standard D4840-95.

Procedure:

1) The chain-of-custody (COC) record (Appendix A) should be completely filled out, with all relevant information.

2) The original COC goes with the samples. It should be placed in a Ziploc bag and taped on the inside lid of the sample cooler. The sampler should retain a copy of the COC.

3) Place inert cushioning material such as vermiculite or bubble-wrap in the bottom of the cooler.

4) Place the bottles in the cooler in such a way that they do not touch (use cardboard dividers or bubble-wrap).

5) Wrap VOA vials securely in bubble-wrap and tape. Place them in the center of the cooler.

6) Pack the cooler with ice in doubled Ziploc plastic bags.

7) Pack the open space of the cooler with cushioning material.

8) Tape the drain valve shut.

9) Wrap the cooler completely with strapping tape at two locations securing the lid. Do not cover any labels.

10) Place the lab address on top of cooler. For out-of-town laboratory, add the following: Put "This side up" labels on all four sides and "Fragile" labels on at least two sides. Affix numbered custody seals on the front right and left sides of the cooler lid seam. Cover the seals with wide, clear tape.

11) Ship samples via overnight carrier the same day that they are collected. Samples must be maintained at 4 degrees Celsius (C) ± 2°C throughout the shipping duration.

12) Ship soil and groundwater samples to:

Mitkem Corporation
175 Metro Center Boulevard
Warwick, Rhode Island 02886
Ph: (401) 732-3400

13) Ship Summa Canisters to:

Con-Test Analytical Laboratory
39 Spruce Street
East Longmeadow, MA 01028

Ph: (413)525-2332

14) Ship samples by Fed Ex priority overnight delivery, referencing the URS Fed Ex Account Number and the URS internal billing reference number (11174465.00002) on the airbill.

REFERENCES

New York State Department of Environmental Conservation (NYSDEC), 1989. *Disposal of Drill Cuttings, Technical and Administrative Guidance Memorandum (TAGM) #4032*; November.

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New York State Department of Environmental Conservation (NYSDEC), 1997. *Record of Decision, Stuart Olver Holtz Site, Town of Henrietta, Monroe County*; March.

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New York State Department of Environmental Conservation (NYSDEC), 2006. *Draft Sub Part 375-1 General Remedial Program Requirements*; June.

Shaw Environmental, Inc. (SHAW), 2002. *Pre-Design Investigation Summary Focused Feasibility Study Stuart Olver Holtz Site Henrietta, New York;* prepared for New York State Department of Environmental Conservation; November.

URS Corporation (URS) 2006. *Site Characterization/Remedial Design Stuart Olver Holtz Site Project Management Work Plan/Budget Estimate;* prepared for New York State Department of Environmental Conservation; July.

FIGURES

SOURCE:
- NYS GIS Clearinghouse
April 2005 One Foot Digital
Camera Color West Zone

