# REMEDIAL INVESTIGATION/FEASIBILITY STUDY
# WORK PLAN
# ORDER-OF-CONSENT INDEX #B8-0400-92-03

## GENERAL CIRCUITS INACTIVE
## HAZARDOUS WASTE SITE
## NYSDEC SITE CODE #828085
## 95 MT. READ BLVD.
## ROCHESTER, NEW YORK

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|---|---|
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| Project #: | 1275S-97 |
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# I. INTRODUCTION

The subject site is located at 95 Mt. Read Boulevard, City of Rochester, Monroe County, New York (Site.) Drawing SR-1 included in Appendix A illustrates the location of the Site. Currently, the Site is listed by the New York State Department of Environmental Conservation (NYSDEC) as a Class 2 inactive hazardous waste site (NYSDEC Site Code #828085). This work plan presents the details of a Remedial Investigation and Feasibility Study (RI/FS) that will be implemented. The RI/FS will be performed under Order-of-Consent Index #B8-0400-92-03. The goals of the Order-on-Consent (Order) are to develop and implement a RI/FS for the Site, and to reimburse the NYSDEC for its administrative costs.

## 1.1 Background

The Site consists of approximately 3.5 acres of land improved primarily by a single story 120,000 square-foot building. The original portion of the building was constructed in the 1920's, and the Site was operated as a printing company until the early 1960's. Rochester Lithograph Corporation was a former owner/operator of the Site when it was operated as a printing business. It has been reported that Pluta Manufacturing acquired the property around 1960 and began General Circuits, a printed circuit board manufacturer. Several expansions were constructed in the 1960's and 1970's that increased the floor space of the building about four times the original size. General Circuits was then acquired in 1979 by Brand-Rex, a division of Akzona. In 1985, the name Brand-Rex was changed to BRIntec after a leveraged buyout. In June, 1990, General Circuits (a Divisions of BRIntec) closed as a result of bankruptcy. The current owner of the Site purchased it in mid-1991, and has subdivided and leased the building to small light-industrial and commercial businesses. The Site is located in a predominantly industrial area of the City of Rochester. The Site and adjoining properties are serviced by public water.

In 1990, Environmental Resources Management, Inc. (ERM) conducted a Phase I Environmental Site Assessment of the Site. ERM also performed a Phase II study consisting of test borings, hand borings, soil/sediment sampling and analysis, installation of groundwater monitoring wells, groundwater sampling and analysis, and development of a cost estimate for building cleaning/decommissioning. Copies of key figures and tables from the ERM report are included in Appendix B. Also, the NYSDEC has a copy of the ERM report. Figure 4-1 in Appendix B shows the layout of the building and identified the different areas of the building by name (i.e., Shipping Room, Chemical Storage Room, etc.). Figure 4.1 also shows the soil and groundwater sampling locations. Areas within the facility that ERM identified during the Phase I assessment as having the potential to release contaminants into subsurface materials beneath the building included the following:

- the Baker Line and Copper-Tin-Lead Plating area in the Wet Process Room,
- the Entek Room,

- the Flammables Storage Area
- the Gold Plate Room,
- the Tin Immersion Room,
- the Gyrex Room,
- the wastewater treatment system in the basement, and
- the Blanketing and Screening Department.

The ERM report indicated that these areas "were the focus of efforts to collect soil samples from beneath the concrete floor for laboratory analysis to identify chemical constituents of concern related to former metal plating operations". The soil sampling "locations were selected in areas of concern identified by ERM based upon the presence of exposed soils in floor trenches, visual evidence of cracks or surficial deterioration of the concrete floor, the types of materials used in process or stored in a particular area, or the type of activities that occurred in particular areas. Soil samples could not be obtained at some locations initially selected due to either the presence of gravel-size stone in the subgrade, or an inability to penetrate the concrete floor. A total of 16 soil samples were collected during Phase 2 activities, including 15 samples from soils beneath the building floor, and one background sample from the lawn east of the building. Each soil sample was analyzed for total and leachable concentrations of copper, lead, nickel, tin, total cyanide, and moisture content...Selected samples were also analyzed for Target Compound List VOCs...Two additional soil samples were collected for laboratory analysis during installation of two monitoring wells inside the building (MW-9 and MW-10)."

The analytical results for the soil samples are summarized in ERM's Table 4-2 included in Appendix B. The ERM report concluded that: "Although the total concentration of metals for some of the soil samples were significant, the data for leachable analyses indicated that the metals are not being leached from the soils. Based on the leaching test data, metals are not being released to the environmental in significant concentrations. Subsequently, those areas of the facility with soils containing metals do not appear to present a significant environmental risk".

ERM also installed ten groundwater monitoring wells at various locations on the Site. Refer to Figure 4-1 in Appendix B. These wells included three overburden wells (MW-1, MW-4 and MW-5) and four bedrock wells (MW-2, MW-3, MW-6 and MW-7) on the exterior of the building, and three overburden wells (MW-8, MW-9 and MW-10) inside the building. In addition, groundwater samples were collected from several drains and sumps located in the basement of the building. A summary of the analytical results is presented in ERM's Table 4-4 and 4-5, which are included in Appendix B. The analytical results indicated that the overburden groundwater beneath the building located at the Site was contaminated with various

VOCs, included the chlorinated VOCs trichloroethene (TCE) and tetrachloroethene (also known as perchloroethene or PCE). According to the ERM report, total VOCs were detected in groundwater samples collected from inside the building at concentrations as high as 252 parts per million (ppm). According to ERM, the suspected source of the VOCs was historical usage of chlorinated solvent degreasers that were disposed of on the ground prior to the plant expansion. Metals and cyanide were not detected in the groundwater samples analyzed.

In 1991, the current owner of the Site had the building cleaned and decommissioned. The NYSDEC was involved during this process, and has records of the wastes and materials that were shipped off-site. After this clean-up was complete, the equipment in the building was auctioned and removed from the Site. The current owner then began subdividing and leasing space in the building.

In 1992, the current owner installed a passive groundwater treatment system in the basement of the building. The treatment system is designed to treat groundwater that accumulates in the basement foundation drains and sump system. As indicated in the ERM report, the groundwater is contaminated with volatile organic compounds (VOCs). Also, the ERM report concluded that "off-site migration is mitigated since the basement appears to act as a sump, drawing the VOCs through the soil layer into the basement". The treatment system involves removal of VOCs from the groundwater using activated carbon. A permit to discharge the effluent from the treatment system to the sanitary sewer system was obtained from Monroe County Pure Waters. Periodic sampling of the influent and effluent of the treatment system has been performed to monitor the effectiveness of the system, and to insure compliance with permit conditions. The NYSDEC has been provided with copies of the monitoring data when it has been requested.

In early 1993, ambient air monitoring was performed in the basement of the building at the Site to satisfy a request of the New York State Department of Health. The air monitoring involved the collection and analysis of air samples for VOCs. The analytical results indicated that VOCs were not present in the air of the basement above permissible exposure limits.

In the Spring of 1995, the wells installed by ERM were resampled by the NYSDEC and Day Environmental, Inc. (DAY). The results generally supported the previous data generated by ERM that VOCs are only present in one of the four original bedrock wells (MW-6) located on the exterior of the building. The overburden wells located in the building still contained part per million concentrations of VOCs. Also, part per million concentrations of chromium were detected in two overburden wells located inside the building. The NYSDEC has copies of these analytical results.

The source of the chromium contamination appears to be the result of a former process that used chromic acid to etch copper circuit boards. It has been reported that the etching process utilizing chromic acid was performed in one area of the building (formerly known as the "Shipping Room") from the early 1960's through the early 1970's. According to a former General Circuits Inc. employee, the use of chromic acid resulted in the deterioration of underground cast iron and PVC piping that was initially used to transfer the chromic acid between etching machines. As a result, releases of chromic acid into the underlying soil and/or groundwater appears to have occurred in this area of the building. Since chromium was not detected in the exterior wells during the Spring of 1995 sampling event described above, there seemed to be indications that the chromium was also contained to an area underneath the building (i.e., chromium contamination had not migrated beyond the footprint of the building).

The NYSDEC requested that additional work be conducted at the Site to further delineate the extent of the VOC and chromium contamination. A "Subsurface Investigation Work Plan" was prepared and submitted to the NYSDEC for review and comment. The work plan was implemented in late 1995, and a report entitled "Subsurface Investigation Report" was prepared. This report, dated January, 1996, described the details of the investigative work that was performed. A copy of this report was submitted to the NYSDEC. A summary of the conclusions from that report is provided below:

- A light-toned, disturbed area devoid of vegetation and about 10,000 to 20,000 square feet in size (approximately 0.23 to 0.46 acres) was observed northwest of the original building in the 1961 to 1951 aerial photographs. The disturbed area observed in the 1961 and 1951 aerial photographs is located in close proximity to interior monitoring wells MW-8, MW-9, MW-10, MW-11 and the basement. Refer to Drawing No. SR-2 in Appendix A. Two smaller, light-toned, disturbed areas devoid of vegetation were also observed south and west of the southwestern corner of the original building (beneath the western addition) in the 1951 aerial photograph. These disturbed areas appeared to represent areas at the Site where materials (e.g., solvents containing VOCs) could have been disposed of on the ground surface immediately west of the original building prior to the construction of the western building addition.

- A former process involving chromic acid was performed in the area of the building formerly known as the "Shipping Room". This room contains glass-lined floor drains that were evaluated as part of this investigation.

- The foundation drains and sump system appear to be draining or dewatering groundwater from the building foundation; thus, the basement appears to act as "sink" or "sump" for groundwater present within the overburden beneath the building in the vicinity of the basement. Groundwater in the vicinity of the basement appears to flow radially towards the basement sump system. Refer to Drawing No. SR-3 in Appendix A. The extent and distribution of VOCs in the groundwater in the vicinity of the basement also indicates that the basement is controlling groundwater movement in a localized area in the vicinity of the basement.

- Five soil samples obtained from underneath the building floor slab in the vicinity of the former "Shipping Room" were analyzed for VOCs. The analytical results indicate that acetone, PCE, and TCE were present in the soil samples at concentrations below their respective NYSDEC soil cleanup objectives.

