REMEDIAL INVESTIGATION WORK PLAN

FOR

399 GREGORY STREET
ROCHESTER, NEW YORK

DECEMBER 2004

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1.0 Introduction

This project is being performed as part of the City of Rochester's 2003 Brownfield Assessment grant from the United States Environmental Protection Agency (EPA). The objectives of the proposed project include identification of site soil and groundwater gaps, performing additional investigation in order to perform a qualitative exposure assessment, establishing appropriate remedial objectives and selecting effective remedial alternatives. The evaluation of remedial alternatives will be consistent with the contemplated site reuse plans.

The investigation and remediation of the Davidson Collision site is a key to the City's efforts to redevelop several vacant and abandoned properties located throughout the City in densely populated commercial and residential areas. After receiving the EPA Brownfield Grant the City acquired the Site through tax foreclosure. A Site Location Map is included as Figure 1.

Several neighbors have expressed interest in the property and there is a documented need for additional parking in the area. Concept redevelopment plans will incorporate input obtained from neighborhood meetings as well as input from the City. It is assumed the property will have future commercial use that will include a parking lot.

The City will schedule the building for demolition prior to the commencement of Remedial Investigation activities. The City will be responsible for Asbestos Containing Building Materials (ACBM), demolition activities and construction of a Site fence. The concrete slab will be left in place to provide cover to soils until remediation is completed.

This Work Plan identifies the remedial investigation tasks to be completed in accordance with the Brownfields Cleanup Program (BCP). The activities proposed for the Site are outlined in Section 1.3 of this Work Plan.

1.1 Site Background

The following site background information was obtained from information presented in a "Fact Sheet" dated April 2003, prepared by the New York State Department of Environmental Conservation (DEC), in conjunction with the New York State Department of Health and the Monroe County Department of Health and a Site Investigation Report, Davidson's Collision, Site No. 828091, prepared by the DEC dated March 2003. The Davidson Collision Site consists of two adjoining parcels. The Davidson Collision business located at 399 Gregory Street, operated as an auto body shop from the early 1960s until it went out of business in March 1993. In June 1993, the auto body shop reopened under new management and the new name of Southwedge Collision. The adjoining 10 Cayuga Street parcel consists of an unimproved grass-covered parcel that was formerly owned by Davidson Collision.

Previous investigations at the Site between 1991 and 1994 identified the disposal of a consequential amount of hazardous waste (primarily paint waste including paint thinner) through a pipe leading from a paint booth inside the shop to a storage container outside the building. This method of discharging paints and paint thinner contaminated soil near the southwestern corner of the auto body shop. In January 1993, some contaminated soil from the waste disposal area was excavated, however, confirmatory soil samples were not taken and the vertical and lateral limits of impacted soil were not determined prior to backfilling. The 1991 and 1993 activities were performed without DEC approval or oversight. In 1994 the DEC

conducted an investigation and determined the 1993 soil removal activity did not remove all of the subsurface contamination at the Site. As such, the DEC conducted an investigation in 2000-2002 to obtain additional information regarding the nature and extent of contamination at the Site and to determine if the Site represents a significant threat to human health or the environment. Further information regarding the various investigations that have been conducted are presented in the following section.

1.2 Previous Investigations

The previous environmental studies that have been completed at the 399 Gregory Street Site and the adjacent 10 Cayuga Street parcel:

- a September 1991 Phase II Investigation[1];
- an August 1995 Preliminary Site Assessment Report[2];
- a March 2003 Site Investigation Report[3]; and
- a December 13, 2004 Site Visit.

Presented below is a summary of the findings and conclusions of these previous investigations.

<u>September 1991 Phase II Investigation[1]</u>

1. A 55-gallon drum was determined to contain hazardous waste (elevated chromium, lead, toluene, styrene, ethylbenzene and xylene) and surface soil surrounding the drum was contaminated with toluene, ethylbenzene and xylene.

2. Surface soil collected from the waste paint area was contaminated with toluene, ethylbenzene and xylene.

3. A concrete poured, in-ground hydraulic lift pit (7'X8') with a yellowish-brown liquid that contained methylene chloride, toluene and xylene was described as being located in the "eastern garage section".

4. A gap in the floor paint storage/mixing room was screened with a PID and an FID and no detectable readings were reported.

5. Floor and trench drain dye tests were performed and the drains were determined to discharge to the combined sanitary/storm sewer system. It was noted that the floor drain located outside the paint booth was clay tile with a portion of the tile missing.

The report concluded that additional investigations be conducted to determine the vertical and lateral extent of soil contamination and a groundwater investigation be conducted to determine if groundwater had been impacted.

August 1995 Preliminary Site Assessment Report[2]

1. Organic compounds, butylbenzylphthalate and lead, were detected in surficial soil samples at relatively low concentrations. An exhaust fan was observed discharging a visible quantity of dust and automotive paint to the ground surface from the rear of the building.

2. Elevated concentrations of ethylbenzene, toluene and total xylenes were detected in subsurface soil samples from depths of 6'-8' and 8'-10' below ground surface from BS-101 and BS-108 located in the waste paint disposal excavation area.

3. Elevated concentrations of benzene, ethylbenzene, toluene and total xylenes were detected in groundwater samples from MW-101 located in the waste paint disposal excavation area. With the exception of a single detection of bis(2-ethylhexyl)phthalate, no organic compounds were detected in MW-103 and MW-104. There were exceedances of groundwater standards for several inorganics, however, due to significant suspended particulates, the evaluation of these reported exceedances was difficult.

The report concluded that hazardous wastes were present in soil and groundwater, however, no receptors of the contaminated groundwater were identified and therefore the Site was determined not to pose any significant threat to public health.

March 2003 Site Investigation Report[3]

Volatile organic compounds (VOCs) in surficial soils, subsurface soils, and groundwater were the primary focus of this investigation to help determine the extent of contamination at the Site.

1. No VOCs were detected in surficial soils.

2. VOC contamination was present in subsurface soils and groundwater near the southwest corner of the building in an area where hazardous waste disposal had occurred.

3. VOC contaminated soils were present at a depth of approximately 6' below ground surface and extended into groundwater.

4. Significant groundwater contamination associated with hazardous waste disposal appears to be limited to the overburden.

5. A source of petroleum related VOC contamination, which is not associated with the waste paint disposal area, appears to be present under the eastern section of the building where automobile maintenance was routinely performed.

6. There were no indications of significant off-Site migration of contaminated groundwater towards neighboring residences.

December 13, 2004 Site Visit

City and Stantec personnel performed a Site visit on December 13, 2004. The interior of the building was filled with a significant amount of debris including abandoned cars, bicycles, rubbish, etc. The observations noted during the visit were consistent with the prior observations noted by the DEC with the exception of a concrete floor pit in the eastern portion of the building. It is suspected that this may have been the pit found during the September 1991 Phase II Investigation. The pit was covered with steel floor plates and contained two hydraulic reservoirs. Standing oil was present in the bottom of the pit with visible dark staining approximately one-half the way up the pit walls. No debris was visible in the standing oil.

Evaluation of Available Data

Based on the information presented in the previous investigations and the observations made during the Site visit, Stantec has identified the following data gaps that require additional investigation:

- The lateral extent of soil contamination in the vicinity of the waste paint disposal area (paint booth area inside the building and outside on the west side of building) has not been delineated.
- It was noted that a light non-aqueous phase liquid (LNAPL) was present in one groundwater monitoring well (MW-116, located off-Site adjacent to the west of the building) during the 2000-2002 investigation. The vertical and lateral extent of the LNAPL layer was not delineated.
- The vertical and lateral extent of potential petroleum related soil and/or groundwater VOC contamination in the vicinity of the eastern section of the building where automobile maintenance routinely occurred has not been delineated.

References:

1 "Phase II Investigation, Davidson's Collision, 399 Gregory Street, Rochester, New York. Prepared by Day Environmental, Inc., September 21, 1991."

2 "Preliminary Site Assessment Report, Davidson's Collision, DEC Site No. 828091, Rochester, New York. Prepared by ABB Environmental Services, August 1995."

3 "Site Investigation Report, Davidson's Collision, Site No. 828091, Rochester, New York. Prepared by Frank Sowers, PE, New York State Department of Environmental Conservation, Division of Environmental Remediation, Region 8, March 2003."

- A chlorinated solvent (trichloroethene) was detected at 1,800 parts per billion (ppb) in one soil sample during a 1994 sampling event from the waste paint disposal area and methylene chloride was detected at 3.56 parts per million (ppm) during a 1991 sampling event of the accumulated liquid from the in-ground hydraulic lift pit in the "eastern garage section".
- The extent of potential impacts to the subsurface from the standing oil in the eastern concrete floor pit needs to be evaluated. This is suspected to be the same pit that was sampled by the DEC in 1991 and found to contain methylene chloride at a concentration of 3.56 ppm.

Given the results from the prior investigations, a remedial investigation is proposed to undertake an investigation in order to delineate the extent of impacts in the two areas of concern previously identified by the DEC.

These areas include the paint booth and waste paint disposal area (AOC 1) and the former vehicle maintenance area and the hydraulic lift pit (AOC 2) and are depicted on Figure 2.

1.3 Scope and Objective of the Remedial Work Plan

Based on the results of the previous investigations described above and the investigation activities to be conducted at the Site as described herein, it is generally expected that one additional round of investigation will be sufficient in order to meet the goals of Remedial Investigation. The objective of this Work Plan is to outline the procedures that will be followed to complete the following significant tasks:

- Identification of Site soil and groundwater data gaps that require additional investigation;
- Investigation of the area where the 1993 soil removal action was performed at the Site to identify the magnitude and extent of the remaining soil and groundwater impacts;
- Investigation and evaluation of an apparent source of VOC (BTEX) contamination of soils in a former auto maintenance area under the eastern section of the building footprint;
- Evaluation of soil and groundwater data;
- Evaluation of remedial alternatives consistent with the contemplated Site reuse and recommendation of a preferred approach;
- Preparation of draft and final remedial investigation and remedy selection reports, including a data usability report for submission to the DEC; and
- Preparation of a reuse concept plan, with involvement of the community, for use by parties interested in redeveloping the Site.

Due to the urban setting, there is no apparent potential risk to fish or wildlife, therefore, the remedial investigation will not address fish or wildlife resources.

The data collected from this Work Plan will be used to evaluate potential remedial options for the Site. A summary of proposed tasks and an associated schedule for the additional investigation is presented in Table 1.

The proposed remedial investigation activities will involve the following:

- Complete 18 geoprobe soil borings in the interior and exterior portions of the Site;
- Install six new monitoring wells on the Site;
- Conduct a well survey with groundwater elevations;
- Complete a test pit in the western pit; and
- Prepare a Remedial Investigation Report.

Following this introduction (Section 1), Sections 2 through 9 of the Work Plan include the following information:

Section 2:	Identification of Site Soil and Groundwater Data Gaps
Section 3:	Investigation of the 1993 Soil Removal Area
Section 4:	Investigation of Source of VOC (BTEX) Contamination in the Former Auto Maintenance Area
Section 5:	Evaluation of Soil and Groundwater Data
Section 6:	Remedy Selection Report or Remedial Alternatives Report
Section 7:	Site Reuse Concept Plan
Section 8:	Documentation and Reporting
Section 9:	Project Organization and Schedule

1.4 Supplemental Plans

Additional plans including a Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), Citizen Participation Plan (CPP) and Community Air Monitoring Plan (CAMP) have been prepared to supplement the Remedial Investigation Work Plan. The following provides detail regarding these additional plans.

- **QAPP:** Outlines the procedures to be used to assure that analytical results obtained from the investigation meet data quality objectives, including a Data Usability Summary Report. The QAPP is included as Appendix A.

- **HASP:** Describes personal safety protection standards and procedures to be followed by Stantec personnel during the planned investigation activities at the Site. The HASP is included as Appendix B. Material Safety Data Sheets (MSDS) for the chemicals identified at the Site are provided as an appendix to the HASP.

- **CPP:** Describes the procedure for informing and involving the public during the remedial investigation at 399 Gregory Street. The Citizen Participation Plan (CPP) provides summary information regarding the history of the Site, a chronology of environmental investigations conducted to date, the primary contacts for various state and local agencies, as well as private entities involved in environmental investigation and investigation activities being conducted at the Site. The CPP is included as Appendix C.

- **CAMP**: Describes the real-time air monitoring activities to be carried out during the remedial investigation activities. The CAMP is included as Appendix D.

2.0 Identification of Site Soil and Groundwater Data Gaps

Based on the information presented in the previous investigation reports by the DEC and others, and a Site inspection performed on December 13, 2004, Stantec has identified the following data gaps that will require additional investigation:

- The lateral extent of soil contamination in the vicinity of the paint booth and waste paint disposal area (inside the building and on the west side of building) has not been fully delineated.
- It was noted that a light non-aqueous phase liquid (LNAPL) was present in one groundwater monitoring well (MW-116, located off-Site and adjacent to the west of the building) during the 2000-2002 investigation. The vertical and lateral extent of the LNAPL layer has not delineated.
- The extent of potential petroleum related soil and/or groundwater VOC contamination in the vicinity of the eastern section of the building where automobile maintenance routinely occurred has not been delineated.
- A chlorinated solvent (trichloroethene) was detected at 1,800 parts per billion (ppb) in one soil sample during a 1994 sampling event from the waste paint disposal area and methylene chloride was detected at 3.56 parts per million (ppm) during a 1991 sampling event of the accumulated liquid from the in-ground hydraulic lift pit in the "eastern garage section".
- The extent of potential impacts to the subsurface from the standing oil in the eastern concrete floor pit needs to be evaluated. This is suspected to be the same pit that was sampled by the DEC in 1991 and found to contain methylene chloride at a concentration of 3.56 ppm, as described above.

Given the results from the prior investigations, the Remedial Investigation will delineate the extent of impacts in two areas of concern previously identified by the DEC.

These Areas of Concern (AOCs) include the former waste paint disposal area (AOC 1) and the former vehicle maintenance area (AOC 2). In addition, the former hydraulic lift pit in the vicinity of MW-114 has been included with AOC 1. AOCs are presented on Figure 2.

A review of the most recent March 2003 Site Investigation Report prepared by the DEC indicates that VOCs in surficial soils, subsurface soils, and groundwater were the primary focus of the investigation in order to help determine the extent of contamination at the site. In particular, no VOCs were detected in surficial soils. VOC contamination was present in only subsurface soils and groundwater near the southwest corner of the building in an area where hazardous waste disposal had occurred. In addition, significant groundwater contamination associated with hazardous waste disposal appears to be limited to the overburden. The results from SVOC and metals analyses that were conducted by the DEC were not identified as a concern in AOC 1.

Given the DEC's previously identified focus on VOCs and the associated results, the focus of the Remedial Investigation in AOC 1 will be limited to VOCs in subsurface soils and groundwater. SVOC and metals analyses were not previously conducted in AOC 2, therefore, soil and groundwater sampling in AOC 2 will include SVOCs and metals analyses in addition to VOCs. This will provide further characterization in that area of the Site.

3.0 Investigation of the Paint Booth and Waste Disposal Area: AOC1

3.1 Geoprobe Soil Borings

A total of twelve (12) Geoprobe soil borings will be completed in order to investigate and delineate residual impacted soils associated with the paint booth and waste disposal area. The proposed locations of the soil borings are shown on Figure 2.

It is anticipated that the City will schedule the building for demolition prior to the commencement of Remedial Investigation activities.

The proposed boring locations may be modified based upon field observations or other data. Borings will be consecutively numbered in a B-200 series system. A summary of the proposed borings and monitoring well installations is provided in Table 2.

Borings will be advanced with the use of small-diameter, direct push Geoprobe® drilling methods. Stantec anticipates that the soil borings will extend to approximately 15 ft. below the ground surface. However, the exact depths of each boring will be contingent on soil conditions. At the present time, we do not anticipate the need for hollow stem augers. In the event that shallow refusal depths are encountered, Stantec will utilize small diameter augers to reach target depths. In addition, based upon previous investigations, no bedrock drilling is included in the scope of this Remedial Investigation.

Prior to initiating a drilling program, the Underground Facilities Protective Organization (UFPO) will be contacted to locate publicly owned utilities. In addition, any additional drawings or knowledge of the location of underground utilities, both public and private, at the property will be requested prior to the commencement of drilling.

Soil sampling equipment will be decontaminated between samples with a liquinox and potable water wash followed by a potable water rinse. Continuous samples will be collected at each soil boring location. Borings will be drilled to the apparent vertical limits of contamination or refusal, whichever is encountered first. Each soil sample will be screened with a calibrated photoionization detector (PID) for the presence of volatile organic vapors. Soil samples will also be visually evaluated for indications of staining, oils, fill, etc.

If no evidence of potential impacts is observed, cuttings will be returned to the borehole. Asphalt will be repaired with tamped, cold patch asphalt. Concrete will be repaired with grout. If evidence of potential impacts is observed, the drill cuttings and decontamination water will be contained and stored on-Site in secured 55-gallon drums and the boring will be grouted to the ground surface.

3.2 Soil Analytical Program

Based upon the highest PID readings and visual or olfactory evidence of impacts, Stantec proposes to submit 12 soil samples plus the required QA/QC samples (MS/MSD and blind field duplicate) to a New York State Department of Health (NYSDOH) certified laboratory with current ELAP certification for analysis as follows:

- Target Compound List (TCL) and VOCs plus Tentatively Identified Compounds (TICs) using USEPA Method OLM 4.2.

- All soils will be subject to ASP category B deliverables. The proposed analytical sampling summary is presented in Table 3.

3.3 Monitoring Well Installations

Stantec will complete four (4) of the AOC 1 soil borings with one-inch monitoring wells in order to delineate residual impacted groundwater in the area of the 1993 soil removal action. The proposed well locations will be based upon the soil boring program and/or other data. Wells will be numbered consistently with the B-200 boring numbers in an MW-200 series system. A summary of proposed monitoring well installation is provided in Table 2. The proposed monitoring well locations are shown on Figure 2.

Each groundwater monitoring well will be constructed of 1-inch diameter, schedule-40 PVC with 10-ft., 0.010-inch slot well screens. If there is sufficient annular space, sand packs will consist of fine sand extending 24 inches above the well screens. The sand packs will be capped with bentonite seals and the remaining annulus will be grouted to the surface. The wells will be completed with locking, flush-mounted protective casings.

3.4 Groundwater Analytical Program

Two rounds of groundwater sampling will be collected from newly installed wells. It is intended that the two rounds correspond approximately with seasonal high and low water levels. For existing wells included in the sampling schedule, one round only will be collected with the first round of samples from new wells. Analytical protocols for all groundwater samples collected in the first round will include ASP category B deliverables. Subsequent groundwater samples from new wells collected in the second round of sampling will be submitted for VOCs by TCL 8260 with standard deliverables and therefore will not be subject to ASP analytical protocol.

After allowing the bentonite seals to expand for a minimum of 24 hours, the monitoring wells will be developed utilizing disposable bailers in an effort to cleanse them of suspended sediments so that turbidities are reduced to the maximum extent practicable. Turbidity will be monitored during well development.

Each well will be purged utilizing a peristaltic pump. General water quality field parameters (i.e. turbidity, pH, specific conductance and temperature) will be monitored during purging.

Stantec will collect a total of eleven (11) groundwater samples from the four new wells and seven existing monitoring wells for laboratory analysis. An analytical samples summary is presented in Table 3. Existing wells in AOC 1 to be sampled include MW-101, MW-105, MW-108, MW-110, MW-113, MW-114 (if water is present) and MW-116. Each groundwater sample, along with one trip blank, one blind field duplicate, and one MS-MSD (for QA/QC purposes) will be analyzed for:

- TCL VOCs plus TICs using USEPA Method OLM 4.2.

It was noted that a light non-aqueous phase liquid (LNAPL) was present in one groundwater monitoring well, MW-116, located off-Site and adjacent to the west side of the subject building. The lateral extent of the LNAPL layer was not delineated. The presence of LNAPL in new wells will be evaluated with an oil water interface probe. A discrete sample of the LNAPL is proposed to be collected, if present, from MW-116 for:

- TCL VOCs analysis using OLM 4.2; and
- TPH using NYSDOH Method 310-13.

3.5 Well Survey and Groundwater Elevations

Following installation of the new monitoring wells, a limited survey will be performed to provide x,y,z coordinate data for each well relative to the Site datum used for the existing well network. The purpose of the survey will be to ascertain water table elevations at each well location so that the site-specific groundwater flow direction can be interpreted. The survey will be completed by licensed land surveyors.

Three rounds of groundwater measurements will be collected to correspond with initial well development and two rounds of groundwater sampling.

3.6 Test Pit Investigation

A backhoe is proposed to be used to excavate debris which has accumulated in a former pit (adjacent to MW-114) in order to inspect the bottom of the pit for potential residual liquids as previously reported (see Figure 2).

The removal of any debris will be coordinated with the City and the demolition debris from the building.

If present, soil, sediment, or sludge at the bottom of the pit will be screened with a photoionization detector (PID) in the field. Contingent on field observations, laboratory analytical testing of residual liquids will be recommended. Based upon the PID readings and visual or olfactory evidence of impacts, Stantec may propose to select one sample from the bottom of the maintenance pit for submission for laboratory analysis of VOCs by OLM 4.2.

4.0 Investigation of Source of VOC (BTEX) Contamination in a Former Auto Maintenance Area: AOC2

A suspected second potential contamination source is the former automobile maintenance operation area, AOC 2, which is located in the eastern section of the building (see Figure 2). To address potential subsurface environmental impacts from the former auto maintenance operation, the following investigative methods will be employed:

- Geoprobe soil borings;
- Monitoring well installations;
- Soil and groundwater analytical testing; and
- Well survey and groundwater elevations.

This study will also include areas which are presently inside the building that will be accessed more easily following building demolition. In addition to the above items, the City will sample, characterize, remove and dispose of the standing oil in the eastern concrete floor pit.

4.1 Geoprobe Soil Borings

Stantec will complete a total of six (6) Geoprobe soil borings in order to identify and/or delineate impacted soils associated with the former auto maintenance operation. The field methods will be similar to those described for the investigation of AOC 1. A summary of proposed borings is presented in Table 2. The locations of the proposed soil borings are shown on Figure 2. The proposed boring locations may be modified based upon field observations or other data.

4.2 Monitoring Well Installations

Stantec will complete two (2) of the soil borings with one-inch monitoring wells in order to delineate impacted groundwater associated with the former auto maintenance operation. The wells will be constructed using similar methods to those previously described. The proposed well locations will be based upon the soil boring program and/or other data. Wells will be numbered consistently with the B-200 series boring numbers in a MW-200 series system. A summary of proposed monitoring wells is presented in Table 2. The proposed monitoring well locations are shown on Figure 2.

4.3 Soil Analytical Program

Based upon the highest PID readings and visual or olfactory evidence of impacts, Stantec proposes to submit six (6) soil samples plus the required QA/QC samples (MS/MSD and blind field duplicate) to a NYSDOH certified laboratory with current ELAP certification for analysis as follows:

- TCL VOCs plus TICs using USEPA Method OLM 4.2; and
- TCL SVOCs plus TICs and PCBs using OLM 4.2 and TAL Metals using ILM 5.1

All soils will undergo ASP category B protocols.

4.4 Groundwater Analytical Program

Using the same procedures previously described, Stantec will develop and purge the wells prior to sample collection.

Stantec will collect a total of five (5) groundwater samples from new and existing monitoring wells from this former auto maintenance area for submission to a NYSDOH certified laboratory for analysis. Existing wells to be sampled will include MW-104, MW-106 (if water is present) and MW-111. Each groundwater sample, along with one trip blank, one blind field duplicate, and one MS-MSD (for QA/QC purposes) will be tested for:

- TCL VOCs plus TICs using USEPA Method OLM 4.2.

In addition, new wells will be sampled for:

- TCL SVOCs plus TICs and PCBs using OLM 4.2 and TAL Metals using ILM 5.1

Two rounds of groundwater sampling will be collected from newly installed wells. It is intended that the two rounds correspond approximately with seasonal high and low water levels. For existing wells included in the sampling schedule, one round only will be collected with the first round of samples from new wells. Analytical protocols for all groundwater samples collected in the first round will include ASP category B deliverables. Subsequent groundwater samples from new wells collected in the second round of sampling will be submitted for VOCs by TCL 8260 with standard deliverables and therefore will not be subject to ASP analytical protocol.

5.0 Evaluation of Soil and Groundwater Data

Analytical data will undergo a Data Usability evaluation by an independent data validator to assure that analytical results meet data quality objectives (see Appendix A). Data will be compared to existing and proposed soil and groundwater cleanup objectives and standards as well as risk based corrective action levels as noted in Section 8.3.1. Historical data will be included in the evaluation. The data evaluation will also incorporate the conceptual redevelopment plans including provisions for anticipated uses, such as parking lots, as appropriate.

The results of the data analysis will be used to identify remedial parameters and the conditions needed to evaluate remedial alternatives.

6.0 Remedial Alternatives Analysis

Immediately following the completion of the Remedial Investigation, Stantec will perform an evaluation of potential remedial alternatives for the Site. The ultimate goal of the remedy selection process is to select a remedy for the Site that is fully protective of public health and the environment, taking into account the current, intended and reasonably anticipated future land use.

The remedy selection will be performed following the requirements of the "Draft Brownfield Cleanup Program Guide", New York State Department of Environmental Conservation, Division of Environmental Remediation, May 2004 and consistent with Section 4 of "Draft DER-10 Technical Guidance for Site Investigation and Remediation", New York State Department of Environmental Conservation, Division of Environmental Remediation, December 25, 2002 (DER-10).

Consistent with current City zoning of the Site as commercial, the City will propose a use-based approach, which requires the submittal of an Alternative Analysis Report that is defined in the Brownfields program as a Remedial Alternatives Report (RAR). As required by the DEC, the RAR will consider both an unrestricted use scenario and the proposed restricted use scenario, and will be signed and sealed by a licensed Professional Engineer registered in New York State.

The RAR will evaluate how the remedy will be protective of public health and the environment. The DEC has defined nine criteria and the manner in which they are to be evaluated within DER-10. The following are the nine criteria to be used in the evaluation:

- Protection of Human Health and the Environment;
- Standards, Criteria and Guidance (SCG);
- Short-Term Effectiveness and Impacts;
- Long-Term Effectiveness and Permanence;
- Reduction of Toxicity, Mobility or Volume;
- Implementability;
- Cost Effectiveness;
- Community Acceptance; and
- Land Use.

The RAR will include the following sections presenting the nine criteria:

Section 1 – Executive Summary
Section 2 – Purpose
Section 3 – Site Description and History
Section 4 – Summary of Remedial Investigation and Exposure/Risk Assessment
Section 5 – Remedial Goals and Remedial Objectives
Section 6 – Development and Analysis of Alternatives
  i. Assemble Technologies into Alternatives
  ii. Evaluation of Alternatives with Respect to the First Seven Criteria (listed above)
Section 7 – Selection of Recommended Remedy

The RAR will present 2-3 potential remedial options, as well as recommended IRMs (i.e. targeted source removal), for each area of concern (if applicable) or engineering or institutional controls to address the soil and groundwater impacts at the Site and an opinion of the probable range of remedial costs. Stantec will also provide a recommendation concerning the preferred remedial approach.

The potential remedial options and/or engineering controls including potential IRMs (if applicable), will include descriptions of each of the conceptual remedial layouts, associated design sketches, calculations, cost tables, etc.

7.0 Site Reuse Concept Plan

The preparation of a Site Reuse Concept Plan for 399 Gregory Street will afford the City the opportunity to evaluate a means for returning the subject brownfield to a productive commercial use. Interaction with the neighborhood team during the planning phase of the project will provide the information required to create a redevelopment approach that responds to the needs of the community. The "Neighborhood Team Process," a citizen empowerment program, will be used to bring the public into the planning process.

The following tasks have been identified regarding preparation of the Site Reuse Concept Plan.

1. Meet with City staff to discuss program requirements.
2. Meet with concerned citizens at the first of two project neighborhood meetings to solicit their input.
3. Meet with City staff to review two concept reuse plans.
4. Meet with the neighborhood at the second meeting to review concepts.

8.0 Documentation and Reporting

Detailed documentation of site activities will be maintained during the field work. Reporting will include discussions of findings in monthly progress reports and submission of a final written report to NYSDEC. The written report will be provided to the DEC in both hard copy and electronically on compact disk.

8.1 Field Documentation

Documentation of the field activities and environmental sampling will include the following:

Field Notebook - Field personnel will maintain a bound field notebook which will document dates, times and duration of pertinent field occurrences. Notebook entries will be made on consecutive pages.

Project Photographs - Photographs will be taken of field activities.

Calibration Records - Calibration records for field instrumentation will be maintained in the field notebook.

Geologic Logs - Observations pertaining to site geology and hydrogeology made during subsurface drilling will be recorded in the field notebook. Construction logs of monitoring well installations will also be recorded.

Safety Forms - Sign-in forms, air monitoring results, and other safety related documentation will be maintained.

Chain-of-Custody Forms - Sample handling will be recorded on chain-of-custody forms with associated labels and custody seals.

8.2 Reporting

Stantec will generate monthly progress reports on behalf of the City of Rochester that will include field findings and laboratory data as they are received.

8.3 Remedial Investigation Report

Upon receipt and review of the full set of analytical data generated by the additional investigation, a report will be prepared which summarizes the methods, field findings, lab results, interpretations, conclusions and recommendations.

8.3.1 On-Site and Off-Site Risk Assessment

As part of the investigation report an on-Site and off-Site risk assessment will be completed. A vicinity reconnaissance will be competed within ¼ mile of the Site to evaluate human health and within ½ mile to evaluate environmental exposure pathways. The following will be noted for each parcel:

a) Distance from Site;

b) Use of facility (commercial, residential or industrial) within ¼ mile downgradient;
c) Presence of streams or wetlands within ½ mile downgradient;
d) Presence of basement within ¼ mile downgradient; and
e) Water Supply within ¼ mile down gradient (presence of on-Site well or municipal supplied).

The human health qualitative risk assessment will involve the comparison of both on-Site and off-Site contamination levels to applicable standards including:

- **TAGM 4046,** "Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels" dated January 24, 1994 (Revised December 20, 2000).

- **TOGS 1.1.1,** "Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" October 22, 1993, Revised June 1998.

- **New York State Drinking Water Standards,** "Title 10 New York Codes, Rules and Regulations, Subpart 5-1 Public Water Systems"

The environmental risk assessment will be performed using the "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA) dated October 1994.

8.4 Remedial Alternatives Report

A Remedial Alternatives Report (RAR) will be prepared following the completion of the Remedial Investigation. The preparation of the RAR is discussed in Section 6.0.

9.0 Project Organization and Schedule

A multi-disciplined team is required to perform the activities described in this document in accordance with the proposed schedule. The project team will include experienced Stantec staff and qualified subcontractors that are appropriately trained for their assigned duties and acceptable to the DEC.

9.1 Project Personnel

The Stantec personnel selected to perform the activities included in this document are presented below along with a brief description of their duties:

Michael Storonsky - Project Manager

- Provides overall project management;
- Provides managerial guidance to technical group;
- Serves as liaison between technical group and client;
- Serves as liaison with DEC; and
- Prepares and reviews reports.

Kevin Ignaszak, P.E. - Environmental Engineering Manager

- Project QA director;
- Manages exposure assessment and remedial evaluation;
- Assists in review and interpretation of contaminant data; and
- Prepares report.

Peter Smith - Senior Hydrogeologist

- Investigation task leader;
- Reviews and interprets hydrogeological data and contaminant plume geometry;
- Provides the geological and hydrogeological description of the Site;
- Provides technical representation at meetings; and
- Prepares reports.

David Belaskas, P.E. - Senior Environmental Engineer

- Project Health and Safety Director; and
- Coordinates project Health and Safety.

Dave Gnage – Hydrogeologist, Site Coordinator

- Provides immediate supervision of on-Site activities, including Site preparation, borehole and monitoring well installations, sample collection, aquifer testing and health and safety;
- Ensures that samples are properly collected, stored and subjected to the appropriate chain-of-custody protocols;
- Maintains field equipment; and
- Prepares reports.

Kyle Miller – Field Geologist

- Performs on-Site activities, including analytical sampling, subsurface exploration observations, hydraulic conductivity testing, etc.; and
- Prepares field logs.

Rebecca Gerardi, Kyle Miller, Travis Money, Matt Conley, EIT, Adam Cummings, EIT and Luann Meyer – Environmental Scientists and Engineers

- Provide field and office support as needed.

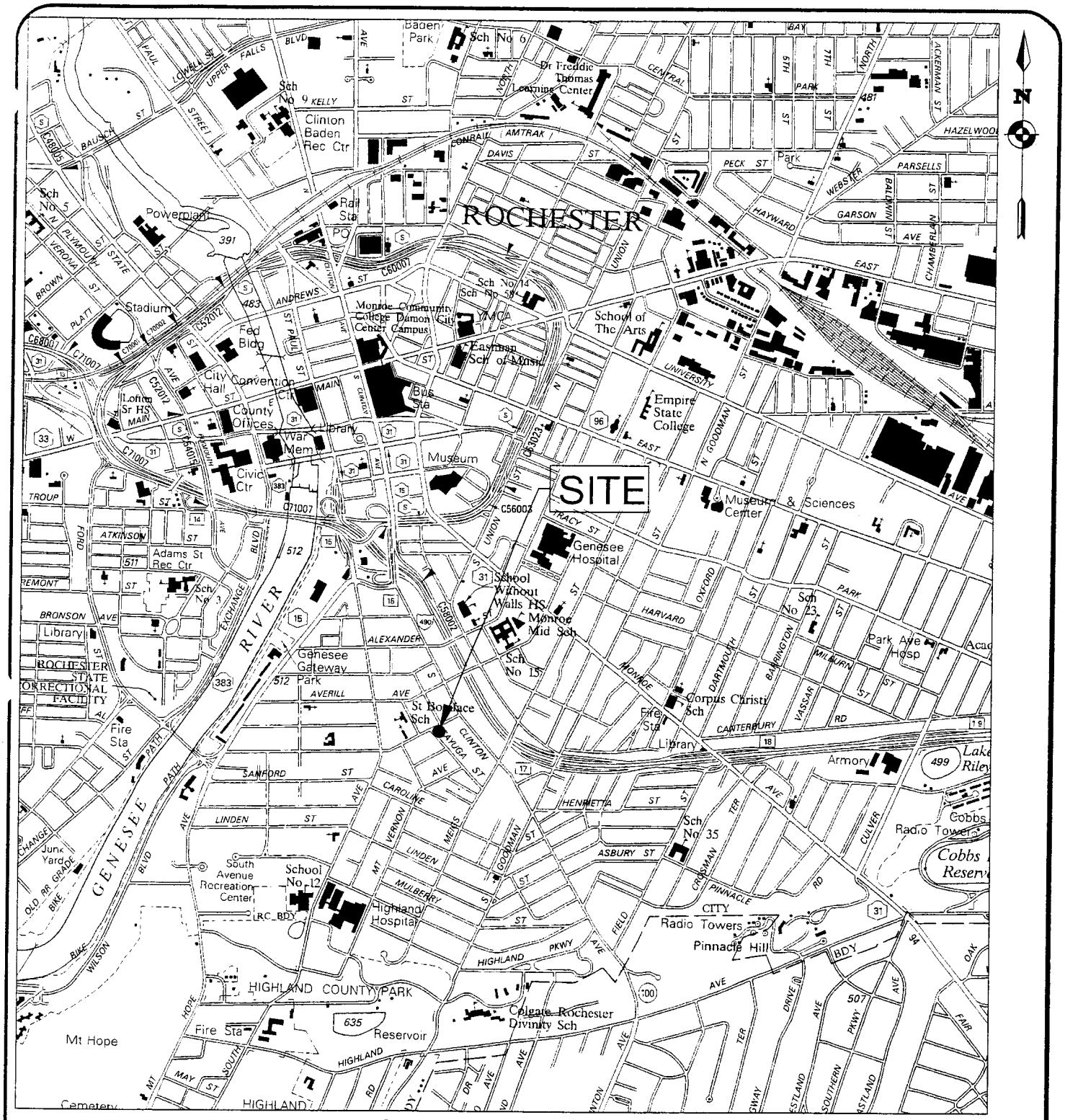
9.2 Subcontractors

Qualified, experienced and licensed or certified subcontractors will be retained to perform soil boring/monitoring well installations and sample analyses. All subcontractors will be subject to the approval of the DEC.