200 0 200 Feet

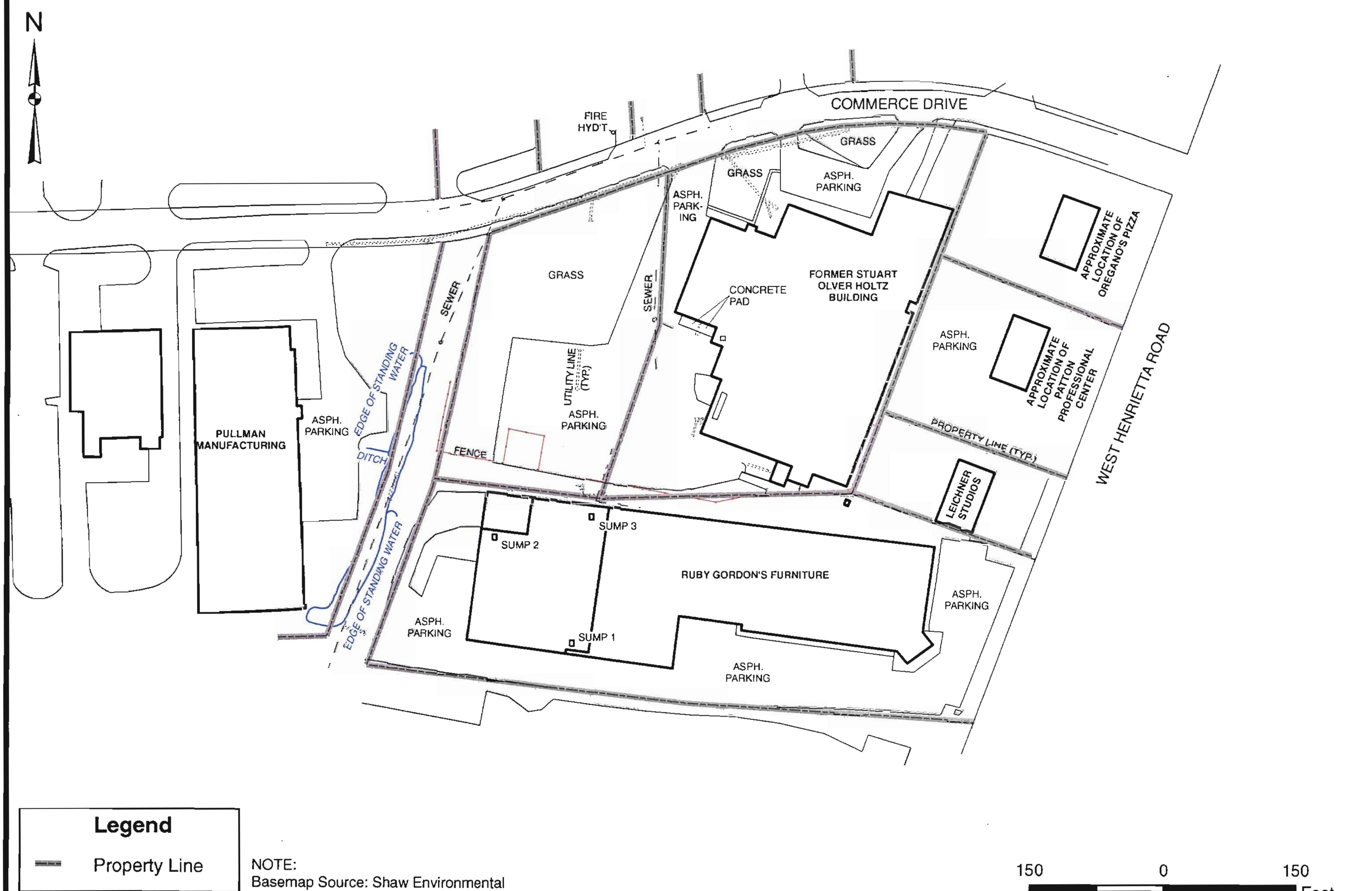
URS

STUART OLVER HOLTZ
SITE LOCATION

FIGURE 1

J:\11174465.00000\DB\GIS\SITE_LOCATION_ORTHO.mxd Date: 9/14/2006 Name: Tobin_D

J:\11174465.00000\DB\GIS\SITE PLAN.mxd Date: 9/12/2006 Name: Tobin_D



NOTE:
Basemap Source: Shaw Environmental

URS

STUART OLVER HOLTZ SITE
SITE PLAN

FIGURE 2

Well	Rationale	Est. Total Depth	Depth to bedrock
URS-01	Source Delineation	40	40
URS-02	Source Delineation	25	40
URS-03	Down Gradient	38	38
URS-04	Plume Limit	20	41
URS-05	Plume Limit	20	40
URS-06	Plume Limit	25	42
URS-07	Infill Coverage	41	41
URS-08	Infill Coverage	34	34
URS-09	Infill Coverage	35	35
URS-10	Infill Coverage	42	42
URS-11	Source Delineation	38	38
URS-12	Source Delineation	40	40
URS-13	Infill Coverage	25	35
URS-14	Infill Coverage	20	39
URS-15	Plume Limit	25	40

Legend

- Proposed Monitoring Well
- Existing Monitoring Well
- Proposed Soil Boring
- Property Boundary
- Groundwater Flow Direction
- Estimated Extent of Source Area
- Total VOC's Groundwater Contamination >100 ug/L (1995 Sampling)

NOTE:
Basemap Source: Shaw Environmental

J:\11174465.00000\DB\GIS\WELL_LOCATION (11 X 17).mxd Date: 9/14/2006

STUART OLVER HOLTZ SITE
PROPOSED MONITORING WELLS

URS

FIGURE 3

Legend

- Proposed Monitoring Well
- Proposed Soil Boring

SOURCE:
- NYS GIS Clearinghouse April 2005 One Foot Digital Camera Color West Zone

50 0 50 Feet

URS

STUART OLVER HOLTZ SITE
PROPOSED SOIL BORING LOCATIONS

FIGURE 4

J:\11174465.00000\DB\GIS\PROPOSED SOIL BORING LOCATIONS.mxd 10/12/2006

TABLES

TABLE 1

PROPOSED BORINGS/MONITORING WELLS AND PREDICTED STRATIGRAPHY [(1)]