- Thirteen monitoring wells and the basement sump were also analyzed for VOCs. TCE, PCE, and their degradation products (e.g., cis-1,2,-dichloroethene; trans-1,2,-dichloroethene; 1,2,-dichloroethene; and vinyl chloride) were detected at the highest concentrations. Refer to Drawing No. SR-2 in Appendix A. The highest concentrations of total VOCs were detected in the interior overburden wells and the sample collected from the basement sump system. These results are summarized below:

| Sample/Well | Total VOCs (ug/l) |
|---|---|
| MW-9 | 192,900 |
| MW-10 | 19,100 |
| MW-12 | 3,810 |
| MW-8 | 2,237 |
| Basement Sump | 13,730 |

VOCs were detected in five of the seven exterior monitoring wells. The highest concentration of total VOCs in the exterior wells was 130 ug/l, which was detected in exterior monitoring well MW-6, located on the northern portion of the Site. Exterior monitoring well MW-16, located on the southwestern portion of the Site, contained 68 ug/l of total VOCs; and exterior monitoring wells MW-7, MW-3 and MW-14 contained an estimated concentration of total VOCs of 8 ug/l, 4 ug/l, and 3 ug/l, respectively. VOCs were not detected in exterior monitoring wells MW-1 and MW-4.

The groundwater analytical results indicate that the highest concentration of VOCs are located beneath the building, and that only lower part per billion concentrations of VOCs have been detected in the monitoring wells located outside the building. It appears that the primary reason that VOCs have not migrated beyond the building foundation at higher concentrations is that the groundwater flow direction in the suspected VOC source area is towards the basement. As previously stated, the basement is acting as a "sink" or "sump", drawing VOC-contaminated groundwater present within the overburden into the basement sump system.

The passive groundwater treatment system that is currently operating in the basement is effectively treating the VOC-contaminated groundwater that is entering the basement sump system. The Site owner is committed to continuing the operation of this treatment system until total VOC concentrations are below applicable sewer discharge limits.

- The highest concentration of total and hexavalent chromium was detected in the soils samples collected from inside the former "Shipping Room". Total chromium was detected in four of the five samples at concentrations that exceed the NYSDEC soil cleanup objective value 10 ug/g and the New York State background range for chromium. The results of one soil sample indicate that at least some of the soils in the unsaturated zone beneath the former "Shipping Room" exceed the USEPA TCLP regulatory level for chromium, and that these soils would be considered a characteristic hazardous waste if removed for disposal. Based on the analytical data obtained, the former "Shipping Room" area appears to be the source of the chromium contamination at the Site.

  Parts per million concentrations of chromium and hexavalent chromium are also present in the groundwater in monitoring well MW-8, located immediately downgradient of the former "Shipping Room". Refer to Drawing No. SR-4 in Appendix A. However, the next-most downgradient well (MW-9) and the basement sump system contain chromium at concentrations of only 38 and 4.5 ug/l respectively. The NYSDEC groundwater standard is 50 ug/l for chromium. In addition, the concentration of chromium in the basement sump system does not exceed the sewer use effluent limit for chromium of 3,000 ug/l (or 3 mg/l).

  Concentrations of chromium detected in the wells located outside of the building ranged from non-detect to 10.6 ug/l in monitoring well MW-6. The concentration of total chromium detected in the exterior monitoring wells is below the NYSDEC groundwater standard for chromium of 50 ug/l.

The Subsurface Investigation report also provided the following recommendations:

- The glass-lined floor drains within the former "Shipping Room" should be removed (e.g., to at least the point where the "snake" met refusal), and any sediments within the drains should also be removed, characterized, and disposed of in accordance with applicable regulations. During the removal of these floor drains, the integrity of the piping should be assessed to identify areas where leaks or spills may have occurred, and to further characterize the extent of chromium contamination. At this time, it may be also warranted to remove a limited amount of chromium impacted soils (i.e., grossly contaminated soils acting as a potential source of groundwater contamination), and to conduct additional soil sampling and laboratory analysis to further assess the extent of chromium contamination. The excavated soil should be disposed of off-site in accordance with applicable regulations. After removing the floor drains and any impacted soil, and after further assessing the extent of chromium contamination, the concrete floor should be restored.

- The interior wells should be resampled for chromium on a periodic (i.e., semi-annual) basis to monitor the wells for patterns or seasonal trends in groundwater quality. The analytical results should be provided to the NYSDEC for review.

- The exterior monitoring wells should be resampled for VOCs to monitor for patterns of seasonal trends in groundwater quality. It is recommended that monitoring wells MW-6 and MW-16 (and MW-15 if this well contains groundwater) be resampled quarterly, and that the remaining exterior wells be sampled annually. The analytical results should be provided to the NYSDEC for review.

The recommendation to resample the six interior wells for chromium was implemented in September, 1996. The results indicated that chromium was detected in wells MW-8, MW-9 and MW-12. Well MW-8 contained the highest concentration of total chromium (60.1 mg/l), followed by well MW-12 (4.21 mg/l), and well MW-9 (0.0931 mg/l). Hexavalent chromium was also detected in wells MW-8 and MW-12 at concentrations of 57.5 mg/l and 4.4 mg/l, respectively. The concentrations detected in these wells exceed the NYSDEC Class GA groundwater standard for total and hexavalent chromium of 0.050 mg/l. The analytical results indicated that chromium was not detected in wells MW-13, MW-11 and MW-10. These results seem to indicate that the chromium contaminated groundwater is localized in the areas of the former "Shipping Room" (i.e., source area), and immediately downgradient of the former "Shipping Room". A letter that presented the results of this sampling program was submitted to the NYSDEC in October 1996.

The recommendation to address the suspected source area of the chromium contamination was implemented in late 1996. In general, the field activities included the removal of the glass-lined floor drains and adjacent soils in the former "Shipping Room", evaluating the integrity of the drain lines, and the collection and analysis of additional soil samples from the excavation. A brief summary of the work that was completed is provided below:

- The floor in the former "Shipping Room" was removed and a pit was excavated in the area of the glass-lined floor drains. The glass-lined floor drains were approximately half full of a dry greenish colored sediment. An underground sump associated with the floor drains was encountered during the excavation. The floor drains were connected to another glass-lined drain which discharged out the side wall of the excavation. Refer to Drawing No. SR-5 in Appendix A. The discharge location of this discharge pipe was unknown. This drain line did not contain any sediments. The glass-lined floor drains and sump were removed from the excavated pit. The sediments were collected and disposed of off-site in accordance with applicable regulations.

  Also, two cast iron pipes were observed to enter the west wall of the excavated pit at approximately 3.3' below grade. These pipes were clogged with brown sediment/debris and did not appear to be functional. These two lines could have been part of a former floor drain system that discharged to the sanitary sewer. These lines were capped and sealed with concrete prior to backfilling the excavated pit.

- The glass-lined drain that served as the discharge pipe was open and functional. This line was videotaped and was confirmed to be constructed of glass for approximately 10', and then it changed to cast iron pipe, and eventually to clay tile pipe. The integrity of this drain line appeared in relatively good condition with the exception of signs of infiltration at some pipe joints. It appeared that this drain line flowed east toward Mt. Read Boulevard. The line was videotaped approximately 52' before the camera hit an obstruction in the line that kept it from advancing any further. It appears that this line discharges to the sanitary sewer system. The opening to this drain line was capped and sealed with concrete prior to backfilling the excavated pit.

- Confirmatory soil samples were collected from six locations within the excavated pit (two from the pit floor [i.e., locations 1-1 and 1-5] and four from the pit sidewalls [locations 1-2, 1-3, 1-4, and 1-6]). The sampling locations and detected chromium concentrations for each sample are shown on the field sketch (Drawing SR-5) included in Appendix A. As shown, the total chromium concentrations ranged from 2,390 ppm to 21,400 ppm. The current NYSDEC soil cleanup objective for chromium is listed as 10 ppm or site background. (Note, the NYSDEC has proposed to revise the chromium soil cleanup objective to 50 ppm, or site background). The analytical results obtained exceed both the current and proposed NYSDEC soil cleanup objective.

- Two of the confirmatory soil samples (locations 1-3 and 1-5) were also analyzed for TCLP chromium. The confirmatory sample from location 1-3 contained 98.2 mg/l of leachable chromium, and from location 1-5 contained 7.37 mg/l of leachable chromium. The USEPA TCLP regulatory level for chromium is 5.0 mg/l. Thus, the soils excavated from this area were disposed of off-site as a hazardous waste.

- A test boring was also advanced in the area of the former sump (location 1-5) in order to obtain information regarding the vertical extent of chromium contamination. The analytical results are summarized below:

  0-2' below pit floor: 2590 ppm
  2-4' below pit floor: 1460 ppm
  4-6' below pit floor: 100 ppm

It should be noted that a depth of 4 to 6 feet below the excavated pit floor corresponds to a depth of approximately 7.7 to 9.7 below floor grade, and that the depth to groundwater in the former "Shipping Room" (as measured in well MW-12) was approximately 8.0 feet below grade on the day of soil sampling. Thus, the sample collected from 4 to 6 feet below the pit floor was in the saturated zone.

Based on the results of the investigation/remedial work conducted in the suspected source area of the chromium contamination, a decision was made to backfill the excavated pit and restore the concrete floor because further removal of chromium-impacted soils was not practical. The best approach for remediating the chromium contamination appeared to be the containment, collection, and treatment of the groundwater in the vicinity of the former "Shipping Room" and well MW-8. Also, further delineation of the extent of chromium contamination would need to be performed. The analytical data described above in relation to this chromium remediation project was submitted to the NYSDEC during a meeting on March 26, 1997.

In February, 1997, the NYSDEC indicated that the current owner of the assessed property must enter into an Order-on-Consent (Order) that commits to the implementation of an investigation designed to satisfy the requirements for a full site evaluation, or that the NYSDEC will have an investigation conducted on the property. On March 26, 1997, a meeting was held with representatives of the NYSDEC to obtain input regarding the investigative approach that the NYSDEC wants to implement at this Site under the Order. The NYSDEC representatives indicated that the following items should be addressed:

1) The sources of VOC and chromium contamination should be delineated. Also the potential for non-aqueous phase liquids (NAPL) must be evaluated as part of the delineation process. Installing borings in the building, or conducting a soil gas survey, could assist in source delineation.

2) Sample the Site for other constituents besides VOCs and chromium to insure that there are no other "contaminants of concern".

3) Install additional wells, including "down-gradient" wells.

4) The remedial investigation must "lead up" to a feasibility study evaluating remedial options (i.e., pump and treat; dual phase treatment, etc.) for the Site, if warranted. The work plan must include Quality Assurance/Quality Control (QA/QC), Citizen Participation, and the other requirements typical for an RI/FS.

## 1.2 Objectives

The objective of the work plan described in this RI/FS Work Plan is to comply with the Order and to satisfy the requirements of the NYSDEC as presented above.