9.3 Project Schedule

The Site investigation activities proposed in this work plan will be conducted upon approval by DEC. Table 1 contains a summary of the activities to be conducted and the approximate timetable to complete those tasks.

FIGURES



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PROJECT ENGINEER/ARCHITECT
K. IGNASZAK, P.E.

PROJECT MANAGER
M. STORONSKY

DRAWN BY
STAFF

SCALE
1"=2000'

FIRST ISSUE DATE

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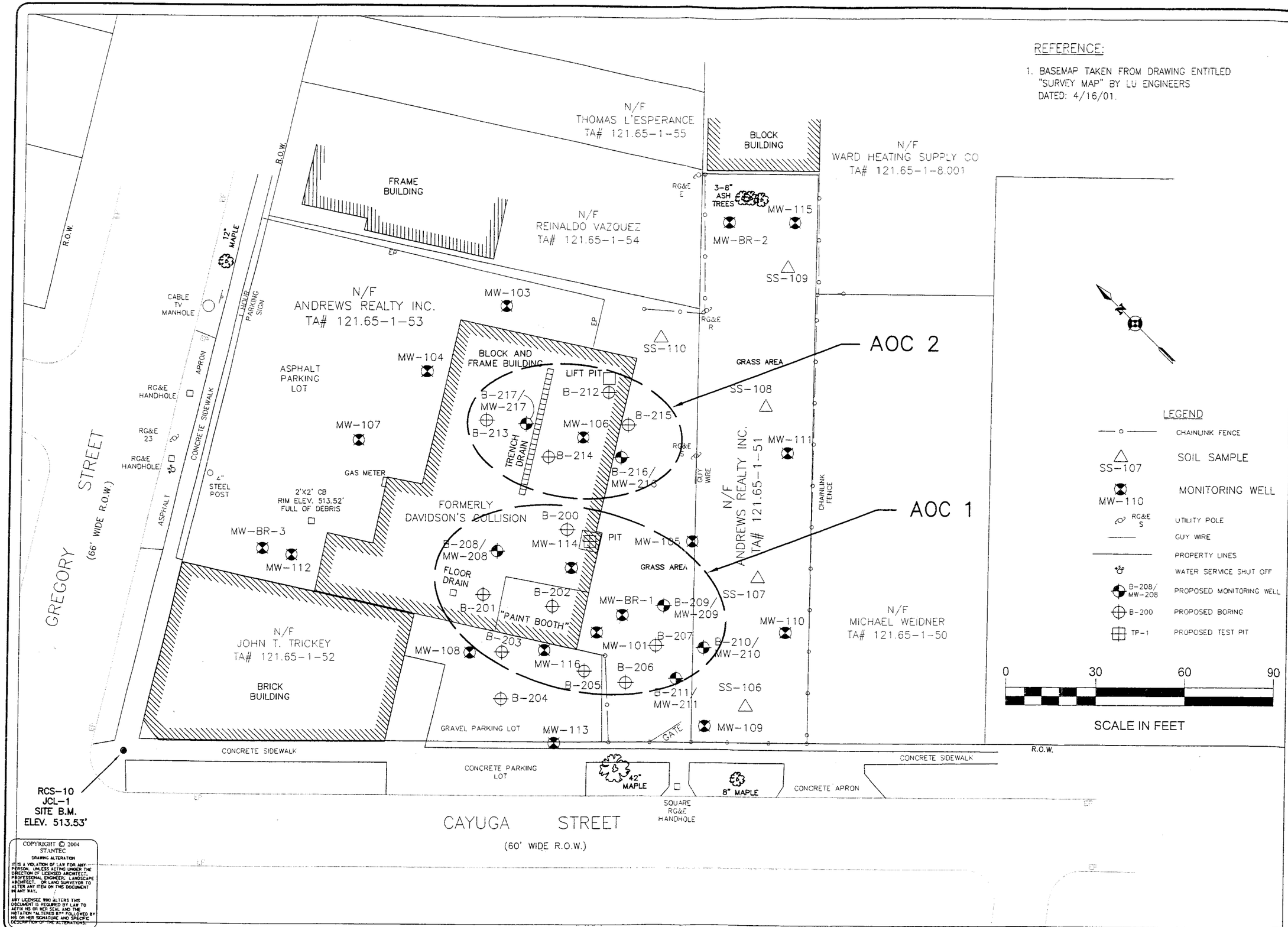
PROJECT
BROWNFIELD ASSESSMENT SITE
399 GREGORY STREET
ROCHESTER, NEW YORK

TITLE OF DRAWING
SITE LOCATION MAP

PROJECT NO.
190500196

DRAWING NO.
1



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6		
5		
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1		
0	REVISIONS	DATE BY

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K. IGNASZAK, P.E.
PROJECT MANAGER
M. STORONSKY

DRAWN BY
M. CONLEY, E.I.T.
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AS SHOWN
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PROJECT
BROWNFIELD ASSESSMENT SITE
399 GREGORY STREET
ROCHESTER, NY

TITLE OF DRAWING
PROPOSED SOIL BORING AND MONITORING WELL LOCATION MAP

PROJECT NO.
190500196

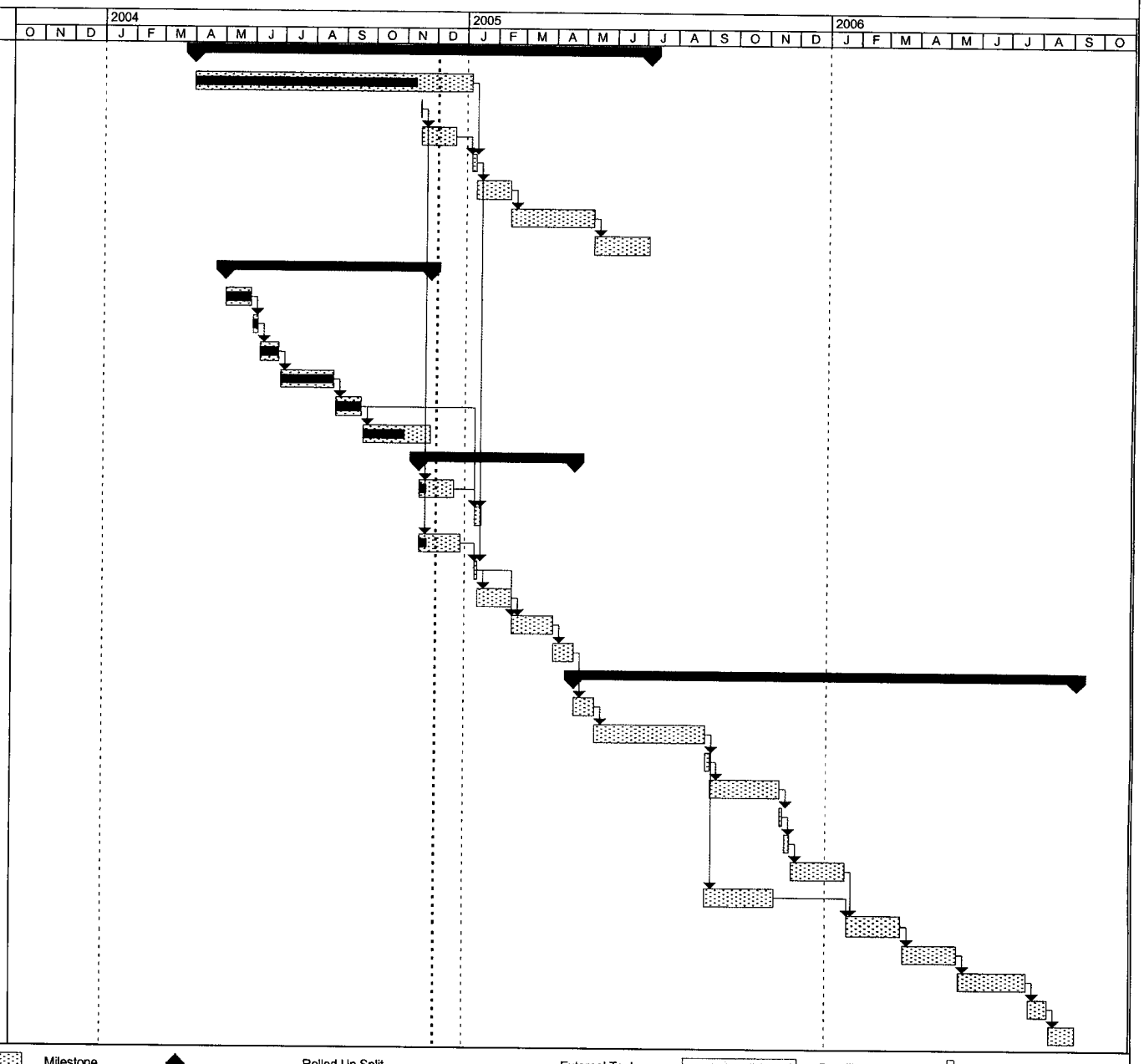
DRAWING NO.
2

TABLES

TABLE 1

399 Gregory Street EPA Brownfield Assessment Grant
NYSDEC BCP Project RI - Remedy Selection Schedule

ID	Task Name
1	**NYS Brownfield Cleanup Agrmt**
2	BCP Application Prep
3	BCP Preapplication meeting
4	Prepare newspaper ad & sheet
5	BCP application submittal
6	30 day public comments (incl. Sector 6)
7	BCA approval
8	Execution Process
9	**Consultant Procurement Process**
10	Prepare Request for proposal
11	Advertise for Proposals
12	Solicit proposals
13	Review proposals
14	Obtain City Council Authorization
15	Execute Prof. Services Agreement
16	**Invest. & Community Based Project Planning**
17	Prepare Community Participation Plan
18	Present Project to Sector 6 NBN/SWPC,SEAC
19	RI Work Plan/QAPP, HASP & reuse concept
20	Submit WP, HASP, & reuse plan
21	Public Comment period - RI Work Plan
22	DEC/MCDOH/NYSDOH/EPA comments
23	Revise WP & HASP
24	**Rem.Invest. - Remedy Selection - Work Plan**
25	RI WP and HASP Approval
26	Conduct RI field work
27	Sector 5 Presentation & Comments
28	Prepare RI report
29	RI Report submission to NYSDEC/NYSDOH, MCDOH, EPA
30	Issue Fact Sheet
31	Agency reviews
32	Consultant remedy scoping/remedial concept plan
33	Develop remedial work plan w/alt analysis
34	DEC review & remedy identification
35	Public Comment Period & Public meeting
36	Remedial work plan changes
37	Final NYSDEC Approval



Project: 399 Gregory
Date: Thu 12/2/04
g/envqual/bf/epaqrpt/2003astg/399gre

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary | External Milestone | Deadline

TABLE 2

SUMMARY OF PROPOSED GEOPROBE BORING AND MONITORING WELL INSTALLATIONS
Remedial Investigation
399 Gregory Street
Rochester, New York

Proposed Soil Boring and Monitoring Well Designations	Proposed Soil Boring and Monitoring Well Locations	Drilling Equipment	Well Diameter (inches)	Total Depth (ft. BGS)
B-200	AOC-1	Geoprobe	NA	15
B-201	AOC-1	Geoprobe	NA	15
B-202	AOC-1	Geoprobe	NA	15
B-203	AOC-1	Geoprobe	NA	15
B-204	AOC-1	Geoprobe	NA	15
B-205	AOC-1	Geoprobe	NA	15
B-206	AOC-1	Geoprobe	NA	15
B-207	AOC-1	Geoprobe	NA	15
B-208/MW-208	AOC-1	Geoprobe	1	15
B-209/MW-209	AOC-1	Geoprobe	1	15
B-210/MW-210	AOC-1	Geoprobe	1	15
B-211/MW-211	AOC-1	Geoprobe	1	15
B-212	AOC-2	Geoprobe	NA	15
B-213	AOC-2	Geoprobe	NA	15
B-214	AOC-2	Geoprobe	NA	15
B-215	AOC-2	Geoprobe	NA	15
B-216/MW-216	AOC-2	Geoprobe	1	15
B-217/MW-217	AOC-2	Geoprobe	1	15

Notes:
1. Well depths may be modified based on field conditions.
2. ft. BGS = feet below ground surface.

TABLE 3
SUMMARY OF PROPOSED ANALYTICAL TESTING
Remedial Investigation
399 Gregory Street
Rochester, New York

LOCATION	SAMPLE I.D.	Matrix	TCL VOCs	TCL SVOCs	TAL Metals	TCL PCBs	TPH
Soil Borings/Monitoring Well Soil Samples							
B-200	GR-B200-S	soil	X				
B-201	GR-B201-S	soil	X				
B-202	GR-B202-S	soil	X				
B-203	GR-B203-S	soil	X				
B-204	GR-B204-S	soil	X				
B-205	GR-B205-S	soil	X				
B-206	GR-B206-S	soil	X				
B-207	GR-B207-S	soil	X				
B-208/MW-208	GR-B208-S	soil	X				
B-209/MW-209	GR-B209-S	soil	X				
B-210/MW-210	GR-B210-S	soil	X				
B-211/MW-211	GR-B211-S	soil	X				
B-212	GR-B212-S	soil	X	X	X	X	
B-213	GR-B213-S	soil	X	X	X	X	
B-214	GR-B214-S	soil	X	X	X	X	
B-215	GR-B215-S	soil	X	X	X	X	
B-216/MW-216	GR-B216-S	soil	X	X	X	X	
B-217/MW-217	GR-B217-S	soil	X	X	X	X	
TP-1	GR-TP1-S	soil	X				
DUP	GR-XX-S-DUP	soil	X	X	X	X	
MS/MSD	GR-XX-S-MS/MSD	soil	X	X	X	X	
		TOTAL (Soil Borings/Geoprobe Samples):	**19**	**6**	**6**	**6**	**0**
		TOTAL (QA Soil Boring Samples):	**2**	**2**	**2**	**2**	**0**

TABLE 3
SUMMARY OF PROPOSED ANALYTICAL TESTING
Remedial Investigation
399 Gregory Street
Rochester, New York

LOCATION	SAMPLE I.D.	Matrix	TCL VOCs	TCL SVOCs	TAL Metals	TCL PCBs	TPH
Groundwater Samples							
Existing Wells							
MW-101	GR-MW101-GW	groundwater	X				
MW-104	GR-MW104-GW	groundwater	X				
MW-105	GR-MW105-GW	groundwater	X				
MW-106	GR-MW-106-GW	groundwater	X				
MW-108	GR-MW108-GW	groundwater	X				
MW-110	GR-MW110-GW	groundwater	X				
MW-111	GR-MW111-GW	groundwater	X				
MW-113	GR-MW113-GW	groundwater	X				
MW-114	GR-MW114-GW	groundwater	X				
MW-116	GR-MW116-GW	groundwater	X				X
New Wells							
MW-208	GR-MW208-GW	groundwater	X				
MW-209	GR-MW209-GW	groundwater	X				
MW-210	GR-MW210-GW	groundwater	X				
MW-211	GR-MW211-GW	groundwater	X				
MW-216	GR-MW216-GW	groundwater	X	X	X	X	
MW-217	GR-MW217-GW	groundwater	X	X	X	X	
MS/MSD	GR-XX-GW-MS/MSD	groundwater	X	X	X	X	
DUP	GR-XX-GW-DUP	groundwater	X	X	X	X	X
Trip Blank	GR-XX-GW-TB	water	X				
TOTAL (Geoprobe/Monitoring Well Groundwater Samples):			16	2	2	2	1
TOTAL (QA Groundwater Samples):			3	2	2	2	1
Total Analytical Samples:			35	8	8	8	1
Total QA Samples:			5	4	4	4	1
Total Samples for Project:			40	12	12	12	2

Notes:

1. TCL VOCs - Target Compound List Volatile Organic Compounds by EPA Method OLM 4.2.
2. TCL SVOCs - Target Compound List Semi-Volatile Organic Compounds by EPA Method OLM 4.2.
3. TAL Metals - Target Analyte List Metas.EPA Method ILM 5.1.
4. TCL PCBs - Target Compound List Polychlorinated Biphenyls by EPA Method OLM 4.2.
6. MS/MSD - Matrix Spike/Matrix Spike Duplicate.
7. Dup = Field Duplicate Sample.

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

FOR

REMEDIAL INVESTIGATION
399 GREGORY STREET
ROCHESTER, NEW YORK

DECEMBER 2004

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
6274 EAST AVON-LIMA ROAD
AVON, NEW YORK 14414-9519

Prepared on Behalf of:

CITY OF ROCHESTER
30 CHURCH STREET, ROOM 300B
ROCHESTER, NEW YORK 14614

Prepared By:

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85 METRO PARK
ROCHESTER, NEW YORK 14623

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Table 1 Summary of Proposed Analytical Testing
Table 2 Summary of Quality Control Checks
Table 3 Required Sample Containers, Volumes, Preservation, and Holding Times for Analytical Samples

Appendix

Appendix A Laboratory QA Manual

1.0 Introduction

On behalf of the City of Rochester, Stantec has prepared this Quality Assurance Project Plan (QAPP) for use during the Remedial Investigation (RI) activities for the property located at 399 Gregory Street, Rochester, New York (Site) (Figure 1).

This QAPP presents the policies, organization, objectives, functional activities, and specific quality assurance and quality control activities to ensure the validity of data generated in the completion of the investigation. The purpose of the QAPP is to ensure that technical data generated are accurate and representative.

Quality Assurance (QA) is a management system for ensuring that information, data, and decisions resulting from investigation and environmental monitoring programs are technically sound, and properly documented. Quality Control (QC) is the functional mechanism through which quality assurance achieves its goals. Quality control programs, for example, define the frequency and methods of checks, audits, and reviews necessary to identify problems and dictate corrective actions to resolve these problems, thus ensuring high quality data. As such, a quality assurance and quality control program pertains to data collection, evaluation, and review activities, which are part of the investigation.

QA/QC procedures will be in accordance with applicable professional technical standards, government regulations and guidelines, and specific project goals and requirements. This QAPP has been prepared in accordance with New York State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (EPA) Region II guidance documents.

The QAPP incorporates the following activities:

- Sample collection, control, chain-of-custody, and analysis;
- Document control;
- Laboratory instrumentation, analysis, and control; and
- Review of project reports.

Analytical samples will be collected in the field using standard operating procedures and sent to a NYSDEC-certified Analytical Services Protocol (ASP) laboratory for analysis. Duplicates, replicates, and spiked samples will be used to identify the quality of the analytical data. Field audits may be conducted to verify that proper sampling techniques and chain-of-custody procedures are followed. Field data compilation, tabulation, and analysis will be checked for accuracy. Calculations and other post-field tasks will be reviewed by senior project personnel. Equipment used to take field measurements will be maintained and calibrated in accordance with established procedures. Records of calibration and maintenance will be kept by assigned personnel. Field testing and data acquisition will be performed following strict guidelines as described herein.

Document control procedures will be used to coordinate the distribution, coding, storage, retrieval, and review of all data collected during all sampling tasks.

2.0 Project Description

This QAPP pertains to the completion of field activities and subsequent laboratory and data analysis associated with the Remedial Investigation activities at 399 Gregory Street (Figure 2). Previous investigations completed at the Site identified volatile organic compounds (VOCs) impacts to soil and groundwater. The Remedial Investigations are intended to delineate the extent of residual contamination.

2.1 Site Description

The Davidson Collision Site consists of two adjoining parcels. The Davidson Collision business located at 399 Gregory Street, operated as an auto body shop from the early 1960s until it went out of business in March 1993. In June 1993, the auto body shop reopened under new management and the new name of Southwedge Collision. The adjoining 10 Cayuga Street parcel consists of an unimproved grass-covered parcel that was formerly owned by Davidson Collision.

Previous investigations at the site between 1991 and 1994 identified the disposal of a consequential amount of hazardous waste (primarily paint waste including paint thinner) through a pipe leading from a paint booth inside the shop to a storage container outside the building. This method of discharging paints and paint thinner contaminated soil near the southwestern corner of the auto body shop. In January 1993, some contaminated soil from the waste disposal area was excavated, however, confirmatory soil samples were not taken and the vertical and lateral limits of impacted soil were not determined prior to backfilling. The 1991 and 1993 activities were performed without DEC approval or oversight. In 1994 the DEC conducted an investigation and determined the 1993 soil removal activity did not remove all of the subsurface contamination at the site. As such, the DEC conducted an investigation in 2000-2002 to obtain additional information regarding the nature and extent of contamination at the site and to determine if the site represents a significant threat to human health or the environment.

2.2 Previous Investigations

The previous environmental studies that have been completed at the 399 Gregory Street Site and the adjacent 10 Cayuga Street parcel and for which reports were reviewed by Stantec included:

- a September 1991 Phase II Investigation[1];
- an August 1995 Preliminary Site Assessment Report[2]; and
- a March 2003 Site Investigation Report[3].

Presented below is a summary of the findings and conclusions of these previous investigations.

September 1991 Phase II Investigation[1]

1. A 55-gallon drum was determined to contain hazardous waste (elevated chromium, lead, toluene, styrene, ethylbenzene and xylene) and surface soil surrounding the drum was contaminated with toluene, ethylbenzene and xylene.

2. Surface soil collected from the waste paint area was contaminated with toluene, ethylbenzene and xylene.

3. A concrete poured, in-ground hydraulic lift pit (7'X8') with a yellowish-brown liquid that contained methylene chloride, toluene and xylene was described as being located in the "eastern garage section".

4. A gap in the floor paint storage/mixing room was screened with a PID and an FID and no detectable readings were reported.

5. Floor and trench drain dye tests were performed and the drains were determined to discharge to the combined sanitary/storm sewer system. It was noted that the floor drain located outside the paint booth was clay tile with a portion of the tile missing.

The report concluded that additional investigations be conducted to determine the vertical and lateral extent of soil contamination and a groundwater investigation be conducted to determine if groundwater had been impacted.

August 1995 Preliminary Site Assessment Report[2]

1. Organic compounds, butylbenzylphthalate and lead, were detected in surficial soil samples at relatively low concentrations. An exhaust fan was observed discharging a visible quantity of dust and automotive paint to the ground surface from the rear of the building.

2. Elevated concentrations of ethylbenzene, toluene and total xylenes were detected in subsurface soil samples from depths of 6'-8' and 8'-10' below ground surface from BS-101 and BS-108 located in the waste paint disposal excavation area.

3. Elevated concentrations of benzene, ethylbenzene, toluene and total xylenes were detected in groundwater samples from MW-101 located in the waste paint disposal excavation area. With the exception of a single detection of bis(2-ethylhexyl)phthalate, no organic compounds were detected in MW-103 and MW-104. There were exceedances of groundwater standards for several inorganics, however, due to significant suspended particulates, the evaluation of these reported exceedances was difficult.

The report concluded that hazardous wastes were present in soil and groundwater, however, no receptors of the contaminated groundwater were identified and therefore the site was determined not to pose any significant threat to public health.

March 2003 Site Investigation Report[3]

Volatile organic compounds (VOCs) in surficial soils, subsurface soils, and groundwater were the primary focus of this investigation to help determine the extent of contamination at the site.

1. No VOCs were detected in surficial soils.

2. VOC contamination was present in subsurface soils and groundwater near the southwest corner of the building in an area where hazardous waste disposal had occurred.

3. VOC contaminated soils were present at a depth of approximately 6' below ground surface and extended into groundwater.

4. Significant groundwater contamination associated with hazardous waste disposal appears to be limited to the overburden.

5. A source of petroleum related VOC contamination, which is not associated with the waste paint disposal area, appears to be present under the eastern section of the building where automobile maintenance was routinely performed.

6. There were no indications of significant off-site migration of contaminated groundwater towards neighboring residences.

Evaluation of Available Data

Based on the information presented in the previous investigations, Stantec has identified the following data gaps that require additional investigation:

- The lateral extent of soil contamination in the vicinity of the waste paint disposal area (inside the building and on the west side of building) has not been delineated.
- It was noted that a light non-aqueous phase liquid (LNAPL) was present in one groundwater monitoring well (MW-116, located off-site adjacent to the west of the building) during the 2000-2002 investigation. The vertical and lateral extent of the LNAPL layer was not delineated.
- The vertical and lateral extent of potential petroleum related soil and/or groundwater VOC contamination in the vicinity of the eastern section of the building where automobile maintenance routinely occurred has not been delineated.
- There is a lack of up-gradient groundwater contamination delineation since two shallow monitoring wells (MW-106 and MW-114, both located within the building) were both dry during one of three sampling events, and one of the wells (MW-114) was inaccessible during the third sampling event, therefore, it was only sampled once.

- A chlorinated solvent (trichloroethene) was detected at 1,800 parts per billion (ppb) in one soil sample during a 1994 sampling event from the waste paint disposal area and methylene chloride was detected at 3.56 parts per million (ppm) during a 1991 sampling event of the accumulated liquid from the in-ground hydraulic lift pit in the "eastern garage section". It is understood from discussions with Mr. Frank Sowers, DEC project manager for this site, that this pit was filled with concrete rubble at the time of their investigation.

Given the results from the prior investigations, and the City's recent EPA Brownfield Assessment gr
ant, it is proposed to undertake an investigation in order to delineate the extent of impacts in the two areas of concern previously identified by the DEC.

These areas include the former waste paint disposal area, including the former vehicle maintenance area, and the hydraulic lift pit.

References:

[1] "Phase II Investigation, Davidson's Collision, 399 Gregory Street, Rochester, New York. Prepared by Day Environmental, Inc., September 21, 1991."

[2] "Preliminary Site Assessment Report, Davidson's Collision, DEC Site No. 828091, Rochester, New York. Prepared by ABB Environmental Services, August 1995."

[3] "Site Investigation Report, Davidson's Collision, Site No. 828091, Rochester, New York. Prepared by Frank Sowers, PE, New York State Department of Environmental Conservation, Division of Environmental Remediation, Region 8, March 2003."

3.0 Project Organization and Responsibility

This QAPP provides for designated qualified personnel to review products and provide guidance on QA matters. This QAPP also outlines the approach to be followed to ensure that products of sufficient quality are obtained. This structure will provide for direct and constant operational responsibility, clear lines of authority, and the integration of QA activities. The various QA functions of the project positions are explained in the following subsections.

Project Manager
The project manager will have overall responsibility for ensuring that the project meets the objectives and quality standards as presented in the Work Plan and this QAPP. He will be responsible for implementing the project and will have the authority to commit the resources necessary to meet project objectives and requirements. The project manager's primary function is to ensure that technical, financial, and scheduling objectives are achieved successfully. The project manager will provide the major point of contact and control for matters concerning the project. In addition, he will be responsible for technical quality control and project oversight, and will be the primary point-of-contact.

Team Leaders
The project manager will be supported by a team leader or leaders who will be responsible for leading and coordinating the day-to-day activities of the various resource specialists under their supervision. The team leader is a highly experienced environmental professional who will report directly to the project manager.

Technical Staff
The technical staff (team members) for this project will be drawn from corporate resources and appropriately qualified subcontractors. The technical team staff will be used to gather and analyze data, and to prepare various task reports and support materials. The designated technical team members will be experienced professionals who possess the degree of specialization and technical competence required to effectively and efficiently perform the required work.

Project QA Director
The Project QA Director will be responsible for maintaining QA for the project.

Laboratory Director
The laboratory director will be responsible for analytical work and works in conjunction with the QA unit. He maintains liaison with the QA officer regarding QA and custody requirements.

Laboratory Manager
The laboratory manager will maintain liaison with the laboratory director regarding QA elements of specific sample analyses tasks. He will report to the laboratory director and work in conjunction with the laboratory QA unit.

Laboratory QA Coordinator

The Laboratory QA officer will be responsible for overseeing the QA program within the laboratory and for maintaining all QC documentation. He reports directly to the laboratory director.

Laboratory Staff

Each member of the laboratory staff will perform an assigned QA or analytical function that is pertinent to and within the scope of his or her knowledge, experience, training, and aptitude. An individual will be assigned the responsibility for checking, reviewing, or otherwise verifying that a sample analysis activity has been correctly performed.

Laboratory Facilities

Laboratory work will be performed in accordance with guidelines established by NYSDEC, USEPA, the Water Pollution Control Federation, and/or the American Society for Testing and Materials (ASTM). In case of conflict, these guidelines and protocols will be considered in the order shown (i.e., NYSDEC criteria is of primary precedence). In addition, QA and QC programs will be maintained for the instruments and the analytical procedures used.

4.0 QA Objectives for Data Measurement

Measurements will be made to ensure that analytical results are representative of the media and conditions measured. Unless otherwise specified, data will be calculated and reported in units consistent with other organizations who report similar data to allow comparability of databases among organizations.

The key considerations for the QA assessment of generated data are accuracy, precision, completeness, representativeness, and comparability. These characteristics are defined below:

Accuracy: Accuracy is the degree of agreement of a measurement or average of measurements with an accepted reference or "true" value and is a measure of bias in the system.

Precision: Precision is the degree of mutual agreement among individual measurements of a given parameter.

Completeness: Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct normal conditions.

Representativeness: Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

Comparability: Comparability expresses the confidence with which one data set can be compared to another.

4.1 Goals

The QA/QC goal will focus on controlling measurement error within the limits established and will ultimately provide a database for estimating the actual uncertainty in the measurement data.

Target values for detection limit, percent spike recovery and percent "true" value of known check standards, and relative percent difference of duplicates/replicates are provided in the referenced analytical procedures. It should be noted that target values are not always attainable. Instances may arise where high sample concentrations, non-homogeneity of samples, or matrix interferences preclude achievement of target detection limits or other quality control criteria. In such instances, the laboratory will report reasons for deviations from these detection limits or noncompliance with quality control criteria.

5.0 Sampling Procedures

The sampling of various environmental media will be completed as part of the investigation activities. Table 1 presents a Summary of Proposed Analytical Testing for the site including; location, matrix, and analytical requirements.

5.1 Sampling Protocol

The following sections outline the sampling procedures for the collection of environmental media samples of soils and groundwater. Groundwater monitoring well installation procedures are described in the Work Plan.

5.1.1 Soil Samples from Geoprobe Soil Borings

Continuous soil samples will be collected from Geoprobe soil borings to the target depth as outlined in the Work Plan. An experienced geologist will observe the work associated with the soil borings.

Collected soil samples will be described according to soil type, color, texture, grain size, moisture content, and will be visually noted for physical indications of contamination, such as staining, oils, fill material and/or odor.

Each soil sample interval will be screened with a photoionization (PID-Minirae Model 2000 or equivalent) with a 10.6 eV lamp for the presence of elevated levels of volatile organic vapors. Each sample screening will include peak, and background PID readings.

During the drilling operations, the most impacted soil, based on field screening and visual observations, will be obtained from each sample sleeve or split spoon. A portion of this apparently contaminated soil will be containerized and chilled for possible laboratory analysis. Another portion of the soil sample will be containerized and allowed to equilibrate to room temperature. The accumulated vapors within the container will then be subjected to headspace analysis for VOCs using the PID.

The VOC data from the headspace analysis, soil type and depth of sample will be used to select which soil sample is submitted for analyses.

Soil samples to be submitted for chemical analysis will be extracted from samplers using a stainless steel trowel or knife. Care will be taken to ensure that the outer portion of the split spoon sample is removed by scraping with the trowel or knife. New latex gloves will be used for placing each sample into the laboratory glassware. Each sample container will be labeled, handled, packaged, and shipped in accordance with the procedures as outlined in Section 6.0.

5.1.2 *Groundwater Samples From Monitoring Wells*

New and existing groundwater monitoring wells will be developed prior to purging and sampling using disposable polyethylene bailers, dedicated Waterra inertial pumps or dedicated peristaltic pump tubing. Prior to development, wells will be allowed to equilibrate for at least 48-hours following installation. All development water will be collected and stored on site in 55-gallon drums. All drums will be labeled with paint markers according to matrix, location and date of generation. Turbidity readings and the number of consecutive well volumes removed will be recorded during well development. The wells will be developed to reduce sediment and turbidity to the maximum extent practical.

Following well development, each well will be allowed to equilibrate for at least 24-hours prior to purging and sampling. Purging of each new and existing well will be performed with a low flow peristaltic pump and dedicated polyethylene tubing or disposable polyethylene bailers. Purging of each well for at least three consecutive well volumes or until dry will allow representative formation water to enter the well prior to sample collection. Water quality field parameters (turbidity, pH, specific conductance and temperature) will be recorded during purging and sampling.

Immediately following the completion of purging and monitoring well recovery, groundwater samples will be collected using a dedicated disposable polyethylene bailer. The groundwater sample will be collected from the middle portion of the water column. New latex gloves will be used for collection of each sample. Each sample container will be labeled, handled, packaged, and shipped in accordance with the procedures as outlined in Section 6.0.

5.1.3 *Soil Sampling from Test Pit*

Soil sediment, or sludge at the bottom of the pit will be screened with a photoionization detector (PID) in the field. Based upon the PID readings and visual or olfactory evidence of impacts, Stantec proposes to select one sample from the bottom of the maintenance pit. Samples will be collected with a stainles steel trowel. New latex gloves will be used for placing the sample into the laboratory glassware.

5.2 *Field Quality Control Samples*

A summary of the following quality control samples is presented in attached Table 2.

5.2.1 *Field Duplicates*

Field quality control samples will be collected to verify reproducibility of the sampling and analytical methods. Field duplicates will be obtained as outlined in Table 1 and include the following:

- one field duplicate soil sample collected from the Geoprobe soil borings;
- one field duplicate groundwater sample collected from one groundwater monitoring well;

5.2.2 *Trip Blanks*

Trip blanks will be used to assess whether groundwater, has been exposed to volatile constituents during sample storage and transport. Trip blanks will be submitted at a frequency of once per day, per cooler containing water to be analyzed for volatile organics. The trip blank for water samples will consist of a container filled by the laboratory with analyte-free water. The trip blank will remain unopened throughout the sampling event and will only be analyzed for volatile organics.

5.2.3 *Matrix Spike/Matrix Spike Duplicates*

Matrix Spike/Matrix Spike Duplicates (MS/MSD) will be obtained as outlined on Table 1 and include the following:

- one MS/MSD soil sample collected from the Geoprobe soil borings; and
- one MS/MSD groundwater sample collected from representative groundwater monitoring wells.

5.2.4 *Laboratory Quality Control Checks*

Internal laboratory quality control checks will be used to monitor data integrity. These checks include method (equipment) blanks, spike blanks, internal standards, surrogate samples, calibration standards, and reference standards.

5.3 *Sample Containers*

The volumes and containers required for the sampling activities are included in Table 3. Prewashed sample containers will be provided by the laboratory. All bottles are to be prepared in accordance with EPA bottle washing procedures.

5.4 *Decontamination*

Dedicated and/or disposable sampling equipment will be used to minimize decontamination requirements and the possibility of cross-contamination.