Boring Number	Purpose	Rationale	Total Estimated Boring Depth (Feet)	Depth to Upper Till (Feet)	Depth to Lower Till (Feet)	Depth to Bedrook (Feet)	Number of Split Spoon Samples
URS-1	Sample to Rock; Monitoring Well in Upper till	Source Delineation	40	8	28	40	20
URS-2	Sample to Lower Till; Monitoring Well in Upper Till	Source Delineation	25	16	22	40	20
URS-3	Sample to Rock; Monitoring Well in Upper till	Down Gradient	38	7	28	38	19
URS-4	Sample to Lower Till; Monitoring Well in Upper Till	Plume Limit	20	9	19	41	21
URS-5	Sample to Lower Till; Monitoring Well in Upper Till	Plume Limit	20	14	19	40	20
URS-6	Sample to Lower Till; Monitoring Well in Upper Till	Plume Limit	25	13	23	42	21
URS-7	Sample to Rock; Monitoring Well in Upper till	Infill Coverage	41	8	22	41	21
URS-8	Sample to Rock; Monitoring Well in Upper till	Infill Coverage	34	2	17	34	17
URS-9	Sample to Rock; Monitoring Well in Upper till	Infill Coverage	35	2	17	35	18
URS-10	Sample to Rock; Monitoring Well in Upper till	Infill Coverage	42	7	30	42	21
URS-11	Sample to Rock; Monitoring Well in Upper till	Source Delineation	38	12	28	38	19
URS-12	Sample to Rock; Monitoring Well in Upper till	Source Delineation	40	10	25	40	20
URS-13	Sample to Lower Till; Monitoring Well in Upper Till	Infill Coverage	25	10	22	35	18
URS-14	Sample to Lower Till; Monitoring Well in Upper Till	Infill Coverage	20	9	15	39	20
URS-15	Sample to Lower Till; Monitoring Well in Upper Till	Plume Limit	25	18	23	40	20
SB-1	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-2	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-3	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-4	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-5	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-6	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-7	Soil Boring/Soil Samples	Source Area	30	10	25	NA	15
SB-8	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-9	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-10	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-11	Soil Boring/Soil Samples	Source Area	30	10	25	NA	15
SB-12	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-13	Soil Boring/Soil Samples	Source Area	30	10	25	NA	15
SB-14	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-15	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-16	Soil Boring/Soil Samples	Source Area/Sub-Slab	30	10	25	NA	15
SB-17	Soil Boring/Soil Samples	Source Area	30	10	25	NA	15
SB-18	Soil Boring/Soil Samples	Source Area	30	10	25	NA	15
SB-19	Soil Boring/Soil Samples	Source Area	30	10	25	NA	15
SB-20	Soil Boring/Soil Samples	Source Area	30	10	25	NA	15

Notes:

1. Estimated bsed on stratigraphic cross sections provided in the *Remedial Investigation Report-Stuart Olver Holtz Site* by GZA Geoenvironemtal of New York dated September 1996.

TABLE 2
SUMMARY OF SAMPLES AND ANALYTICAL PARAMETERS
STUART OLVER HOLTZ SITE CHARACTERIZATION/REMEDIAL DESIGN
NYSDEC WORK ASSIGNMENT D004440-3
SITE #8-28-079