Additional tasks, or modification to tasks already identified as part of this work plan, may be necessary as new information is generated during the implementation of this RI/FS Work Plan. Prior to modifying this work plan or conducting additional tasks, the NYSDEC will be notified for input and approval.

## 2.0 WORK PLAN

The following tasks will be performed to accomplish the RI/FS at the Site. Table 1 in Appendix C provides a summary of the proposed tasks.

### 2.1 Overburden Test Borings

#### 2.1.1 Overburden Test Boring Locations

Overburden test borings will be advanced inside the building to evaluate if contamination exists in the overburden below the concrete floor and to further delineate the suspected sources of contamination. It is anticipated that 35 to 45 boreholes will be advanced.

Initially, about 22 boreholes will be advanced inside the building at the node points of an approximately 70' grid. Refer to Figure SR-6 in Appendix C. This approach will be utilized to obtain information regarding general conditions below the building floor slab. The remaining 13 to 23 boreholes will be used to delineate any areas of contamination encountered during the grid work, and to further delineate the suspected source areas of contamination. As identified in the background section, the following suspect source areas have already been identified.

- The former shipping room is suspected to be the source area for the chromium contamination at the Site. As previously discussed, investigative and remedial work has been performed inside the former "Shipping Room", so additional test borings will primarily focus on areas south/southeast and north/northwest of the former "Shipping Area". (Refer to Figure SR-6).

- The disturbed area observed in the 1961 and 1951 aerial photographs that is located in proximity to interior monitoring wells MW-8, MW-9, MW-10, MW-11 and the basement is a suspected source for VOCs at the Site. This is the area of the highest concentrations of VOCs detected at the Site, and it is suspected that dumping could have occurred in this area prior to the construction of the additions to the building. Additional boreholes will be advanced in this area to further delineate the extent of VOC contamination. The location of these boreholes will be based on aerial interpretation and field accessibility.

- The two smaller, light-toned disturbed areas devoid of vegetation that were observed in the 1951 aerial photographs that are located under the western addition to the building could also be suspected sources for contamination at the Site. Additional boreholes will be advanced in the general area of these disturbed areas in order to determine if contamination exists. The location of these boreholes will be based on aerial interpretation and field accessibility.

The location of the rest of the boreholes will be dependent on the results of the field work. Note, the exact location of the boreholes may vary from the locations shown on Figure SR-6 due to physical constraints in the building, access difficulties caused by tenant operations (i.e., it will not be possible to install probe holes in office spaces, etc.), geologic conditions, and other such factors.

### 2.1.2 Installation and Sampling Techniques

The test borings will be advanced using a remote Geoprobe unit capable of being placed indoors. The Geoprobe unit is equipped with rotary concrete drill bits capable of cutting through standard concrete floors. It is anticipated that the boreholes will be advanced to bedrock (i.e., a depth of about 14 feet below grade), or to equipment refusal.

To collect soil samples, a Macro Core open sampler will be used. These samplers are open tube design and measure approximately 2" in diameter by 46" long. The samplers are fitted with a removable cutting shoe and disposable (i.e., one use) clear acetate liners. It is anticipated that samples will be collected from 0' to 4', 4' to 8', 8' to 12', and 12' to 14' below grade. As a result, it is planned that a total of four samples will be collected from each borehole. The recovered samples will be observed for evidence of suspect contamination (e.g. staining, odors), and will be scanned with a flame ionization detector (FID) and/or a photoionization detector (PID) equipped with a 10.6 eV lamp in order to determine if VOCs are present in the samples. Headspace samples will also be prepared from selected split spoon samples, and scanned with the FID and/or PID meter. A portion of selected split spoon samples will be placed in pre-cleaned laboratory containers, and preserved for possible analysis.

An on-site geologist or technician will record pertinent information for each borehole in a field book, whereupon portions of information will subsequently be transcribed onto boring logs. The recorded information will include:

- Date, borehole identification, and project identification
- Name of individual developing the log
- Names of driller and assistant(s)
- Drill make and model, auger size
- Identification of alternative drilling methods used and justification thereof (e.g., use of hand-operated Geoprobe equipment, etc.)
- Depths recorded in feet and fractions thereof (tenths of feet) referenced to ground surface
- The length of the sample interval and the length of the sample recovered
- The depth of the first encountered water table, along with the method of determination, referenced to ground surface
- Drilling and borehole characteristics
- Sequential stratigraphic boundaries
- Initial FID/PID screening results of split-spoon samples and/or FID/PID screening results of ambient headspace air above selected samples

Drilling equipment to be used during the borehole activities will be steam cleaned upon arrival at the Site and prior to exiting the Site. Also, the drilling equipment and sampling tools contacting the overburden will be decontaminated prior to each use. The following decontamination procedures will be followed: alconox (i.e., soap) and tap water wash; a rinse in tap water; and a final rinse with deionized water. Decontamination fluids and any remaining soil residue will be collected and placed in New York State Department of Transportation (NYSDOT) approved 55-gallon drums. These drums will be labelled and staged on-site until a proper disposal method is determined.

The boreholes will be backfilled with soil sample cuttings and/or bentonite pellets. The concrete floor will be repaired with ready mix concrete.

### 2.1.3 Soil Sampling and Laboratory Analysis

The number and type of soil samples that will be collected for analysis are summarized below:

- up to 15 samples for TCL VOCs
- up to 5 samples for TAL metals (including Cr)
- up to 15 samples for total chromium, and hexavalent chromium
- 2 samples for full Target Compound List (TCL) and Target Analyte List (TAL) parameters

Table 2 in Appendix C provides a summary of the anticipated sampling and analytical program.

Soil samples will be placed in pre-cleaned laboratory containers, labeled, and preserved with ice. The samples will then be transported under chain-of-custody control to RECRA Environmental, Inc. (RECRA), Amherst, New York, a New York State Department of Health (NYSDOH) approved laboratory, for subsequent analysis.

The actual samples that are selected for analysis will be determined based on field observations (i.e., PID readings, staining, odors, etc.).

The soil analyses will be performed in accordance with 1995 Analytical Services Protocol (ASP). The 15 soil samples for TCL VOC analysis will be performed in accordance with ASP Method 95-1. The 15 soil samples for chromium and hexavalent chromium analysis will be performed in accordance with ASP Method CLP-M. The five soil samples for TAL metals will be performed in accordance with ASP Method CLP-M. Two soil samples will be analyzed for full TCL/TAL (VOCs, SVOCs [semi-volatile organic compounds], metals, PCBs/pesticides, and cyanide). ASP protocol (i.e., use of ASP Methods 95-1, 95-2, 95-3 and CLP-M) will be used for the analyses, including analysis of QA/QC samples.

## 2.2 Monitoring Well Installation

### 2.2.1 Monitoring Well Type and Location

As part of this Remedial Investigation, five additional wells will be installed at the Site. One of the wells will be a shallow bedrock well that will be installed in the upper fractured zone of the rock (i.e., drilled about five feet into the rock and the well screen will extend through the bedrock/overburden interface). The four other wells will be deep bedrock wells. It is anticipated that these deep bedrock wells will be drilled up to twenty five feet into bedrock. If possible, these deep bedrock wells will be installed by drilling through the upper fractured zone of bedrock and into the competent rock below. A casing will then be installed and grouted in-place and it is anticipated that these deep wells will continue to be drilled until the next fractured zone is encountered or until a depth of 25' below the top of rock is reached. Refer to Figure SR-6 in Appendix C for the proposed locations of the wells.

### 2.2.2 Shallow Bedrock Well Installation Technique

A drilling subcontractor will be retained to advance and install the shallow bedrock well (MW-18). The drilling subcontractor will utilize a truck-mounted drill rig to advance 4 1/4-inch hollow stem augers (HSAs) at this location. Continuous split spoon samples will be collected ahead of the augers in general accordance with ASTM 1586. The boring will be sampled to refusal (suspected top of rock). It is currently anticipated that refusal will be encountered at a depth of approximately 14' below grade. Soil will be sampled using split spoon samplers driven by a 140-pound hammer free-falling 30 inches (Standard Penetration Test). The recovered split spoon samples will be visually examined by a geologist or technician for evidence of suspect contamination (e.g., staining, unusual odors). Portions of the recovered split spoon samples will also be screened with an FID and/or a PID equipped with a 10.6 Ev lamp in order to determine if VOCs are present in the samples.

An on-site geologist or technician will record pertinent information for the test boring in a field log book, whereupon portions of information will subsequently be transcribed onto a boring log. The recorded information will include:

- Date, boring/well identification, and project identification
- Name of individual developing the log
- Names of driller and assistant(s)
- Drill make and model, auger size, core barrel
- Identification of alternative drilling methods used and justification thereof (e.g., rotary drilling with a specific bit type to remove a sand plug from within the hollow stem augers)
- Depths recorded in feet and fractions thereof (tenths of inches) referenced to ground surface
- Standard penetration test (ASTM D-1586) blow counts
- The length of the sample interval and the length of the sample recovered

- The depth of the first encountered water table, along with the method of determination, referenced to ground surface
- Drilling and borehole characteristics
- Sequential stratigraphic boundaries
- Initial FID/PID screening results of spilt-spoon samples, and/or FID/PID screening results of ambient headspace air above selected samples

Once top of bedrock is encountered, it is anticipated that the first five feet of bedrock will be cored in order to complete the advancement of the boring. Following the completion of the boring, the monitoring well will be constructed. The shallow bedrock well will consist of a precleaned five-foot long, two-inch I.D., threaded, flush-jointed, No. 10 slot, schedule 40 PVC screen with attached riser casing of the same material. The well screen will be installed within the fractured zone of the bedrock extending through the interface with the overburden. The well installation will include a washed and graded sand pack surrounding the screen and extending one foot below it, and one to two feet above it. A minimum two-foot bentonite seal will be placed above the sand pack and the remaining annulus will be filled with cement/bentonite grout. A steel protective casing or curb box with locking cap will be placed over the well and cemented in place.

### 2.2.3 Deep Bedrock Well Installation Technique

The drilling subcontractor will also advance and install four deep bedrock wells at the Site (MW-17, MW-19, MW-20, and MW-21). The drilling subcontractor will utilize the same procedures as described in Section 2.2.2 for drilling through the overburden. Once the top of bedrock is encountered, the first five feet of bedrock will be reamed, and a six-inch permanent steel casing will be set into the bedrock. This will be followed by water rotary coring using a 3-inch NX Core bit. The recovered rock cores will be visually examined and logged by a geologist, and this information will be transferred onto a test boring/well log. The wells will continue to be drilled until the next fractured zone is encountered or until a depth of 25' below the top of rock is reached. These wells will be open rock wells. The top of each of these wells will be fitted with a steel protective casing or curb box with locking caps that are cemented in place.