The water level indicator, stainless steel trowels, split spoons and Geoprobe are pieces of sampling equipment to be used at more than one location. They will be decontaminated between locations by the following decontamination procedures:

- Initial cleaning of any foreign matter with paper towels;
- Low phosphate detergent wash;
- De-ionized water rinse; and
- Air dry.

5.5 *Levels of Protection/Site Safety*

Field sampling will be conducted under a documented Health and Safety Plan. On the basis of air monitoring, the level of protection may be downgraded or upgraded at the discretion of the site safety officer. Crew members will stand upwind of open boreholes or wellheads during the collection of samples, when possible.

All work will initially be conducted in Level D (refer to Site Specific Health and Safety Plan). Air purifying respirators (APRs) will be available if monitoring indicates an upgrade to Level C is appropriate.

6.0 Sample Custody

This section describes standard operating procedures for sample identification and chain-of-custody to be used for all field activities. The purpose of these procedures is to ensure that the quality of the samples is maintained during collection, transportation, storage, and analysis. All chain-of-custody requirements comply with standard operating procedures indicated in USEPA and NYSDEC sample-handling protocol.

Sample identification documents will be carefully prepared so that sample identification and chain-of-custody can be maintained and sample disposition controlled. Sample identification documents include:

- Field records,
- Sample label,
- Custody seals, and
- Chain-of-custody records.

6.1 Chain-Of-Custody

The primary objective of the chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses.

6.1.1 Sample Labels

Sample labels attached to or affixed around the sample container must be used to properly identify all samples collected in the field. The sample labels are to be placed on the bottles so as not to obscure any QA/QC lot numbers on the bottles. Sample information must be printed in a legible manner using waterproof ink. Field identification must be sufficient to enable cross-reference with the field sampling records or sample logbook. For chain-of-custody purposes, all QC samples are subject to exactly the same custodial procedures and documentation as "real" samples.

6.1.2 Custody Seals

Custody seals are preprinted adhesive-backed seals with security slots designed to break if the seals are disturbed. Sample shipping containers (coolers, cardboard boxes, etc., as appropriate) are sealed in as many places as necessary to ensure security. Seals must be signed and dated before use. On receipt at the laboratory, the custodian must check (and certify, by completing logbook entries) that seals on shipping containers are intact. Strapping or other clear packaging tape should be placed over

the seals to ensure that seals on shipping containers are not accidentally broken during shipment.

6.1.3 *Chain-Of-Custody Record*

The chain-of-custody record must be fully completed at least in duplicate by the field technician who has been designated by the project manager as being responsible for sample shipment to the appropriate laboratory for analysis. In addition, if samples are known to require rapid turnaround in the laboratory because of project time constraints or analytical concerns (e.g., extraction time or sample retention period limitations, etc.), the person completing the chain-of-custody record should note these constraints in the "Remarks" section of the custody record.

6.1.4 *Field Custody Procedures*

- As few persons as possible should handle samples.
- Sample bottles will be obtained pre-cleaned by the laboratory and shipped to the sampling personnel in charge of the field activities. Coolers or boxes containing cleaned bottles should be sealed with a custody tape seal during transport to the field or while in storage prior to use.
- The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under chain-of-custody rules.
- The sample collector will record sample data in a controlled field notebook and/or on appropriate field sampling records.
- The site team leader will determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required.

6.2 *Documentation*

6.2.1 *Sample Identification*

All containers of samples collected from the project will be identified using the following format on a label or tag fixed to the sample container:

GR-XX-YY-ZZ

- GR - This set of initials indicates the project name:

  GR – Gregory

- XX - These initials identify the sample. Actual sample locations will be numbered sequentially:

  B202 – Geoprobe boring
  MW201 – Monitoring Well
  TP1 – Test pit

- YY - These initials identify the sample matrix in accordance with the following abbreviations:

  S – Soil
  GW - Groundwater

- ZZ - Sub Sample Type - Field duplicates, rinsate blanks and trip blanks will be assigned unique sample numbers (if applicable):

  DUP - Duplicate Sample
  TB - Trip Blank
  MS/MSD - Matrix Spike/Matrix Spike Duplicate

  Each sample will be labeled, chemically preserved, if required, and sealed immediately after collection. To minimize handling of sample containers, labels will be filled out prior to sample collection. The sample label will be filled out using waterproof ink and will be firmly affixed to the sample containers. The sample label will give the following information:
  - Name of sampler;
  - Date and time of collection;
  - Sample number;
  - Intended analysis; and
  - Preservation required.

6.2.2 Daily Logs

Daily logs and data forms are necessary to provide sufficient data and observations to enable participants to reconstruct events that occurred during the project. All daily logs will be kept in a notebook and consecutively numbered. All entries will be made in waterproof ink, dated, and signed. Sampling data will be recorded in the sampling records. All information will be completed in waterproof ink. Corrections will be made according to the procedures given at the end of this section.

6.3 *Sample Handling, Packaging, And Shipping*

The transportation and handling of samples will be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects due to the possible hazardous nature of samples. Regulations for packaging, marking, labeling, and shipping hazardous materials are promulgated by the United States Department of Transportation (DOT) in the Code of Federal Regulations, 49 CFR 171 through 177.

All chain-of-custody requirements will comply with standard operating procedures in the NYSDEC and USEPA sample handling protocol. Field personnel will make arrangements for transportation of samples to the laboratory. When custody is relinquished to a shipper, field personnel will telephone the laboratory custodian to inform him of the expected time of arrival of the sample shipment and to advise him of any time constraints on sample analysis. All samples will be delivered to the laboratory no later than 48 hours from the day of collection.

7.0 Calibration Procedures and Frequency

Instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations as well as criteria set forth in the applicable analytical methodology references.

7.1 Field Instruments

A calibration program will be implemented to ensure that routine calibration is performed on all field instruments. Field team members familiar with the field calibration and operations of the equipment will maintain proficiency and perform the prescribed calibration procedures outlined in the Operation and Field Manuals accompanying the respective instruments. Calibration records for each field instrument used on the project will be maintained on-site during the respective field activities and a copy will be kept in the project files.

7.1.1 Portable Total Organic Vapor Monitor

Any vapor monitor used will undergo routine maintenance and calibration prior to shipment to the project site. Daily calibration and instrument checks will be performed by a trained team member at the start of each day. Daily calibrations will be performed according to the manufacturer's specifications and are to include the following:

Battery check: If the equipment fails the battery check, recharge the battery.

- Gas standard: The gauge should display an accurate reading when a standard gas is used.

- Cleaning: If proper calibration cannot be achieved, then the instrument ports must be cleaned.

7.1.2 pH, Specific Conductance and Turbidity

The following steps should be observed by personnel engaged in groundwater sampling for pH and specific conductance:

- The operation of the instrument should be checked with fresh standard buffer solution (pH 4 and pH 10) prior to each day's sampling.
- The specific conductance meter should be calibrated prior to each day's sampling using a standard solution of known specific conductance.

- The turbidity meter should be calibrated prior to each day's sampling using a standard solution of known turbidity.

More frequent calibrations may be performed as necessary to maintain analytical integrity. Calibration records for each field instrument used on the project should be maintained and a copy kept in the project files.

7.2 Laboratory Instruments

Laboratory calibration procedures are addressed in detail in the laboratory QAPP (Appendix A). All calibration procedures will be consistent with the method used for analysis.

8.0 Analytical Procedures

8.1 Field

On-site procedures for analysis of total organic vapor and other field parameters are addressed in the Work Plan.

8.2 Laboratory

Analytical methods to be used for the sampling tasks are referenced in the NYSDEC's Analytical Services Protocols (ASP), 1995 or its most current version.

Specific analytical methods for constituents of interest in soil, groundwater, and air are listed in Table 1. The laboratory will maintain and have available for the appropriate operators standard operating procedures relating to sample preparation and analysis according to the methods stipulated in Table 1.

9.0 Data Reduction and Reporting

QA/QC requirements will be strictly adhered to during sampling and analytical work. Laboratory data generated will be reviewed by comparing and interpreting results from chromatograms (responses, stability of retention times), accuracy (mean percent recovery of spiked samples), and precision (reproducibility of results). Refer to Section 10 for detailed discussion of QA/QC protocol.

Data storage and documentation will be maintained using logbooks and data sheets that will be kept on file. Analytical QC will be documented and included in the analytical testing report. A central file will be maintained for the sampling and analytical effort after the final laboratory report is issued.

Relevant calculations and data manipulations are included in the appropriate methodology references. Control charts and calibration curves will be used to review the data and identify outlying results. Prior to the submission of the report to the client, all data will be evaluated for precision, accuracy, and completeness. Sections 4.0 and 13.0 of this document include some of the QC criteria to be used in the data evaluation process.

Laboratory reports will be reviewed by the laboratory supervisor, the QA officer, laboratory manager and/or director, and the project manager. Analytical reports will contain a data tabulation including results and supporting QC information will be provided. Raw data will be available for later inspection, if required, and maintained in the control job file.

10.0 Internal Quality Control Checks

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of glassware and reagents. The procedures to be followed for internal quality control checks are to be consistent with NYSDEC ASP and NYSDOH Environmental Laboratory Approval Program (ELAP).

11.0 Performance and System Audits

11.1 Field Audits

The Project QA Director may conduct episodic audits of the operations at the site to ensure that work is being performed in accordance with the work plan and associated standard operating practice. The audit will cover, but not necessarily be limited to, such areas as:

- Conformance to standard operating procedures
- Completeness and accuracy of documentation
- Chain of custody procedures
- Construction specifications

11.2 Laboratory Audits

In addition to any audits required by NYSDEC, the Project QA Director may chose to audit the laboratory. These additional audits may take the form of performance evaluation samples or on-site inspections of the laboratory. Performance evaluation samples may be either blind samples or samples of known origin to the laboratory. Reasonable notice will be provided if the audit is to include an on-site inspection of the laboratory.

12.0 Preventive Maintenance

12.1 Field

Field personnel assigned to complete the work will be responsible for preventative maintenance of all field instruments. The field sampling personnel will protect the portable total organic vapor monitors, temperature, conductivity, pH and turbidity instruments by placing them in portable boxes and/or protective cases.

Field equipment will be subjected to a routine maintenance program, prior to and after each use. The routine maintenance program for each piece of equipment will be in accordance with the manufacturer's operations and maintenance manual. All equipment will be cleaned and checked for integrity after each use. Necessary repairs will be performed immediately after any defects are observed, and before the item of equipment is used again. Equipment parts with a limited life (such as batteries, membranes and some electronic components) will be periodically checked and replaced or recharged as necessary according to the manufacturer's specifications.

12.2 Laboratory

The laboratory's preventative maintenance procedures are provided in the laboratory's QAPP (Appendix A).

13.0 Data Assessment Procedures

Performance of the following calculations will be completed by Ms. Judy Harry of Data Validation Services for the completion of a Data Usability Summary Report (DUSR). The purpose of the DUSR will be to evaluate the accuracy, precision and completeness of collected measurement data.

13.1 Precision

Precision of a particular analysis is measured by assessing its performance with duplicate or replicate samples. Duplicate samples are pairs of samples taken in the field and transported to the laboratory as distinct samples. Their identity as duplicates is sometimes not known to the laboratory and usually not known to bench analysts, so their usefulness for monitoring analytical precision at bench level is limited. For most purposes precision is determined by the analysis of replicate pairs (i.e., two samples prepared at the laboratory from one original sample). Often in replicate analysis the sample chosen for replication does not contain target analytes so that quantification of precision is impossible. Replicate pairs of spiked samples, known as matrix spike/matrix spike duplicate samples, are used for precision studies. This has the advantage that two real positive values for a target analyte can be compared.

Precision is calculated in terms of Relative Percent Difference (RPD), which is expressed as follows:

$$RPD = \frac{(X_1 - X_2)}{(X1 + X2)/2} \times 100$$

where X_1 and X_2 represent the individual values found for the target analyte in the two replicate analyses or in the matrix spike/matrix spike duplicate analyses.

RPDs must be compared to the method RPD for the analysis. The analyst or his supervisor must investigate the cause of RPDs outside stated acceptance limits. This may include a visual inspection of the sample for non-homogeneity, analysis of check samples, etc. Follow-up action may include sample re-analysis or flagging of the data as suspect if problems cannot be resolved.

13.2 Accuracy

Accuracy of a particular analysis is measured by assessing its performance with "known" samples. These "knowns" can take the form of EPA or NBS traceable standards (usually spiked into a pure water matrix), or laboratory prepared solutions of target analytes into a pure water or sample matrix; or (in the case of GC or GC/MS analyses) solutions of surrogate compounds which can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination. In each case the recovery of the analyte is measured as a percentage, corrected for analytes known to be present in the original sample if necessary, as in the case of a matrix spike analysis. For EPA or NBS supplied known solutions, this recovery is compared to the published data that accompany the solution. For prepared solutions, the

recovery is compared to EPA-developed data or historical data as available. For surrogate compounds, recoveries are compared to USEPA CLP acceptable recovery tables. If recoveries do not meet required criteria, then the analytical data for the batch (or, in the case of surrogate compounds, for the individual sample) are considered potentially inaccurate.

For highly contaminated samples, recovery of matrix spike may depend on sample homogeneity. As a rule, analyses are not corrected for recovery of matrix spike or surrogate compounds.

13.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the total amount expected to be obtained under normal conditions. Completeness for each parameter is calculated as:

$$\text{Completeness} = \frac{\text{Number of successful analyses} \times 100}{\text{Number of requested analyses}}$$

Target value for completeness for all parameters is 100%. A completeness value of 95% will be considered acceptable. Incomplete results will be reported to the client project officer.

13.4 Representativeness

The characteristic of representativeness is not quantifiable. Subjective factors to be taken into account are as follows:

- The degree of homogeneity of a site;
- The degree of homogeneity of a sample taken from one point in a site; and
- The available information on which a sampling plan is based.

To maximize representativeness of results, sampling techniques and sample locations will be carefully chosen so that they provide laboratory samples representative of the site and the specific area.

14.0 Corrective Action

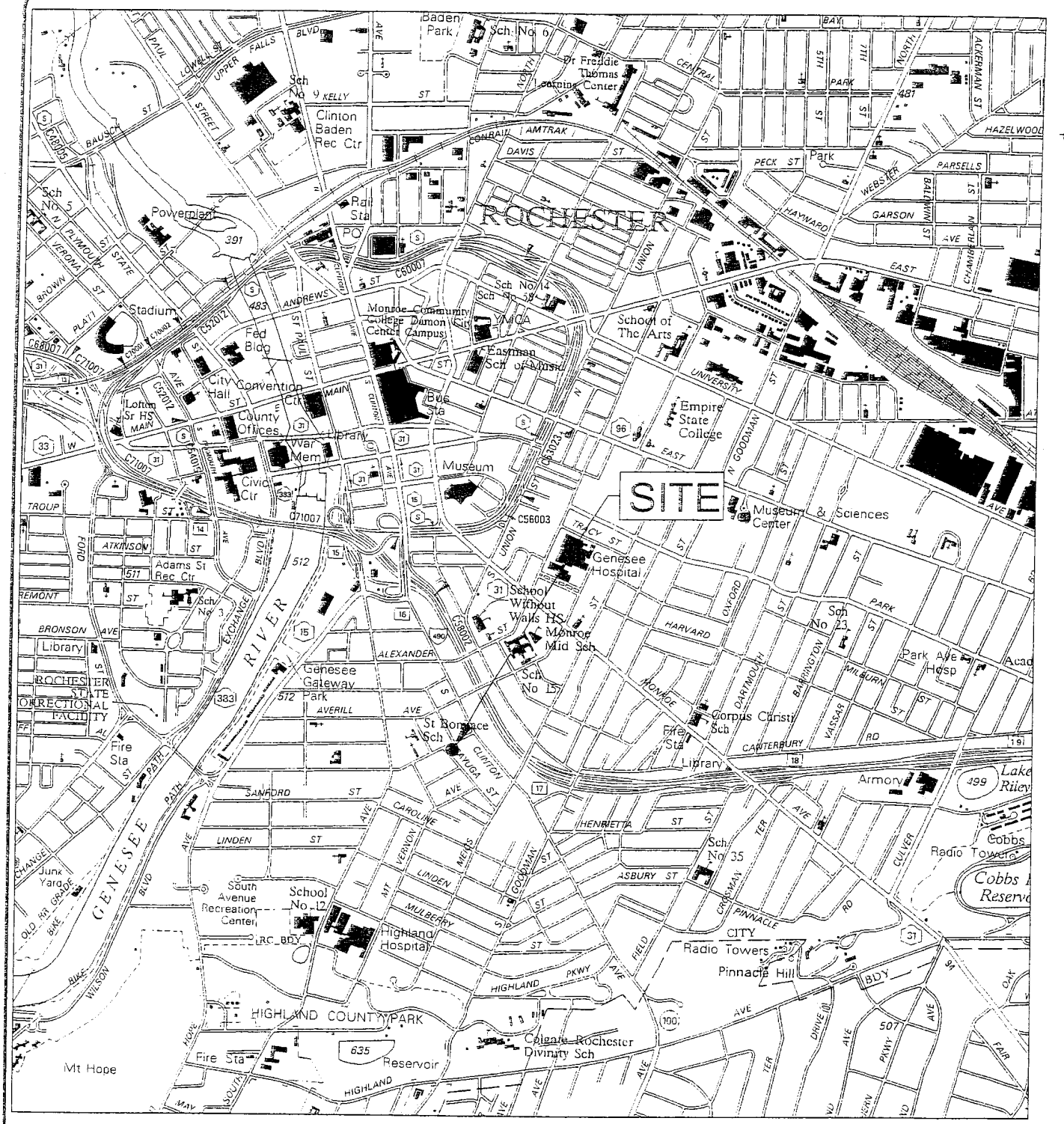
Corrective actions can be initiated as a result of performance and system audits, laboratory and interfield comparison studies, data validation, and/or a QA program audit. They may also be required as a result of a request from project representatives. All corrective action necessary to resolve analytical problems will be taken. Success or failure of corrective actions will be reported with an estimate of effect on data quality, if any.

Corrective actions may include altering procedures in the field, conducting subsequent audits, or modifying project protocol. Time and type of corrective action, if needed, will depend on the severity of the problem and relative overall project importance. The project manager is responsible for initiating corrective action and the team leader is responsible for its implementation in the correction of field non-conformance corrective actions.

15.0 Quality Assurance Reports

Upon completion of a project sampling effort, analytical and QC data will be included in a comprehensive report that summarizes the work and provides a data evaluation. A discussion of the validity of the results in the context of QA/QC procedures will be made, as well as a summation of all QA/QC activity.

Serious analytical problems will be reported. Time and type of corrective action, if needed, will depend on the severity of the problem and relative overall project importance. Corrective actions may include altering procedures in the field, conducting an audit, or modifying laboratory protocol. Corrective actions will be implemented after notification of project representatives.



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1"=2000'

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PROJECT
BROWNFIELD ASSESSMENT SITE
399 GREGORY STREET
ROCHESTER, NEW YORK

TITLE OF DRAWING
SITE LOCATION MAP

PROJECT NO.
190500196

DRAWING NO.
1

Plotting Parameters
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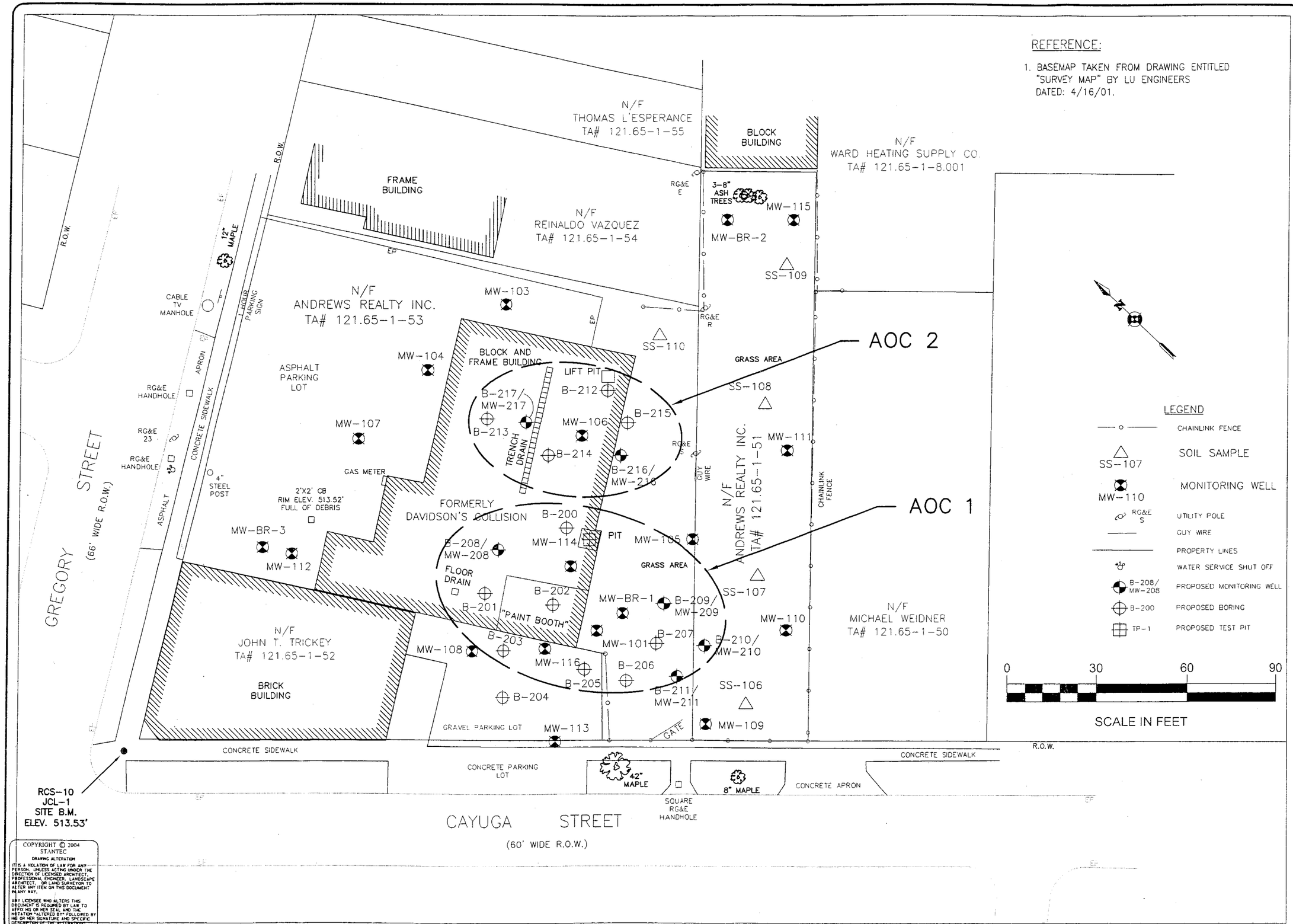
Dwg. File: U:\190500196\drawing\FIG2.dwg
Plotted: Dec 15, 2004 - 10:47am

iDevelopmentDesk
Node: LESSA



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TITLE OF DRAWING
PROPOSED SOIL BORING AND MONITORING WELL LOCATION MAP

PROJECT NO.
190500196
DRAWING NO.
2

TABLE 1
SUMMARY OF PROPOSED ANALYTICAL TESTING
Remedial Investigation
399 Gregory Street
Rochester, New York

LOCATION	SAMPLE I.D.	Matrix	TCL VOCs	TCL SVOCs	TAL Metals	TCL PCBs	TPH
Soil Borings/Monitoring Well Soil Samples							
B-200	GR-B200-S	soil	X				
B-201	GR-B201-S	soil	X				
B-202	GR-B202-S	soil	X				
B-203	GR-B203-S	soil	X				
B-204	GR-B204-S	soil	X				
B-205	GR-B205-S	soil	X				
B-206	GR-B206-S	soil	X				
B-207	GR-B207-S	soil	X				
B-208	GR-B208-S	soil	X	X	X	X	
B-209	GR-B209-S	soil	X	X	X	X	
B-210	GR-B210-S	soil	X	X	X	X	
B-211	GR-B211-S	soil	X	X	X	X	
MW-200	GR-MW200-S	soil	X				
MW-201	GR-MW201-S	soil	X				
MW-202	GR-MW202-S	soil	X				
MW-203	GR-MW203-S	soil	X				
MW-208	GR-MW208-S	soil	X	X	X	X	
MW-209	GR-MW209-S	soil	X	X	X	X	
TP-1	GR-TP1-S	soil	X				
Soil Dup #1		soil	X	X	X	X	
MS/MSD		soil	X	X	X	X	
TOTAL (Soil Borings/Geoprobe Samples):			**19**	**6**	**6**	**6**	**0**
TOTAL (QA Soil Boring Samples):			**2**	**2**	**2**	**2**	**0**

TAB. 1

SUMMARY OF PROPOSED ANALYTICAL TESTING

Remedial Investigation
399 Gregory Street
Rochester, New York

LOCATION	SAMPLE I.D.	Matrix	TCL VOCs	TCL SVOCs	TAL Metals	TCL PCBs	TPH
Groundwater Samples							
Existing Wells							
MW-101		groundwater	X				
MW-105		groundwater	X				
MW-110		groundwater	X				
MW-111		groundwater	X				
MW-113		groundwater	X				
MW-114		groundwater	X				
MW-116		groundwater	X				X
BR-1		groundwater	X				
BR-2		groundwater	X				
B4-3		groundwater	X				
New Wells							
MW-200	GR-MW200-GW	groundwater	X				
MW-201	GR-MW201-GW	groundwater	X				
MW-202	GR-MW202-GW	groundwater	X				
MW-203	GR-MW203-GW	groundwater	X				
MW-204	GR-MW204-GW	groundwater	X	X	X	X	
MW-205	GR-MW205-GW	groundwater	X	X	X	X	
MS/MSD		groundwater	X	X	X	X	
GW-DUP#1		groundwater	X	X	X	X	X
Trip Blank		water	X				
TOTAL (Geoprobe/Monitoring Well Groundwater Samples):			16	2	2	2	1
TOTAL (QA Groundwater Samples):			3	2	2	2	1
Total Analytical Samples:			35	8	8	8	1
Total QA Samples:			5	4	4	4	1
Total Samples for Project:			40	12	12	12	2

Notes:

1. TCL VOCs - Target Compound List Volatile Organic Compounds OLM 4.2.
2. TCL SVOCs - Target Compound List Semi-volatile Organic Compounds OLM 4.2.
3. TAL Inorganics - Target Analyte List Inorganics ILM 5.1.
4. TCL PCBs - Target Compound List Polychlorinated Biphenyls OLM 4.2.
5. MS/MSD - Matrix Spike/Matrix Spike Duplicate.
6. Dup = Field Duplicate Sample.

TABLE 2

SUMMARY OF QUALITY CONTROL CHECKS

Remedial Investigation
399 Gregory Street
Rochester, New York

Type of QC Check	Frequency	Min. Number Required for Project	Remarks
Laboratory Blanks			
Method Blanks	1 per sample batch	1 or 5% of batch size	Batch may include samples from other projects
Reagent/Solvent Blanks	1 per lot	1	
Standard Reference Blanks	1 per sample batch	1 or 5% of batch size	Batch may include samples from other projects
Field Samples			
Matrix Spike/Matrix Spike Duplicates	1 per matrix contingent on total number of samples [soil and groundwater]	1 or 5% of batch size	Batch may include samples from other projects
Trip Blanks	1 per shipment of water samples	Based on number of water sample shipments	Trip Blanks to be prepared by Analytical Laboratory
		1	
Field Duplicates	1 per matrix	1 for soil	Select a sample with suspected contamination impacts.
		1 for groundwater	

TABLE 3
REQUIRED SAMPLE CONTAINERS, VOLUMES, PRESERVATION, AND HOLDING TIMES FOR ANALYTICAL SAMPLES

Remedial Investigation
399 Gregory Street
Rochester, New York

Media	Type of Analysis	Required Container	Preferred Sample Volume	Preservation	Maximum Holding Time
Soil	VOCs by EPA Method OLM 4.2	4 oz.cwm	4 oz.	Cool 4°C	VSTR + 10 days
	SVOCs by EPA Method OLM 4.2	4 oz.cwm	4 oz.	Cool 4°C	VSTR + 5 days
	PCBs by EPA Method OLM 4.2	4 oz.cwm	4 oz.	Cool 4°C	VSTR + 5 days
	TAL Metals by EPA Method ILM 5.1	4 oz.cwm	4 oz.	Cool 4°C	VSTR + 6 Months
Groundwater	VOCs by EPA Method OLM 4.2	(2) 40 ml glass vials	80 ml	pH<2, HCL	VTSR + 10 days if acidified with HCL
	SVOCs by EPA Method OLM 4.2	1000 ml amber glass jar	1000 ml	pH<2, HCL	VTSR + 5 days if acidified with HCL
	PCBs by EPA Method OLM 4.2	1000 ml amber glass jar	1000 ml	Cool 4°C	VTSR + 5 days if acidified with HCL
	TAL Metals by EPA Method ILM 5.1	100-200 ml plastic or glass jar	100-200 ml	pH<2, HNO3	VTSR + 6 Months

Notes:
1. Samples have to be received by the lab within 48 hours of the first sample being taken.
2. VTSR = Validated Time of Sample Receipt at laboratory
3. cwm = clear wide mouth jar

CHEMTECH

RECEIVED

December 8, 2004

Peter H. Smith
Stantec
85 Metro Park
Rochester, NY 14623-2674

Re: QA manual for Gregory St.

Pursuant to your email to Kurt Hummler today, enclosed please find the signed page for our QA Manual.

Please do not hesitate to contact Kurt or me if you require any further information at 908-789-8900 Ext. 208.

Sincerely,

Mildred V. Reyes
QA Officer

QUALITY ASSURANCE MANUAL

CHEMTECH
284 Sheffield Street
Mountainside, NJ 07092
Tel: (908) 789-8900

Document Control Number: A2040129

Revision Number: 2001-12

Date Revised: April 13, 2004
Date Effective: April 13, 2004

Approved By:

Divya Mehta
Technical Director

Mildred U. Reyes

Mildred Reyes
QA/QC Director

"The technical information contained herein is to be considered confidential and proprietary and is not to be disclosed, copied, or otherwise made available to other

INTRODUCTION

The Chemtech Quality Program, outlined in this document, has been prepared to meet the requirements of ISO Guide 25 and National Environmental Laboratory Accreditation Program (NELAP). The program establishes all Quality Assurance (QA) policies and Quality Control (QC) procedures to follow in order to ensure and document the quality of the analytical data produced by the Laboratory. The Quality Program is reviewed periodically and revisions are implemented as required.

Chemtech Standard Operating Procedures (SOP's), provide explicit instructions on the implementation of each element of the plan and assure that compliance with the requirements of the plan are achieved. All employees are required to adhere to the requirements of the SOP's in performing their specific job functions. SOP's are reviewed periodically and revisions are implemented as required when change occurs.

The goal of the Quality Program is to consistently produce accurate, defensible analytical data through the implementation of sound and useful Quality Assurance/Quality Control management practices. The plan will ensure that Chemtech, its employees and client expectations are achieved.

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1 QUALITY POLICY

1.1 CHEMTECH MISSION

Chemtech will be recognized as a dynamic, professional organization which provides high quality analytical services to the environmental market.

It will consistently meet client expectations while providing a challenging work environment for its employees and acceptable profit margins for its shareholders.

1.2 POLICY STATEMENT

Chemtech is committed to the production of analytical data meeting specific defined quality standards and to continue improvements in all areas of our operation. As a result of having a focus on environmental analyses, an emphasis is placed on timelines of work, meeting data quality objectives, and the legal defensibility of the data. Each operation maintains a local perspective in its scope of services and client relations and maintains a national perspective in terms of quality. Under the guidance of this quality assurance manual, a level of quality, which is acceptable on a national and international scale, is upheld in all Chemtech laboratory operations.

Our corporate goal for all segments of Chemtech operations is to have uniform products and service quality standards, while encouraging local variation to meet state regulations and customer specifics needs. The process of achieving this goal entails continuous evaluation and action. Chemtech management requires documentation of existing practices and improvement action plans at every stage in the analytical measurement process. Documentation is fundamental to the demonstration and management of quality practices in environmental analytical laboratories.

A spirit of innovation is an essential element to the success of Chemtech in solving the complicated analytical problems encountered with environmental samples. This spirit, combined with the discipline and attention to detail required to provide the level of service expected by our customers, is what makes Chemtech stand out among others in this field. This same spirit is what drives continuous quality improvement and which is the keystone to the Chemtech quality program.

2. ORGANIZATION AND MANAGEMENT

2.1 ORGANIZATIONAL ENTITY

Chemtech, located in Mountainside, New Jersey, is a privately held independent analytical laboratory established in 1967. Chemtech is incorporated in the State of New York and registered to do business in the State of New Jersey. Our Directors, many of who are also major shareholders are acutely aware of the dynamics of our industry, the changing technology, and need for capital investment. Capital for investment in technology and expansion is mainly derived from operating profits and our shareholders. We have been successful in acquiring the necessary equipment, software and automation necessary to be a leader in the analytical community.

2.2 MANAGEMENT RESPONSIBILITIES

Objective: The laboratory has an established chain of command as detailed in the Organizational Chart. The responsibilities of the management staff are linked to the President of Chemtech who establishes the strategy and direction for all company activities.

President: Primarily responsible for all operations and business activities. Develops and implements strategies, initiatives and direction for the company. Delegates authority to Laboratory Directors, all Managers, and Quality Assurance/Quality Control Director to conduct day to day operations and execute quality assurance duties.

Chief Operating Officer/Technical Director: To facilitate uniformity and focus in all aspects of the company's technical affairs; including, Quality Assurance, Information Systems, and Organic and Inorganic technical direction. Strives to align the strategies, initiative and direction of technical affairs with the strategic direction of the company. Reports to the President.