Analytical Method[1]	Matrix	Field Samples	Field Duplicates	Equipment Blanks	Trip Blanks	MS/MD/ MSD (Pairs)[2]	Total No. of Samples
A. Surface Soil Samples							
TCL VOCs (USEPA Method 8260B) + TICs	Soil	10	1	1	0	1	14
TCL SVOCs (USEPA Method 8270C) + TICs		3	1	1	0	1	7
TCL Pesticides/PCBs (USEPA Methods 8081A/8082)		3	1	1	0	1	7
TAL Metals (USEPA Methods 6010B/7471A)		3	1	1	0	1	7
Total Cyanide (USEPA Method 9012A)		3	1	1	0	1	7
B. Subsurface Soil Samples							
TCL VOCs (USEPA Method 8260B) + TICs	Soil	70	4	4	0	4	86
TCL SVOCs (USEPA Method 8270C) + TICs		10	1	1	0	1	14
TCL Pesticides/PCBs (USEPA Methods 8081A/8082)		10	1	1	0	1	14
TAL Metals (USEPA Methods 6010B/7471A)		10	1	1	0	1	14
Total Cyanide (USEPA Method 9012A)		10	1	1	0	1	13
Natural Oxidant Demand (NOD)		15	1	0	0	0	16
B. Groundwater Samples							
TCL VOCs (USEPA Method 8260B) + TICs	Groundwater	38	2	2	5	2	51
TCL SVOCs (USEPA Method 8270C) + TICs		38	2	2	0	2	46
TCL Pesticides/PCBs (USEPA Methods 8081A/8082)		38	2	2	0	2	46
Total TAL Metals (USEPA Methods 6010B/7470A)		38	2	2	0	2	46
Dissolved TAL Metals (USEPA Methods 6010B/7470A)		38	2	2	0	2	46
Total Cyanide (USEPA Method 9012A)		38	2	2	0	2	46
Total Organic Carbon (USEPA Method 415.1)		38	2	2	0	2	46
Chemical Oxygen Demand (USEPA Method 410.4)		38	2	2	0	2	46
Chloride (USEPA Method 300.0)		38	2	2	0	2	46
Total Petroleum Hydrocarbons (USEPA Method 1664)		38	2	2	0	2	46
Total Dissolved Solids (USEPA Method 160.1)		38	2	2	0	0	42
C. Vapor Intrusion Samples							
VOCs (USEPA Method TO-15)	Soil Vapor	1	0	0	0	0	1
Low-Level VOCs (USEPA Method TO-15/TO-15 SIM)	Indoor/Outdoor Air	3	1	0	0	0	4
D. Investigation-Derived Waste Samples							
TCLP ZHE Leaching (USEPA Method 1311)	Waste	2	0	0	0	0	2
TCLP Non-ZHE Leaching (USEPA Method 1311)		2	0	0	0	0	2
TCLP VOCs (USEPA Method 8260B)		2	0	0	0	0	2
TCLP SVOCs (USEPA Method 8270C)		2	0	0	0	0	2
TCLP Pesticides (USEPA Method 8081A)		2	0	0	0	0	2
Total PCBs (USEPA Method 8082)		2	0	0	0	0	2
TCLP Herbicides (USEPA Method 8151A)		2	0	0	0	0	2
TCLP Metals (USEPA Methods 6010B/7470A)		2	0	0	0	0	2
Corrosivity (USEPA Method 9040B/9045C)		2	0	0	0	0	2
Ignitability (USEPA Method 1010/1030)		2	0	0	0	0	2
Reactive Sulfide/Cyanide (USEPA SW-846 Ch. 7, Sec. 3)		2	0	0	0	0	2

1. Analytical Services Protocol, NYSDEC, June 2000.
   Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, USEPA 25/R-96/010b, January 1999, or as updated.

2. Matrix spike/matrix spike duplicate (MS/MSD) pairs shall be analyzed for organic parameters. MS/matrix duplicate (MD) pairs shall be analyzed for inorganic/wet chemistry parameters.

TCL/TAL - USEPA Superfund Target Compound List/Target Analyte List
TCLP - Toxicity Charcteristic Leaching Procedure
TICs - Tentatively Identified Compounds
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PCBs - Polychlorinated Biphenyls

TABLE 3
ANALYTICAL METHODS, SAMPLE CONTAINER AND PRESERVATION REQUIREMENTS, AND ANALYTICAL HOLDING TIMES
STUART OLVER HOLTZ SITE CHARACTERIZATION/REMEDIAL DESIGN
NYSDEC WORK ASSIGNMENT D004440-3
SITE #8-28-079