### 2.2.4 Monitoring Well Development

The newly installed monitoring wells will be developed prior to sampling in order to ensure that representative groundwater samples and static water measurements are obtained. Well development will be performed utilizing either precleaned stainless steel bailers with dedicated cord, a centrifugal pump and dedicated tubing, or a submersible pump with dedicated tubing. No fluids will be added to the wells during development, and well development equipment will be decontaminated prior to development of each well. The well development procedure will be as follows:

- Obtain pre-development static water level readings.
- Calculate water/sediment volume in the well.
- Obtain groundwater sample for field analysis using bailer.

- Select development method and set up equipment depending on method used.
- Begin pumping or bailing.
- Obtain initial field water quality measurements (e.g., conductance, temperature, turbidity, and PID readings). Record water quantities and rates removed.
- For overburden wells, obtain field water quality measurements every 5 gallons or well volume, whichever is less. For bedrock wells, obtain field water quality measurements after evacuating one well volume.
- Stop development when water quality criteria are met.
- Obtain post-development water level readings.
- Document development procedures, measurements, quantities, etc.

Development will continue until the following criteria is achieved:

- A minimum of five well volumes have been removed, or to dryness.
- pH, conductance, and temperature are relatively stable for three consecutive measurements.
- Turbidity is less than or equal to 50 NTU's, if possible to achieve.

Note: During development, the purge water will be observed for the presence of non-aqueous phase liquids. Monitoring wells containing such material will be noted and samples of the various phases will be collected for analytical testing (Refer to Section 2.3).

The water removed from each well during development will be placed in a NYSDOT-approved 55-gallon drums that will be labeled and staged on-site until a proper disposal method can be determined.

## 2.3 Groundwater Sampling and Laboratory Analyses

### 2.3.1 General Sampling Protocol

Following development, and a suitable period to allow stabilization (a minimum of 2 weeks following development), groundwater samples will be obtained from the five newly installed wells. Groundwater samples will also be collected from each of the fourteen existing, undamaged wells (i.e., assuming that none of the existing wells are dry). Prior to sampling, the depth to static water within each monitoring well will be measured. In addition, a Horon Oil/Water Interface Meter Model HOIL, or equivalent, will be used to assess the presence of light non-aqueous phase liquids (LNAPL) and dense non-aqueous phase liquids (DNAPL) within each well. If such materials are encountered, samples will be collected in accordance with the procedures described in Section 2.3.2. If LNAPL and/or DNAPL is not identified, each well will be purged prior to sampling by evacuating a minimum of three well casing volumes of water, or to dryness. Evacuation of the water from each well will be conducted using the same equipment utilized for developing the wells. The evacuation waters will be pumped into NYSDOT approved 55-gallon drums that will be labeled and staged on-site until a proper disposal method can be determined.

In general, the wells will be allowed to recharge to a minimum of 90% of their static water level prior to sampling; however, regardless of recharge rate, the wells will be sampled within 24 hours of purging. Each well will be sampled by using new, dedicated disposable teflon bailers with dedicated nylon cord. In addition to the volume of groundwater necessary to satisfy the laboratory container requirements, an additional volume will be obtained at each well to obtain field measurements. Field measurements will be obtained for pH, specific conductivity, temperature, and turbidity. The field measurement data will be presented on Monitoring Well Sampling Logs.

### 2.3.2 LNAPL and DNAPL Sampling Protocol

Monitoring wells suspected to contain LNAPL will be sampled using a bottom-filled bailer. Samples of the LNAPL will be collected prior to purging water from these wells by slowly lowering the bailer through the entire thickness of the LNAPL layer to collect a sample. Care will be taken not to lower the bailer to a significant depth into the underlying groundwater. In the event wells contain more than one LNAPL layer, samples of progressively dense layers will also be obtained using a bottom loading bailer. Following completion of the LNAPL layer(s), the monitoring wells will be purged at least three well volumes and samples will be collected as discussed above.

Monitoring wells determined to contain DNAPL will be sampled using a dual check valve bailer or a pump with dedicated tubing. These samples will be collected prior to purging the well and care will be taken during sampling to lower the sampling device to the approximate mid-point of the DNAPL layer. Following collection of the DNAPL samples, the monitoring wells will be purged at least three well volumes and samples will be collected as discussed above.

The samples obtained will initially be scanned with an FID and/or a PID equipped with a 10.6 eV lamp in order to determine if VOCs are present in the samples. For the purpose of this work plan, it is anticipated that one sample of LNAPL and one sample of DNAPL will be obtained for laboratory analysis; however, the actual number and type of samples collected will be dependent upon field conditions.

### 2.3.3 Laboratory Analysis

The groundwater samples will be placed in pre-cleaned laboratory containers, labeled, and preserved with ice. The samples will then be transported under chain-of-custody to RECRA Environmental, Inc. (RECRA), a New York State Department of Health approved laboratory, for subsequent analysis. The groundwater analyses will be performed in accordance with 1995 ASP. Three of the groundwater samples will be analyzed for full TCL/TAL parameters (VOCs, SVOCs, metals, PCBs/pesticides, and cyanide). The three samples selected for full TCL/TAL analyses will be selected based on field observations; however, it is currently anticipated that the groundwater samples obtained from MW-17 and MW-16 will be two of the samples selected. The remaining sixteen groundwater samples will be analyzed for TCL VOCs, chromium, and hexavalent chromium. Samples for VOCs will be collected first. The samples of LNAPL and the sample of DNAPL will be analyzed for specific gravity, and for

TCL VOCs. Also, the sample of DNAPL will be analyzed for total chromium and hexavalent chromium. Table 2 in Appendix C provides a summary of the anticipated sampling and analytical program.

Full TCL/TAL samples will be analyzed using ASP Methods 95-1, 95-2, 95-3, and CLP-M. TCL VOC samples will be analyzed using ASP Method 95-1. Chromium/hexavalent chromium samples will be analyzed using ASP Method CLP-M.

## 2.4 Basement Sump Evaluation

Based upon past groundwater elevation measurements obtained from existing monitoring wells, the basement sump collects groundwater from beneath the Site and serves to drawdown groundwater elevations in proximity to the sump. However, the hydraulic impact (i.e., areal and vertical) of the basement sump is not specifically known. Thus, to further evaluate the impact of the basement sump on the groundwater table, testing will be conducted following the collection of the initial round of groundwater samples. The testing proposed is discussed below.

Initially, a complete round of groundwater elevations will be obtained in the functioning monitoring wells with the basement sump operating. This round of elevations will be conducted following a suitable period to allow stabilization after sampling. At the time of testing, pumping rates of the basement sump will be measured or estimated. Following initial elevation measurements, the basement sump will then be turned off and measurements will be made in the monitoring wells and the basement sump at regular intervals.

Depending upon the recovery rate, it is expected that the basement sump and wells MW-3, MW-9, MW-10, MW-14 and MW-17 will be monitored at three minute intervals for the first fifteen minutes following shut down, and thereafter at one hour intervals or greater depending upon the stabilization rate. The remaining wells will initially be monitored at one hour intervals or greater depending upon the stabilization rate. Monitoring will continue until water in the basement sump rises to within 6 inches of the basement floor, or until water levels stabilize. The basement sump will then be activated and water levels will be monitored during the subsequent drawdown period.

Data collected during this testing will be evaluated to assess the effectiveness of the basement sump in collecting contaminated groundwater and, to the extent possible, the hydraulic connection between any groundwater zones of the overburden and bedrock. Depending on the suitability of the data collected, the hydraulic conductivity, transmissivity, and storage values will be collected for the water bearing units.

## 2.5 Groundwater Potentiometric Map

The top of each of the newly constructed monitoring well casings, as well as the ground/floor elevation in proximity to each new well location, will be surveyed by a Licensed Surveyor relative to an assumed datum of 100.00 feet, which corresponds to the assumed datum already established and used to survey the elevation of existing wells at the Site.

Static groundwater measurements will be collected at least twice from each existing and newly installed monitoring well using an electronic groundwater measuring device. The first set of groundwater measurements will be obtained prior to the testing of the basement sump described above. A second set of groundwater measurements will be obtained after the testing of the basement sump is completed. Groundwater elevations will be calculated, and groundwater potentiometric maps will be prepared illustrating the approximate groundwater elevations and groundwater flow direction(s).

## 2.6 Quality Assurance/Quality Control (QA/QC)

### 2.6.1 Project Team

The investigation team will consist of a Principal, Project Manager, Certified Industrial Hygienist, Senior Geologist, Site Supervisor, Site Safety Officer, and support personnel. David D. Day, P.E. will be the Principal and Project Manager for the field investigation. Also, Raymond L. Kampff, a Project Manager who is a geologist, will provide technical support to project personnel on an as-needed basis. Davis E. Frederiksen, CIH, is the Certified Industrial Hygienist that has reviewed and approved the Health and Safety Plan for this project. Jeffrey A. Danzinger will be the Senior Geologist responsible for the oversight of the field work and preparation of the remedial investigation report. Steven R. Mullin and/or J. Joseph Dorety will be the Site Supervisor responsible for working with the Senior Geologist to implement the field work. The Site Supervisor will also be the Site Safety Officer. The qualifications and experience of the assigned project personnel are provided in Appendix D. The Site Safety Officer will be responsible for ensuring that the procedures outlined in the Health and Safety Plan included in Appendix E are adhered to by personnel involved in this field investigation. RECRA, a NYSDOH-approved laboratory will be utilized for sample analysis. Lab personnel and/or DAY personnel will collect the samples.

Day Engineering, P.C. will be the firm retained to review and certify the final remedial investigation report. David D. Day, P.E. will be the principal of Day Engineering, P.C. that will sign and stamp the report.

### 2.6.2 Laboratory Quality Assurance/Quality Control and Reporting

During soil and groundwater sampling activities, sample preservation and holding times will adhere to the requirements set forth in NYSDEC ASP. Subsequent analysis of the samples via the methods noted in Section 2.1.3 and 2.3.3 will be performed in accordance with USEPA SW-846, 3rd Edition, ASP protocol. Soil sample results will be reported on a dry-weight basis.

A copy of RECRA's Quality Assurance Program is included in Appendix F. Also, a copy of RECRA's chain-of-custody form is included in Appendix F.