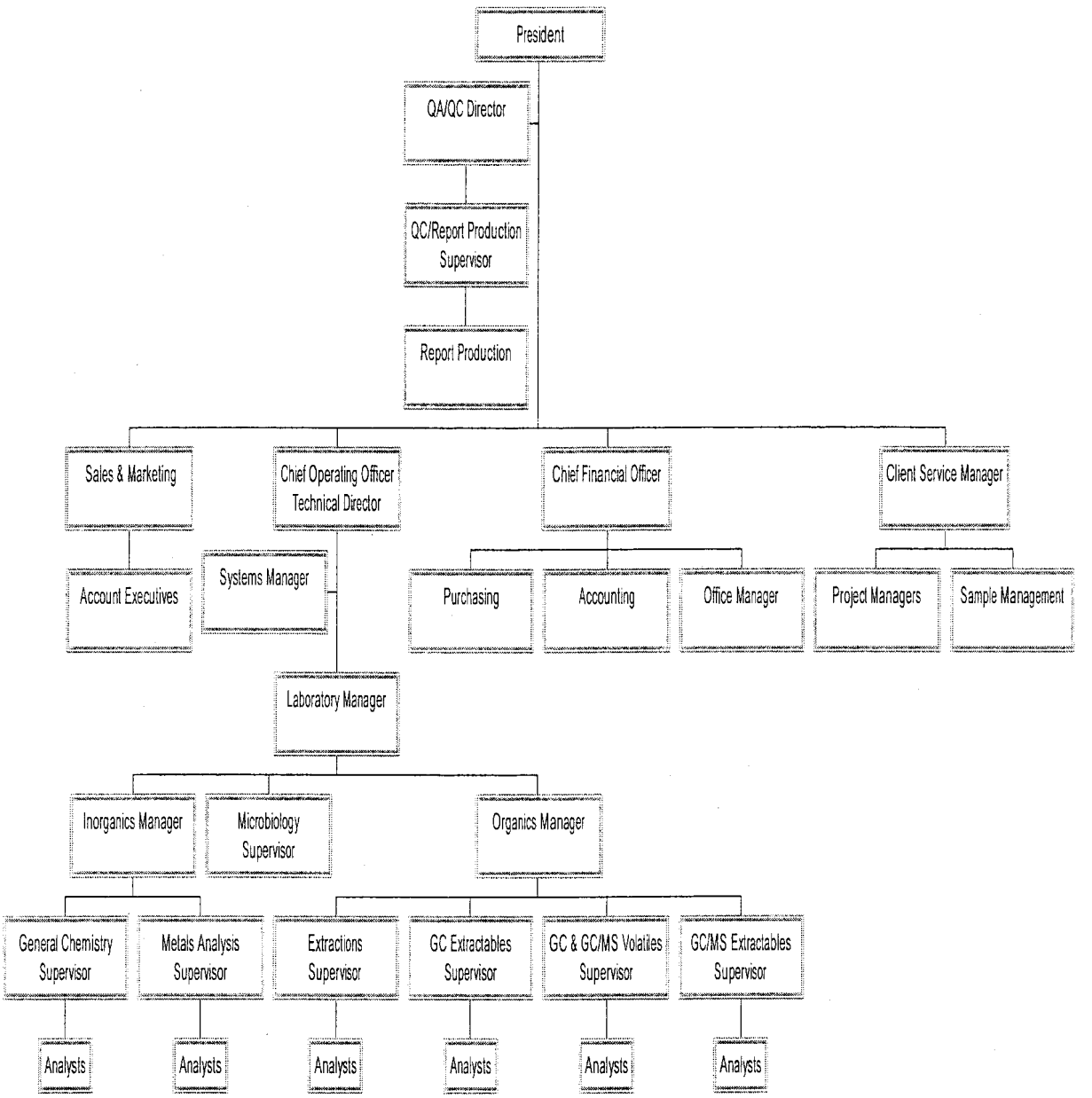
Quality Assurance/Quality Control (QA/QC) Director: To implement, supervise, and facilitate responsibility for all QA activities established by the Quality Program. Reports to the President.

Laboratory Manager: To plan, direct, and control the day to day company's operational performance expectations. Reports to the Chief Operating Officer/Technical Director.

Department Managers: To supervise, plan, direct, and control the day to day responsibility of a specific laboratory department. Report to Laboratory Manager.

Department Supervisors: To supervise day to day responsibility of a specific laboratory department. Report to Department Manager.

Chemtech
Organization Chart



3. RELATIONSHIP BETWEEN MANAGEMENT, TECHNICAL OPERATIONS, SUPPORT SERVICES, AND THE QUALITY SYSTEM

Objective: The members of the management team have defined responsibility for the Quality Program. The development and implementation of the Quality Program is the responsibility of Quality Assurance/Quality Control Director. The implementation and operation of the Program is the responsibility of the operations management.

President: Responsible for all quality activities including the overall responsibility of implementing the Program. Is the primary alternate in the absence of QA/QC Director. Authorizes the QA/QC Director to design, implement, and coordinate the Program.

Chief Operating Officer/Technical Director: Responsible for executing and coordinating the Program in all laboratory departments. Responsible to certify and document that personnel have the appropriate education and or technical background to perform the tests for which the laboratory is accredited to perform. Responsible for the development and implementation of corrective actions, including the authority to delegate Quality Program implementation responsibilities.

Quality Assurance/Quality Control Director: Responsible for the establishment, execution, support, training, and monitoring of the Quality Program. Identifies all product, process, or operational defects through statistical monitoring and audits including implementation of corrective action. Audits corrective actions for compliance with the Program.

Laboratory Manager: Responsible for coordinating and monitoring the requirements of the Quality Program in the laboratory. To assure that subordinates follow the requirements of the Quality Program. Implement corrective actions as necessary to address quality deficiencies. Is the primary alternate in the absence of Technical Director

Department Managers: Responsible for implementing the requirements of the Quality Program in their departments. To assure all subordinates and analysts follow the requirements of the Quality Program. Implement corrective actions as necessary to address quality deficiencies.

Department Supervisors: Responsible for implementing the requirements of the Quality Program within their department. To assure all analysts follow the requirements of Quality Program. Implement corrective actions as necessary to address quality deficiencies.

Analysts: Responsible for applying the requirements of the Quality Program to the analyses they perform. To evaluate QC data and initiate corrective action for quality control deficiencies within their control. Implement corrective actions as directed by superiors.

Support Services: Sample Management, MIS, Client Services and the Account Executives are responsible for applying the applicable requirements of the Quality Program to their specific tasks.

4. JOB DESCRIPTIONS OF KEY STAFF

Objective: Job descriptions of key positions are defined to communicate a clear understanding of the duties and responsibilities including reporting relationships.

President: Responsible for all business activities including the strategic direction, mission and expectations of the company. Builds a strong, cohesive management team that is constantly focused on improving the operating, technical and financial performance of the company.

Chief Operating Officer/Technical Director: Coordinates the operational activities and the technical direction of the laboratory. Responsible to certify and document that personnel have the appropriate education and or technical background to perform the tests for which the laboratory is accredited to perform. Develops the strategy to evaluate and new methods, technology and objectives. Provides assistance and leadership to management teams to implement new innovated technologies. Reports to the President.

Quality Assurance/Quality Control Director: Establishes and audits the company quality program. Provides technical assistance to ensure that the procedure and data quality is technically sound, legally defensible and consistently meets the objectives of the QA Manual. Reports to the President.

System Manager: Provides the operational support for all information systems. Develops and implements MIS software to meet the strategic and technical goal of the company. Reports to the Technical Director.

Client Service Manager: Responsible for the planning, directing and control of the Sample Management Department and the Project Management staff. Supervises the sample log in operation and coordinates the project management activities. Communicates client expectations to the laboratory regarding analytical and reporting requirements. Reports to the President.

Laboratory Manager: Provides the technical, operational and administrative leadership through planning, allocation and management of personnel and equipment resources. Maintains a clearly qualified model of laboratory capacity. Uses this model as a basis for controlling the flow of work into and through the laboratory. Reports to the Technical Director.

Department Manager: Directs, plans and controls the operations of the department. Supervises daily production to ensure compliance with the requirements of the Quality Program and client expectations. Reports to the Laboratory Manager.

Department Supervisor: Provides supervision and directions for the group. Implements the daily analysis schedule. Ensures that the group and the analytical data are in compliance with the Quality Program. Reports to the Department Manager.

5. APPROVED SIGNATORIES

Objective: For traceability of data and related documents procedures are required which detail the authorization of signature approvals of data and information within Chemtech. A log of signatures and initials of all the analytical staff is maintained in the QA/QC office for cross-reference check.

5.1 SIGNATURE AUTHORITY

President: Authorizes contracts and binding agreements.

Chief Operating Officer/Technical Director: Approves the QA policy and SOP's and approves final reports in the absence of QC supervisor and QA/QC Director.

Quality Assurance/Quality Control Director: Approves SOP's, and the QA Plan. Approves final reports in the absence of QC supervisor.

5.2 SIGNATURE REQUIREMENT: All laboratory activities, commencing with sample receipt through the release of data, are approved by appropriate personnel by initialing or signing and dating the documents. A document is signed or initialed by an employee, is within their limits of authority. All raw data are initialed and dated by the analyst conducting the analysis. All signatures and initials can be cross-referenced to the signatures and initial log.

5.3 SIGNATURE AND INITIAL LOG: The QA/QC office keeps a logbook of all signatures and initials of all technical personnel. New technical employee's signatures and initials are added to the logbook on the first day of their employment. Ex-employee signatures are kept on file but annotated with the last day of employment.

6. PERSONNEL TRAINING

Objective: To ensure that all analysts are properly trained, acquire an adequate amount of experience prior to performing independent analyses and maintain technical competence. These factors are an essential part of the laboratory QA Program.

6.1 EMPLOYEE ORIENTATION AND TRAINING: All new employees go through a training period which includes introducing new personnel to Chemtech company policies, QA/QC practices, safety and health, and ethics training in addition to training related to their job functions. The training period extends approximately 1 to 6 months, depending upon the level of experience of the individual.

6.2 PERSONNEL QUALIFICATIONS AND TRAINING: All technical employees at Chemtech fulfill the educational, work experience, and training requirements for their positions as outlined in their job description. As workload permits, Chemtech encourages cross training of personnel as appropriate.

All employees must undergo laboratory health and safety training and ethics training and must read laboratory QA Manual. A signed and dated statement from each technical employee that they have read, understood, and are using the latest version of the laboratory QA manual and SOP's is maintained in their training file.

A signed and dated statement from each employee that they have read, acknowledged and understood their personal ethical and legal responsibilities is kept in their training record.

The analysts are also required to take any QA/QC training (Introduction to Quality Assurance and specialized QC courses) provided by the QA/QC Director.

6.3 TECHNICAL SKILLS: Analysts are initially qualified by education with a minimum of a BS degree in Chemistry, Physical and/or Biological sciences. Every new analyst is trained, regardless of education and outside experience, in the individual analytical procedures by a senior analyst. All Chemtech analyst capabilities are determined initially with PT studies and Initial Demonstration of Capability studies.

When new equipment is purchased, appropriate Chemtech personnel are trained locally by the manufacturer, vendor or at the manufacturer's training course.
Any significant change to an analytical system requires that the analyst performs an initial demonstration of precision and accuracy, and recalibration of the instrument. For example, replacing a column in a gas chromatograph, cleaning the mass spectrometer ion source, etc.

6.4 **TRAINING RECORDS:** Training records for technical employees are kept in the QA office. The Technical Director certifies and document's that all technical employees have the appropriate education and or technical background to perform the tests for which the laboratory is accredited to perform. It is the responsibility of each employee to assure that records of completed training are provided to the QA/QC Director to update his/her personnel file.

In addition to the ethics and QA manual statements the employee record file contains: read receipts of SOP's, a Demonstration of Capability for each accredited method; documentation of any training courses, seminars, and/or workshops; and documentation of continued proficiency to perform each test.

Continued analyst proficiency can be achieved by one of the following: acceptable performance of blind samples for each accredited method; through the analysis of Laboratory Control Samples - at least four consecutive Laboratory Control Samples with acceptable levels of precision and accuracy.

6.5 **Training requirements for key positions:** Training requirements are assigned depending on the position and department the employee is in.

Quality Assurance Officer: The QAO must have ample knowledge of the laboratory procedures. Have at least 5 years of laboratory experience preferably in Organics and Have at least 2 years of data review procedures training.

Department Manager- A department manager must have at least 3 years of experience in the area of Supervision. Must have proper training in methodology and the skill to organize schedule and train personnel for a successful operation of their department

Department Supervisor: A department supervisor must have at least 2 years of experience in the area they are to supervise. Be able to write SOPs

7. ETHICS POLICY

Chemtech provides comprehensive analytical testing services for the qualitative and quantitative assessment of environmental contaminants. Our services are used to meet various regulatory permitting and reporting requirements, determine compliance for both State and Federal environmental regulations to assess potential present and future environmental liability or health risks.

Our policy to conduct our business with honesty and integrity; to produce accurate and usable data, and provide our employees with guidelines leading to an understanding of the ethical and quality standard required by Chemtech.

7.1 **CODE OF ETHICS:** Chemtech is managed in accordance with the following principals:

To produce analytical test results that are accurate and meet the requirements of our Quality program.

To operate our laboratory in a manner that protects the environment, as well as the health and safety of all our employees.

To provide employees with guidelines leading to an understanding of the ethical and quality standards required by Chemtech.

To report analytical data without any considerations or self-interests.

To provide analytical services in a confidential, truthful, and candid manner.

To abide by all Federal, State, and Local regulations that effects our business.

7.2 **EMPLOYEE ETHICS TRAINING:** Each employee receives ethics training during employee orientation and must sign an Employee Ethics Statement. During the orientation, an employee is made aware of the ethical and legal responsibilities including potential punishments and penalties for improper, unethical or illegal actions. The Employee Ethics Training program is updated annually (or more frequently if required). Ethics Training Seminars are presented annually, and all employees are required to attend. Personnel files are updated to include the date the employee attended the annual Ethics Training Seminar.

8. FACILITIES AND RESOURCES FOR NEW ANALYTICAL PROJECTS AND IMPLEMENTING CLIENT REQUIREMENTS

Objective: To ensure that appropriate facilities and resources are available to meet the demand for new analytical projects and process to implement client requirements.

8.1 **REVIEW OF NEW ANALYTICAL PROJECTS:** A Project Chronicle (PC) is prepared by the Account Executive prior to a quotation preparation and or an award, and presented to the Technical Director and his staff for review and comments. The PC outlines all the client requirements and includes copies (if available) of the clients Quality Assurance Project Plan (QAPP), Statement of Work (SOW) and contractual provisions. The PC and associated information are scanned and stored on the network for future reference.

A "Kick Off Meeting" chaired by the Technical Director is scheduled to discuss the PC and its associated information. Project Management, the QA/QC Director, Laboratory Manager, including appropriate Department Managers/Supervisors, Sample Management and MIS staff are present to familiarize themselves with the requirements, and are asked to participate in the planning and implementation of the project.

8.2 **RESOURCE AVAILABILITY:** Chemtech maintains a 30,000 square foot laboratory designed for maximum efficiency and safety. There is a redundancy of equipment to ensure ample equipment resources. The laboratory is adequately staffed by a highly skilled group of chemists with diversified experience in environmental analysis; and managed by a knowledgeable team of professionals who are committed to quality and client satisfaction.

The laboratory management maintains a clearly defined model of laboratory capacity based upon historical data. This model is the basis for controlling resources, management of personnel and equipment, including the flow of work into and through the laboratory.

8.3 **NEW WORK COORDINATION:** Project Management coordinates the project logistics with the client and Sample Management in addition to overseeing the analytical progress through the laboratory. Sample Management initiates the Log-In process, which includes requirements, detailed in the PC and Quotation.

Prior to release of data to the client the Department Managers, Supervisors, and the QC/Report Production staff review the data for

completeness, accuracy, and conformance with applicable regulatory and clients requirements.

9. CLIENT CONFIDENTIALITY

Objective: To design and implement policies and procedures to protect the confidentiality and proprietary rights of our clients.

9.1 CLIENT CONFIDENTIALITY

Information related to a Client and or a Project are entered and stored in Chemtech's LIMS SQL Server. The information is entered by employees with the appropriate level of authority. Security levels within Chemtech's system define an individuals access to information levels. Information on the Server is backed up at defined intervals, and the backup information is stored offsite.

Analytical data is prepared in a report format as required by the client. The report is copied and scanned electronically. A paginated copy of the report is distributed as directed by the client while the original copy and related information is kept on site in the Document Storage Area. The scanned copy is archived on our LIMS Server. Access to the Document Storage Area or the LIMS Server is limited by the employee's security authorization levels. The files are archived for a period of five years.

Electronic data stored in Chemtech's database is protected by a variety of systems including, Virtual Private Networks (VPS), firewalls, log in user names and passwords. A Gateway system is also employed to restrict access to specific users based upon their authorization level.

Reports or client information requested by a third party must be accompanied by written authorization from our Client. Client information is released when directed by a subpoena from a court with valid jurisdiction. The Client is promptly notified of the subpoena requesting their information.

10. CLIENT COMPLAINTS RESOLUTIONS

Objective: To establish a system to address and resolve client complaints regarding any laboratory activity. The process for dealing with complaints must include a procedure, documentation, corrective action, and monitoring of the implemented corrective action.

10.1 **PROCEDURE:** When a client calls or e-mails an inquiry regarding a project or a report to the Project Manager (PM), the PM receiving the call (or e-mail) summarizes the client issue or requests the client to mail/fax any questions. Once a formal request is received, the PM prepares a Corrective Action (CA) report form, that includes the client name, laboratory project numbers(s), summary of issues, PM initials and date. The CA report form is an assigned a four digit tracking number, by the QC Supervisor. The CA report form is submitted to the Technical Director, who assigns the CA report form to the affected department supervisor to review, comment and correct the issue within 24 hours. All technical and data reporting inquiries are submitted to the QA/QC Director for review. Once the response comes back from the laboratory the QC Supervisor and QA/QC Director reviews it and if satisfactory the CA report form is filed in the QA/QC office. The client is sent the corrected information.

10.2 **DOCUMENTATION:** Client's complaints are documented using CA report form, which originates from PM office or QA Officers office. The original communication (phone log, e-mail, or fax) is kept in the PM office while closed CA report form is filed in the QC office. The CA report contains the date and name of the person receiving the complaint, a description of the complaint, source of the complaint, the resolution, and any written material accompanying the complaint. The CA database is updated by QA/QC office to which only QA/QC Director and QC officer has excess. A database is maintained where client inquiries are logged-in including date, client name, project number, department in question, and a summary of the inquiry and CA taken.

10.3 **CORRECTIVE ACTION:** The CA report is entered in a database to monitor systematic defects. The appropriate department supervisor must deal with the complaint by responding to the inquiry. The response must address the issue(s) and provide an explanation and resolution. The response may involve reprocessing of data and issuing a revised data report. The QA/QC Director reviews the CA for a persistent defect in case the respective SOP needs modifications.

10.4 **QA/QC AUDITING:** The CA is entered in a database to monitor systematic defects. The QA/QC Director investigates complaints and promptly audits all areas of activity to assure that the CA implemented has resolved the defect. If the defect persists, the QA/QC Director, and Department Manager and Supervisor develop and implement an effective process. When the defect is resolved, monitoring is incorporated as a part of the annual system audit. For a detailed information on client inquiries refer to the SOP for handling client inquiries.

11. SAMPLE MANAGEMENT PROCESS

Objective: To establish a system to process client requests for analytical services and samples upon arrival at the laboratory. Please refer to P204-Chain of Custody SOP and P250-Log in SOP for detailed information for sample receipt, containers and all other related information.

11.1 ANALYTICAL REQUEST: Project Managers prepare an Analytical Request (AR) Form from the information detailed on the Project Chronicle (PC) and provide a copy to Sample Management in order to initiate a sampling event.

11.2 SAMPLE CONTAINER PREPARATION AND SHIPMENT: All bottle orders prepared from the Analytical Requests are prepared with bottles that are certified pre-cleaned by the manufacturer according to US EPA specifications. Reagent grade preservatives are added to the bottles at the laboratory. All preservative solutions are checked to assure that they are free of contamination. Chemtech utilizes laboratory reagent water for trip and field blanks.

Bottle orders are prepared by one individual and checked by a second individual to ensure that the bottle order was properly prepared. The bottles are then relinquished from Sample Management to the appropriate courier. When the bottles arrive at the client destination, the courier will then relinquish custody of the bottles to the client or the client designee.

Samples arrive at the laboratory via Chemtech couriers, common carrier, or client delivery. All shipments and deliveries of samples are received through the shipping & receiving door located in the rear of the facility. All deliveries enter in the same location and go directly to the sample room. The SOP's for Chain of Custody (CoC) and Sample Acceptance and Receipt are followed.

Sample Management personnel will sign for all shipments received and notify the Sample Custodian immediately. The samples are then relinquished to the Sample Custodian.

A sample or sample container is considered to be in custody if: it is in the persons' actual possession; it is in the person's view after being in their physical possession; it was in their possession and then locked in a refrigerator or sealed in a cooler; it is in a designated secure area.

11.3 SAMPLE ACCEPTANCE

Upon receipt of sample coolers at the laboratory, coolers are examined for damaged or broken custody seals. Records of the condition of the custody seals and coolers are recorded on the Laboratory Chronicles. If seals and coolers are intact, the sample acceptance procedure is continued. If they are not intact, the appropriate Laboratory Project Manager (PM) is notified. The PM will seek guidance from the client whether to proceed with the analysis of the samples or discard or send back the samples. The PM will communicate information given by the Client to Sample Management via a Record of Communication.

11.4 SAMPLE RECEIPT

Once the samples have been accepted, the sample receipt process begins. The Sample Custodian will line up the samples according to the CoC and begin comparing the information documented on the CoC to the samples received. Any deviation noted from the CoC or non-conformance is recorded on the Laboratory Chronicle and communicated to the appropriate Laboratory Project Manager.

11.5 SAMPLE CUSTODIAN RESPONSIBILITIES

The Sample Custodian must take a cooler temperature soon after sample receipt and record it on the Laboratory Chronicle and the Field CoC. This will verify that the samples were transported and received at the required temperature.

The Sample Custodian must ensure that samples are received in good condition and ensure that samples listed on the CoC are all present. The Sample Custodian must compare the sample identification on the CoC to the labels on the bottles, and make sure that the information on the CoC exactly matches the bottle labels. Verification that enough volume has been received for the sample tests requested and absence of headspace for volatile analysis must be noted.

The Sample Custodian must ensure that all samples are properly preserved. Appropriate preservation of samples is determined by checking the pH of the samples. Sample Management Staff are issued a reference table that lists the tests methods we utilize and their appropriate preservation techniques. The pH of the samples is recorded on the Laboratory Chronicle.

The Sample Custodian must sign the CoC and other documentation received with the samples. Documentation of custody is initiated when the field sampler is collecting the samples. Custody documentation includes all information that provides a clear record of the sample identification,

time of collection, and collection chronology. This record is kept on the Chemtech or Client CoC Forms.

The Sample Custodian must place the samples in storage or relinquish to the appropriate laboratory analyst after labeling the samples with the unique laboratory number.

11.6 SAMPLE MANAGEMENT STAFF RESPONSIBILITIES

Sample Management staff must review the Field CoC submitted by the Sample Custodian and procure the correct Analytical Request (AR) form from the file. They must compare the AR to the Field CoC and ensure that all information on the CoC follows the AR exactly. If not, contact the appropriate PM for further guidance. The PM should resolve all discrepancies between the AR and the CoC prior to sample login. Once the discrepancies are resolved the PM will issue a Record of Communication to document the client's instructions.

If an unapproved rush analysis is received, Sample Management staff must inform the PM, and contact the appropriate Department Supervisor via email. Proceed to login the samples. Create a folder with the original Field CoC, the sample and delivery tickets, any third party delivery documentation, and the login report.

11.7 SUBCONTRACTED ANALYSIS

Projects sometimes contain analyses that Chemtech does not perform. In order to give a high level of service to our clients, Chemtech will subcontract these analyses to other laboratories. All subcontracted laboratories must meet vigorous standards set forth by QA/QC Department as well as standards established for the environmental laboratory industry. A documented procedure is followed to qualify laboratories for subcontracting and a list in maintained in our QA/QC Department. Procedures have also been established to assure that CoC is maintained and the subcontract laboratory achieves all client objectives.

A subcontracted laboratory must provide our QA/QC Department the following information in order to be used as a subcontractor: a valid state certification for the required tests, Quality Assurance Plan, PT Studies for the required tests, and copies of the SOP's for the required tests.

The subcontracting procedure is a documented procedure that is initiated by an Account Executive. The Account Executive is responsible for ensuring that the subcontracted laboratory meets all client specifications. When a client issues a Scope of Work, the Account Executive thoroughly reviews the document. If subcontracting is required, the Account

Executive will consult the established subcontracting list that is issued by the QA/QC Department. If a particular analysis is not conducted by one of these approved laboratories, the Account Executive must then request that QA/QC Director locates and approves a laboratory for the requested analysis.

Once a subcontract laboratory is found, the Account Executive must contact the laboratory to communicate the client's requirements and request a quotation from the laboratory. The Account Executive then creates a Project Chronicle that documents the client requirements, the subcontract laboratory to be used, and attaches a quote to this document. The Project Chronicle is an electronic document available to all appropriate personnel. This procedure is followed prior to the receipt of samples from the client.

When the client calls to order the bottles for the project, the PM initiates an Analytical Request Form (AR) from the information documented on the Project Chronicle. The AR includes the information for the subcontract laboratory as well as any special bottle instructions for the subcontracted tests, and is given to Sample Management. Sample Management then creates the bottle order and sends it to the client.

Upon receipt of the samples, the Sample Custodian will give a copy of the CoC to the Client Service Manager. The Client Service Manager will then create a subcontract chain of custody and procure a Purchase Order from Accounting. This documentation is given to Sample Management to send to the subcontract laboratory along with the samples. A copy of this documentation is retained and placed in the login folder and double-checked by the appropriate Project Manager.

All subcontracted samples are logged into the LIMS System to allow for sample tracking and data reporting. A PM will track the samples to ensure that client deadlines and specifications are met. Once the data packages arrive from the subcontract laboratory, the PM will check the report for completeness. If the data package is deficient, the PM will immediately notify the subcontract laboratory to remediate the deficiencies. The report is then passed to the QA/QC Department for further review. If any corrective action is required at this point, the QA/QC staff will call the subcontractor laboratory. All data that is subcontracted is clearly designated.

11.8 SAMPLE STORAGE

Chemtech maintains a 40-foot walk-in refrigerator that contains a multitude of shelves. All samples, with the exception of volatiles, are kept

in this refrigerator. The refrigerator temperature is monitored constantly and recorded once a day. All shelves in the walk-in refrigerator are identified with a code. The Sample Custodian assigns samples to a refrigerator shelve and gives the shelve location to Sample Management to login with the sample information. This documented procedure allows the samples to be found very easily.

The volatile refrigerators are located in the Volatile Department and kept secure. All Volatile refrigerators are also monitored for temperature. The temperature is recorded every day in a logbook.

Back-up refrigerators are available should any mechanical problem present itself. All samples are securely moved to the backup refrigerators if necessary.

Only the Sample Custodians are permitted access to sample storage. Analysts create a sample request electronically and send the request to the Sample Custodians. Once received, the Sample Custodians fill out the appropriate paperwork and issue the samples to the Analysts.

Periodically throughout the day, the Sample Custodians will pick up samples from the laboratory and sign them back into storage. Analysts will send the Sample Custodian an email when they finished with the samples. All samples must be back in refrigeration at the end of a shift and the chain of custody is required to be kept at all times.

12. ANALYTICAL CAPABILITIES

Analytical Fraction	Soil/Solid Matrix Methods	Aqueous Matrix Methods
Volatile Organics by GC/MS	SW 5030B/8260B SW 5035/8260B SW 3585 OLM03.2 OLM04.2 OLM04.3	SW 5030B/SW 8260B SW5035/SW 8260B OLM03.2, OLM04.3 OLM04.2 OLC02.1 OLC03.1 EPA 524.2 EPA 624
Volatile Organics by GC	SW 8015B SW 5030B/SW 8021B SW 5035/8021B	SW 8015B SW 5030B/SW 8021B SW 5035/8021B EPA 601 EPA 602
Semivolatiles by GC/MS	SW 3510C/SW 8270C SW 3520C/SW 8270C SW 3540C/SW 8270C SW 3545/SW 8270C SW 3580A/SW 8270C OLM03.2 OLM04.2 SW 3550B OLM04.3	EPA 625 SW 3510C/SW 8270C SW 3520C/SW 8270C SW 3540C/SW 8270C SW 3545/SW 8270C SW 3580A/SW 8270C OLM03.2, OLM04.3 OLM04.2 OLC02.1 OLC03.1
Semivolatiles by HPLC	SW 8310	SW 8310 SW 8330
Semivolatiles by GC	SW 8015B	SW 8015B
Pesticides &/ or PCBs	SW 3510C/SW 8081A&/or 8082 SW 3520C/SW 8081A&/or 8082 SW 3540C/SW 8081A&/or 8082 SW 3545/SW 8081A&/or 8082 SW 3580A/SW 8081A&/or 8082 OLM03.2 OLM04.2 OLM04.3	SW 3510C/SW 8081A&/or 8082 SW 3520C/SW 8081A&/or 8082 SW 3540C/SW 8081A&/or 8082 SW 3545/SW 8081A&/or 8082 SW 3580A/SW 8081A&/or 8082 EPA 608 OLM03.2 OLM04.2, OLM04.3
Chlorinated Herbicides	SW 8151A	SW 8151A
Volatile Organics by GC/MS	Air Matrix Method: TO-14	

Analytical Fraction	Soil/Solid Matrix Methods	Aqueous Matrix Methods
Metals	SW 6010B SW 7471A ILMO4.1 ILM05.3 SW 3050B	EPA 200.7 EPA 245.1 SW 6010B SW 7470A ILM04.1 ILM05.3 SW 3005A SW 3010A
Wet Chemistry		
Acidity	------	EPA 305.1 SM 18 2310B(4A)
Alkalinity	------	EPA 4100B SM18/19 2320 B
Alkalinity, Bicarbonate	------	SM18/19 2320 B
Ammonia	EPA 350.2	EPA 350.2 SM 18 4500-NH3 B/E
Anions: Bromate Bromide Chloride Fluoride Nitrate Nitrite Orthophosphate Sulfate	------	EPA 300.0
ASTM Leaching Procedure	ASTM 3987	------
Biochemical Oxygen Demand (BOD5)	------	EPA 405.1 SM 18 5210B
Bromide	SW 9211	EPA 320.1 EPA 300.0
Carbon Dioxide	------	EPA 310.1
Carbonaceous BOD (cBOD)	------	SM 18/19 ED 5210B
Cation-Exchange Capacity	SW 9080 SW 9081	------
Chemical Oxygen Demand (COD)	------	EPA 410.1 EPA 410.2 EPA 410.3 SM 18 5220C SM 18 5220D

Analytical Fraction	Soil/Solid Matrix Methods	Aqueous Matrix Methods
Chloride	SW 9212 SW 9056	EPA 325.3 EPA 300.0 SM 18 4500-Cl C
Chlorine Demand	------	SM 18/19 ED 2350B
Color	------	EPA 110.2 SM 18 2120B
Conductivity	SW 9050A	EPA 120.1 SM 18/19 ED 2510 B
Corrosivity	SW 9040B	SW 9040B
Corrosivity Toward Steel	SW 1110	SW 1110
Cyanide	SW 9010B	EPA 335.2 EPA 340.1 SM 18/19 4500-CN C&E
Cyanide-Amenable	SW 9010B SW 9213	EPA 335.1 SM 18 4500-CN G
Density	------	SM 18 2710F ASTM D1298 ASTM 5057
Dissolved Oxygen	-----	EPA 360.1 EPA 360.2 SM 4500-O C SM 4500-O G
Extractions	SW 3610 SW 3620 SW 3640 SW 3665 SW 8440	SW 3610 SW 3620 SW 3640 SW 3665 SW 8440
Ferrous Iron	------	SM 18 3500 B SM 19 3500FE-D
Flashpoint	SW 1010 SW 1030	SW 1010 SW 1030
Foaming Agents	-----	SM 18/19 ED 5540 C
Fluoride	SW 9214	EPA 340.2 SM 18 4500 F-B, C EPA 300.0
Hardness, Calcium	------	EPA 200.7
Hardness, Total	------	EPA 130.2 SM 18 2340 B OR C

Analytical Fraction	Soil/Solid Matrix Methods	Aqueous Matrix Methods
Hexavalent Chromium	SW 3060A/SW 7196A	SM 18/19 ED3500-Cr D
Ignitability	SW 1010 SW 1030	SW 1010 SW 1030
Methylene Blue Active Substances (MBAS) Surfactants	------	EPA 425.1 SM 18/19 ED 5540 C
Nitrate	SW 9210 SW 9056	EPA 353.2 SM 18 4500-NO3 F EPA 300.0
Nitrate/Nitrite	EPA 353.2	EPA 353.2 SM 18 4500-NO3 F EPA 300.0
Nitrite	EPA 353.2 SW 9056	EPA 354.1 SM 18 4500-NO2 B EPA 300.0
Odor	------	SM 18 2150 B
Oil & Grease	SW 9070, SW 9071	EPA 413.1 EPA 1664A
Organic Nitrogen	EPA 351.1, .2, .3 .4 EPA 350.1.2.3	EPA 351.1, .2, .3 .4 EPA 350.1.2.3 SM 18/19 4500-NH3 BCEFGH
Orthophosphate		EPA 365.2 SM 18/19 ED 4500-P,E
Paint Filter Test	------	SW 9095
Petroleum Hydrocarbons	EPA 418.1	EPA 418.1
pH	SW 9040B SW 9045C	EPA 150.1 SM 18 4500-H+-B SW 9041A
Phenolics	SW 9065 SW 9066 SW 9067	EPA 420.1
Phosphorus, Ortho	------	EPA 365.2 SM 18/19 4500 P-E
Phosphorus, Total	EPA 365.2	EPA 365.2 SM 18 4500-P B5+E
Reactive Cyanide	SW 7.3.3.2 Rev 3	SW 7.3.3.2 Rev 3
Reactive Sulfide	SW 7.3.4.2 Rev 3	SW 7.3.4.2 Rev 3
Redox Potential	SM 18 2580	SM 18 2580 ASTM D1498
Residual Chlorine	-----	SM 18 4500-Cl G

Analytical Fraction	Soil/Solid Matrix Methods	Aqueous Matrix Methods
Settleable Solids	------	EPA 160.5 SM 18/19 2540 F
Silica	SW 6010B	EPA 200.7
SPLP Extraction	SW 1312	SW 1312
Sulfate	SW 9035 SW 9036 SW9038	EPA 375.4 EPA 300.0 SM 18/19 4500SO4 F, C or D
Sulfide	SW 9215	EPA 376.1 SM 18/19 4500-S E SW 9215
Sulfide, Acid Soluble & Insoluble	SW 9030B	SW 9030B SW 9031
TCLP Leaching Procedure	SW 1311	SW 1311
Temperature	SW 2550B	EPA 170.1 SM 18/19 2550B
Total Dissolved Solids (TDS)	------	EPA 160.1 SM 18 2540 C
Total Kjeldahl Nitrogen (TKN)	EPA 351.3	EPA 351.3 SM 18/19 4500-N Org B or C
Total Organic Carbon (TOC)	SW 9060 Lloyd Kahn	EPA 415.1 SM 18/19 5310 B, C or D
Total Organic Halides (TOX)	SW 9020B	SW 9020B EPA 450.1
Extractable Organic Halides (EOX)	SW 9023	SW 9023
Total Solids (TS)	EPA 160.3	EPA 160.3 SM 2540 B
Total Suspended Solids (TSS)	------	EPA 160.2 SM 2540 D
Total Volatile Solids (TVS)	------	EPA 160.4
Turbidity	------	EPA 180.1 SM 18/19 2130 B
Volatile Suspended Solids (VSS)	------	PA 160.4
Microbiology		
Total Coliform	SW 9131 SW 9132	SM 18/19 9221D SM 18/19 9222B
Fecal Coliform	------	SM 18/19 9222B or D

Analytical Fraction	Soil/Solid Matrix Methods	Aqueous Matrix Methods
Escherichia coli	------	SM 18/19 9222B SM 18/19 9221E
Heterotrophic bacteria (Standard Plate Count)	SM 18/19 9215D	SM 18/19 9215B