Parameter	Method Number [1]	Container [2]	Minimum Sample Volume [2]	Preservation	Holding Time [3]
A. Surface and Subsurface Soil					
TCL VOCs + TICs	SW8260B	Glass, septum cap	2 x 2 oz.	Cool, 4°C	10 days
TCL SVOCs + TICs	SW8270C	Glass	2 x 8 oz.		10 days to extract, 40 days to analysis
TCL Pesticides/PCBs	SW8081A/8082	Glass			10 days to extract, 40 days to analysis
Total Cyanide	SW9012A	Glass			12 days
TAL Metals	SW6010B/7471A	Glass			6 months, except mercury - 26 days
Natural Oxidant Demand	Laboratory SOP [4]	Glass	1 x 4 oz. glass	Cool, 4°C	As soon as possible
B. Groundwater					
TCL VOCs + TICs	SW8260B	Glass, septum cap	3 x 40 mL VOA vials	Cool, 4°C, HCl to pH < 2	10 days
TCL SVOCs + TICs	SW8270C	Glass	2 x 1 L	Cool, 4°C	5 days to extract, 40 days to analysis
TCL Pesticides/PCBs	SW8081A/SW8082	Glass	2 x 1 L	Cool, 4°C	5 days to extract, 40 days to analysis
TAL Metals - total (unfiltered)	SW6010B/7470A	HDPE	1 x 500 mL	Cool, 4°C, HNO_3 to pH < 2	6 months, except mercury - 26 days
TAL Metals - dissolved (filtered)	SW6010B/7470A	HDPE	1 x 500 mL	Cool, 4°C, HNO_3 to pH < 2 (preserve sample after filtering)	6 months, except mercury - 26 days
Total Cyanide	SW9012A	HDPE	1 x 500 mL	Cool, 4°C, NaOH to pH >12, Ascorbic Acid	12 days
Total Organic Carbon	415.1	Glass	2 x 40 mL abmber vials	Cool, 4°C, H_2SO_4 to pH < 2	26 days
Chemical Oxygen Demand	410.4	HDPE	1 x 125 mL	Cool, 4°C, H_2SO_4 to pH < 2	26 days
Chloride	300.0	HDPE	1 x 125 mL	Cool, 4°C	26 days
Total Dissolved Solids	160.1	HDPE	1 x 250 mL	Cool, 4°C	5 days
Total Petroleum Hydrocarbons	1664	Glass	2 x 1L Amber	Cool, 4°C, HCl or HNO_3 to pH < 2	26 days
C. Soil Vapor/Air					
TCL VOCs	TO-15	Summa Canister W/ 24 Hr. Regulator	6 Liter	None	7 days for polar compounds, 14 days for non-polar compounds
D. Investigation-Derived Waste					
TCLP VOCs	SW1311/SW8260B	Glass	2 x 2 oz. (solid) or 2 x 40 mL VOA (liquid)	Cool, 4°C	7 days to TCLP extract, 7 days to analysis
TCLP SVOCs	SW1311/SW8270C	Glass, HDPE	2 x 8 oz. glass (solid) or 4 x 1L Amber and 1 x 500 mL HDPE (liquid)	Cool, 4°C	5 days to TCLP extract, 7 days to prep extract, 40 days to analysis
TCLP Pesticides	SW1311/SW8081A				
TCLP Herbicides	SW1311/SW8151A				
TCLP Metals	SW1311/SW6010B/SW7470A				180 days to TCLP extract, 180 days to analysis; Mercury 5 days to TCLP extract, 28 days to analysis
Total PCBs	SW8082				10 days to extract (5 days for aqueous), 40 days to analysis
Reactivity	SW Chapter 7, Section 3	Glass, HDPE	1 x 4 oz. glass (solid) or 1 x 500 mL HDPE (liquid)	Cool, 4°C	As soon as possible
Ignitability	SW1010/SW1030				As soon as possible
Corrosivity	SW9040B/SW9045C				As soon as possible

NOTES:

1. Analytical Services Protocol (ASP), NYSDEC, June 2000.
   Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, USEPA 25/R-96/010b, January 1999, or as updated.

2. Alternative containers may be used as needed based on laboratory sample volume requirements. Any alternative containers used must meet the minimum requirements specified in the NYSDEC ASP.

3. All holding times are from validated time of sample receipt (VTSR) at the laboratory.

4. NOD analyses to be performed according to Carus Chemical Company's Standard Operating Procedure (SOP). There is no standard analytical method for this analysis.

TCL/TAL - USEPA Superfund Target Compound List/Target Analyte List
TCLP - Toxicity Charcteristic Leaching Procedure
TICs - Tentatively Identified Compounds
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PCBs - Polychlorinated Biphenyls

APPENDIX A

FIELD ACTIVITY FORMS

Stuart Olver Holtz Site

VISITORS LOG

Date	Name/Company (Print)	Signature

Stuart Olver Holtz Site

TAIL GATE SAFETY TALK

TOPIC:

Date	Name/Company (Print)	Signature

WELL INSPECTION SHEET

Well ID: ______________________ **Date:** ________________

Location: ____

Name of Inspector: ____

Monitoring Point
Physical Condition: 1) **ID marked?** ______________________________

2) **Lock** ____________________________________

3) **Protective casing** ____________________________

4) **Concrete pad** ________________________________

5) **Riser cap** ___________________________________

6) **Visible well riser** ____________________________

7) **Riser size/material (PVC, SS)** ____________________

8) **Measuring point marked?** _______________________

Depth to Water: ____feet

Depth to Bottom:
____feet

Bottom is: ____

Any signs of unauthorized well use? _____________________________

Any unauthorized encroachment upon or interference with this well? __________

9.0 **REPAIRS OR COMMENTS:** ____

____

____

____

DAILY DRILLING RECORD *URS Corporation*

PROJECT TITLE: ____________________ DATE: ____________________

CLIENT: ____________________ CONTRACTOR: ____________________

FROM	TO	PRODUCTIVE HOURS	ACTIVITIES/COMMENTS
TOTAL PRODUCTIVE HOURS			LEVEL B / LEVEL C / LEVEL D (CIRCLE ONE SELCTION)

LABOR:		MATERIALS / SUPPLIES:	
UNITS		UNITS	

WEATHER:

URS ONSITE COORDINATOR

CONTRACTOR REPRESENTATIVE

j:\11174465\excel\SOH Field Forms\Daily Drilling Record

URS Corporation											**TEST BORING LOG**
											BORING NO:
PROJECT:											SHEET: 1 of
CLIENT:											JOB NO.:
BORING CONTRACTOR:											BORING LOCATION:
GROUNDWATER:					CAS.	SAMPLER	CORE	TUBE			GROUND ELEVATION:
DATE	TIME	LEVEL	TYPE	TYPE							DATE STARTED:
				DIA.							DATE FINISHED:
				WT.							DRILLER:
				FALL							GEOLOGIST:
				* POCKET PENETROMETER READING							REVIEWED BY:

DEPTH FEET	SAMPLE					DESCRIPTION			REMARKS
	TIME	NO.	TYPE	BLOWS PER 6"	ROD%	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	
5									
10									
15									
20									
25									
30									

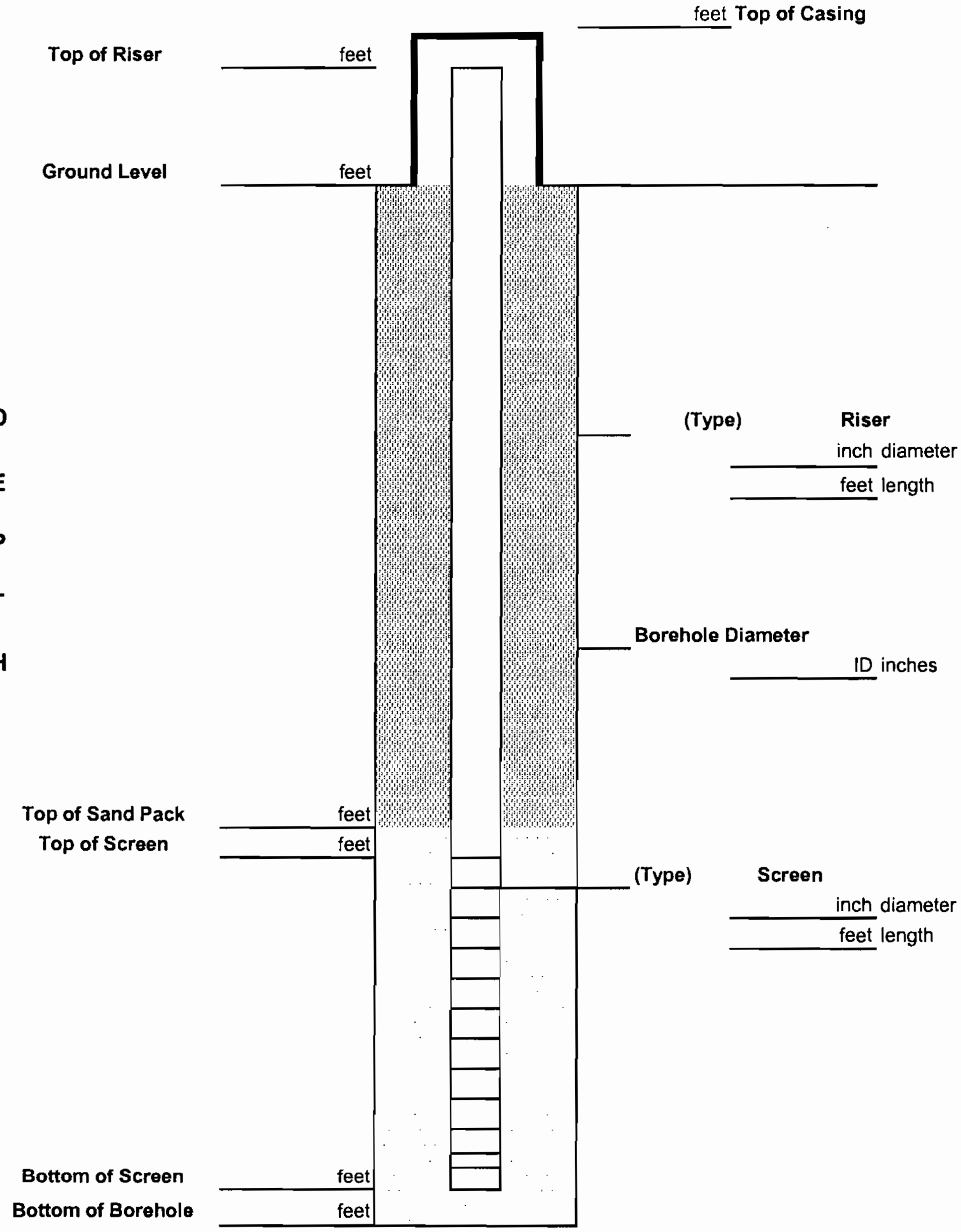
COMMENTS:	PROJECT NO. BORING NO.