### 2.6.3 Quality Assurance & Quality Control (QA/QC) Samples

In order to provide control over the collection, analysis, review and interpretation of analytical data, the following QA/QC samples will be included as part of this investigation.

- one trip blank (analyzed for VOCs via ASP Method 95-1) will be included for every shipment of VOC samples
- one field blank (i.e., rinsate sample) will be analyzed for chromium and hexavalent chromium using ASP Method CLP-M
- one field blank (i.e., rinsate sample) will be analyzed for TAL VOCs using ASP Method 95-1
- one matrix spike/matrix spike duplicate (MS/MSD) will be analyzed for each 20 samples of each matrix (i.e., soil and groundwater) that is shipped within each seven day period. Specific parameters that MS/MSD samples will be tested for will be dependent upon the test parameters of the samples that are being analyzed.

Table 2 in Appendix C provides a summary of the anticipated sampling and analytical program.

## 2.7 Schedule

The field work portion of the remedial investigation will be initiated upon completion of any public participation requirements.

Due to the logistics of drilling inside a building that is fully occupied and leased, and due to tenant notification requirements, it is estimated that it will take six to nine months to complete the installation of the Geoprobe boreholes and monitoring wells described in this work plan. Efforts will be made to expedite the field work within a shorter period of time; however, access to certain tenant areas may not be possible until shutdown times or off-peak production times. In addition, there may be situations where a tenant will need to move equipment/materials so that access can be gained to key/critical areas. DAY will work closely with the owner of the property to gain the necessary access with minimal disruption to operations within the building. Also, it will not be possible to install boreholes or monitoring wells in currently used office space. DAY will keep the NYSDEC informed to assure that the NYSDEC is satisfied that the field work is being performed as quickly as possible. Whenever possible, the NYSDEC will be notified at least 5 working days in advance of any field activities to be conducted as part of this work plan to ensure that the NYSDEC has the opportunity to observe the field work or to obtain split spoon samples for independent testing.

## 3.0 REMEDIAL INVESTIGATION REPORT

### 3.1 Report General Description

A Remedial Investigation Report will be prepared that shall:

1. Include data generated and other information obtained during the Remedial Investigation;

2. provide the assessments and evaluations consistent with the requirements outlined in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA") [42 U.S.C. 9601 ET SEQ.], as amended, the National Contingency Plan ("NCP") of March 8, 1990 [40 CFR Part 300], the USEPA guidance document entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA," dated October 1988, and any subsequent revisions to that guidance document in effect at the time the Work Plan is approved, and appropriate USEPA and NYSDEC technical and administrative guidance documents;

3. identify additional data, if any, that must be collected; and

4. include a certification by the individual or firm with the primary responsibility for the day-to-day performance of the Remedial Investigation that activities that comprised the Remedial Investigation were performed in accordance with the Work Plan as approved by the NYSDEC.

### 3.2 Report Content

The report will summarize the work effort and information obtained, and will be submitted to the NYSDEC for review. The report will identify any data gaps, if any, provide recommendations, and will specifically include the following:

- Presentation of field investigation methodology, field observations, field measurements, and field data.
- A map summarizing the sampling locations, and a map illustrating the approximate groundwater flow direction.
- Comparison of analytical results to available NYSDEC soil cleanup objectives and groundwater standards/guidance values.
- Discussion of the areal and vertical extent of contamination.
- Discussion of conclusions and pertinent findings of the investigation.

- Identification of data gaps, if any, and recommendations regarding additional investigations or remediation that may be warranted.

## 3.3 RI Report Schedule

It is anticipated that the Remedial Investigation Report will be completed within 60 calendar days of the completion of the field work and receipt of the analytical results.

# 4.0 FEASIBILITY STUDY

## 4.1 Approach

Based on the findings of the RI, a Feasibility Study (FS) will be performed to evaluate the range of alternatives available to address the contamination at the Site. The FS will consist of three phases:

1) The development of alternatives;

2) the screening of alternatives; and

3) the detailed analysis of alternatives.

These phases are further discussed below.

### 4.1.1 Development and Screening of Alternatives

Alternatives for remediation will be developed by assembling combinations of technologies and the media to which the technologies will be applied. The following steps will be undertaken to develop appropriate remedial alternatives:

- Development of remedial action objectives specifying the contaminants and media of interest, exposure pathways, and the remediation goals that permit a range of treatment and containment alternatives to be developed. The preliminary remediation goals will be developed on the basis of chemical-specific applicable or relevant and appropriate requirements (ARARs) (i.e., regulatory standards and/or guidelines), other available information, and site-specific risk-related factors.

- Development of general response actions for each medium of interest defining containment, treatment, excavation, pumping, or other actions, singularly or in combination, that may be taken to satisfy the remedial action objectives for the site.

- Identification of volumes or areas of media to which general response actions might be applied, taking into account the requirements for protectiveness as identified in the remedial action objectives, and the chemical and physical characterization of the Site.

- Identification and screening of the technologies applicable to each general response action to eliminate those that cannot be implemented technically at the Site. The general response actions are further defined to specify remedial technology types (e.g., the general response action of treatment can be further defined to include chemical or biological technology types).

- Identification and evaluation of technology process options to select a representative process for each technology type retained for consideration. Although specific processes are selected for alternative development and evaluation, these processes are intended to represent the broader range of process options within a general technology type.

- Assembly of the selected representative technologies into alternatives representing a range of treatment and containment combinations, as appropriate.

Due to the limited number of contaminants presently known to exist at the Site, and the confined location of the contaminants (i.e., underneath the building floor slab), it is anticipated that no more than three to four alternatives will be identified for each contaminant. Thus, it is not anticipated that the screening of alternatives will be required. If it is found that more alternatives are appropriate for consideration, a screening process will be undertaken in accordance with EPA guidance documents.

### 4.1.2 Detailed Analysis of Alternatives

The selected alternatives will then be evaluated based on the following criteria:

- Overall protection of human health and the environment;

- compliance with applicable regulatory standards and guidelines;

- long-term effectiveness and permanence;

- reduction of toxicity, mobility, or volume;

- short-term effectiveness;

- implementability;

- cost;

- NYSDEC acceptance; and

- community acceptance.

Costs that will be used in this comparison will include short-term capital and operational costs, and any long-term operation and maintenance costs. Present worth analyses will be used to compare the alternatives.

A preferred remedial approach will be recommended for each contaminant at the Site from among those alternatives that meet the following criteria:

1) The alternative is protective of human health and the environment, and it meets applicable regulatory standards and/or guidelines, except under circumstances listed in the National Contingency Plan.

2) The alternative is cost effective.

3) The alternative utilizes treatment technologies and permanent solutions to the maximum extent practicable as determined by technological feasibility, availability, and cost effectiveness.

## 4.2 Project Team

Day Engineering, P.C. will be retained to perform the Feasibility Study. The team will consist of a Principal, Project Manager, Sr. Geologist, Sr. Engineer, Environmental Specialist, and a Draftsman. The Principal will be David D. Day, P.E. The Project Manager will be Timothy K. Hampton, P.E. Jeffrey A. Danzinger will be the Senior Geologist, and Barton F. Kline will be the Senior Engineer that will be responsible for implementation of the Feasibility Study. Thomas E. Roszak will be the Environmental Specialist that provides technical support on the project. Richard J. McPhee will be the Draftsman for the Feasibility Study. The qualifications and experience of the assigned project personnel are provided in Appendix D.

The Feasibility Study will be signed and sealed by either David D. Day, P.E. or Timothy K. Hampton, P.E., and the professional engineer will certify that the Feasibility Study was performed in accordance with the Order.

## 4.3 FS Schedule

Within 60 days after receipt of the NYSDEC's approval of the Remedial Investigation Report, the Feasibility Study will be submitted to the NYSDEC for review and approval.

## 5.0 PUBLIC PARTICIPATION SUPPORT

A public participation program will be implemented by the NYSDEC as part of this RI/FS. The owner of the property (Owner) and DAY will cooperate with the NYSDEC in providing RI/FS information to the public. At the request of the NYSDEC, the Owner or DAY will also participate in the preparation of information that must be disseminated to the public, and will attend and participate in public meetings held by the NYSDEC to present information regarding the RI/FS program (i.e., proposed approach, findings, etc.).

## 6.0 PROGRESS REPORTS

Progress reports will be submitted on a quarterly basis. The reports will be submitted by the tenth day of every fourth month following the effective date of the Order. The progress reports will include the following information:

1. Describe the actions which have been taken toward achieving compliance with this Order during the previous quarter;

2. include the results of sampling and tests and other data received or generated in the previous quarter, including quality assurance/quality control information, whether conducted pursuant to this Order or conducted independently;

3. identify work plans, reports, and other deliverables required by the Order that were completed and submitted during the previous quarter;

4. describe actions, including, but not limited to, data collection and implementation of work plans, that are scheduled for the next quarter and provide other information relating to the progress at the Site;

5. include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate those delays or anticipated delays;

6. include any modifications to any work plans have been proposed to the NYSDEC or that the NYSDEC has approved; and

7. describe activities undertaken in support of the Citizen Participation Plan during the previous quarter, and those to be undertaken in the next quarter.

## 7.0 RI/FS SCHEDULE

The proposed schedule (Table 3 provided in Appendix C), provides a tentative timeframe for the various components of the RI/FS. This schedule assumes the following conditions:

- Minimal deviation from the proposed scope-of-work defined within the Work Plan;

- timely review of submittals by the NYSDEC;

- no significant difficulties in conducting the field work; and

- analytical results available within 20 business days after submission to the laboratory.