13. MAJOR EQUIPMENT

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
GC/MS SEMI VOA Lab							
GC	BNA-A	Hewlett Packard 5890 Series II	3223A43380	June 1992	July 2001	BNA Lab	used
MSD	BNA-A	Hewlett Packard 5971 Series	2919A00378	June 1992	July 2001	BNA Lab	used
Auto Sampler	BNA-A	Hewlett Packard 18596B	2718A04705	June 1992	July 2001	BNA Lab	used
Injector Tower	BNA-A	Hewlett Packard 7673 A	3048A24622	June 1992	July 2001	BNA Lab	used
Controler	BNA-A	Hewlett Packard 7673 A 18594B	3330A32763	June 1992	July 2001	BNA Lab	used
Computer	BNA-A	Minta	CN548014089	June 1992	July 2001	BNA Lab	used
GC	BNA-B	Hewlett Packard 5890	2750A18411	July 1994	July 2001	BNA Lab	used
MSD	BNA-B	Hewlett Packard 5971 Series	3188A03673	July 1994	July 2001	BNA Lab	used
Auto Sampler	BNA-B	Hewlett Packard 18596B	3021A21493	July 1994	July 2001	BNA Lab	used
Injector Tower	BNA-B	Hewlett Packard 7673 A	2704A04914	July 1994	July 2001	BNA Lab	used
Controler	BNA-B	Hewlett Packard 7673 A 18594B	320A28097	July 1994	July 2001	BNA Lab	used
Computer	BNA-B	Minta	93001897	July 1994	July 2001	BNA Lab	used
GC	BNA-E	Hewlett Packard 5890 Series	4500030441	Dec 2002	Jan 2003	BNA Lab	new
MSD	BNA-E	Hewlett Packard 5973	4591422501	Dec 2002	Jan 2003	BNA Lab	new
Auto Sampler	BNA-E	Agilent 7683 Series	4514413296	Dec 2002	Jan 2003	BNA Lab	new
Injector Tower	BNA-E	Agilent 7683 Series	CN13922355	Dec 2002	Jan 2003	BNA Lab	new
Computer	BNA-E	Hewlett Packard Vectra VL 420 DT	4522100267	Dec 2002	Jan 2003	BNA Lab	new
GC	BNA-F	Thermo Finnigan Trace Ultra	20041853	March 2004	March 2004	BNA Lab	new
MSD	BNA-F	Thermo Finnigan Trace DSQ	100166	March 2004	March 2004	BNA Lab	new
Auto Sampler	BNA-F	Thermo Finnigan AS 3000	20041111	March 2004	March 2004	BNA Lab	used
Refrigerator	BNA-Ref-4	Roper	ED2933135	May 1999	July 2001	BNA Lab	used
Refrigerator	BNA-Ref--5	White Westinghouse	BA54880352	August 1999	July 2001	BNA Lab	used
GC SEMI VOA Lab							
HPLC	HPLC-1	Hewlett Packard Series 1100 DAD	JP73007001/ US72101011/ US72101340	May 1999	July 2001	Pest Lab	used
Auto sampler	HPLC-1	Hewlett Packard 1313 AS	US72102636	May 1999	July 2001	Pest Lab	used
Computer	HPLC-1	HP Vectra XA	US73465640	May 1999	July 2001	Pest Lab	used
ECD	ECD-6	Hewlett Packard 5890 Series II	3235A44756	May 1999	July 2001	Pest Lab	used
Auto Sampler	ECD-6	Hewlett Packard 7673A	2718A07968	May 1999	July 2001	Pest Lab	used

Inject Tower	ECD-6	Hewlett Packard 7673A	2546A01644	May 1999	July 2001	Pest Lab	used
Instrument	**Lab Id**	**Manufacturer Description**	**Serial Number**	**Year Purchased**	**Date place in service at this location**	**Current Location**	**Condition Received (used, new, recondition)**
Controller	ECD-6	Hewlett Packard 7673A	2546A01644	May 1999	July 2001	Pest Lab	used
Computer	ECD-6	Expert Group	CN548014091	May 1999	July 2001	Pest Lab	used
ECD	ECD-5	Hewlett Packard 5890 Series II	----------	June 1992	July 2001	Pest Lab	.used
Auto Sampler	ECD-5	Hewlett Packard 7673A	3137A26240	June 1992	July 2001	Pest Lab	used
Inject Tower	ECD-5	Hewlett Packard 7673A	3033A23016	June 1992	July 2001	Pest Lab	used
Controller	ECD-5	Hewlett Packard 7673A	3329A32728	June 1992	July 2001	Pest Lab	used
Computer	ECD-5	Expert Group 36X MAX	----------	June 1992	July 2001	Pest Lab	used
ECD	ECD-1	Shimadzu AOC-20	C11144007149KG	Feb 2004	Feb 2004	Pest Lab	used
Auto Sampler	ECD-1	Hewlett Packard 7673A	2718A07921	June 1992	July 2001	Pest Lab	used
Inject Tower	ECD-1	Hewlett Packard 7673A	2843A11812	June 1992	July 2001	Pest Lab	used
Controller	ECD-1	Hewlett Packard 7673A	----------	June 1992	July 2001	Pest Lab	used
Computer	ECD-1	Seventeam	3862A403	June 1992	July 2001	Pest Lab	used
ECD	ECD-8	Hewlett Packard 5890 Series II	2541A06937	May 1999	July 2001	Pest Lab	used
Auto Sampler	ECD-8	Hewlett Packard 7673A	3043A23328	May 1999	July 2001	Pest Lab	used
Inject Tower	ECD-8	Hewlett Packard 7673A	----------	May 1999	July 2001	Pest Lab	used
Controller	ECD-8	Hewlett Packard 7673A	2730A08254	May 1999	July 2001	Pest Lab	used
ECD	ECD-2	Hewlett Packard 5890	2618A07910	May 1999	July 2001	Pest Lab	used
Refrigerator	GC ext-Ref 1	General Electric	ST734619	May 1999	July 2001	Pest Lab	used
Refrigerator	GC ext-Ref 2	General Electric	MT841152	May 1999	July 2001	Pest Lab	used
FID	FID-1	Hewlett Packard 5890	2643A09798	May 1999	July 2001	Pest Lab	used
Auto Sampler	FID-1	Hewlett Packard 7673A	2718A08986	May 1999	July 2001	Pest Lab	used
Inject Tower	FID-1	Hewlett Packard 7673A	----------	May 1999	July 2001	Pest Lab	used
Computer	FID-1	44X Max Expert Group	----------	May 1999	July 2001	Pest Lab	used
Controller	FID-1	Hewlett Packard 7673A	2702A05818	May 1999	July 2001	Pest Lab	used
ECD	ECD-4	Hewlett Packard 5890	3203A40376	May 1999	July 2001	Pest Lab	used
Auto Sampler	ECD-4	Hewlett Packard 7673A	2718A05058	May 1999	July 2001	Pest Lab	used
Inject Tower	ECD-4	Hewlett Packard 7673A	3120A26762	May 1999	July 2001	Pest Lab	used
Computer	ECD-4	ACER 324	93006805	May 1999	July 2001	Pest Lab	used
Controller	ECD-4	Hewlett Packard 7673A	3113A26547	May 1999	July 2001	Pest Lab	used

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
ECD	ECD-3	Hewlett Packard 5890 ECD Dual		May 1999	July 2001	Pest Lab	used
Auto Sampler	ECD-3	Hewlett Packard 7673A	271A08998	May 1999	July 2001	Pest Lab	used
Inject Tower	ECD-3	Hewlett Packard 7673A	----------	May 1999	July 2001	Pest Lab	used
Controller	ECD-3	Hewlett Packard 7673A	2702A06597	May 1999	July 2001	Pest Lab	used
Computer	ECD-3	Gateway 2000 40X-33	1556740	May 1999	July 2001	Pest Lab	used
GC/GC MS VOA Lab							
MSD	MSVOA-B	Hewlett Packard 5970		June 1994	July 2001	VOA Lab	used
GC	MSVOA-B	Hewlett Packard 5890	2643A11383	June 1994	July 2001	VOA Lab	used
LCS 2000	MSVOA-B	TEKMAR LCS 2000	90361023	June 1994	July 2001	VOA Lab	used
Auto Sampler	MSVOA-B	TEKMAR ALS 2016	91239007	June 1994	July 2001	VOA Lab	used
Computer	MSVOA-B	MINTA ACER 32X	83007353	June 1994	July 2001	VOA Lab	used
MSD	MSVOA-C	Hewlett Packard 5970	2637A01812	June 1994	July 2001	VOA Lab	used
GC	MSVOA-C	Hewlett Packard 5890	2429A02435	June 1994	July 2001	VOA Lab	used
Auto Sampler	MSVOA-C	TEKMAR ALS 6016	93263003	June 1994	July 2001	VOA Lab	used
Concentrator	MSVOA-C	TEKMAR LCS 6000	9322012	June 1994	July 2001	VOA Lab	used
Oven	MSVOA-C	Precision Scientific Air Oven	9402-010	June 1994	July 2001	VOA Lab	used
Computer	MSVOA-C	Expert Group	97001604	June 1994	July 2001	VOA Lab	used
MSD	MSVOA-D	Hewlett Packard 5970	2238A0031	May 1999	July 2001	VOA Lab	used
GC	MSVOA-D	Hewlett Packard 5890	3033A31948	May 1999	July 2001	VOA Lab	used
Auto Sampler	MSVOA-D	Archon 5100 Purge & Trap	12011	May 1999	July 2001	VOA Lab	used
Concentrator	MSVOA-D	OI 4660 Eclipse	A405466419P	2004	Feb 04	VOA Lab	new
Computer	MSVOA-D	MINTA ACER 32X	93007352	May 1999	July 2001	VOA Lab	used

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
MSD	MSVOA-I	Hewlett Packard 5971 Series	334A04258	June 1992	July 2001	VOA Lab	used
GC	MSVOA-I	Hewlett Packard 5890	3235A45496	June 1992	July 2001	VOA Lab	used
Concentrator	MSVOA-I	OI 4660 Eclipse	338466643P	2003	March 2003	VOA Lab	new
Auto Sampler	MSVOA-I	OI 4552 Archon	13990	2003	March 2003	VOA Lab	used
Computer	MSVOA-I	Expert Group 36X Max	----------	June 1992	July 2001	VOA Lab	used
MSD	MSVOA-F	Hewlett Packard 5971 Series	3118A02237	May 1999	July 2001	VOA Lab	used
GC	MSVOA-F	Hewlett Packard 5890	3108A34429	May 1999	July 2001	VOA Lab	used
Concentrator	MSVOA-F	TEKMAR LCS 2000	92056013	July 2001	July 2001	VOA Lab	recondition
Auto Sampler	MSVOA-F	TEKMAR ALS 2016	93194013	July 2001	July 2001	VOA Lab	recondition
Computer	MSVOA-F	MINTA ACER 32X	93007037	May 1999	July 2001	VOA Lab	used
MSD	MSVOA-H	Hewlett Packard 5970 Series	2206A01946	May 1999	July 2001	VOA Lab	used
GC	MSVOA-H	Hewlett Packard 5890	2750A17849	May 1999	July 2001	VOA Lab	used
Concentrator	MSVOA-H	OI Eclipse 4660	A401466023P	2004	Feb 2004	VOA Lab	used
Auto Sampler	MSVOA-H	OI Archon 5100	12225	May 1999	July 2001	VOA Lab	used
Computer	MSVOA-H	MINTA ACER 32X	93006275	May 1999	July 2001	VOA Lab	used
MSD	MSVOA-G	Hewlett Packard 5971A	2749A00075	May 1999	July 2001	VOA Lab	used
GC	MSVOA-G	Hewlett Packard 5890 Series II	3020A11012	May 1999	July 2001	VOA Lab	used
Concentrator	MSVOA-G	OI Eclipse 4660	338466642P	2003	March 2003	VOA Lab	used
Auto Sampler	MSVOA-G	OI Archon 5100	12971	May 1999	July 2001	VOA Lab	used
Computer	MSVOA-G	Expert Group	----------	May 1999	July 2001	VOA Lab	used
MSD	MSVOA-J/K	Hewlett Packard 5971A Series	3324A04574	December 2002	Jan 2003	VOA Lab	New
GC	MSVOA-J/K	Hewlett Packard 5890	3324A04574	December 2002	Jan 2003	VOA Lab	New
P&T 1	MSVOA-J	OI Analytical 4560	N249460495	December 2002	Jan 2003	VOA Lab	New

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
P&T 2	MSVOA-K	OI Analytical 4560	N249460496	December 2002	Jan 2003	VOA Lab	New
Auto Sampler	MSVOA-J	OI Analytical 4552	13854	December 2002	Jan 2003	VOA Lab	New
Auto Sampler	MSVOA-K	OI Analytical 4552	13832	December 2002	Jan 2003	VOA Lab	New
Computer	MSVOA-J	Dell XPS D233	DLCY9	December 2002	Jan 2003	VOA Lab	New
MSD	MSVOA-L	Finnigan Thermo Trace DSQ	MS100167	2004	March 2004	VOA Lab	new
GC	MSVOA-L	Thermo Trace Ultra	20041827	2004	March 2004	VOA Lab	new
Concentrator	MSVOA-L	OI Eclipse 4660	A405466417P	2004	March 2004	VOA Lab	new
Auto Sampler	MSVOA-L	OI Archon 5100	14126	2004	March 2004	VOA Lab	new
Computer	MSVOA-L	Dell XP	----------	2004	March 2004	VOA Lab	new
Refrigerator	VOA-Ref-1	Excellence	80700124	June 1992	July 2001	VOA Lab	New
Refrigerator	VOA-Ref-2	Welbilt	9860305517	June 1998	July 2001	VOA Lab	New
Refrigerator	VOA-Ref-3	True Refrigerator	----------	Jan 2002	Jan 2002	VOA Lab	used
Refrigerator	VOA-Ref-8	National 14572	72S19207-F87	May 1999	July 2001	VOA Lab	used
Refrigerator	VOA-Ref-3	Curtis Ward	03F0692	June 1992	July 2001	VOA Lab	used
Refrigerator	VOA-Methanol	Gibson	1270710366	May 1999	July 2001	VOA Lab	used
Oven	VOA-1	Fisher Scientific 230F	2876	May 1999	July 2001	VOA Lab	used
GC	GC-VOA-1-A	Perkin Elmer PID	61N4101940	May 1999	July 2001	GC Lab	used
Hall Detector	GC-VOA-1-A	Perkin Elmer 1000 Hall	920071	May 1999	July 2001	GC Lab	used
Concentrator	GC-VOA-1-A	TEKMAR LCS 2000	90029018	May 1999	July 2001	GC Lab	used
Auto Sampler	GC-VOA-1-A	Hewlett Packard Purge & Trap	3448A20160	May 1999	July 2001	GC Lab	used
Computer	GC-VOA-1-A	MINTA	93001817	May 1999	July 2001	GC Lab	used
GC	GC-VOA-2-B	Hewlett Packard 5890 Series II PID	3235A46097	May 1999	July 2001	GC Lab	used

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
Concentrator	GC-VOA-2-B	TEKMAR LCS 2000	91233006	May 1999	July 2001	GC Lab	used
Auto Sampler	GC-VOA-2-B	Hewlett Packard Purge & Trap	3449A20164	May 1999	July 2001	GC Lab	used
Computer	GC-VOA-2-B	MINTA	93001817	May 1999	July 2001	GC Lab	used
GC	GC-VOA-3-C	Dimension PID/FID	921105	May 1999	July 2001	GC Lab	used
Concentrator	GC-VOA-3-C	TEKMAR LCS 2000	93257007	May 1999	July 2001	GC Lab	used
Auto Sampler	GC-VOA-3-C	TEKMAR 2016	94067022	May 1999	July 2001	GC Lab	used
Computer	GC-VOA-3-C	MINTA	93001817	May 1999	July 2001	GC Lab	used
Metals Lab							
ICAP	ICP-1	Thermo Jarrell Ash (ICAP 61E Trace Analyzer	346590	June 1994	July 2001	Metals Lab	New
Power Unit	ICP-1	Thermo Jarrell Ash Power Unit	2579	June 1994	July 2001	Metals Lab	New
Circulator	ICP-1	Thermo Jarrell Ash (Water Circulator)	J95048013	June 1994	July 2001	Metals Lab	New
Computer	ICP-1	Expert Group	8011894	June 1994	July 2001	Metals Lab	New
ICAP	ICP-2	Thermo Jarrell Ash (ICAP 61E Trace Analyzer	357490	May 1999	July 2001	Metals Lab	used
Power Unit	ICP-2	Thermo Jarrell Ash Power Unit	2653	May 1999	July 2001	Metals Lab	used
Circulator	ICP-2	Thermo Jarrell Ash (Water Circulator)	J95048013	May 1999	July 2001	Metals Lab	used
Computer	ICP-2	Expert Group		May 1999	July 2001	Metals Lab	used
ICAP	ICP-3	Thermo Jarrell Ash (ICAP 61E Trace Analyzer	249490	May 1999	July 2001	Metals Lab	used
Power Unit	ICP-3	Thermo Jarrell Ash Power Unit	2244	May 1999	July 2001	Metals Lab	used
Circulator	ICP-3	Thermo Jarrell Ash (Water Circulator)	20205	May 1999	July 2001	Metals Lab	used
Computer	ICP-3	Expert Group	8011861	May 1999	July 2001	Metals Lab	used
ICP MS	ICPMS 1	Thermo Elemental Analyzer	56	Dec 2003	Feb 2004	Metals Lab	New
Auto Sampler	ICPMS-1	ASX-510 Autosampler	120308ASX	Dec 2003	Feb 2004	Metals Lab	new
Circulator	ICP MS 1	Thermo Neslab (Water Circulator)	103240043	Dec 2003	Feb 2004	Metals Lab	New
Computer	ICP MS 1	Dell XP	1 DCV V0J	Dec 2003	Feb 2004	Metals Lab	New

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
AA Spectrophotometer	GFAA-1	Perkin Elmer Mod 5100	136018	May 2002	May 2002	Metals Lab	new
Furnace	GFAA-1	Perkin Elmer Zeeman 5100 Furnace AA	6590	May 2002	May 2002	Metals Lab	new
Power Unit	GFAA-1	Perkin Elmer HGA 600	5008	May 2002	May 2002	Metals Lab	new
Mercury Analyzer	HG-1	Leeman Labs PS 200II Automated Mercury Analyzer	0006	Jan 2002	Jan 2002	Metals Lab	new
Computer	HG-1	Leeman Labs	6857	Jan 2002	Jan 2002	Metals Lab	new
Mercury Analyzer	HG-2	Leeman Labs Hydra AA Automated Mercury Analyzer	0006	June 2002	June 2002	Metals Lab	new
Computer	HG-21	Dell	CJ85K11	June 2002	June 2002	Metals Lab	new
Hot Plate	HP-1	Valad Electric Co. 24 X 36	1920	Jan 2002	Jan 2002	Metals Digestion Lab	new
Block Digestor	BD-1	Environmental Express Hot Block	615CEC0814	Jan 2002	Jan 2002	Metals Digestion Lab	new
Block Digestor	BD-2	Westco Easy Digest	1279	2003	2003	Metals	new
Oven	O-1	Lab-Line Model 3512	0700-0078	May 1999	July 2001	Metals Digestion Lab	used
Water Bath	WB-3	National Model 230	1SW-7	2003	2003	Metals Digestion Lab	new
Scale	SC-1	OHAUS Model TP2KS	1570	May 1999	July 2001	Metals Digestion Lab	used
Scale	MDSC-2	Mettler PJ 400	G62435	May 1999	July 2001	Metals Digestion Lab	used
General Chemistry Lab							
Ion Chromatograph	IC-1	Metrohm 761 Compact Ion Chromatograph	17610020/09119	June 2002	June 2002	General Chemistry Lab	New
Sample Processor	IC-1	Metrohm 766	62041430	June 2002	June 2002	General Chemistry Lab	New
Computer	IC-1	Micron	13186350008	June 2002	June 2002	General Chemistry Lab	New

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
Scale	SC-3	Mettler PJ 400	J39330	May 1999	July 2001	General Chemistry Lab	used
Konelab	Konelab	Konelab	P4719011	Dec 2002	Jan 2003	General Chemistry Lab	new
Computer	Konelab	Dell	2000-256036	Dec 2002	Jan 2003	General Chemistry Lab	new
Refrigerator	WC-Ref-1	White-Westinghouse	BA93101741	May 1999	July 2001	General Chemistry Lab	used
COD	COD-1	Hach DR/2010 Spectrophotometer	971100006417	May 1999	July 2001	General Chemistry Lab	used
IR	IR-1	Perkin Elmer 1310 Infrared Spectrophotometer	135039	May 1999	July 2001	General Chemistry Lab	used
GBC	GBC	GBC UV Spectrophotometer Cyanide	1409	May 1999	July 2001	General Chemistry Lab	used
GBC	GBC	Monitek-TA1/Nephelometer	T04136701H7E	May 1999	July 2001	General Chemistry Lab	used
GBC	GBC	Orion Ion Analyzer EA940	SR32A	May 1999	July 2001	General Chemistry Lab	used
Scale	SC-4	Ohaus GT410	02008	May 1999	July 2001	General Chemistry Lab	used
Conductance Meter	Conductance Meter	YSI Model 35 Conductance Meter	K8002530	May 1999	July 2001	General Chemistry Lab	used
Hot Plate	WC-HP-1	PMC Hot Plate/Stirret 9 Position Model 529P	981990758506	May 1999	July 2001	General Chemistry Lab	used
Hot Plate	WC-HP-2	PMC Hot Plate/Stirrer 9 Position Model 529P	981990758504	May 1999	July 2001	General Chemistry Lab	used
Hot Plate	WC-HP-3	PMC Hot Plate/Stirrer 9 Position Model 529P	981990758507	May 1999	July 2001	General Chemistry Lab	used
Hot Plate	WC-HP-4	PMC Hot Plate/Stirrer 9 Position Model 529P	981990655236	May 1999	July 2001	General Chemistry Lab	used
Muffle Furnace	Muffle Furnace	Blue M Model M15A-2A	7419	May 1999	July 2001	General Chemistry Lab	used
Oven	WC-2	Fisher Model 516G	803N0088	May 1999	July 2001	General Chemistry Lab	used

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
S-Evaporator	Evaporator	Organomation Analytical Evaporator	10688	May 1999	July 2001	General Chemistry Lab	used
TKN Heater	TKN Heater	Labconco TKN Heater (6 position)	183300	May 1999	July 2001	General Chemistry Lab	used
Midi Cyanide	Midi Cyanide	Andrews Glass (Cyanide Distillation)	ABX0409	May 1999	July 2001	General Chemistry Lab	used
Scale	SC-5	Mettler AE200	J39333	May 1999	July 2001	General Chemistry Lab	used
TOC	TOC	Tekmar Appolo 9000	US03227003	Aug 2003	Aug 2003	General Chemistry Lab	new
Auto-Titrator	Titrator	Titroline Alpha	441912	March 2004	March 2004	General Chemistry Lab	new
Auto-Titrator Sampler	Titrator	TW Alpha 16 Sample Changer	00472248	March 2004	March 2004	General Chemistry Lab	new
Digestor	Digestion	Westco Easy Digest 40/20	1102	March 2003	March 2003	General Chemistry Lab	new
Ignitability instrument	IGN-1	Koehlex closed cup (Penske substitute)	R61091858	March 2004	April 2004	General Chemistry Lab	new
Oven	WC-1	Lab-Line (Model 3512)	0789-0078	May 1999	July 2001	General Chemistry Lab	used
Microbiology Lab							
Autoclave	Autoclave	Tuttnauer Autoclave Model 2540M	9603296	May 1999	July 2001	Microbiology Lab	used
Incubator Bath	Incubator-1	Precision Coliform Incubator Bath	10AY-11	May 1999	July 2001	Microbiology Lab	used
Refrigerator	Micro-Ref-4	Goldstar (GR-142BP)	20019795	May 1999	July 2001	Microbiology Lab	used
Colony Counter		Darkfield Quebec Colony Counter	3325	May 1999	July 2001	Microbiology Lab	used
Incubator	Incubator-2	VWR 1540 Incubator	0102290	May 1999	July 2001	Microbiology Lab	used
Incubator	Incubator-3	Shel-Lab 1545 Incubator	1100691	May 1999	July 2001	Microbiology Lab	used
Refrigerator	Micro-Ref-5	Sanyo	911246533	May 1999	July 2001	Microbiology Lab	used
Incubator	Incubator-3	Forma-Scientific Model 3918 Incubator	60147-89	May 1999	July 2001	Microbiology Lab	used
Dissolved Oxygen meter	DO Meter	YSI 5000 Dissolved Oxygen Meter	98C0951AB	May 1999	July 2001	Microbiology Lab	used

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
Sample Management							
Refrigerator	SMVOA-2	Gibson	LA23205322	May 1999	July 2001	Sample Manageme nt	used
Refrigerator	SM-3	Howard WC-45 (Glass Double Door)	84236156	May 1999	July 2001	Sample Manageme nt	used
Walk in Refrigerator	SM-1	Bally (10' X 38')	----------	May 1999	July 2001	Sample Manageme nt	used
Scale	SMB-3	Sartorius Model L320	36050083	May 1999	July 2001	Sample Manageme nt	used
Temperature Gun	Temperature Gun	Wahl Model DHS-100X	2459	May 1999	July 2001	Sample Manageme nt	used
Freezer		Sears/Kenmore (Ice Packs)	544123998	May 1999	July 2001	Sample Manageme nt	used
Extractions Lab							
Scale	EX-SC-1	Mettler PM 4600	975690	May 1999	July 2001	Extraction s Lab	used
Refrigerator	#3	Gibson	LA23601205	May 1999	July 2001	Extraction s Lab	used
Sonicator	#1	TEKMAR Sonicator	----------	May 1999	July 2001	Extraction s Lab	used
Sonicator	#2	TEKMAR Sonicator	----------	May 1999	July 2001	Extraction s Lab	used
Sonicator	#3	TEKMAR Sonicator	----------	May 1999	July 2001	Extraction s Lab	used
Sonicator	#4	TEKMAR Sonicator	----------	May 1999	July 2001	Extraction s Lab	used
Sonicator	#5	Heat Systems-Ultrasonics Inc (W-380)	----------	May 1999	July 2001	Extraction s Lab	used
Sonicator	#6	Heat Systems-Ultrasonics Inc (W-380)	----------	May 1999	July 2001	Extraction s Lab	used
N-EVAP	N-EVAP	Organomation Nitrogen Evaporation System	----------	May 1999	July 2001	Extraction s Lab	used
Water Bath	EX-WB-1	Boekel	----------	May 1999	July 2001	Extraction s Lab	used
Water Bath	EX-WB-2	Boekel	----------	May 1999	July 2001	Extraction s Lab	used
Water Bath	EX-WB-3	Boekel	----------	May 1999	July 2001	Extraction s Lab	used
Water Bath	EX-WB-4	Boekel	----------	May 1999	July 2001	Extraction s Lab	used
GPC	GPC-1	Ol Analytical AP 500	9612AP/500	2000	July 2001	Extraction s Lab	used
GPC	GPC-2	Accuprep JZ Scientific	03B-1060-3.0	2003	March 2003	Extraction s Lab	used
Auto Soxhlet	Auto Soxhlet-1	Soxtherm/Multistat	4031743	Feb 2004	March 2004	Extraction s Lab	New

Instrument	Lab Id	Manufacturer Description	Serial Number	Year Purchased	Date place in service at this location	Current Location	Condition Received (used, new, recondition)
Auto Soxhlet	Auto Soxhlet-1	Soxtherm/Multistat	0431744	Feb 2004	March 2004	Extraction s Lab	new
Oven	Oven	VWR 13054	01002393	May 1999	July 2001	Extraction s Lab	used
Heater	Heater-1	Lab line Extraction Heater 6 position	----------	May 1999	July 2001	Extraction s Lab	used
Heater	Heater-2	Lab line Extraction Heater 6 position	----------	May 1999	July 2001	Extraction s Lab	used
ASE	ASE-1	Dionex Accelerated Extraction	03010456	March 2003	October 2003	Extraction s Lab	new
ASE	ASE-2	Dionex Accelerated Extraction	03060034	March 2003	October 2003	Extraction s Lab	new
ASE	ASE-3	Dionex Accelerated Extraction	03060032	March 2003	October 2003	Extraction s Lab	new
Ultrasonic Bath	Sonicator Bath	Bransonic Ultrasonic Cleaner 8510	RPA020497187 E	March 2004	March 2004	Extraction s Lab	new

14. DOCUMENT CONTROL

Objective: To establish a system in order to have all information related to the production of analytical data controlled, protected, and stored to ensure its integrity and traceability. The system must ensure that only most recent version of required documentation is used by the appropriate personnel in the laboratory. All internal regulatory documents including the QA manual, SOP's, software, and equipment user's manuals are subject to document control.

Quality Assurance Manual: The QA Manual outlines how Chemtech plans, implements, and assesses the effectiveness of QA/QC control actions in the functioning of its analytical services.

Standard Operating Procedures (SOP's): An SOP is a written document which details the method of an operating, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive task. SOP's are an integral part of consistent quality laboratory work.

14.1 DOCUMENT OVERSIGHT: The QA/QC Director is responsible for the document control system and maintains a current list of controlled documents, their location, and revision number. The QA/QC Director and Technical Director approve all newly released operating procedures and any revision to controlled documents.

14.2 DISTRIBUTION OF CONTROLLED DOCUMENTS: Controlled documents are signed by QA/QC Director and Technical Director. Copies of documents not signed or assigned a control number are considered uncontrolled documents. All departments supervisor receive a copy of the updated document control of the QA Manual, SOP's, and any other related documents. With the document, the supervisor receives a distribution document log that is signed and returned to the QA Office to be filed in a binder. This distribution log has the name of the document the printed name of the person receiving it, the signature and date of distribution.

A copy of current applicable SOP (analytical, administrative, and or procedural) and QA Manual is kept in each department. The original document of each outdated SOP or QA manual is retained in the QA/QC office.

14.3 DOCUMENTS REVISIONS: All laboratory documents under document control are reviewed annually and revised as appropriate. A request to change a document is detailed on a "Document Change/Revision Form."

For further details refer to the SOP for writing SOP's. The Technical Director and QA/QC Director review the requested change. The QA/QC Director is responsible for updating the appropriate document and Document Control List once a change has been approved.

14.4 STANDARD OPERATING PROCEDURES **(SOP's):** Three (3) types of SOP's are used at Chemtech.

14.4.1 **Analytical SOP**: Provides stepwise instructions to an analyst on how to perform a particular analysis.

14.4.2 **Administrative SOP**: Details the process of documentation of all administrative activities.

14.4.3 **Procedural SOP**: Provides instructions and information for support activities in the laboratory.

Each SOP developed is assigned a unique document control number. SOP's are reviewed annually and updated if necessary. SOP's can be edited more frequently if systematic errors dictate a need for process change or the originating regulatory agency promulgates a new revision of the method.

SOP's are maintained in electronic read only format on Chemtech LIMS network server. All original hard copies are kept in the QA/QC office in official SOP file.

14.5 LOGBOOK CONTROL: Laboratory logbooks maintained at Chemtech are preprinted, numbered and include a title which identifies the purpose of the logbook. Each logbook indicates the instrument name, manufacturer, model number and a Chemtech identification number. The logbooks also include calibration and maintenance schedules. Extraction department activities are recorded in preparation logbooks. All quality control activities are recorded in the logbooks.

Active logbooks are maintained in the laboratory and retired logbooks are maintained in the QA/QC office. Laboratory staff may keep two recent sequentially dated logbooks of the same type in order to simplify review of recently conducted analysis. For further details refer to the "Logbook Protocol" SOP.

14.6 ANALYTICAL DOCUMENT MAINTENANCE AND STORAGE: Analytical data logbooks and clients reports are retained for five years unless specified otherwise. After five years, the analytical data and reports are systematically destroyed.

Projects completed in the current year are maintained in the Report Production area. All other analytical data, reports, and logbooks are kept in the Document Storage Area. The electronically scanned data are archived on LIMS Server. Access to Document Storage Area and the LIMS Server is limited by levels of authorization.

In the event of an ownership change all appropriate regulatory agencies will be notified. As a condition of the ownership change the buyer will be requested to maintain all records and reports prior to the time of legal transfer.

In the event of a bankruptcy all appropriate regulatory agencies and clients will be notified. They will be given the opportunity to retrieve their records and reports within 30 days of notification. The records and reports will be destroyed after the 30 days notification period has expired.

14.7 **PERSONNEL RECORDS:** The QA/QC office maintains personnel folders for all analytical staff members. These folders document that analysts have received instructions for their job related activities including read receipts for SOP's and the QA Manual. Personnel records also include health and safety training received and a signed ethics agreement, in addition to technical training records, demonstration of capability, and precision and accuracy for the tests.

15. TRACEABILITY OF MEASUREMENTS

Objective: To establish procedures for achieving traceability of measurements between a measured value and a national reference standard.

15.1 METRIC MEASUREMENTS – THERMOMETER AND BALANCE CALIBRATION: Verification and/or validation of balances and thermometers are performed with National Institute of Standards and Technology (NIST) traceable standards. All new thermometers used in the laboratory are calibrated prior to their use and all thermometers are calibrated annually. A tag attached to the calibrated thermometer documents the date it was calibrated and any correction factor if necessary. The calibration readings are recorded in a logbook. Test equipment used in the laboratory requiring temperature control is assigned a separate calibrated thermometer. The temperature is recorded daily in a temperature log for all required equipment. For further details refer to the "Thermometer Calibration SOP."

Class S Calibration weights are used to calibrate all the balances used in the laboratory. Calibration checks are performed on a daily basis and recorded in a logbook. An annual balance calibration is conducted by a certified agency or organization. Calibration certificates include the location of the equipment, model, serial number, manufacturer and sensitivity information. This information is maintained in the QA/QC office.

15.2 CHEMICAL STANDARDS: All reference and working standards used for calibration must be NIST traceable and have a traceability certificate. Vendors provide a traceability certificate for all chemical standards, which include a lot number and expiration date. Working standards are prepared from the vendor traceable standards and are documented in the "Standard Preparation Logbook" and include the vendor lot number, dates of preparation, and preparer's initials and date. The certificates of traceability are affixed to the logbook to keep a permanent record. The vials, in which working standards are kept, are labeled with the lot number, preparation date, and expiration date.

16. CALIBRATION AND VERIFICATION OF TEST PROCEDURES

Objective: To ensure that instrumentation is performing to predetermined operational standard prior to the analysis of any samples and that the data are of known quality and appropriate for a given regulatory agency requirements must be established by the laboratory.

16.1 ORGANIC TEST PROCEDURES

Tuning Criteria for GC/MS Instruments: Each GC/MS system must pass the performance criteria for 4-Bromofluorobenzene (BFB) or Decafluortriphenylphosphine (DFTPP) before any samples, standards or blanks can be analyzed. The tuning standard must meet the criteria specified in each analytical SOP. The chromatogram should not contain any baseline drift and the peaks should be symmetrical. Each GC/MS system must be tuned every 12 hours for SW846 methods, OLM04.2 and 24 hours for 600 series methods.

Initial Calibration: Second source standards are obtained from a different manufacturer than the original standards, unless one is not available and are used to verify the initial calibration. An initial calibration is run on all instruments. Initial calibration is rerun when continuing calibration criteria cannot be met. The criterion for an initial calibration curve consists of a minimum of five points for SW846 Methods and OLM04.2 and a minimum of three points for 600 series methods. The lowest standard analyzed must be equal to or less than the reporting limit. The response factor (RF) must be calculated for all compounds. The Relative Standard Deviation (RSD) is used to determine linearity. See individual SOPs for limits, criteria and allowances. The system performance check compounds (SPCC) are checked for a minimum average response factor. These compounds must meet the minimum response factors specified in each analytical SOP. If the minimum average response factor for any SPCC does not meet the criteria then corrective action is required and the GC/MS system recalibrated. The initial calibration verification must be successfully completed prior to running any samples.