DRILLING SUMMARY
Geologist:
Contractor:
Operator:
Model:
Date:

GEOLOGIC LOG

Depth(ft.)	Description

DEPTH



WELL DESIGN

CASING MATERIAL	SCREEN MATERIAL	FILTER MATERIAL
Surface:	Type:	Type: Setting:
Riser:	Slot Size:	**SEAL MATERIAL**

COMMENTS:

LEGEND

Seal

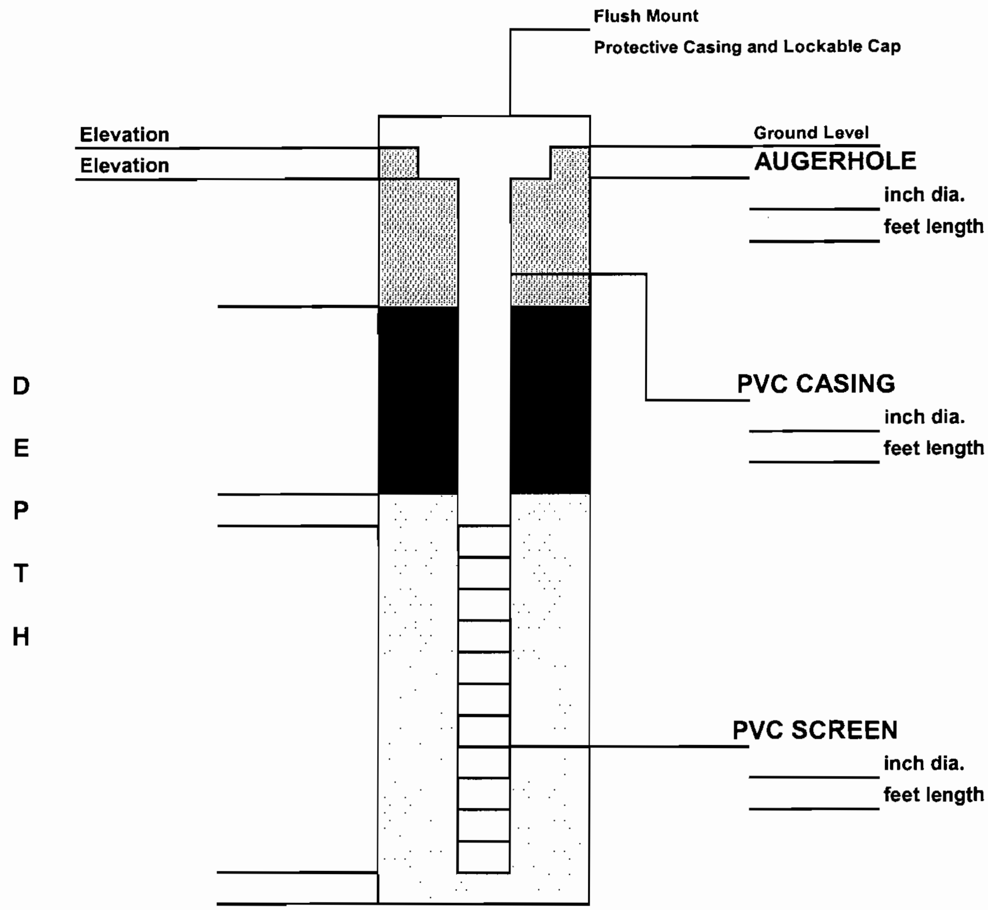
Sand Pack

Client:	Location:	Project No.:
NAME	WELL CONSTRUCTION DETAILS	Well Number:

DRILLING SUMMARY
Geologist:
Drilling Company:
Driller:
Rig Make/Model:
Date:

GEOLOGIC LOG

Depth(ft.)	Description



WELL DESIGN

CASING MATERIAL	SCREEN MATERIAL	FILTER MATERIAL
Surface: Steel grade box	Type: 4" PVC	Type: #2 Sand Setting:
		SEAL MATERIAL
Monitor: 4" PVC	Slot Size: .020"	Type: Bentonite Setting:

COMMENTS:	LEGEND
	Cement/Bentonite Grout
	Bentonite Seal
	Silica Sandpack

Client:	Location:	Project No.:
URS Corporation	MONITORING WELL CONSTRUCTION DETAILS	Well Number:

j:\11174465\excel\SOH Field Forms\Flush Mount

WELL DEVELOPMENT LOG

URS Corporation

PROJECT TITLE: ____________________ WELL NO.: ____________

PROJECT NO.: ____________________

STAFF: ____________________

DATE(S): ____________________

			WELL ID.	VOL. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=		1"	0.04
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=		2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	0.0	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	0.17	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	0.0	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x ___)	=	0	6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=		8"	2.60

OR

$V=0.0408 \times (\text{CASING DIAMETER})^2$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
pH											
SPEC. COND. (umhos)											
APPEARANCE											
TEMPERATURE (°C)											

COMMENTS:

WELL PURGING LOG

URS Corporation

PROJECT TITLE: ______________________ WELL NO.: ______________

PROJECT NO.: ______________________

STAFF: ______________________

DATE(S): ______________________

			WELL ID.	VOL. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=		1"	0.04
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=		2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	0.00	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	0.17	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	0.00	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x 3)	=	0.00	6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=		8"	2.60

OR

$V=0.0408 \times (\text{CASING DIAMETER})^2$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
pH											
SPEC. COND. (umhos)											
APPEARANCE											
TEMPERATURE (°C)											

COMMENTS:

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: ____________________ Site: ____________ Well I.D.: ____________

Date: ________ Sampling Personnel: ____________________ Company: ____________

Purging/ Sampling Device: ____________________ Tubing Type: ____________ Pump/Tubing Inlet Location: ____________

Measuring Point: ________ Initial Depth to Water: ________ Depth to Well Bottom: ________ Well Diameter: ________ Screen Length: ________

Casing Type: ____________ Volume in 1 Well Casing (liters): ________ Estimated Purge Volume (liters): ________

Sample ID: ____________________ Sample Time: ____________ QA/QC: ____________

Sample Paramaters: ____

Other Information: ____

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (μmhos)	DISS. O_2 (mg/l)	TURB. (NTU)	Eh (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
Tolerance:	0.1	---	3%	10%	10%	+ or - 10	---	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft; 1 inch diameter well = 154 ml/ft; 2 inch diameter well = 617 ml/ft; 4 inch diameter well = 2470 ml/ft ($vol_{cyl} = \pi r^2 h$)

Summa Canister Sampling Field Data Sheet

Site:

Samplers:

Date:

Sample #					
Location					
Summa Canister ID (Lab ID, if provided)					
Additional Tubing Added	NO/ YES - How much	NO/ YES - How much	NO/ YES - How much	NO/ YES - How much	NO/ YES - How much
Purge Time (Start)					
Purge Time (Stop)					
Total Purge Time (min)					
Purge Volume					
Pressure Gauge - before sampling					
Sample Time (Start)					
Sample Time (Stop)					
Total Sample Time (min)					
Pressure Gauge - after sampling					
Sample Volume					
Canister Pressure Went To Ambient Pressure?	YES / NO	YES / NO	YES / NO	YES / NO	YES / NO

General Comments:

APPENDIX B

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION

Soils are classified for engineering purposes according to the Unified Soil Classification System (USCS) adopted by the U.S. Army Corps of Engineers and U.S. Department of the Interior Bureau of Reclamation. Soil properties, which form the basis for the USCS, are:

- Percentage of gravel, sand, and fines;
- Shape of the grain-size distribution curve; and
- Plasticity and compressibility characteristics.

According to this system, all soils are divided into three major groups: coarse-grained, fine-grained, and highly organic (peaty). In a laboratory, the boundary between coarse-grained and fine-grained soils is determined by the amount of material passing through a 200-mesh (0.074 mm) sieve. In the field, the distinction is based on whether the majority of the individual particles can be seen with the unaided eye. If more than 50% of the soil is judged to consist of grains that can be distinguished separately, the soil is considered to be coarse-grained.

The USCS classifies coarse-grained soils as gravelly (G) or sandy (S) soils, depending whether 50% of the visible grains are larger (gravelly) or smaller (sandy) than the No. 4 sieve (3/16 inch). In the field, gravel consists of grains measuring between 0.19-inches and 2.9-inches in length.

Coarse-grained granular soils are each divided further into four groups:

W: Well graded; fairly clean (<5% finer than 0.074 mm)

P: Poorly graded (gap-graded); fairly clean (<5% finer than 0.074mm)

C: Clayey (>12% finer than 0.074mm); plastic (clayey) fines. Fine fraction above the A- line with plasticity index above 7.

M: Silty (>12% finer than 0.074 mm); nonplastic or silty fines. Fine fraction below the A- line and plasticity index below 4.

The soils are represented by symbols such as GW or SP. Borderline materials are represented by a double symbol, as GW-GC.

The fine-grained soils are divided into three groups: inorganic silts (M), inorganic clays (C), and organic silts and clays (O). The soils are further divided into those having liquid limits lower than 50% (L), or higher than 50% (H).

The distinction between the inorganic clays (C), the inorganic silts (M), and organic soils (O) is made on the basis of a modified plasticity chart. Soils CH and CL are represented by points above the A-line, whereas soils OH, OL, and MH correspond to positions below the A-line. Soils ML, except for a few clayey fine sands, are also represented by points below the A-line. The organic soils O are distinguished from the inorganic soils M and C by their characteristic odor and dark color.

Reference: ASTM Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System) D2487-92.

ATTACHMENT 1

QUALITY ASSURANCE PROJECT PLAN