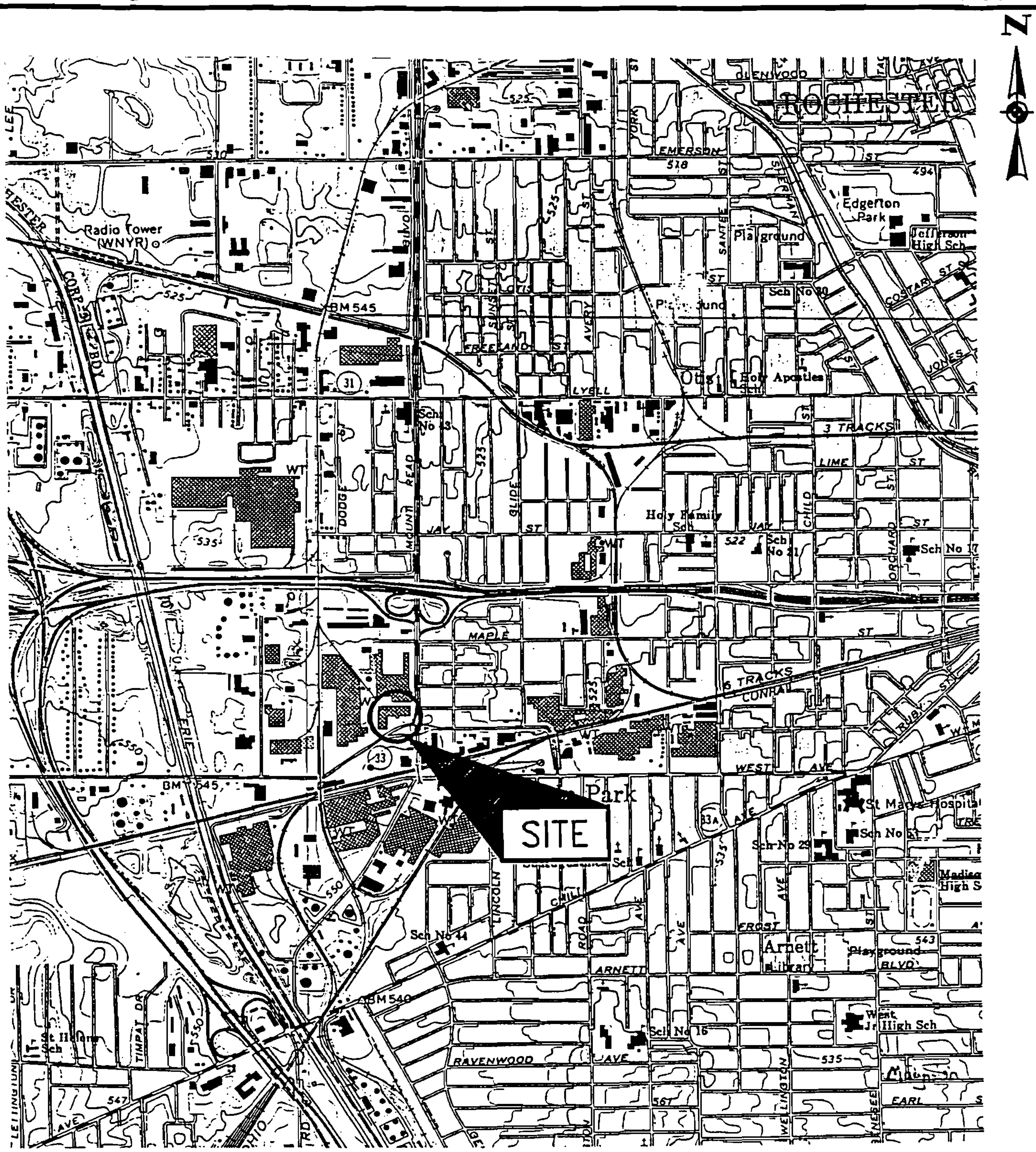
As the project progresses, the schedule will be revised to reflect actual conditions. The NYSDEC will be advised of any anticipated deviations from the proposed schedule if delaying factors are encountered. Also, the NYSDEC will be notified at least seven days in advance of prebid meetings, job progress meetings, substantial completion meetings and/or inspections, and final inspections and/or meetings.

# APPENDIX A

**Drawing Showing Site Location, and Drawings Showing Results of Previous Studies**

TIME PLOTTED: THUR MAY 29, 08:35:00 1997
FILENAME: MAGUIR2

REF1: BORDER13
REF2: REF2
REF3: REF3




DRAWING PRODUCED FROM: ROCHESTER WEST, N.Y.
N4307.5–W7737.5/7.5
1971
PHOTOREVISED 1978

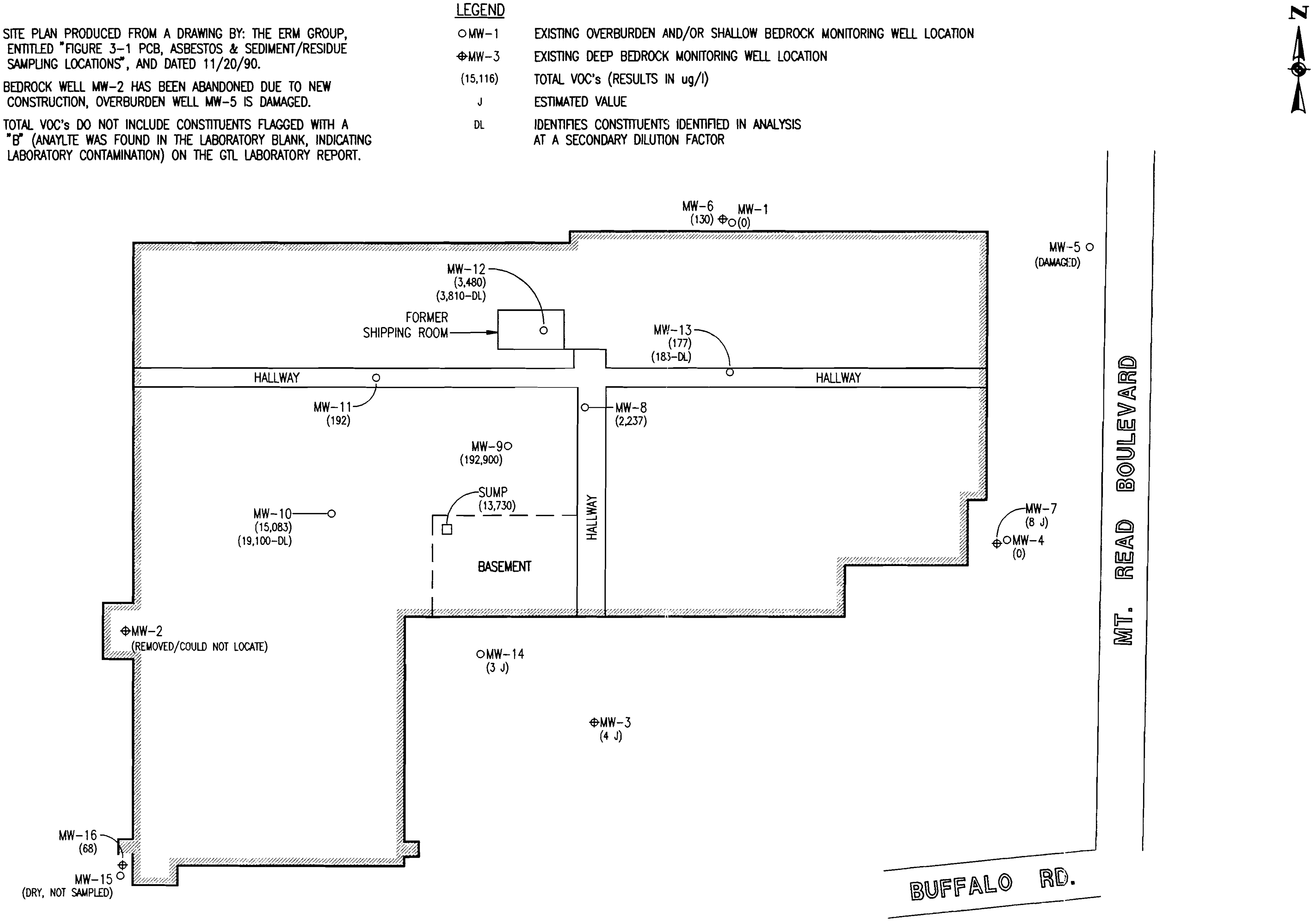
| | | | |
|---|---|---|---|
| PROJECT NO. 1275S–97 | PROJECT TITLE 95 MT. READ BOULEVARD ROCHESTER, NEW YORK | **DAY ENVIRONMENTAL, INC.** | DATE 5/29/97 |
| DRAWING NO. SR–1 | REMEDIAL INVESTIGATION/ FEASIBILITY STUDY | *ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK* | DRAWN BY |
| SHEET 1 OF 1 | DRAWING TITLE PROJECT LOCUS MAP | | SCALE 1" = 2000' |

## NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.
3. TOTAL VOC's DO NOT INCLUDE CONSTITUENTS FLAGGED WITH A "B" (ANAYLTE WAS FOUND IN THE LABORATORY BLANK, INDICATING LABORATORY CONTAMINATION) ON THE GTL LABORATORY REPORT.

## LEGEND

| | |
|---|---|
| ○MW-1 | EXISTING OVERBURDEN AND/OR SHALLOW BEDROCK MONITORING WELL LOCATION |
| ⊕MW-3 | EXISTING DEEP BEDROCK MONITORING WELL LOCATION |
| (15,116) | TOTAL VOC's (RESULTS IN ug/l) |
| J | ESTIMATED VALUE |
| DL | IDENTIFIES CONSTITUENTS IDENTIFIED IN ANALYSIS AT A SECONDARY DILUTION FACTOR |




***SITE PLAN***

SCALE: 1" = 50'