Continuing Calibration Verification (CCV): The initial calibration curve for each compound of interest is checked and verified once every 12 hours for SW846 methods and OLMO4.2, and once every 24 hours for 600 series methods. This is accomplished by analyzing a midpoint calibration standard and verifying all continuing calibration criteria for a given method are met. Sample, blank, and QC standards cannot be

analyzed unless a CCV meets method criteria. For further details refer to the individual SOP's.

Formulas:

$$RF = \frac{\text{Area of compound x Concentration of ISTD}}{\text{Area of ISTD x Concentration of compound}}$$

$$\% RSD = \frac{SD}{RF} \times 100$$

where **SD** is the standard deviation for all compounds and **RF** is the average response factor

16.2 INORGANIC TEST PROCEDURES

Balance Calibration: All balances are calibrated each day with 3 class "S" weights covering the expected range of analysis and recorded in the balance calibration logbook. Each balance is certified for accuracy once a year by an outside contractor. A calibration sticker is placed on the balance and all associated information is maintained in the QA/QC department.

Titrant Standardization: All titrants used in the laboratory are standardized when opened to verify the titrant's normality in duplicate. These values are recorded in the appropriate analytical logbook. Each titrant must be within 90-110% of the known value. If not, the titrant is restandardized.

Instrument Calibration: An initial calibration is run on all instruments.

Mercury analyzer must be calibrated using a blank and 5 standards in graduated amounts that define the linear range of analysis. The correlation coefficient for the curve must be > 0.995.

Spectrophotometric analyses are calibrated by using a blank and minimum 5 standards. The correlation coefficient must be > 0.995, or as defined in the analytical SOP

If any calibration curve has a correlation coefficient < 0.995, corrective action is taken and a new calibration curve is analyzed. Samples, blanks, and standards are not analyzed until the curve passes the criteria. For all calibrations the lowest standard analyzed must be equal to or less than the reporting limit.

Formula:

$$y = ax \pm b,$$

where:
y = instrument response (peak area or height)
a = slope of the line(also called the coefficient of x)
x = concentration of the calibration standard
b = intercept

Initial Calibration Verification (ICV): Second source standards are obtained from a different manufacturer than the original standards, unless one is not available and are used to verify the initial calibration. The ICV must be performed immediately after calibration of each metal and spectrophotometric analysis. This is accomplished by analyzing a midpoint calibration standard. The ICV must have a percent recovery between 90-110% from the initial calibration curve. If the criterion is not met, corrective action must be taken. If the source of the problem can be determined after corrective action has been taken, a new calibration MUST be generated. Samples, blank, and QC standards cannot be analyzed unless the ICV meets method criteria. The initial calibration shall be verified and documented for every analyte at each wavelength used for analysis.

Continuing Calibration Verification (CCV): CCV analysis is performed every 10 samples for all FLAA and spectrophotometric analyses. The CCV must be analyzed at the beginning of the run and after the last analytical sample. The CCV concentration is at or near the midpoint of the calibration curve and is analyzed at every wavelength used for the analysis of each analyte. The CCV results must fall within the control limits of 85-115% of the true value or the control limits specified in each analytical SOP.

Thermometer Calibration: Every thermometer used in the laboratory is certified annually against a NIST certified thermometer, which is traceable to the manufacturer. All data is recorded in a logbook.

pH meter Calibration: Each pH meter is calibrated daily at pH of 4 and 7 and then checked with a pH 10 buffer solution. The calibration is recorded in the pH logbook along with the date and time of calibration. The calibration is checked every 3 hours during use and any adjustments are made.

Spectrophotometer Wavelength Check: A wavelength check of each spectrophotometer is performed annually against Platinum/Cobalt standards and recorded in the maintenance logbook. If the wavelength

does not meet the manufacturer's specified conditions, service is performed on the instruments.

Autoclave test strip: A temperature sensitive tape is used to verify the content of each autoclave run is processed.

Linear range Verification & Calibration for ICP - Metals: Linear range verification is performed for all ICP instruments. A series of calibration standards are analyzed over a broad range of concentration and data from these analyses are used to determine the valid analytical range for the instrument. ICP instrument calibration is routinely performed using a single standard at a concentration within the linear range and a blank.

17. CALIBRATION, VERIFICATION, AND MAINTENANCE OF EQUIPMENT

Objective: To establish a system to ensure accurate calibration and maintenance of all laboratory equipment. All instrument maintenance activities must be recorded in the instrument logbooks. Instrument should be labeled as a dedicated piece of equipment when an instrument is used for a unique activity.

17.1 INSTRUMENT CALIBRATION: Instruments are calibrated according to the requirements set forth in the by the manufacturer or as dictated by the respective SOP's for the test method for which the instruments are used. The frequency and type of maintenance and calibration activity performed must be documented in the instrument logbook. If an instrument is out of working order, out of calibration or in need of repair, a tag is affixed to the instrument directing the analysts to use another instrument.

Support instruments are calibrated and verified using NIST traceable reference standards over the range of use. Balances, ovens, incubators, water baths, freezers, and refrigerators are checked daily if in use and readings are recorded in their respective logbooks.

17.2 INSTRUMENT MAINTENANCE: Some instruments are purchased with a service contract. If a service contract is purchased, it is recorded in the logbook along with a contact phone number. Calibration is necessary after instrument repair and prior to using any new instrument. Instrument servicing includes routine cleaning and the repair and/or replacement of any faulty parts. For further information refer to the instrument manual or the SOP for the test method the equipment is used.

17.3 CALIBRATION/MAINTENANCE LOG: Each instrument has an associated maintenance and calibration logbook. The interval maintenance/calibrations are guided by the manufacturer's instructions or as often as needed based on individual instrument performance. It may be modified by user's experience and frequency of use. The instrument is identified on the first page of the logbook. The logbook must document the calibration and maintenance of the instrument.

18. VERIFICATION PRACTICES

Objective: To establish a process for the verification practices in effect to assure adherence to the Quality Assurance Plan. A system for proficiency testing, use of reference materials, and internal QC schemes must be in place in order to ensure compliance.

18.1 PROFICIENCY TESTING (PT) PROGRAMS:

External PT Samples: Chemtech participates in NYSDOH Potable, Non Potable and Solid/Hazardous Categories and USEPA CLP. The results are used to evaluate the ability of the laboratory to produce accurate data. PT reports and raw data are retained in the laboratory. The laboratory participates in the PT from other providers as well, e.g., client specific PT samples and Environmental Resources Association (ERA).

Internal PT Samples: The QA/QC Director is responsible for administering an in-house blind check sample program. Quality control samples are obtained from the EPA and from a private supplier. The known samples are blindly introduced into the system as a typical sample and analyzed as such. The results are reported to the QA/QC Director and evaluated.

This process allows for close monitoring of the accuracy of laboratory analyses on blind samples. If a problem is discovered, the QA/QC Director brings it to the attention of the Company President and Laboratory and Department Manager. With the assistance of the Technical Director, the cause of the problem is determined and appropriate corrective action is taken. Another blind sample is sent through the laboratory to confirm the problem has been resolved.

18.2 USE OF REFERENCE MATERIAL: The laboratory purchases external reference samples from known vendors. All reference samples are certified and the laboratory maintains the manufacturer's Certificate of Analysis on file.

18.3 INTERNAL QUALITY CONTROL PROCEDURES: The data acquired from QC procedures are used to judge the analytical quality of the data, to determine the need for a corrective action, and to interpret results after the implementation of corrective actions. Each test method SOP details the QC procedures to be followed.

Method Blank: A method blank is an aliquot of reagent water for aqueous samples and an aliquot of a solid matrix carried through the entire sample

preparation and analytical procedure. A method blank must not contain any target analyte(s) at concentrations that exceed method requirements. If it does, the source of contamination must be removed or minimized before proceeding with sample analysis.

Laboratory Control Samples (LCS): A LCS is an aliquot of reagent water for aqueous samples and aliquot of a solid matrix spiked with the target analyte list analyzed with each batch of samples to demonstrate the method accuracy within acceptance QC limits. The results are used to determine batch acceptance. Each method SOP includes detailed QC procedures and QC limits.

Sample Duplicates: Sample duplicates are performed to measure analytical precision. One duplicate sample must be analyzed from each group of samples of similar matrix type for each batch of 20 samples. If a duplicate result falls outside QC limits the original sample and the duplicate sample data are regarded as unreliable and may necessitate corrective action.

Matrix Spikes: Matrix spikes are analyzed at a frequency of one per twenty samples to measure analytical precision and accuracy of the specified matrix. If precision and accuracy are out of QC limits, corrective action is required.

Surrogate Spikes: Surrogates are organic compounds that are similar in behavior to the target analytes but are not found in nature. They are added to all blanks, samples, and standards except the tuning standards at a concentration specified in relevant SOP's. All surrogates must meet the recovery limits specified in each SOP. If any surrogate does not meet the limits, the sample must be reanalyzed.

Internal Standard: An internal standard (IS) is a known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. Retention time (RT) for an IS is also compared to reference standards to assure that target analytes can be located by their individual relative RT. If the criteria for IS response or RT criteria are not achieved corrective action is required, e.g., recalibration and reanalysis.

Sample Analysis: The analyst is responsible for performing all QC requirements before and after analyzing the sample to make sure that required QC criteria are met. If the sample QC criteria are not met, the analyst must take corrective action to rectify any problems. If the analyst

is not able to remediate the issue, then must notify the supervisor who will take necessary corrective action.

Data Package Review: Data review is performed at four different levels to assure that all QC criteria are met. The analyst conducting the analysis performs first data review. Another analyst conducts a peer review and then the data is submitted for supervisory review. The final review of the data is conducted in the QC department before the data are released to the client. A spot check review of the completed data packages is conducted by the QA/QC Director. For further details refer to "Procedures for Audits and Data Review" section of this QA Manual and "Data Review/Validation" SOP.

Monitoring Quality Control Limits: Quality Control data generated from duplicate analysis and matrix spikes/matrix spike duplicates are monitored and plotted on Quality Control Charts. Chemtech utilizes the Quality Control charts to identify data trends and assure that all tests are within control.

Chemtech records the theoretical or true value, then calculates and plots the mean value. In general, our warning limits are ±2 Standard Deviations from the true value. Corrective action is taken when ±3 Standard Deviations from the mean value are encountered. The Percent Recovery for all quality control samples must be within the limits stated in the method.

In addition to control chart limits, the laboratory uses limits of 75-125% and RPD limits of ±20% for inorganic analysis. For organic analysis %R limits and RPD limits as stated in applicable methods are used.

In control charts application, any points beyond the control limits indicate an out of control situation. When an out-of-control situation occurs, analyses must be stopped immediately until the problem has been identified and resolved. The control charts are also utilized to identify trends, which can be checked and resolved before the system goes out-of-control.

Annual Quality Audits: An annual quality review of the system is important to ensure that laboratory management can continue to be confident that all measures are being taken to produce the highest quality of data and services. Annual audits, along with day-to-day data review, provide effective means for ensuring that QC activities are being implemented and that each analyst performs in a manner consistent with the quality system. The QA/QC Director conducts the audits, which are

scheduled and announced in advance. For further details refer to the "Data Review and Internal Quality Audits" section of this manual.

19. LABORATORY MANAGEMENT POLICY FOR PERMITTED DEPARTURES FROM DOCUMENTED POLICIES AND PROCEDURES

Objective: To establish a process for an event which requires departure from the documented policies and procedures.

19.1 **PROCEDURE:** The Technical Director, Laboratory Manager, and QA/QC Director have the responsibility for ensuring that the laboratory's policies are adhered to by all personnel. A departure from documented policies is allowed if fully documented and approved by the appropriate level of authority. Documentation of the departure includes the reason for the departure, the effected SOP(s), intended results of the departure and the actual results.

If the departure affects data, the client is notified before conducting the analysis for approval. This departure is also noted in the case narrative of the final report.
If the Client requests a method modification that represents a significant departure from a reference method, the client must acknowledge in writing the authorization of the modification. The acknowledgment can be in the form of a contract modification or signing the quotation acceptance page.

The quotation details the analytical requirements including the test methods for the project, the acceptance page to be signed by the client, states that "the quotation accurately describes the analytical requirements".

20. CORRECTIVE ACTIONS FOR TESTING DISCREPANCIES

Objective: To establish a system for actions taken in response to non-conformance reports issued during performance, data review, or a client complaint. The goal of the corrective action program is to correct and monitor out-of-control events, which effect the integrity of analytical results. All conditions that adversely impact data quality must be identified and corrected.

20.1 **OUT-OF-CONTROL EVENTS:** Out-of-control situations are identified through analytical data validation procedures. An out-of-control event is a situation, which results in the development of unacceptable results. Once a problem has been identified, the QC Officer must contact the department supervisor using the Corrective Action (CA) report form. The supervisor must initiate investigation into cause, and must ensure that corrective action is implemented and is effective. The CA must be documented on the (CA) report form and filed in QA/QC office. Refer to Corrective Action SOP for details of the corrective action report forms.

There are many situations that present an out-of-control situation. Contamination, percent recoveries and duplicate variations that are not within control limits, and failing calibrations are examples of situations considered out-of-control. Whenever a situation of this nature is encountered, Chemtech diligently develops the appropriate corrective action.

20.2 **CORRECTIVE ACTION PROCESS:** A corrective action is a response to an out-of-control event, which brings back a system to produce acceptable results. Corrective actions taken to control an event can be: stop analytical work immediately; identify the symptom of the out-of-control event; identify the cause of the out-of-control event; implement a corrective action; confirm that a return to control has been achieved by analyzing reference samples; document entire process by completing a CA Report Form; complete and return the CA Report Form to the QA/QC office.

20.3 **DEPARTURES FROM DOCUMENTED POLICIES AND PROCEDURES:** Method SOP's provide QC acceptance criteria and specific protocols for corrective actions. When testing discrepancies are detected such as out-of-control QC, the analyst must follow the corrective action protocol as described in the applicable method SOP.

Any corrective action taken that is not mentioned in the SOP is first approved by Technical Director and QA/QC Director. This action is recorded in the CA Report Form and is documented in the electronic

database of corrective actions. If necessary, the method SOP is than revised to incorporate the corrective action to make it a part of SOP for future use.

20.4 **CORRECTIVE ACTION MONITORING:** Laboratory Manager, Department Managers and QA/QC Director routinely monitor corrective actions implemented in the laboratory for effectiveness and to ensure that the deficiency has been completely removed from the system. If the deficiency still exists after a given period of time, the corrective action is reevaluated and modified.

21. REPORTING ANALYTICAL RESULTS

Objective: To ensure that the reported results are accurate, clear, objective, and unambiguous. The contents of the final report must include all necessary information and must be clear and understandable for the end-user.

21.1 REQUIRED DOCUMENTATION: All documentation used to approve and defend reported data must be collected and should be available and referenced so it can be found at any time it may be needed. Chemtech reports meet all applicable regulatory and client requirements. Electronic reports can be customized to meet the client specific requirements.

Documentation for Sample Identification: Includes at minimum sample identification, chain-of-custody, Field QC, if any and any other related documents.

Documentation of the Analytical Performance: Analytical method used and method detection limit (MDL, if required); Instrumentation (manufacturer, model, performance checks); Calibration data (initial and continuing); Detailed analytical work (raw data, runlogs, standard and reagent preparation, calculations)

QA/QC Documentation and Data: Analysis of blanks; Source of QC check standards; Preparation of spike stock solution.

Checks and Validation of Analytical Data: Peer review, Supervisory review, and QC review Checklists; Corrective actions (when applicable); Date and signature of approval of the reportable data of each parameter tested; Date and signature for approval of the final report.

21.2 SIGNIFICANT FIGURES IN ANALYTICAL REPORTS: Numerical data are often obtained with more digits than are justified by their accuracy and precision therefore must be reported by the accuracy of the analytical method.

The number of significant figures refers to the number of digits reported for the value of a measured or calculated quantity indicating the accuracy and precision of the value. Nonzero integers always count as significant figures. Leading zeros are zeros that precede all the zero digits and do not count as significant figures. The zeros simply indicate the position of the decimal point.

Captive zeros are zeros between nonzero digits, and always count as significant figures. Trailing zeros are zeros at the right end of the number and are significant only if the number contains a decimal point. At Chemtech the results are reported to two significant figures.

When rounding a number carry at least one digit beyond the last significant digit throughout all calculations. Round the final result by changing all digits beyond the last significant digit to zeros; drop these zeros if they are to the right of the decimal point.

21.3 **UNITS USED TO EXPRESS ANALYTICAL RESULTS:** Units used to express analytical results depend on the analytical method used, the concentration of the analytes, and the matrices of the sample analyzed.

The most common unit used to express results is milligrams per liter (mg/L), which is equal to parts per million (ppm) or milligrams per kilogram (mg/Kg). Other units used are microgram per liter (μg/L) which is equal to parts per billion (ppb) or micrograms per kilogram (μg/Kg).

21.4 **REPORT CONTENTS:** The final report includes the following information:

Client Information: name and address of the client

Project Information: Client project name and location (if specified by the client)

Chemtech Reference Information: Chemtech project number

Evidence Receipt: Description and identification of samples, chain-of-custody

Case narrative (if applicable): Description and/or identification of analysis performed with a description of deviations from the SOP if required

Summary and Results: Analytical results supported by raw data, chromatograms, initial calibration and continuous calibration, etc.

Report is sequentially numbered and all raw data and chromatograms are initialed and dated by the analyst. The final report is signed and dated by the QC supervisor.

22. DATA REVIEW AND INTERNAL QUALITY AUDITS

Objective: To design a process to assess compliance of laboratory activities with the operational requirements of the QA manual and to evaluate the performance of all analytical departments. The validation of data must be accomplished by a data review procedure.

22.1 DATA REVIEW: At Chemtech there are several stages for the data review/validation process. The first data review is conducted by the analyst performing the analysis. A secondary review is performed by a department peer. The supervisor reviews the data after the peer review. The QC/Report Production performs the final review.

Analyst Review: The analyst is responsible for ensuring that all work performed meets the specifications and criteria outlined in the Statement of Work. They are to double-check all aspects of their analyses, including instrumental conditions, QA/ QC limits, calculations, and compound identification. When manual integration's are performed, the raw data records shall include a complete audit trail for those manipulations. Raw data output showing the results of the manual integration's, a notation of the rationale for the manual integration, including the date and initials/signature of the person performing the manual operation must be included in the raw data file.

Peer Review: A qualified peer performs a technical data review, verifying the analysis logbook that the correct method was used, the accurate analytical sequence was employed, all QA/QC criteria were met, compounds were properly identified, and checked for standard, dilutions, and calculations. The supervisor signs the logbook following this review.

Supervisor Review: Supervisor performs a technical data review to ensure that proper analytical sequence was employed, all QA/QC criteria were met, compounds were properly identified and flagged if required, correct standard, dilutions, and calculations were made.

Quality Control/Report Production Review: The completed data is reviewed by the QC/Report Production. Sample information from the sample receiving documentation is compared to in-house laboratory information to ensure consistency. The data are checked for general completeness, compliance, and QA/QC requirements, and random calculations are performed. If a quality control measure is found to be out of control, and the result are to be report, all samples associated with the failed quality control measure will be reported with the appropriate data qualifier(s).

If a defect is identified in the data package, that can be corrected before the data are released to the client, the data package is returned to the laboratory for corrections along with a CA report form. Immediate action is taken by the affected department to rectify the problem and corrected data package is returned to QC/Report Production office for review and final release of the data.

Spot Check Review by QA/QC Director: The QA/QC Director performs spot-check reviews on data packages before they are released to the client. He/she focuses on all elements of data deliverables including sample identification, sample custody documentation, analytical quality control, and client specifications and requirements.

22.2 **INTERNAL QUALITY SYSTEM AUDITS:** Annual internal audits are conducted under the direction of the QA/QC Director. These audits are used to detect and correct any specific problems. The audit involves a thorough laboratory inspection to evaluate the following areas: adherence to all laboratory procedures as specified in applicable New Jersey, Pennsylvania, New York and other state regulations; verification of methodology; adherence to all method QC requirements; frequency of duplicates, spikes, blanks, and QC sample analyses; maintenance of documentation in adherence with good laboratory practices; and verification that laboratory equipment, supplies, and reagents are properly maintained. The internal audits also include the analyst qualifications and training documents.

A comprehensive audit checklist is used for the department to be audited based on the method SOP and includes the cycle of a sample analysis beginning from sample receiving till the disposal of the sample and the release of data to the client. Deficiencies are noted on the checklist and CA reports are issued to the area being audited.

Findings of the audit are documented and copies of the findings are given to the Company President, the Technical Director, the Laboratory Manager, and the Department Supervisor. A copy of the findings is also provided to the analyst. Any problems and their prospective resolutions are discussed among the QA/QC Director, Technical Director, and Department Supervisor. After an agreed upon time period, it is the responsibility of the QA/QC Director to ensure that the required corrective action has been implemented. All audit documents are kept on file by the QA/QC Director in the QA office.

23. Electronic Data

Objective: To establish a system to control, verify, validate and document computer software used by LIMS.

23.1 Software: To ensure that the software that is used to collect, analyze, process and or maintain LIMS Raw Data, SOP's are established, approved and managed for:

Testing and quality assurance methods to ensure that all LIMS software accurately performs its intended functions, including acceptance criteria, tests to be used, personnel responsible for conducting the tests, documentation of test results, and test review and approval.

Change control methods that include instructions for requesting, testing, approving, documenting and implementing changes. When indicated, change control methods shall also include reporting and evaluating problems, as well as implementing corrective actions.

23.2 Documentation: Documentation is established and maintained to demonstrate the validity of all software used in the LIMS and includes:

A description of the software and functional requirements; a listing of all algorithms and formulas; and as the occur, testing and quality assurance, installation and operation/enhancement, and retirement.

23.3 Security: SOP's are established to implement appropriate security procedures to assure the integrity of LIMS data are adequate.

24. Glossary

1. Acceptance Criteria: specified limits placed on characteristics of an item, process, or service defined in requirement documents.

2. Analytical Detection Limit: the smallest amount of an analyte that can be distinguished in a sample by a given measurement procedure throughout a given confidence interval.

3. Analyst: the designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.
4. Audit: a systematic evaluation to determine the conformance to quantitative and qualitative specifications of some operational function or activity.

5. Calibration: to determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurements.

6. Chain of custody: an unbroken trail of accountability that ensures the physical security of samples and includes the signatures of all who handle the samples.

7. Confidential Business Information: Information that an organization designates as having the potential of providing a competitor with inappropriate insight into its management, operation or products.

8. Confirmation: verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to: second column confirmation; alternate wavelength, derivatization, mass spectral interpretation, alternative detectors or additional cleanup procedures.

9. Corrective Action: the action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.

10. Data Audit: a qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data are of acceptable quality.

11. Demonstration of Capability: a procedure to establish the ability of the analyst to generate acceptable accuracy.

12. Document Control: the act of ensuring that documents and revisions are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled to ensure use of the correct version at the location where the prescribed activity is performed.

13. Holding Times: the maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

14. Laboratory: a defined facility performing environmental analyses in a controlled and scientific manner.

15. Laboratory Control Sample (lab fortified blank, blank spike, QC check sample): a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes from a source independent of the calibration standards or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

16. Manager: the individual designated as being responsible for the overall operation, all personnel, and the physical plant of the environmental laboratory.

17. Method Detection Limit : the minimum concentration of a substance an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

18. NELAC standards: the plan of procedures for consistently evaluating and documenting the ability of laboratories performing environmental measurements to meet nationally defined standards established by the National Environmental Laboratory Accreditation Conference.

19. Nonconformance: An indication or judgement that a product or service has not met the requirements of the relevant specifications, contract or regulation; also the state of failing to meet the requirements.

20. Precision: the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator.

21. Preservation: refrigeration and/or reagents added at the time of sample collection to maintain the chemical and/or biological integrity of the sample.

22. Proficiency testing: a means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source.

23. Quality Assurance: an integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

24. Quality Assurance Plan: a formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved.

25. Quality Control Sample: an uncontaminated sample matrix spiked with known amounts of analytes from a source independent from the calibration standards. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

26. Quality System: a structured and documented management system describing the policies objectives, principles, organizational authority, responsibilities, accountability and implementation plan of an organization for ensuring quality in its work processes products and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC.

27. Raw data: any original factual information from a measurement activity or study recorded in a laboratory notebook, worksheets, records memoranda, notes, or exact copies thereof that are necessary for the reconstruction and evaluation of the report of the activity or study.

28. Record Retention: The systematic collection, indexing and storing of documented information under secure conditions.

29. Reference Method: a method of known and documented accuracy and precision issued by an organization recognized as competent to do so.

30. Reporting Limit: A specific concentration at or above the lower quanitation limit that is reported to the client with confidence. It is often defined on a project-specific basis. If set by the client below the lower quanitation limit, method modification is requied or the client will be required to accept the lowest technically valid value that can be provided by the laboratory.

31. Standard Operating Procedures: a written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks.

32. Technical Director: individuals who has overall resposibility ofr the technical operation of the environmental testing laboratory.

33. Traceability: the property of a result of a measurement whereby it can be related to appropriate standards, generally international or national standards, through an unbroken chain of comparisons

25. References

1. ISO/IEC Guide 25: 1990. General requirements for the competence of calibration and testing laboratories.

2. NELAC, Program Policy and Structure, Revision 11, July 1, 1999.

3. NELAC, Quality Systems, Revision 14, June 29, 2000.

4. DOD Quality Systems Manual for Environmental Laboratories Version 1 October 2000

Nelac Certificate and Parameter list

APPENDIX B

HEALTH AND SAFETY PLAN

FOR

REMEDIAL INVESTIGATION
399 GREGORY STREET
ROCHESTER, NEW YORK

DECEMBER 2004

Prepared for:

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1.0 INTRODUCTION

The following Health and Safety Plan (HASP) describes personal safety protection standards and procedures to be followed by Stantec staff during Remedial Investigation activities at 399 Gregory Street, Rochester, New York (Figure 1). Investigation activities include Geoprobe soil borings, groundwater monitoring well installations, soil and groundwater analytical sampling, a well survey and a test pit program.

This HASP establishes mandatory safety procedures and personal protection standards pursuant to the Occupational Safety and Health Administration (OSHA) regulations 29 Code of Federal Regulations (CFR) 1910.120. The HASP applies to all Stantec personnel conducting any site work, as defined in 29 CFR 1910.120(a). All personnel involved in the mentioned activities must familiarize themselves with this HASP, comply with its requirements and have completed the required health and safety training and medical surveillance program participation pursuant to 29 CFR 1910.120 prior to beginning any work on site.

THIS HASP IS FOR THE EXPRESSED USE OF STANTEC CONSULTING GROUP, INC. EMPLOYEES. ALL OTHER CONTRACTORS TO BE WORKING IN THE EXCLUSION AREAS ARE REQUIRED BY LAW TO DEVELOP THEIR OWN HASP, AS WELL TO MEET ALL PERTINENT ASPECTS OF OSHA REGULATIONS. STANTEC RESERVES THE RIGHT TO STOP ANY SITE WORK WHICH IS DEEMED TO POSE A HEALTH AND SAFETY THREAT TO ITS STAFF.

On-site daily safety meetings will be conducted by Stantec for its employees and subcontractors. The form included in Appendix A will be used for guidance during these meetings. The purpose of the meetings is to familiarize the site workers with the known hazards at the site and to discuss the proper safety and emergency procedures.

1.1 Background

This project is being performed as part of the City of Rochester's 2003 Brownfield Assessment grant from the United States Environmental Protection Agency (EPA). The objectives of the proposed project include identification of site soil and groundwater gaps, performing additional investigation in order to perform a qualitative exposure assessment, establishing appropriate remedial objectives and selecting effective remedial alternatives. The evaluation of remedial alternatives will be consistent with the contemplated site reuse plans.

The investigation and remediation of the Davidson Collision site is a key to the City's efforts to redevelop several vacant and abandoned properties located throughout the City in densely populated commercial and residential areas.

Several neighbors have expressed interest in the property and there is a documented need for additional parking in the area. Concept redevelopment plans will incorporate input obtained from neighborhood meetings as well as input from the City. It is assumed the property will have future commercial use that will include a parking lot.

Site Background

The following site background information was obtained from information presented in a "Fact Sheet" dated April 2003, prepared by the DEC, in conjunction with the New York State Department of Health and the Monroe County Department of Health and a Site Investigation Report, Davidson's Collision, Site No. 828091, prepared by the DEC dated March 2003. The Davidson Collision Site consists of two adjoining parcels. The Davidson Collision business located at 399 Gregory Street, operated as an auto body shop from the early 1960s until it went out of business in March 1993. In June 1993, the auto body shop reopened under new management and the new name of Southwedge Collision. The adjoining 10 Cayuga Street parcel consists of an unimproved grass-covered parcel that was formerly owned by Davidson Collision.

Previous investigations at the site between 1991 and 1994 identified the disposal of a consequential amount of hazardous waste (primarily paint waste including paint thinner) through a pipe leading from a paint booth inside the shop to a storage container outside the building. This method of discharging paints and paint thinner contaminated soil near the southwestern corner of the auto body shop. In January 1993, some contaminated soil from the waste disposal area was excavated, however, confirmatory soil samples were not taken and the vertical and lateral limits of impacted soil were not determined prior to backfilling. The 1991 and 1993 activities were performed without DEC approval or oversight. In 1994 the DEC conducted an investigation and determined the 1993 soil removal activity did not remove all of the subsurface contamination at the site. As such, the DEC conducted an investigation in 2000-2002 to obtain additional information regarding the nature and extent of contamination at the site and to determine if the site represents a significant threat to human health or the environment.

1.2 Site-Specific Chemicals of Concern

Based on previous studies completed at the site and the Site's use history, the primary chemicals of concern at the subject site include the following volatile organic compounds (VOCs):

- trichloroethene;
- methylene chloride;
- ethylbenezene;
- toluene; and
- total xylenes.

VOCs were historically used on the site as part of the painting operations. The potential source of the TCE may have been used as a cleaning solvent in the painting operations.

Available Material Safety Data Sheets (MSDS) for the compounds used at the Site are presented in Appendix B. The volatile organic air monitoring action levels will be based on methylene chloride.

2.0 STANTEC PERSONNEL ORGANIZATION

The following Stantec personnel will be involved in investigations at the Site

2.1 Project Manager

Mr. Michael Storonsky, Senior Associate, is the Project Manager. Mr. Storonsky is responsible for ensuring that all Stantec procedures and methods are carried out, and that all Stantec personnel abide by the provisions of this Health and Safety Plan.

2.2 Site Safety Officer/Field Team Leader

Mr. Peter Smith will serve as the field team leader and Mr. David Gnage will serve as the Site Safety Officer during this project. Mr. Smith will report directly to the Project Manager and will be responsible for the implementation of this HASP as well as daily calibration of The Stantec's safety monitoring instruments. Mr. Smith will keep a log book of all calibration data and instrument readings for the site. Mr. Gnage will be responsible for conducting the daily on-site safety meetings.

2.3 Field Team Members

Mr. Dave Gnage, Ms. Luann Meyer, Mr. Kyle Miller, Mr. Travis Money, Mr. Adam Cummings, and Mr. Matt Conley will provide field support to Mr. Smith as needed throughout the duration of the project.

2.4 Health and Safety Coordinator

Mr. David Gnage, Project Health and Safety Coordinator, will coordinate Health and Safety issues on the project as required. Copies of OSHA Hazardous Waste Operations and Emergency Response training certificates for the above-noted field staff are presented in Appendix C.

3.0 MEDICAL SURVEILLANCE REQUIREMENTS

3.1 Introduction

Hazardous waste site workers can often experience high levels of physical and chemical stress. Their daily tasks may expose them to toxic chemicals, physical hazards, biologic hazards, or radiation. They may develop heat stress while wearing protective equipment or while working under temperature extremes. They can face life-threatening emergencies such as explosions and fires. Therefore, a medical program is essential to: assess and monitor worker's health and fitness both prior to employment and during the course of the work; provide emergency and other treatment as needed; and keep accurate records for future reference.

OSHA requires a medical evaluation for employees that may be required to work on hazardous waste sites and/or wear a respirator (29 CFR Part 1910.120 and 1910.134), and certain OSHA standards include specific medical surveillance requirements (e.g., 29 CFR Part 1926.62, Part 1910.95 and Parts 1910.1001 through 1910.1045).

3.2 Medical Examinations

A. All Stantec personnel working in contaminated areas of the site shall have been examined by a licensed physician as prescribed in 29 CFR Part 1910.120, and shall be determined to be medically fit to perform their duties for work conditions which require respirators. Employees will be provided with medical examinations as outlined below:

- Pre-job physical examination;
- Annually thereafter;
- Termination of employment;
- Upon reassignment in accordance with CFR 29 Part 1910.120(f)(3)(i)(C);
- If the employee develops signs or symptoms of illness related to workplace exposures;
- If the physician determines examinations need to be conducted more often than once a year; and
- When an employee develops a lost time injury or illness during the employment period.

B. Examinations will be performed by, or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and will be provided without cost to the employee, without loss of pay and at a reasonable time and place. Medical surveillance protocols and examination and test results shall be reviewed by the Occupational Physician.

4.0 ON-SITE HAZARDS

4.1 Chemical Hazards

The primary potential chemical hazards on-site are expected to be exposure to petroleum related VOCs.

Many of the soil and groundwater contaminants identified to date are volatile; therefore, any activity at the site which causes physical disturbance of the soil can potentially allow the release of contaminants into the air. In addition, aeration of the groundwater may cause volatilization of chemicals into the air, particularly VOCs. Such an occurrence may be recognized by noticeable chemical odors. Field personnel should be aware of the odor threshold for these chemicals and their relation to the action levels and Permissible Exposure Limits.

To prevent dermal exposure to VOCs, dermal contact will be minimized by using disposable gloves and work gloves (as appropriate) when handling soil, groundwater equipment or samples.

To prevent inhalation of VOCs, real-time, breathing zone levels of total VOCs will be monitored using a portable photoionization detector (PID-Minirae Model 2000 or equivalent) equipped with a 10.6 eV lamp. If ambient levels exceed action levels, all site activities will be performed using level C personal protection until ambient concentrations dissipate. Where levels exceed 50 ppm, work will cease and the project manager will be notified immediately.

4.2 Physical Hazards

Hazards typically encountered during drilling, well installation and sampling will be a concern at this site. These hazards include slippery ground surfaces, holes, and operation of heavy machinery and equipment. Basic Level D safety apparel including steel-toed shoes, hard hat and safety glasses will be worn during all activities by field team members.

Under no circumstance will Stantec personnel enter excavations or other confined spaces to collect soil samples for any reason.

Multi-purpose fire extinguishers, functional and with proof of valid annual inspection, will be staged and readily accessible for use.

The use of electrical equipment in any established exclusion zones will be limited to areas verified as containing non-explosive atmospheres (<10% LEL) prior to operation, unless the equipment has been previously demonstrated or designed to be FM or UL rated as intrinsically safe. Care will be taken to avoid an ignition source while working in the presence of vapors.

The contractor shall make all necessary contacts with utilities and/or underground utility locator hotlines prior to drilling, and shall meet OSHA requirements for distances between the heavy equipment and overhead utilities.

4.2.1 Noise

The use of heavy machinery/equipment and operation may result in noise exposures, which require hearing protection. Exposure to noise can result in temporary hearing losses, interference with speech communication, interference with complicated tasks or permanent hearing loss due to repeated exposure to noise.

During the investigative activities, all Stantec field team members will use hearing protection when sound levels are in excess of 90 dB TWA. All aspects of the Stantec Hearing Conservation Program (HCP) will apply when noise levels are in excess of 85 dB TWA. Drill rig and excavator operations do not typically result in noise exposures requiring an HCP.

4.2.2 Heat Stress Exposure

This project may be completed during all seasons. Therefore, both heat and cold are potential threats to the health and safety of site personnel. The Site Safety Officer under the direction of the Project Manager will determine the schedule of work and rest. These schedules will be employed as necessary so that personnel do not suffer adverse effects from heat.

Symptoms of heat stress include fatigue, sweating and irritability and can be treated by removing victim from hot area and providing rest and fluids.

Symptoms of a heat stroke are dizziness, disorientation, perspiration ceases and loss consciousness. If heat stroke symptoms occur, the person should be removed from the hot area, 911 should be contacted and first aid administered. No fluids should be administered to an unconscious victim.

Symptoms of cold stress include, shivering, blanching of the extremities, numbness or burning sensations, blue, purple or gray discoloration of hands and feet, frostbite, hypothermia, and loss of consciousness. Cold stress can be prevented by acclimatizing one's self to the cold, increasing fluid intake, avoiding caffeine and alcohol, maintaining proper salt and electrolyte intake, eating a well-balanced diet, wearing proper clothing, building heated enclosures to work in, and taking regular breaks to warm up. If any of the above symptoms are encountered the person should be removed from the cold area. Depending on the severity of the cold stress, 911 should be contacted and first aid administered. No fluids should be given to an unconscious person.

5.0 SITE WORK ZONES

The following work zones will be physically delineated by Stantec during the remedial activities.

5.1 Control Zones

Control boundaries will be established within the areas of site activities. Examples of boundary zones include: the work zone and decontamination zone. All boundaries will be dynamic, and will be determined by the planned activities for the day. The Field Team Leader will record the names of any visitors to the site.

5.2 Work Zone

The controlled portion of the site will be delineated to identify the work zone, wherein a higher level of personal protective equipment may be required for entry during intrusive activities. The limits of the work zone will be appropriately designated and demarcated at each work location. A decontamination zone will be located immediately outside the entrance to the work zone. All personnel leaving the work zone will be required to adhere to proper decontamination procedures.

5.3 Decontamination Zone

The decontamination zone will be located immediately outside the entrance to the work zone on its apparent upwind side, if feasible, and will be delineated with caution tape and traffic cones. This zone will contain the necessary decontamination materials for personnel decontamination. Decontamination procedures are outlined in Section 8.0 of this plan.

6.0 SITE MONITORING/ACTION LEVELS

6.1 Site Monitoring

Field activities associated with the earth disturbing activities may create potentially hazardous conditions due to the migration of contaminants into the breathing zone. These substances may be in the form of mists, vapors, dusts, or fumes that can enter the body through ingestion, inhalation, absorption, and direct dermal contact. Monitoring for VOCs will be performed in order that appropriate personal protective measures are employed during site activities.

Although the anticipated concentrations of contaminants in soil/groundwater should not present an explosive hazard, explosive environments or conditions may be encountered unexpectedly during the course of this project. Monitoring for explosivity in the atmosphere will be routinely conducted during site activities as a precautionary measure to ensure site personnel are not subjected to any dangerous conditions.

The following describes the conditions that will be monitored for during the remediation activities. All calibrations, etc., done on instruments, as well as background and site readings will be logged.

Organic Vapor Concentrations - Organic vapors will be monitored continuously in the work area with a portable photoionization detector (PID-Minirae Model 2000 or equivalent) with a 10.6 eV lamp. The instrument will be calibrated daily. PID readings will be used as the criteria for upgrading or downgrading protective equipment and for implementing additional precautions or procedures.

If applicable, split spoons or other soil sampling devices will be monitored using the PID at the time they are opened, with appropriate PPE to be used where soils exhibit measurable volatile organic compound levels.

Explosivity - Explosivity will be monitored using an explosive gas meter in the work area during drilling operations. Explosivity measurements will be made periodically at the bore hole after the removal of drill rods. Measurements obtained from this monitoring instrument will also be used as criteria for implementation of work stoppage or site evacuation.

6.2 Action Levels

During the course of any activity, as long as sustained volatile organic vapor readings in the breathing zone are less than 5 ppm above background for total organic vapors above background, Level D protection will be deemed adequate.

If concentrations in the work zone exceed 50 ppm for a period of 5 minutes or longer, work will immediately be terminated by the Site Safety Officer. Options to allow continued remedial activities will then be discussed amongst all parties.
If the lower explosive limit exceeds 10% LEL at the borehole, work will be immediately terminated by the Site Safety Officer. Options to allow continued remedial activities will then be discussed amongst all parties.

7.0 PERSONAL PROTECTIVE EQUIPMENT

Based on an evaluation of the hazards at the site, personal protective equipment (PPE) will be required for all personnel and visitors entering the exclusion zone. It is anticipated that all Stantec oversight work will be performed in Level D. The contractors will be responsible for selection and implementation of PPE for their personnel.

7.1 Protective Clothing/Respiratory Protection:

Protective equipment for each level of protection is as follows:

When HNu readings range above 50 ppm total organic vapors, upgrade to Level C:

Level C

- Full face, air purifying respirator with organic/HEPA cartridge;
- Disposable chemical resistant one-piece suit (Tyvek or Saranex, as appropriate);
- Inner and outer chemical resistant gloves;
- Hard hat;
- Steel-toed boots; and
- Disposable booties.

When HNu readings range between background and 50 ppm for total organic vapors, use Level D:

Level D

- Safety glasses;
- Steel-toed boots;
- Protective cotton, latex or leather gloves depending on site duties;
- Hard hat; and
- Tyvek coverall (optional).

8.0 DECONTAMINATION

8.1 Personnel Decontamination

For complete decontamination, all personnel will observe the following procedures upon leaving the exclusion zone:

1. Remove outer boots and outer gloves and place in disposal drum.

2. If using a respirator, remove respirator, dispose of cartridges if necessary, and set aside for later cleaning.

3. Remove disposable chemical resistant suit and dispose of in drum.

4. Remove and dispose of inner gloves.

Decontamination solutions shall be supplied at the decontamination zone. The wash solution will consist of water and detergent such as Alconox or trisodium phosphate (TSP), and the rinse solution will consist of clean water.

Contaminated wash solutions shall be collected in drums for disposal. All disposable health and safety equipment will be decontaminated and disposed of as non-hazardous waste.

8.2 Equipment Decontamination

If equipment is used during field activities, it will be properly washed or steam-cleaned prior to exiting the decontamination zone.

Monitoring instruments will be either wrapped in poly sheeting or carried by personnel not involved in handling contaminated materials, to reduce the need for decontamination. All instruments will be wet-wiped prior to removal from the work zone.

9.0 EMERGENCY PROCEDURES

The Site Safety Officer will coordinate emergency procedures and will be responsible for initiating emergency response activities. Emergency communications at the site will be conducted verbally. All personnel will be informed of the location of the cellular or public telephone.

9.1 List of Emergency Contacts

Ambulance: 911
Hospital: Highland Hospital (585) 341-6880 - emergency department or 911
Fire Department: 911
Police: 911
Poison Control Center: (585) 275-3232
Electric or Gas Emergency: (585) 546-1100
Mark Gregor: City of Rochester (585) 428-5978
Mike Storonsky: Stantec (585) 475-1440
Frank Sowers: New York State Department of Environmental Conservation, Region 8 Office (585) 226-5357
Joseph Albert: Monroe County Health Department (585) 274-6904

9.2 Directions to Highland Hospital

A map presenting directions to Highland Hospital is included in the back of the document (Figure 3). The route shall be reviewed at the initial site safety meeting on site.

9.3 Accident Investigation and Reporting

A. All accidents requiring first aid, which occur incidental to activities on-site, will be investigated. The investigation format will be as follows:
- interviews with witnesses;
- pictures, if applicable; and
- necessary actions to alleviate the problem.

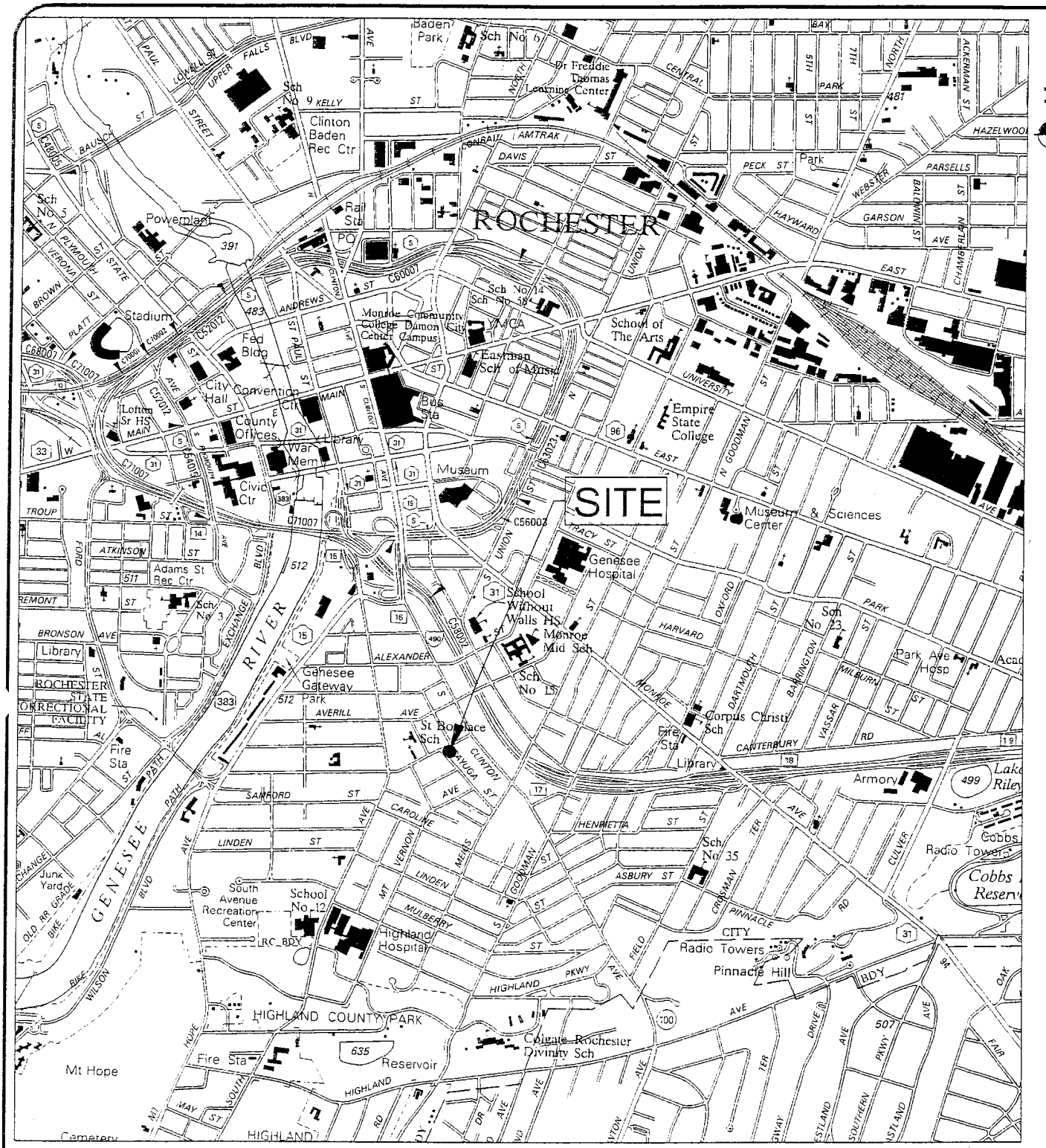
B. In the event that an accident or some other incident such as an explosion or exposure to toxic chemicals occurs during the course of the project, the Project Health and Safety Officer will be telephoned as soon as possible and receive a written report within 24 hours. The report will include the following items:

- Name of injured;
- Name and title of person(s) reporting;
- Date and time of accident/incident;
- Location of accident/incident, building number, facility name;

- Brief summary of accident/incident giving pertinent details including type of operation ongoing at the time of the accident/incident;
- Cause of accident/incident;
- Casualties (fatalities, disabling injuries), hospitalizations;
- Details of any existing chemical hazard or contamination;
- Estimated property damage, if applicable;
- Nature of damage; effect on contract schedule;
- Action taken to insure safety and security; and
- Other damage or injuries sustained (public or private).

Where reportable injuries, hospitalizations or fatalities occur amongst Stantec personnel, the necessary document required by OSHA will be submitted within timeframes allowed by law.

The accident report form is illustrated in Table 1.



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PROJECT ENGINEER/ARCHITECT
K. IGNASZAK, P.E.

PROJECT MANAGER
M. STORONSKY

DRAWN BY
STAFF

SCALE
1"=2000'

FIRST ISSUE DATE

STANTEC CONSULTING GROUP, INC.
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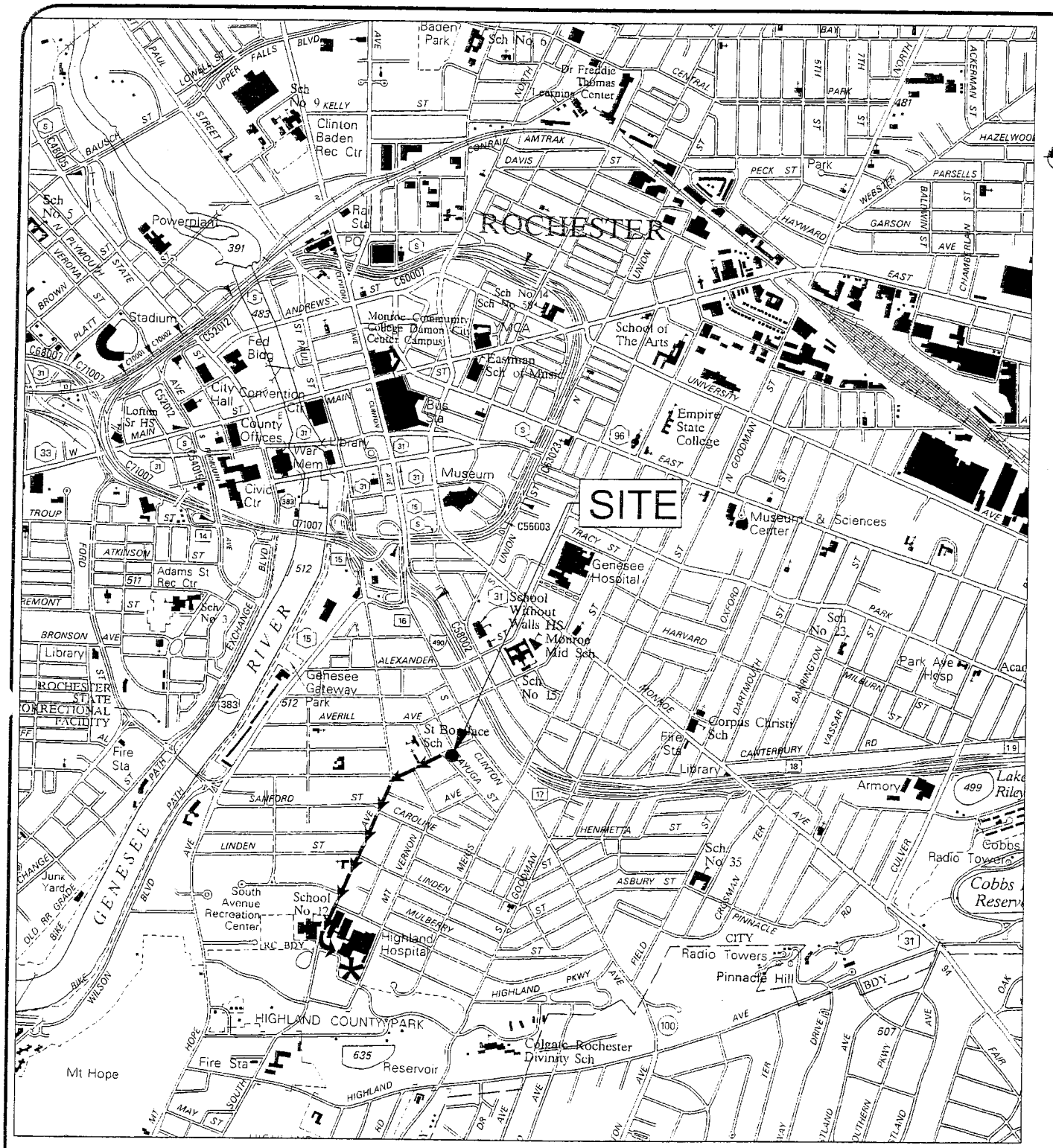
Rochester, N.Y. 14623-2674
Tel:(585) 475-1440
Fax: (585) 272-1814
www.stantec.com

PROJECT
BROWNFIELD ASSESSMENT SITE
399 GREGORY STREET
ROCHESTER, NEW YORK

TITLE OF DRAWING
SITE LOCATION MAP

PROJECT NO.
190500196

DRAWING NO.
1



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PROJECT
BROWNFIELD ASSESSMENT SITE
399 GREGORY STREET
ROCHESTER, NEW YORK

TITLE OF DRAWING
HOSPITAL ROUTE MAP

PROJECT NO.
190500196

DRAWING NO.
2

TABLE 1

ACCIDENT REPORT

Project_____ Date of Occurrence_____

Location _____

_____

Type of Occurrence: (check all that Apply)

- ☐ Disabling Injury
- ☐ Property Damage
- ☐ Chemical Exposure
- ☐ Explosion
- ☐ Other Injury
- ☐ Equip. Failure
- ☐ Fire
- ☐ Vehicle Accident
- ☐ Other (explain)_____

_____

Witnesses to Accident/Injury:

_____ _____
_____ _____
_____ _____

Injuries:

Name of Injured _____

What was being done at the time of the accident/injury?

_____
_____

What corrective actions will be taken to prevent recurrence? _____
_____
_____

SIGNATURES

Health and Safety Officer _____ Date _____
Project Manager _____ Date _____
Reviewer _____ Date _____

Comments by reviewer _____
_____

APPENDIX A
ON-SITE SAFETY MEETING FORM

DAILY
ON-SITE SAFETY MEETING

Project: Remedial Investigation.
Date:_____ Time:_____ Job No.: 190500196
Address: 399 Gregory Street, Rochester, New York_____

Scope of Work:_____

Weather Temp:_____ Wind direction/speed:_____
Sky Conditions:_____ Humidity:_____
Weather Conditions affecting work:_____

Safety Topics Discussed

Protective Clothing/Equipment: _____

Chemical Hazards: _____

Physical Hazardous: _____

Personnel/Equipment Decontamination: _____

Personnel/Job Functions: _____

Emergency Procedures: _____

Special Equipment: _____

Other: _____

Emergency Phone Numbers

Ambulance, Fire, Police: 911
Hospital: Highland Hospital (585) 341-6880 - emergency department
Poison Control Center: (585) 275-3232
Electric or Gas Emergency: (585) 546-1100
Mike Storonsky, Stantec: (585) 475-1440 ext. 760
Mark Gregor, City of Rochester: (585) 428-5978
Frank Sowers, DEC: (585) 226-5357
Joe Albert, MCDOH: (585) 274-6904

On-Site Safety Meeting
ATTENDEES

Name Printed	Signature	Job Function

Meeting Conducted By:_____ _____
Name Printed Signature

Site Safety Officer _____ _____
Team Leader _____ _____

APPENDIX B
MATERIAL SAFETY DATA SHEETS

MSDS for Dichloromethane, stabilized, C.P.

**** MATERIAL SAFETY DATA SHEET ****

Dichloromethane, stabilized, C.P.

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Dichloromethane, stabilized, C.P.
Catalog Numbers:
12405-0000, 12405-0010, 12405-0025, 12405-0250
Synonyms:
Methylene chloride
Company Identification (Europe): Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
Company Identification (USA): Acros Organics
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For information in Europe, call: 0032(0) 14575211
For emergencies in the US, call CHEMTREC: 800-424-9300
For emergencies in Europe, call: 0032(0) 14575299

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
75-09-2	Dichloromethane		200-838-9

Hazard Symbols: XN
Risk Phrases: 40

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW
Limited evidence of a carcinogenic effect.

Potential Health Effects
Eye:
Contact with eyes may cause severe irritation, and possible eye burns. Causes redness and pain.
Skin:
May cause severe skin irritation. May be absorbed through the skin. Causes redness and pain. Prolonged exposure may result in skin burns.
Ingestion:
Harmful if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure.
Inhalation:
Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. May cause narcotic effects in high concentration. Vapors may cause dizziness or

suffocation. May cause thryoid effects. May cause blood changes. Overexposure may cause an increase in carboxyhemoglobin levels in the blood.

Chronic:

Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects. Chronic exposure may cause lung, liver, and pancreatic tumors. Chronic exposure may cause kidney damage.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin:

Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion:

Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation:

Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician:

Treat symptomatically and supportively.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Vapors mixed with air in proper proportion will propagate a flame. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated. Will form explosive mixtures in atmospheres having high oxygen contents. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Extinguishing Media:

Use water spray, dry chemical, carbon dioxide, or chemical foam. Cool containers with flooding quantities of water until well after fire is out.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:

Use with adequate ventilation. Loosen closure cautiously before opening. Do not get in eyes, on skin, or on clothing. Take precautionary measures against static discharges. Keep container tightly closed. Avoid contact with heat, sparks and flame. Do not ingest or inhale. Use only in a chemical fume hood.

Storage:

Keep away from heat, sparks, and flame. Do not store in direct sunlight. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Store below 40°C.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Personal Protective Equipment

Eyes:

Wear chemical goggles.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Clear liquid
Appearance:	APHA: 5 max
Odor:	ethereal odor - chloroform-like
pH:	Not available.
Vapor Pressure:	470 mbar @20 deg C
Viscosity:	0.43 mPas 20 deg C
Boiling Point:	40 deg C @ 760 mmHg
Freezing/Melting Point:	100-103 deg C
Autoignition Temperature:	556 deg C (1,032.80 deg F)
Flash Point:	Not available.
Explosion Limits, lower:	13.00 vol%
Explosion Limits, upper:	22.00 vol%
Decomposition Temperature:	>120 deg C
Solubility in water:	20 g/l (20°C)
Specific Gravity/Density:	1.3250g/cm3
Molecular Formula:	CH2Cl2
Molecular Weight:	84.93

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:

Stable at room temperature in closed containers under normal storage

and handling conditions.

Conditions to Avoid:

Incompatible materials, ignition sources, excess heat.

Incompatibilities with Other Materials:

Strong oxidizing agents, oxidizing agents, strong acids, active metals, alcohols, alkali metals, alkaline earth metals, aluminum, amines, coatings, copper, dimethyl sulfoxide, finely powdered metals, iron, liquid oxygen, magnesium, nitric acid, plastics, rubber, steel, potassium, lithium, sodium, dinitrogen tetraoxide, perchloric acid, nickel, potassium-tert-butoxide, azides, aluminum bromide, dinitrogen pentaoxide, sodium potassium alloys, dinitrogen + tetraoxide.

Hazardous Decomposition Products:

Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:

CAS# 75-09-2: PA8050000

LD50/LC50:

CAS# 75-09-2: Draize test, rabbit, eye: 162 mg Moderate; Draize test, rabbit, eye: 10 mg Mild; Draize test, rabbit, eye: 500 mg/24H Mild; Draize test, rabbit, skin: 810 mg/24H Severe; Draize test, rabbit, skin: 100 mg/24H Moderate; Inhalation, mouse: LC50 = 14400 ppm/7H; Inhalation, rat: LC50 = 52 gm/m3; Oral, mouse: LD50 = 873 mg/kg; Oral, rat: LD50 = 1600 mg/kg.

Carcinogenicity:

Dichloromethane -

ACGIH: A3 - Animal Carcinogen
California: carcinogen; initial date 4/1/88
NIOSH: occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2B carcinogen

Other:

See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:

Fish: Fathead Minnow: 193 mg/l; 96 H; flowthroughFish: Fathead Minnow: 310 mg/l; 96 H; staticWater flea 2270 mg/l; 24 H; LC50Fish: Bluegill/Sunfish: 230 mg/l; 96 H; LC50

Other

This chemical is not likely to bioconcentrate. Do not empty into drains.

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.

**** SECTION 14 - TRANSPORT INFORMATION ****

IATA

Shipping Name: DICHLOROMETHANE
Hazard Class: 6.1
UN Number: 1593
Packing Group: III

IMO

Shipping Name: DICHLOROMETHANE

Hazard Class: 6.1
UN Number: 1593
Packing Group: III

RID/ADR

Shipping Name: DICHLOROMETHANE
Hazard Class: 6.1
UN Number: 1593
Packing group: III

**** SECTION 15 - REGULATORY INFORMATION ****

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN

Risk Phrases:

R 40 Limited evidence of a carcinogenic effect.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.
S 24/25 Avoid contact with skin and eyes.
S 36/37 Wear suitable protective clothing and gloves.

WGK (Water Danger/Protection)

CAS# 75-09-2: 2

United Kingdom Occupational Exposure Limits

Canada

CAS# 75-09-2 is listed on Canada's DSL List.
CAS# 75-09-2 is listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 75-09-2: OEL-AUSTRALIA:TWA 100 ppm (350 mg/m3);Carcinogen
OEL-AUSTRIA:TWA 100 ppm (360 mg/m3)
OEL-BELGIUM:TWA 50 ppm (174 mg/m3);Carcinogen
OEL-CZECHOSLOVAKIA:TWA 500 mg/m3;STEL 2500 mg/m3
OEL-DENMARK:TWA 50 ppm (175 mg/m3);Skin;Carcinoge
OEL-FINLAND:TWA 100 ppm (350 mg/m3);STEL 250 ppm (870 mg/m3)
OEL-FRANCE:TWA 100 ppm (360 mg/m3);STEL 500 ppm (1800 mg/m3)
OEL-GERMANY:TWA 100 ppm (360 mg/m3);Carcinogen
OEL-HUNGARY:STEL 10 mg/m3;Carcinogen
OEL-JAPAN:TWA 100 ppm (350 mg/m3)
OEL-THE NETHERLANDS:TWA 100 ppm (350 mg/m3);STEL 500 ppm
OEL-THE PHILIPINES:TWA 500 ppm (1740 mg/m3)
OEL-POLAND:TWA 50 mg/m3
OEL-RUSSIA:TWA 100 ppm;STEL 50 mg/m3
OEL-SWEDEN:TWA 35 ppm (120 mg/m3);STEL 70 ppm (25 mg/m3);Skin
OEL-SWITZERLAND:TWA 100 ppm (360 mg/m3);STEL 500 ppm
OEL-THAILAND:TWA 500 mg/m3;STEL 1000 mg/m3
OEL-TURKEY:TWA 500 ppm (1740 mg/m3)
OEL-UNITED KINGDOM:TWA 100 ppm (350 mg/m3);STEL 250 ppm
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

US FEDERAL

TSCA

CAS# 75-09-2 is listed on the TSCA inventory.

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 1/20/2000 Revision #0 Date: Original.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of

merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

MSDS for Trichloroethylene, stabilized, 99+%

**** MATERIAL SAFETY DATA SHEET ****

Trichloroethylene, stabilized, 99+%

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Trichloroethylene, stabilized, 99+%
Catalog Numbers:
15831-0000, 15831-0010, 15831-0025
Synonyms:
Ethylene trichloride
Company Identification (Europe): Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
Company Identification (USA): Acros Organics
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For information in Europe, call: 0032(0) 14575211
For emergencies in the US, call CHEMTREC: 800-424-9300
For emergencies in Europe, call: 0032(0) 14575299

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
79-01-6	Trichloroethylene	99+%	201-167-4

Hazard Symbols: XN
Risk Phrases: 40 52/53

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Limited evidence of a carcinogenic effect. Harmful to aquatic organisms; may cause long-term adverse effects in the aquatic environment.Light sensitive.

Potential Health Effects

Eye:
Causes moderate eye irritation. Contact produces irritation, tearing, and burning pain.

Skin:
Causes severe skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.

Ingestion:
Aspiration hazard. May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

Inhalation:
Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause respiratory tract irritation.

Chronic:
Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause defatting and

dermatitis. May cause liver and kidney damage.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

Ingestion:
Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

Inhalation:
Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician:

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Containers may explode in the heat of a fire. Vapors mixed with air can explode when ignited.

Extinguishing Media:
Use water spray to cool fire-exposed containers. Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as saw dust. Use a spark-proof tool.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Use only in a chemical fume hood.

Storage:
Keep away from sources of ignition. Do not store in direct sunlight. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:
Local exhaust ventilation may be necessary to control any air

contaminants to within their TLVs during the use of this product. Use explosion-proof ventilation equipment.

Personal Protective Equipment

Eyes:
Wear safety glasses and chemical goggles or face shield if handling liquids.

Skin:
Wear impervious gloves.

Clothing:
Wear appropriate protective clothing to prevent skin exposure.

Respirators:
Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Clear liquid
Appearance:	APHA: 15 max
Odor:	chloroform-like
pH:	Not available.
Vapor Pressure:	77.320 mbar
Viscosity:	mPas 20 deg C
Boiling Point:	87 deg C @ 760.00mm Hg
Freezing/Melting Point:	-86 deg C
Autoignition Temperature:	410 deg C (770.00 deg F)
Flash Point:	Not available.
Explosion Limits, lower:	7.90 vol %
Explosion Limits, upper:	90.00 vol %
Decomposition Temperature:	
Solubility in water:	insoluble
Specific Gravity/Density:	1.4620g/cm3
Molecular Formula:	ClCH=CCl2
Molecular Weight:	131.39

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable under normal temperatures and pressures.

Conditions to Avoid:
Incompatible materials, light, ignition sources, exposure to moist air or water, oxidizers.

Incompatibilities with Other Materials:
Oxidizing agents, strong reducing agents, strong bases, bases, active metals, aluminum, magnesium, sodium hydroxide, lithium, metals and metal compounds (toxic, e.g. beryllium, lead acetate, nickel carbonyl, tetraethyl lead).

Hazardous Decomposition Products:
Hydrogen chloride, carbon dioxide.

Hazardous Polymerization: Will not occur.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 79-01-6: KX4550000

LD50/LC50:
CAS# 79-01-6: Draize test, rabbit, eye: 20 mg/24H Moderate; Draize

test, rabbit, skin: 2 mg/24H Severe; Inhalation, mouse: LC50 = 8450 ppm/4H; Oral, mouse: LD50 = 2402 mg/kg; Oral, rat: LD50 = 4920 mg/kg; Skin, rabbit: LD50 = >20 gm/kg.

Carcinogenicity:

Trichloroethylene -

ACGIH: A5 - Not Suspected as a Human Carcinogen
California: carcinogen; initial date 4/1/88
NIOSH: occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2A carcinogen

Other:

See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:

Fish toxicity:LC50 (96hr) fathead minnow 0.045 g/lLC50 (7-15 day) guppy 0.132 g/lLC50 (9hr) sheepshead minnow 52 mg/lLC50 (96hr) American flag fish 3.1 mg/lInvertebrate toxicity:LC50 Philodina erythrophthalma, Aeoiosoma hemprichi, Colpoda 92, 47, 75 mg/l respectively.EC50 (5-30 min) Photobacterium phosphoreum 176 ppm Microtox test.(Dictionary of Substances and Their Effects1992)

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.

**** SECTION 14 - TRANSPORT INFORMATION ****

IATA

Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN Number: 1710
Packing Group: III

IMO

Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN Number: 1710
Packing Group: III

RID/ADR

Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN Number: 1710
Packing group: III

**** SECTION 15 - REGULATORY INFORMATION ****

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN

Risk Phrases:

R 40 Limited evidence of a carcinogenic effect.
R 52/53 Harmful to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.
S 36/37 Wear suitable protective clothing and gloves.
S 61 Avoid release to the environment. Refer to

special instructions/Safety data sheets.
WGK (Water Danger/Protection)
CAS# 79-01-6: 3
United Kingdom Occupational Exposure Limits

Canada
CAS# 79-01-6 is listed on Canada's DSL List.
CAS# 79-01-6 is listed on Canada's Ingredient Disclosure List.
Exposure Limits
CAS# 79-01-6: OEL-AUSTRALIA:TWA 50 ppm (270 mg/m3);STEL 200 ppm (1080 mg/m3)
OEL-BELGIUM:TWA 50 ppm (269 mg/m3);STEL 200 ppm (1070 mg/m3)
OEL-CZECHOSLOVAKIA:TWA 250 mg/m3;STEL 1250 mg/m3
OEL-DENMARK:TWA 30 ppm (160 mg/m3)
OEL-FINLAND:TWA 30 ppm (160 mg/m3);STEL 45 ppm (240 mg/m3);Skin
OEL-FRANCE:TWA 75 ppm (405 mg/m3);STEL 200 ppm (1080 mg/m3)
OEL-GERMANY:TWA 50 ppm (270 mg/m3);Carcinogen
OEL-HUNGARY:TWA 10 mg/m3;STEL 40 mg/m3
OEL-JAPAN:TWA 50 ppm (270 mg/m3)
OEL-THE NETHERLANDS:TWA 35 ppm (190 mg/m3);STEL 100 ppm
OEL-THE PHILIPPINES:TWA 100 ppm (535 mg/m3)
OEL-POLAND:TWA 50 mg/m3
OEL-RUSSIA:TWA 50 ppm;STEL 10 mg/m3
OEL-SWEDEN:TWA 10 ppm (50 mg/m3);STEL 25 ppm (140 mg/m3)
OEL-THAILAND:TWA 100 ppm;STEL 200 ppm
OEL-TURKEY:TWA 100 ppm (535 mg/m3)
OEL-UNITED KINGDOM:TWA 100 ppm (535 mg/m3);STEL 150 ppm;Skin
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
US FEDERAL
TSCA
CAS# 79-01-6 is listed on the TSCA inventory.

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 9/27/1996 Revision #0 Date: Original.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

MSDS for Ethylbenzene, 99.8%

**** MATERIAL SAFETY DATA SHEET ****

Ethylbenzene, 99.8%

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Ethylbenzene, 99.8%
Catalog Numbers:
11808-0000, 11808-0250, 11808-5000
Synonyms:
Phenylethane
Company Identification (Europe): Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
Company Identification (USA): Acros Organics
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For information in Europe, call: 0032(0) 14575211
For emergencies in the US, call CHEMTREC: 800-424-9300
For emergencies in Europe, call: 0032(0) 14575299

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
100-41-4	Ethylbenzene	99.8%	202-849-4

Hazard Symbols: XN F
Risk Phrases: 11 20

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Highly flammable. Harmful by inhalation.

Potential Health Effects

Eye:
Causes severe eye irritation. Causes redness and pain.

Skin:
Causes mild skin irritation. Causes redness and pain.

Ingestion:
May cause irritation of the digestive tract. May cause headache. Possible aspiration hazard. May cause nausea and vomiting. May cause central nervous system depression. May cause effects similar to those of acute inhalation.

Inhalation:
Harmful if inhaled. May cause respiratory tract irritation. May cause drowsiness, unconsciousness, and central nervous system depression.

Chronic:
Prolonged or repeated skin contact may cause defatting and dermatitis. May cause liver and kidney damage.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin:
Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion:
Never give anything by mouth to an unconscious person. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation:
Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician:

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Containers may explode in the heat of a fire. Flammable liquid and vapor.
Extinguishing Media:
Use water spray to cool fire-exposed containers. Use foam, dry chemical, or carbon dioxide. Water may be ineffective.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:
Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:
Use spark-proof tools and explosion proof equipment. Avoid breathing dust, vapor, mist, or gas. Avoid contact with skin and eyes. Take precautionary measures against static discharges.
Storage:
Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:
Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Personal Protective Equipment

Eyes:
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:
Wear appropriate protective gloves to prevent skin exposure.