DESIGNED BY --- | DATE -----
DRAWN BY RJM | DATE DRAWN 5/29/97
SCALE | DATE ISSUED

**DAY ENVIRONMENTAL, INC.**
*ENVIRONMENTAL CONSULTANTS*
*ROCHESTER, NEW YORK*

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

DRAWING TITLE TOTAL VOC's IN GROUNDWATER

PROJECT NO. 1275S-97

DRAWING NO. SR-2

SHEET 1 OF 1

REF1: BORDER12
REF2: REF2
REF3: REF3

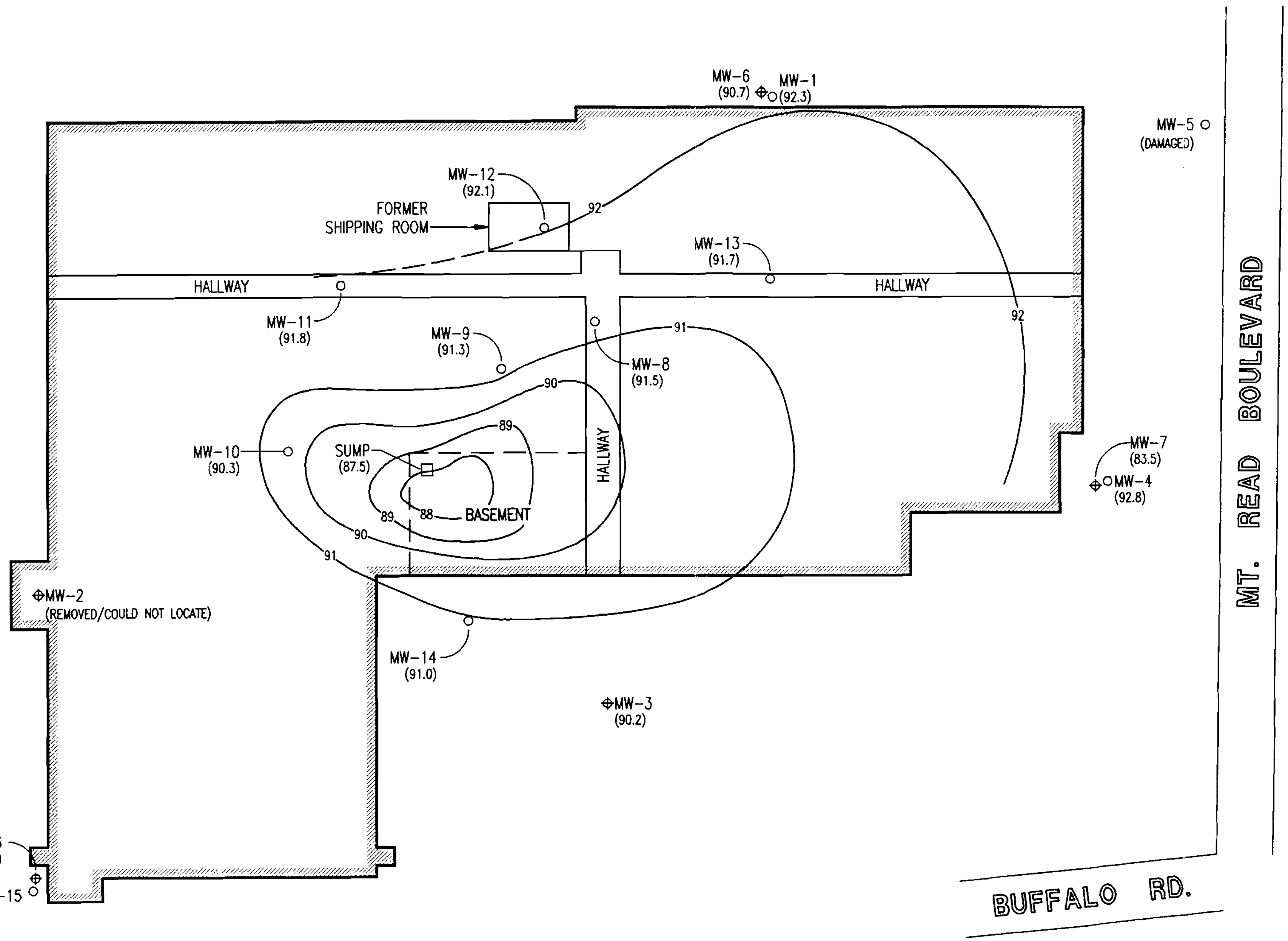
TIME PLOTTED: FRI MAY 30, 10:35:00 1997
FILENAME: MAGUIR6

## NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.

## LEGEND

| | |
|---|---|
| —91— | POTENTIOMETRIC CONTOUR LINE |
| ○MW-1 | EXISTING OVERBURDEN AND/OR SHALLOW BEDROCK MONITORING WELL LOCATION |
| ⊕MW-3 | EXISTING DEEP BEDROCK MONITORING WELL LOCATION |
| (91.8) | GROUNDWATER ELEVATION (FEET) |




**SITE PLAN**
SCALE: 1" = 50'

DESIGNED BY ---
DATE ----
DRAWN BY RJM
DATE DRAWN 5/29/95
SCALE
DATE ISSUED

**DAY ENVIRONMENTAL, INC.**
*ENVIRONMENTAL CONSULTANTS*
*ROCHESTER, NEW YORK*

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DRAWING TITLE GROUNDWATER ELEVATION MAP FOR

PROJECT NO. 1275S-97
DRAWING NO. SR-3
SHEET 1 OF 1

REF1: BORDER12
REF2: REF2
REF3: REF3

TIME PLOTTED: FRI MAY 30, 11:35:00 1997
FILENAME: MAGUIR5

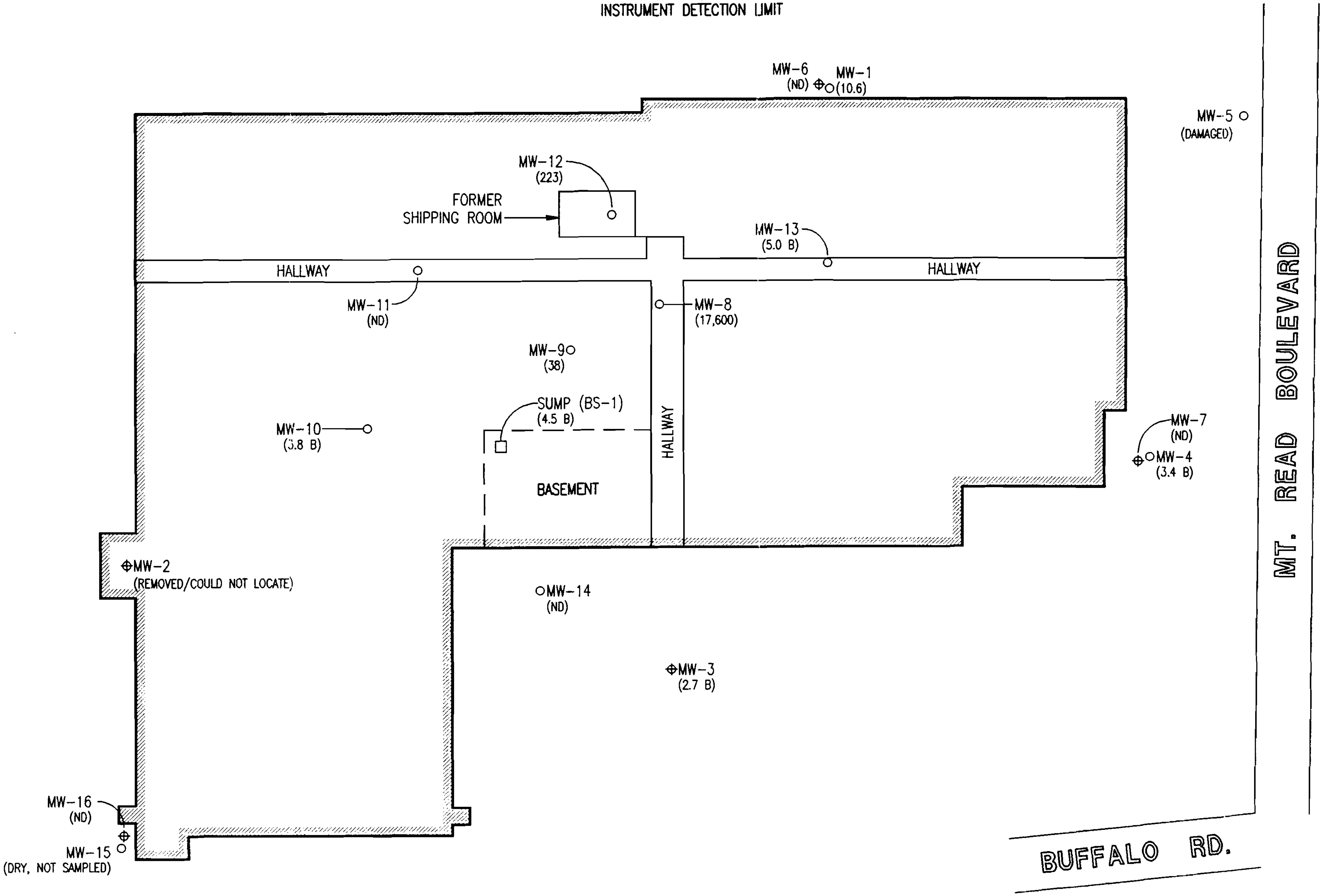
REF1: BORDER12
REF2: REF2
REF3: REF3

NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.

LEGEND

| | |
|---|---|
| ○MW-1 | EXISTING OVERBURDEN AND/OR SHALLOW BEDROCK MONITORING WELL LOCATION |
| ⊕MW-3 | EXISTING DEEP BEDROCK MONITORING WELL LOCATION |
| (38) | CHROMIUM (RESULTS IN ug/l) |
| ND | NOT DETECTED |
| B | REPORTED VALUE LESS THAN CONTRACT REQUIRED DETECTION LIMIT, BUT GREATER OR EQUAL TO THE INSTRUMENT DETECTION LIMIT |