Clothing:
Wear appropriate protective clothing to prevent skin exposure.

Respirators:
Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Clear liquid
Appearance:	APHA: 5 max
Odor:	aromatic odor
pH:	Not available.
Vapor Pressure:	9.3 mbar @ 20 deg C
Viscosity:	0.63 mPas 20 deg C
Boiling Point:	136 deg C @ 760.00mm Hg
Freezing/Melting Point:	-95 deg C
Autoignition Temperature:	432 deg C (809.60 deg F)
Flash Point:	15 deg C (59.00 deg F)
Explosion Limits, lower:	1.00 vol %
Explosion Limits, upper:	7.80 vol %
Decomposition Temperature:	
Solubility in water:	0.2 G/L WATER (20°C)
Specific Gravity/Density:	.8670g/cm3
Molecular Formula:	C6H5C2H5
Molecular Weight:	106.17

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials, ignition sources.
Incompatibilities with Other Materials:
Oxidizing agents.
Hazardous Decomposition Products:
Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 100-41-4: DA0700000
LD50/LC50:
CAS# 100-41-4: Draize test, rabbit, eye: 500 mg Severe; Oral, rat: LD50 = 3500 mg/kg; Skin, rabbit: LD50 = 17800 uL/kg.
Carcinogenicity:
Ethylbenzene -
OSHA: Possible Select carcinogen
IARC: Group 2B carcinogen
Other:
See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:

Fish toxicity:LC50 bluegill sunfish, goldfish, guppy, fathead minnow 12-96 mg/l/96H (Blum, D.J.W. et al Res.J.-Water Pollut. Control Fed. 1991, 63(3), 198-207; Pickering, Q.J. et al J.-Water Pollut. Control Fed. 1966, 38, 1419).Invertebrate toxicity:EC50 Photobacterium phosphoreum 9.68 ppm/30min Microtox test (Kaiser, K.L.E. et al Water Pollut. Res.J.Can. 1991, 26(3), 361-431).EC50 Daphnia magna 2.1 mg/L/48H (Vighi, M. et al Chemosphere 1987, 16(5), 1043-1051).

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.

**** SECTION 14 - TRANSPORT INFORMATION ****

IATA

Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN Number: 1175
Packing Group: II

IMO

Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN Number: 1175
Packing Group: II

RID/ADR

Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN Number: 1175
Packing group: II

**** SECTION 15 - REGULATORY INFORMATION ****

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN F

Risk Phrases:

R 11 Highly flammable.
R 20 Harmful by inhalation.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 24/25 Avoid contact with skin and eyes.
S 29 Do not empty into drains.

WGK (Water Danger/Protection)

CAS# 100-41-4: 1

United Kingdom Occupational Exposure Limits

CAS# 100-41-4: OES-United Kingdom, TWA 100 ppm TWA; 441 mg/m3 TWA
CAS# 100-41-4: OES-United Kingdom, STEL 125 ppm STEL; 552 mg/m3 STEL

Canada

CAS# 100-41-4 is listed on Canada's DSL List.
CAS# 100-41-4 is listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 100-41-4: OEL-AUSTRALIA:TWA 100 ppm (435 mg/m3);STEL 125 ppm (545 mg/m3)
OEL-BELGIUM:TWA 100 ppm (434 mg/m3);STEL 125 ppm (543 mg/m3)
OEL-CZECHOSLOVAKIA:TWA 200 mg/m3;STEL 1000 mg/m3
OEL-DENMARK:TWA 50 ppm (217 mg/m3)
OEL-FINLAND:TWA 100 ppm (435 mg/m3);STEL 150 ppm (655 mg/m3)
OEL-FRANCE:TWA 100 ppm (435 mg/m3)

OEL-GERMANY:TWA 100 ppm (440 mg/m3);Skin
OEL-HUNGARY:TWA 100 mg/m3;STEL 200 mg/m3;Skin
OEL-JAPAN:TWA 100 ppm (430 mg/m3)
OEL-THE NETHERLANDS:TWA 100 ppm (435 mg/m3)
OEL-THE PHILIPPINES:TWA 100 ppm (435 mg/m3)
OEL-POLAND:TWA 100 mg/m3
OEL-RUSSIA:TWA 100 ppm;STEL 50 mg/m3
OEL-SWEDEN:TWA 50 ppm (200 mg/m3);STEL 100 ppm (450 mg/m3)
OEL-SWITZERLAND:TWA 100 ppm (435 mg/m3);STEL 500 ppm
OEL-TURKEY:TWA 100 ppm (435 mg/m3)
OEL-UNITED KINGDOM:TWA 100 ppm (435 mg/m3);STEL 125 ppm
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

US FEDERAL

TSCA

CAS# 100-41-4 is listed on the TSCA inventory.

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 7/16/1996 Revision #0 Date: Original.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

MSDS for Toluene, 99%

**** MATERIAL SAFETY DATA SHEET ****

Toluene, 99%

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Toluene, 99%
Catalog Numbers:
17716-0000, 17716-0010, 17716-0025, 17716-0250
Synonyms:
Methylbenzene, methylbenzol, phenylmethane, toluol.
Company Identification (Europe): Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
Company Identification (USA): Acros Organics
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For information in Europe, call: 0032(0) 14575211
For emergencies in the US, call CHEMTREC: 800-424-9300
For emergencies in Europe, call: 0032(0) 14575299

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
108-88-3	Toluene	99%	203-625-9

Hazard Symbols: XN F
Risk Phrases: 11 20

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Highly flammable. Harmful by inhalation.

Potential Health Effects

Eye:
Causes severe eye irritation. May result in corneal injury. Vapors may cause eye irritation. May cause conjunctivitis. Causes redness and pain.

Skin:
Causes moderate skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May be absorbed through the skin. Causes symptoms similar to those of inhalation. Causes redness and pain.

Ingestion:
Harmful if swallowed. Aspiration hazard. May cause irritation of the digestive tract. May cause effects similar to those for inhalation exposure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May cause nausea and vomiting. May cause unconsciousness.

Inhalation:
Harmful if inhaled. Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. High vapor concentrations may

cause drowsiness. Inhalation of vapor may cause respiratory tract irritation. May cause heart disturbances, possibly leading to cardiac arrest and death. May cause narcotic effects in high concentration.

Chronic:

Prolonged or repeated skin contact may cause dermatitis. May cause cardiac sensitization and severe heart abnormalities. May cause liver and kidney damage. Repeated exposure may cause central nervous system damage.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid. Do NOT allow victim to rub or keep eyes closed.

Skin:

Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

Ingestion:

Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Possible aspiration hazard. Get medical aid.

Inhalation:

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Flammable liquid and vapor.

Extinguishing Media:

Use dry chemical, carbon dioxide, or alcohol-resistant foam.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Avoid runoff into storm sewers and ditches which lead to waterways. Scoop up with a nonsparking tool, then place into a suitable container for disposal. Use water spray to disperse the gas/vapor. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as saw dust. Provide ventilation.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Use spark-proof tools and explosion proof equipment. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Do not get on skin or in eyes. Do not ingest or inhale.

Storage:

Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:

Use adequate ventilation to keep airborne concentrations low.

Personal Protective Equipment

Eyes:

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Clear liquid
Appearance:	APHA: 20 max
Odor:	aromatic odor
pH:	Not available.
Vapor Pressure:	29 mbar @ 20 deg C
Viscosity:	059 cP 20 deg C
Boiling Point:	110.6 deg C @ 760.00mm Hg
Freezing/Melting Point:	-95 deg C
Autoignition Temperature:	535 deg C (995.00 deg F)
Flash Point:	4 deg C (39.20 deg F)
Explosion Limits, lower:	1.20 vol %
Explosion Limits, upper:	7.00 vol %
Decomposition Temperature:	
Solubility in water:	0.05 G/100ML WATER (20°C)
Specific Gravity/Density:	.8650g/cm3
Molecular Formula:	C6H5CH3
Molecular Weight:	92.14

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid:

Incompatible materials, ignition sources, excess heat.
Incompatibilities with Other Materials:
Strong oxidizing agents, bromine trifluoride, nitric acid, silver perchlorate, dinitrogen tetraoxide, tetranitromethane.
Hazardous Decomposition Products:
Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 108-88-3: XS5250000
LD50/LC50:
CAS# 108-88-3: Draize test, rabbit, eye: 870 ug Mild; Draize test, rabbit, eye: 2 mg/24H Severe; Draize test, rabbit, skin: 435 mg Mild; Draize test, rabbit, skin: 500 mg Moderate; Draize test, rabbit, skin: 20 mg/24H Moderate; Inhalation, mouse: LC50 = 400 ppm/24H; Inhalation, rat: LC50 = 49 gm/m3/4H; Oral, rat: LD50 = 636 mg/kg; Skin, rabbit: LD50 = 14100 uL/kg.
Carcinogenicity:
Toluene -
ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Group 3 carcinogen
Other:
See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:
Fish toxicity:LC50 juvenile striped bass 0.0054 mg/L/96H (Palawski, D. et al Trans.Am.Fish Soc. 1985, 114, 748-753).LC50 bluegill sunfish 24 mg/L/96H (Pickering, Q.H. et al J.Water Pollut. Control Fed. 1966, 38, 1419-1429).LC50 goldfish 58 mg/L/48H (Bridie, A.L. et al Water Res. 1979, 13, 623).LC50 pink salmon 6.41 mg/L/96H (Korr, S. et al Bull. Environ. Contam. Toxicol. 1979, 21, 521-525).Invertebrate toxicity:EC50 Photobacterium phosphoreum 19.7 ppm/30 min Microtox test (Kaiser, K.L.E. et al Water Pollut.Res.J.Can. 1991, 26(3), 361-431).
Other
In water, substance volatilizes and biodegrades. On soil, substance volatilizes and biodegrades.

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.

**** SECTION 14 - TRANSPORT INFORMATION ****

IATA
Shipping Name: TOLUENE
Hazard Class: 3
UN Number: 1294
Packing Group: II
IMO
Shipping Name: TOLUENE
Hazard Class: 3
UN Number: 1294
Packing Group: II
RID/ADR
Shipping Name: TOLUENE

Hazard Class: 3
UN Number: 1294
Packing group: II

**** SECTION 15 - REGULATORY INFORMATION ****

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: XN F
Risk Phrases:
R 11 Highly flammable.
R 20 Harmful by inhalation.
Safety Phrases:
S 16 Keep away from sources of ignition - No smoking.
S 25 Avoid contact with eyes.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.
WGK (Water Danger/Protection)
CAS# 108-88-3: 2
United Kingdom Occupational Exposure Limits
CAS# 108-88-3: OES-United Kingdom, TWA 50 ppm TWA; 191 mg/m3 TWA
CAS# 108-88-3: OES-United Kingdom, STEL 150 ppm STEL; 574 mg/m3 STEL
Canada
CAS# 108-88-3 is listed on Canada's DSL List.
CAS# 108-88-3 is listed on Canada's Ingredient Disclosure List.
Exposure Limits
CAS# 108-88-3: OEL-AUSTRALIA:TWA 100 ppm (375 mg/m3);STEL 150 ppm (560 mg/m3)
OEL-BELGIUM:TWA 100 ppm (377 mg/m3);STEL 150 ppm (565 mg/m3)
OEL-CZECHOSLOVAKIA:TWA 200 mg/m3;STEL 1000 mg/m3
OEL-DENMARK:TWA 50 ppm (190 mg/m3);Skin
OEL-FINLAND:TWA 100 ppm (375 mg/m3);STEL 150 ppm;Skin
OEL-FRANCE:TWA 100 ppm (375 mg/m3);STEL 150 ppm (560 mg/m3)
OEL-GERMANY:TWA 100 ppm (380 mg/m3)
OEL-HUNGARY:TWA 100 mg/m3;STEL 300 mg/m3;Skin
OEL-JAPAN:TWA 100 ppm (380 mg/m3)
OEL-THE NETHERLANDS:TWA 100 ppm (375 mg/m3);Skin
OEL-THE PHILIPPINES:TWA 100 ppm (375 mg/m3)
OEL-POLAND:TWA 100 mg/m3
OEL-RUSSIA:TWA 100 ppm;STEL 50 mg/m3
OEL-SWEDEN:TWA 50 ppm (200 mg/m3);STEL 100 ppm (400 mg/m3);Skin
OEL-SWITZERLAND:TWA 100 ppm (380 mg/m3);STEL 500 ppm
OEL-THAILAND:TWA 200 ppm;STEL 300 ppm
OEL-TURKEY:TWA 200 ppm (750 mg/m3)
OEL-UNITED KINGDOM:TWA 100 ppm (375 mg/m3);STEL 150 ppm;Skin
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
US FEDERAL
TSCA
CAS# 108-88-3 is listed on the TSCA inventory.

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 7/16/1996 Revision #0 Date: Original.

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**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Xylene
Catalog Numbers:
57019, 57041A, 57041B
Synonyms:
Dimethylbenzene, xylol, methyltoluene, violet3
Company Identification: Biochemical Sciences, Inc.
200 Commodore Drive
Swedesboro, NJ 08085
For information, call: 800-524-0294
Emergency Number: 800-524-0294
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
1330-20-7	Xylene	100.0	215-535-7

Hazard Symbols: XN
Risk Phrases: 10 20/21 38

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Flammable. Harmful by inhalation and in contact with skin.
Irritating to skin.

Potential Health Effects

Eye:
Causes severe eye irritation.

Skin:
Exposure may cause irritation characterized by redness, dryness, and inflammation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.

Ingestion:
May cause central nervous system depression, kidney damage, and liver damage. Symptoms may include: headache, excitement, fatigue, nausea, vomiting, stupor, and coma. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

Inhalation:
Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Inhalation of vapor may cause respiratory tract irritation. Prolonged exposure may result in dizziness and general weakness. Irritation may lead to chemical pneumonitis and pulmonary edema.

Chronic:
Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Discard contaminated clothing in a manner which limits further exposure.

Ingestion:

Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

Inhalation:

Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician:

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May be ignited by heat, sparks, and flame. Vapors may form an explosive mixture with air. Containers may explode when heated.

Extinguishing Media:

For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Use water spray to cool fire-exposed containers. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated may reduce vapor but may not prevent ignition in closed spaces.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:

Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage:

Keep away from heat, sparks, and flame. Keep away from sources of ignition. Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protective Equipment

Eyes:

Wear chemical goggles.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin

exposure.

Respirators:

Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Liquid
Appearance:	Clear, colorless liquid(max.20 apha)
Odor:	Aromatic odor
pH:	Not available.
Vapor Pressure:	21 mm Hg
Vapor Density:	3.66
Evaporation Rate:	0.6
Viscosity:	0.6 MPA 20.00 d
Boiling Point:	140 deg C @ 760.00mm Hg
Freezing/Melting Point:	- 50.00 - - 0.00 deg
Autoignition Temperature:	460 deg C (860.00 deg F)
Flash Point:	25 deg C (77.00 deg F)
Explosion Limits, lower:	1.10 vol %
Explosion Limits, upper:	7.00 vol %
Decomposition Temperature:	
Solubility:	<0.1 G/L (20&C)
Specific Gravity/Density:	.8620g/cm3
Molecular Formula:	C8H10
Molecular Weight:	106.17

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:

Stable under normal temperatures and pressures.

Conditions to Avoid:

High temperatures, incompatible materials, ignition sources.

Incompatibilities with Other Materials:

Strong acids, strong oxidizers and 1,3-dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin). Attacks some forms of plastics, rubber and coatings.

Hazardous Decomposition Products:

Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:

CAS# 1330-20-7: ZE2100000

LD50/LC50:

CAS# 1330-20-7: Draize test, rabbit, eye: 87 mg Mild; Draize test, rabbit, eye: 5 mg/24H Severe; Draize test, rabbit, skin: 100% Moderate; Draize test, rabbit, skin: 500 mg/24H Moderate; Inhalation, rat: LC50 = 5000 ppm/4H; Oral, rat: LD50 = 4300 mg/kg; Skin, rabbit: LD50 = >1700 mg/kg.

Carcinogenicity:

Xylene -

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Group 3 carcinogen

Epidemiology:

No information available.

Teratogenicity:

No information available.

Reproductive Effects:

TCLo(Inhalation, rat)= 250 mg/m3/24H, Reproductive - Specific Developmental Abnormalities - musculoskeletal system TCLo(Inhalation, rat)= 50 mg/m3/6H; Reproductive - Fertility - post-implantation

Neurotoxicity:

No information available.

Mutagenicity:

No information available.

Other Studies:

Standard Draize Test: Administration onto the skin (rabbit) = 500 mg/24H (Moderate). Standard Draize Test: Administration into the eye (rabbit) = 5 mg/24H (Severe).

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:

Acute and long-term toxicity to fish and invertebrates: LD50 for goldfish is 13 mg/L/24 Hr. Cas#1330-20-7: LC50(96Hr.) rainbow trout = 8.05 mg/L, Static condition; LC50(96Hr.) fathead minnow = 16.1 mg/L, flow-through conditions; LC50(96Hr.) bluegill = 16.1 mg/L, flow-through; EC50 (48 Hr.) water flea = 3.82 mg/L, flow-through conditions; EC50(24 Hr.) photobacterium phosphoreum = 0.0084 mg/L, Microtox test.

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.

**** SECTION 14 - TRANSPORT INFORMATION ****

US DOT

No information available

Canadian TDG

No information available.

**** SECTION 15 - REGULATORY INFORMATION ****

US FEDERAL

TSCA

CAS# 1330-20-7 is listed on the TSCA inventory.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 1330-20-7 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

Xylene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level:

None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN

Risk Phrases:

R 10 Flammable.
R 20/21 Harmful by inhalation and in contact with skin.
R 38 Irritating to skin.

Safety Phrases:

S 25 Avoid contact with eyes.

WGK (Water Danger/Protection)

CAS# 1330-20-7: 2

United Kingdom Occupational Exposure Limits

CAS# 1330-20-7: OES-United Kingdom, TWA 100 ppm TWA; 441 mg/m3 TWA
CAS# 1330-20-7: OES-United Kingdom, STEL 150 ppm STEL; 662 mg/m3 STEL

Canada

CAS# 1330-20-7 is listed on Canada's DSL List.
CAS# 1330-20-7 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 1330-20-7: OEL-ARAB Republic of Egypt:TWA 0.5 ppm (0.9 mg/m3)
OEL-AUSTRALIA:TWA 80 ppm (330 mg/m3);STEL 150 ppm (655 mg/m3)
OEL-BELGIUM:TWA 100 ppm (434 mg/m3);STEL 150 ppm (651 mg/m3)
OEL-CZECHOSLOVAKIA:TWA 200 mg/m3;STEL 1000 mg/m3
OEL-DENMARK:TWA 50 ppm (217 mg/m3);Skin
OEL-FINLAND:TWA 100 ppm (435 mg/m3);STEL 150 ppm;Skin
OEL-FRANCE:TWA 100 ppm (435 mg/m3);STEL 150 ppm (650 mg/m3)
OEL-GERMANY:TWA 100 ppm (440 mg/m3)
OEL-HUNGARY:TWA 100 mg/m3;STEL 300 mg/m3
OEL-JAPAN:TWA 100 ppm (430 mg/m3)
OEL-THE NETHERLANDS:TWA 100 ppm (435 mg/m3);Skin
OEL-THE PHILIPPINES:TWA 0.1 mg/m3
OEL-POLAND:TWA 100 mg/m3
OEL-SWEDEN:TWA 50 ppm (200 mg/m3);STEL 100 ppm (450 mg/m3);Skin
OEL-SWITZERLAND:TWA 100 ppm (436 mg/m3);STEL 200 ppm (870 mg/m3)
OEL-THAILAND:TWA 100 ppm (435 mg/m3)
OEL-TURKEY:TWA 100 ppm (435 mg/m3)
OEL-UNITED KINGDOM:TWA 100 ppm (435 mg/m3);STEL 150 ppm;Skin
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 6/22/1999 Revision #3 Date: 3/14/2001

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APPENDIX C
TRAINING CERTIFICATES

CERTIFICATE OF COMPLETION

HAZARDOUS WASTE OPERATIONS REFRESHER

Kevin Ignaszak

Has successfully completed a course of study prescribed by OSHA 29 CFR 1910.120 (q)(6)(i)

Completed on this Date: 5/13/04

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James E. Sorel, MS, CIH
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HAZARDOUS WASTE OPERATIONS REFRESHER

Luann Meyer

Has successfully completed a course of study prescribed by OSHA 29 CFR 1910.120 (q)(6)(i)

Completed on this Date: 5/13/04

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HAZARDOUS WASTE OPERATIONS REFRESHER

Rebecca Gerardi

Has successfully completed a course of study prescribed by
OSHA 29 CFR 1910.120 (e)
Date of Training: March 6, 2003

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HAZARDOUS WASTE OPERATIONS

REFRESHER

Peter H. Smith

Has successfully completed a course of study prescribed by OSHA 29 CFR 1910.120 (q)(6)(i)

Completed on this Date: 5/13/04

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Presented By

CONDOR

ADAM CUMMINGS

has completed a 40 Hour course in Hazardous Materials and Site Investigations required by OSHA 29 CFR 1910.120

Presented this

NOVEMBER 20, 2003

CONDOR GEOTECHNICAL SERVICES, INC

Philip T. Cruz

BRADFORD PUBLISHING

NO. B.-R. 4

R • I • T

Rochester Institute of Technology
College of Applied Science & Technology
Civil Engineering Technology, Environmental
Management & Safety Department

40-Hour HazWOper Certification

is hereby awarded to

Travis Money

for successful completion of the Environmental
Health & Safety course and lab

November 7, 2003

Jennifer Schneider

Dr. Jennifer Schneider, CIH
Associate Professor

CERTIFICATE OF COMPLETION
HAZARDOUS WASTE OPERATIONS REFRESHER

David Gnage

Has successfully completed a course of study prescribed by OSHA 29 CFR 1910.120 (q)(6)(i)

Completed on this Date: 5/13/04

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David P. Belaskas

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Completed on this Date: 5/13/04

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APPENDIX C

CITIZEN PARTICIPATION PLAN

APPENDIX D

COMMUNITY AIR MONITORING PLAN

FOR

399 GREGORY STREET
ROCHESTER, NEW YORK

DECEMBER 2004

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
6274 EAST AVON-LIMA ROAD
AVON, NEW YORK 14414

Prepared on behalf of:

CITY OF ROCHESTER
30 CHURCH STREET, SUITE 300B
ROCHESTER, NEW YORK 14614

Prepared by:

STANTEC CONSULTING GROUP, INC.
85 METRO PARK
ROCHESTER, NEW YORK 14623

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- 2.2 Work Area Monitoring 2
- 2.3 Minor Vapor Emission Response Plan 3
- 2.4 Major Vapor Emission Response Plan 3

3.0 Record Keeping and Quality Control 5

Figures

Figure 1 Site Location Map
Figure 2 Proposed Boring and Monitoring Well Location Map

1.0 Introduction

This Community Air Monitoring Plan (CAMP) has been prepared by Stantec on behalf of City of Rochester. This CAMP addresses potential volatile organic compound (VOC) air quality issues which may arise during planned Remedial Investigation activities at 399 Gregory Street, Rochester, New York (Site) (Figures 1).

The investigation activities planned during the portion of the project covered by this CAMP include Geoprobe and monitoring well soil borings, groundwater monitoring well installations, test pit and soil and groundwater sampling.

Based on previous studies completed at the Site and the Site's history, the primary chemicals of concern at the subject site are various volatile organic compounds (VOCs). Volatilization of the organic compounds through disturbance of soils and/or groundwater could result in releases to the ambient air creating possible nuisance or health threats to the neighborhood.

This CAMP details real-time monitoring activities to be carried out during the remedial investigation activities, to minimize the potential for neighborhood exposure to airborne hazards resulting from fugitive emissions during the field work.

Air monitoring and response actions for VOCs are included in this CAMP. VOC monitoring of the work areas will also be conducted as part of the Health and Safety Plan (HASP) that will be implemented during Remedial Investigation activities by Stantec.

2.0 Methodology

The Remedial Investigation activities at the site will consist primarily of soil borings. The following programs will be implemented to monitor and, if necessary, control the potential migration of fugitive VOCs on the property.

2.1 Perimeter Monitoring

For each day of intrusive field work, a wind sock or flag will be used to monitor wind direction in the area of the work zone. Based upon the daily wind direction, two temporary monitoring points will be identified, one upwind and one downwind of the work area, at the perimeter of the site or field work location.

VOC monitoring will be done with a photoionization detector (PID-MiniRAE Model 2000 or its equivalent) fitted with an 10.6 eV lamp. Prior to the commencement of field work each day, background measurements of VOC concentrations will be logged at the upwind and downwind locations with the drill rig engine and any other gas/diesel engines operating on site. Thereafter, readings will be recorded at approximate 30-minute intervals. These readings will be used to observe the difference between upwind and downwind VOC levels. If at any time, the downwind VOC levels exceed upwind levels (adjusted for engine exhaust) by 5 ppm, the work will be temporarily halted. The Contractor will then be required to implement means necessary to control VOCs and explosive gasses, similar to those discussed in Section 2.3.

Monitoring for explosivity using an explosive gas meter will be routinely conducted during site activities as a precautionary measure to ensure site personnel are not subjected to any dangerous conditions.

2.2 Work Area Monitoring

In addition to perimeter monitoring, monitoring for VOCs and explosive gases will be carried out continuously within the work area to monitor personal exposures and to compare work area readings with downwind and upwind readings. The first readings of the day will be obtained prior to the commencement of work to obtain daily background readings. Readings will be logged along with the perimeter measurements. Specific monitoring procedures to be used in the work zone can be found in the Health and Safety Plan (HASP) prepared for the activities at this site.

2.3 Minor Vapor Emission Response Plan

If the ambient air concentration of total organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the total organic vapor level decreases below 5 ppm

above background, work activities can resume, with emphasis given to observing spikes in levels. If the total organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 ft. downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background. (The locations of structures in the subject neighborhood may not allow the 200 ft. buffer zone to be used).

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to evaluate if the vapor emission levels exceed those specified in Section 2.4, Major Vapor Emission Response Plan.

2.4 Major Vapor Emission Response Plan

If total organic vapor levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial structure, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, total organic vapor levels greater than 5 ppm above background persist 200 feet downwind or half the distance to the nearest residential or commercial structure, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 foot zone).

If efforts to abate the emission source area are unsuccessful and if the organic vapor levels continue to persist at or near 5 ppm above background for more than 30 minutes in the 20 foot zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

The Major Vapor Emission Response Plan shall also be immediately placed into effect if organic vapor levels are greater than 10 ppm above background at the 20 foot zone.

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan will be contacted.

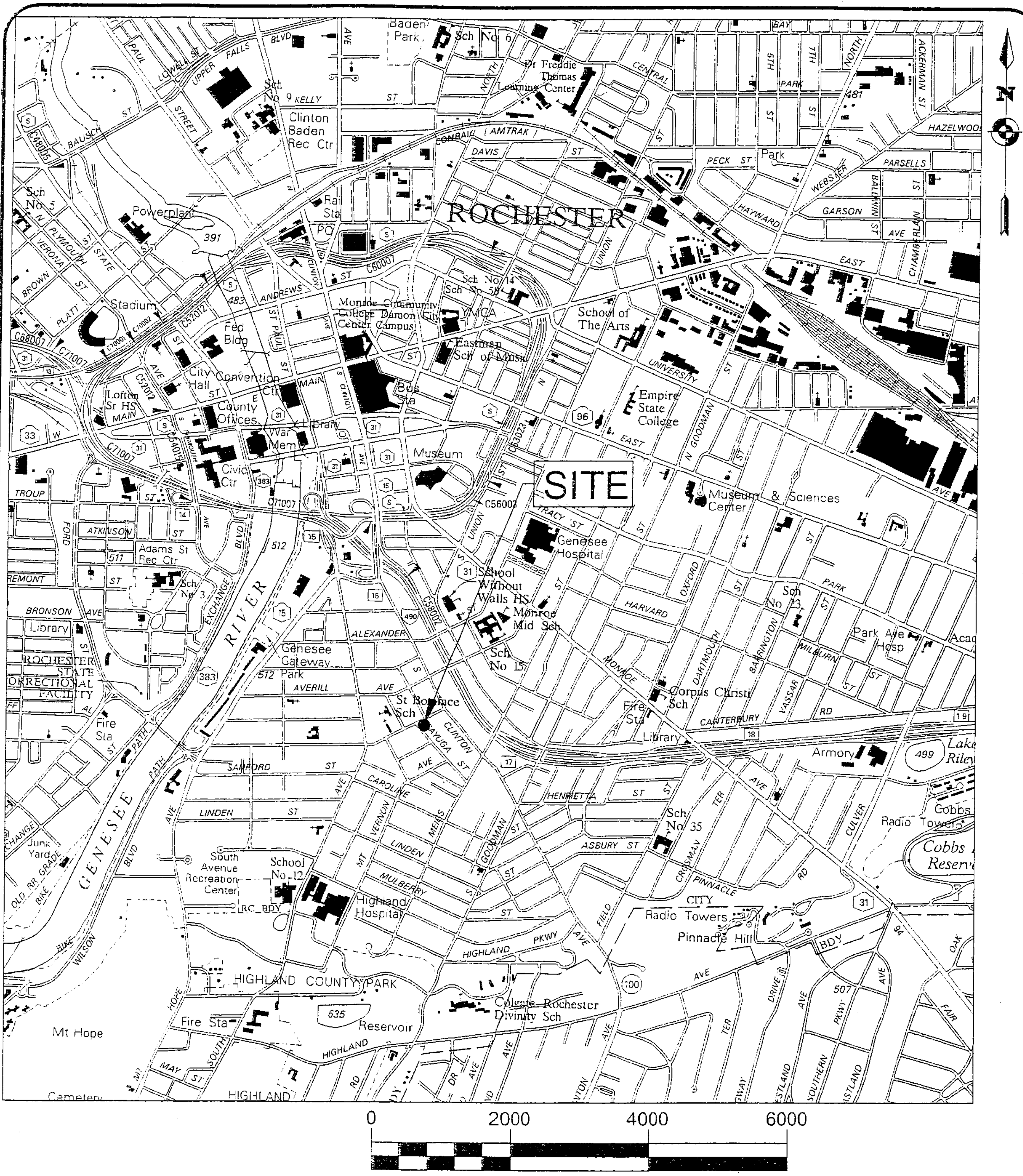
2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation. Evacuation or neighborhood notification plans can be discussed at that time.

3. Air monitoring will be conducted at 30-minute intervals within the 20-Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

3.0 Record Keeping and Quality Control

For the duration of the field activities, a monitoring log book will be kept to record calibration, operational notes and monitoring readings. The results of the Community Air Monitoring Program will be incorporated by Stantec into the required reports.

Instrumentation will be calibrated and/or operationally checked, either daily or at intervals recommended by the manufacturer. Only approved calibration gases will be used. All operators will have been trained in the proper use, maintenance, limitation, and interpretation of results of the monitoring equipment.



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SCALE
1"=2000'
FIRST ISSUE DATE

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PROJECT
BROWNFIELD ASSESSMENT SITE
399 GREGORY STREET
ROCHESTER, NEW YORK

TITLE OF DRAWING
SITE LOCATION MAP

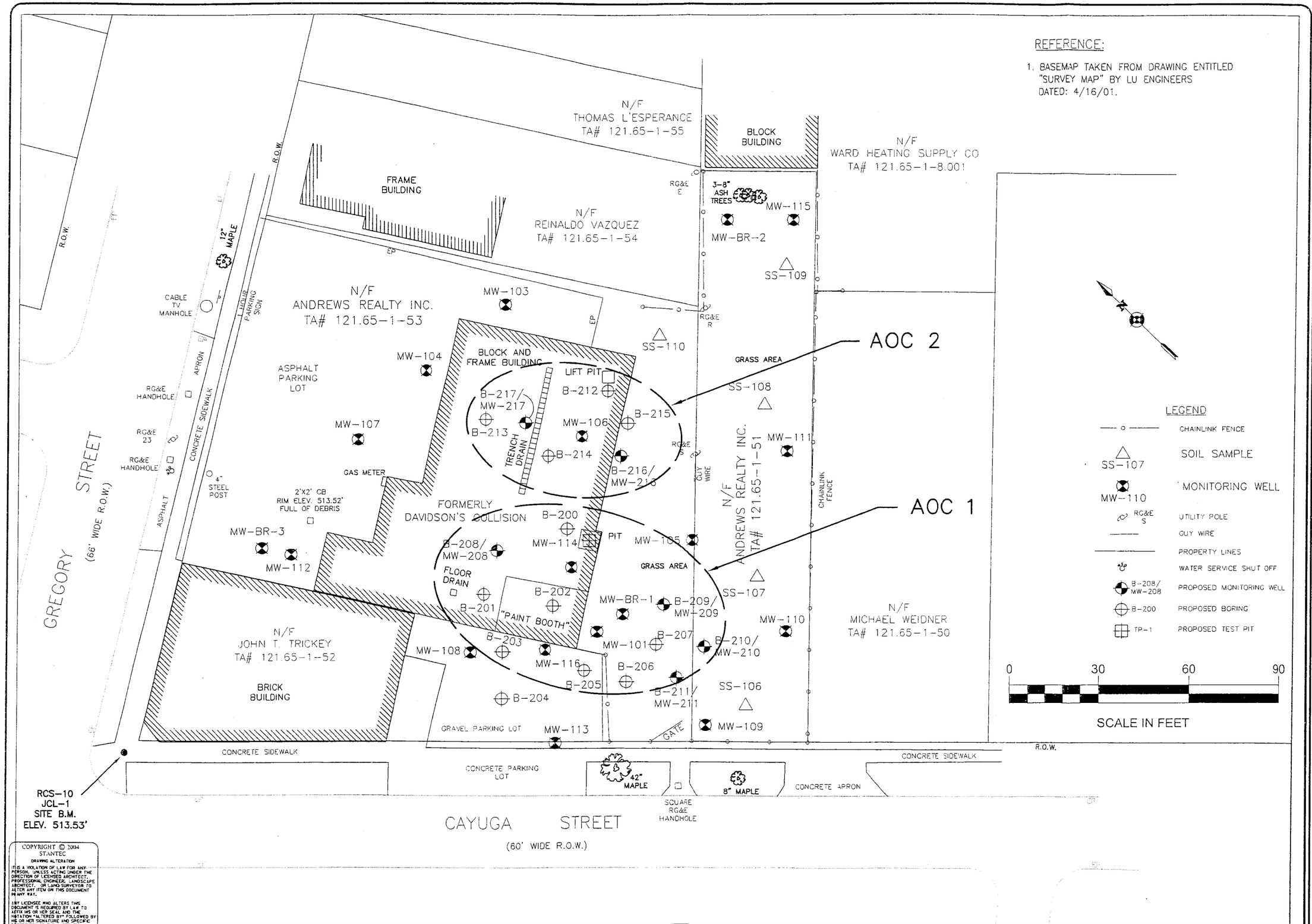
PROJECT NO.
190500196
DRAWING NO.
1

Profile: LandDevelopment(Desk)
Jd: LESSA

Plotting Parameters
Plotted By: dlass
Dwg. File: U:\WRSCORK\drawing\F62.dwg
Plotted: Dec 15, 2004 - 10:51am

REFERENCE:

1. BASEMAP TAKEN FROM DRAWING ENTITLED "SURVEY MAP" BY LU ENGINEERS DATED: 4/16/01.



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6		
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2		
1		
0	REVISIONS	DATE BY

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TITLE OF DRAWING
PROPOSED SOIL BORING AND MONITORING WELL LOCATION MAP

PROJECT NO.
190500196

DRAWING NO.
2