***SITE PLAN***
SCALE: 1" = 50'

TIME PLOTTED: FRI MAY 30, 11:30:00 1997
FILENAME: MAGUIR7

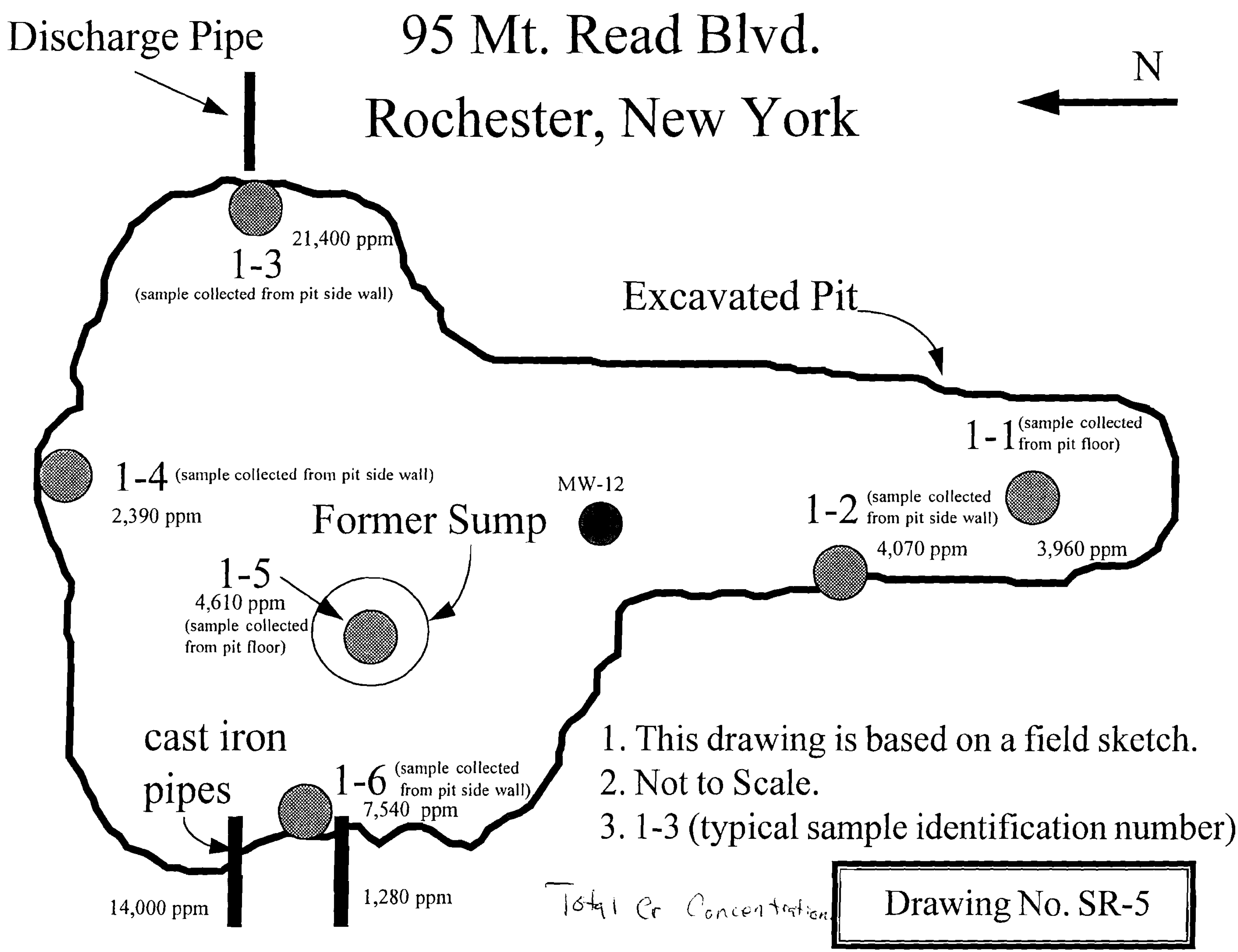
| | |
|---|---|
| DESIGNED BY --- | DATE --- |
| DRAWN BY RJM | DATE DRAWN 5/29/97 |
| SCALE 1" = 50' | DATE ISSUED 5/30/97 |

**DAY ENVIRONMENTAL, INC.**
*ENVIRONMENTAL CONSULTANTS*
*ROCHESTER, NEW YORK*

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

DRAWING TITLE TOTAL CHROMIUM IN GROUNDWATER
OCTOBER 1995

PROJECT NO. 1275S-97
DRAWING NO. SR-4
SHEET 1 OF 1

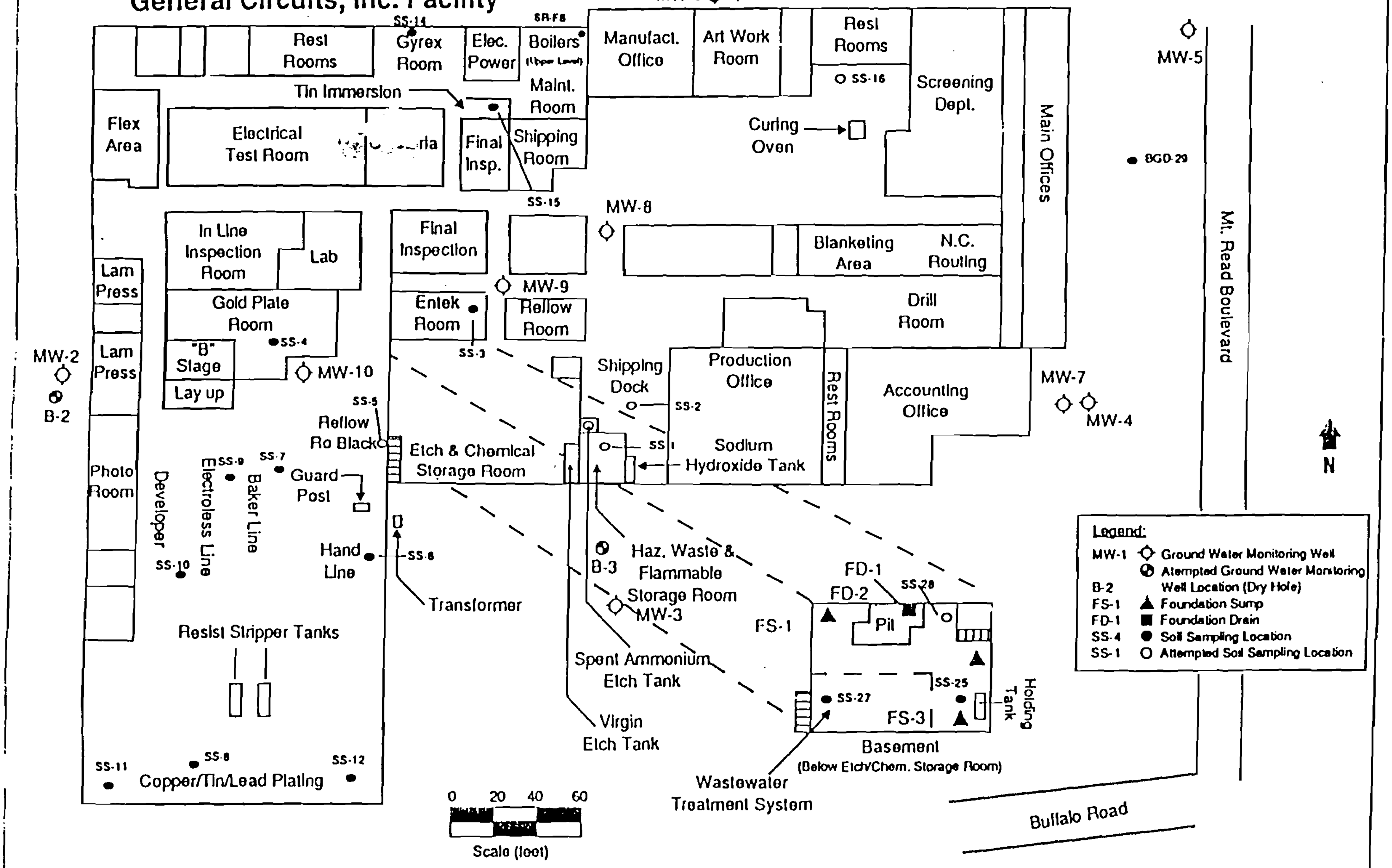


95 Mt. Read Blvd.
Rochester, New York
N
Discharge Pipe
21,400 ppm
1-3
(sample collected from pit side wall)
Excavated Pit
1-1 (sample collected from pit floor)
1-4 (sample collected from pit side wall)
2,390 ppm
MW-12
1-2 (sample collected from pit side wall)
Former Sump
4,070 ppm
3,960 ppm
1-5
4,610 ppm
(sample collected from pit floor)
cast iron pipes
1-6 (sample collected from pit side wall)
7,540 ppm
14,000 ppm
1,280 ppm
1. This drawing is based on a field sketch.
2. Not to Scale.
3. 1-3 (typical sample identification number)
Total Cr Concentration
Drawing No. SR-5

# APPENDIX B

## Key Figures and Tables From ERM Report

## Figure 4-1
## Soil and Ground Water Sampling Locations
## General Circuits, Inc. Facility




| WO# | Drawn By / Date: M. Smith 11.20.90 | Checked By / Date: D. Collins 11.20.90 | Notes: | The ERM Group |
|---|---|---|---|---|
| A73.01.00.01 | Revised By / Date: | Checked By / Date: | | |

## Table 4-2

### Summary of Analytical Data for Soil Samples
### General Circuits, Inc.

**Inorganic Analyses**

| Sample No. | Sample Location | Total Copper (mg/kg)(a) | Total Lead (mg/kg) | Total Nickel (mg/kg) | Total Tin (mg/kg) | Total Cyanide (mg/kg) | Moisture Content (%) | Leachable(b) Copper (mg/l)(c) | Leachable Lead (mg/l) | Leachable Nickel (mg/l) | Leachable Tin (mg/l) | pH of Water Extract (Std. Units) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Detection Limits | 5 | 10 | 5 | 80 | 0.25 | 0.1 | 0.05 | 0.2 | 0.05 | 0.8 | 0.01 |
| SS-3 | Entek Room | 200 | 86 | 6 | 92 | ND | 17.7 | 0.62 | ND | 0.13 | ND | 5.96 |
| SS-4 | Gold Plate Room | 19 | ND (e) | 10 | ND | ND | 7.5 | ND | ND | 0.11 | ND | 9.28 |
| SS-6 | Hand line (WPR)(d) | 9 | ND | 10 | ND | ND | 8.3 | ND | ND | ND | ND | 8.23 |
| SS-7 | Baker Line (WPR) | 15 | ND | 9 | ND | ND | 8.8 | ND | ND | 0.09 | ND | 9.07 |
| SS-8 | Resist Tank Area (WPR) | 11 | ND | ND | ND | ND | 8.9 | ND | ND | 0.07 | ND | 8.14 |
| SS-9 | Electroless Line (WPR) | 22 | ND | 9 | ND | ND | 6.9 | ND | ND | ND | ND | 8.51 |
| SS-10 | Electroless Line (WPR) | 25 | ND | 10 | ND | ND | 6.5 | ND | ND | 0.1 | ND | 9.02 |
| SS-11 | Cu/Sn/Pb(f) Plating Line (WPR) | 10 | ND | ND | ND | ND | 8.2 | ND | ND | 0.09 | ND | 8.13 |
| SS-12 | Cu/Sn/Pb Plating Line (WPR) | 13 | ND | 6 | ND | ND | 7.8 | ND | ND | 0.12 | ND | 8.06 |
| SS-14 | Gyrex Room | 367 | 465 | 24 | 414 | ND | 14.8 | 0.64 | 0.3 | 0.18 | ND | 7.70 |
| SS-15 | Tin Immersion | 146 | 153 | ND | ND | ND | 7.5 | ND | ND | 0.08 | ND | 8.67 |
| SS-25 | Basement - near storage tank | 62 | ND | 8 | ND | ND | 7.7 | 0.08 | ND | 0.06 | ND | 9.30 |
| SS-27 | Basement - near treatment system | 12 | ND | ND | ND | ND | 10.1 | ND | ND | 0.08 | ND | 9.48 |
| BGD-29 | Front lawn outside main offices | 93 | 370 | ND | ND | ND | 8.1 | ND | ND | 0.08 | ND | 7.70 |

**Volatile Organic Compound Analyses**

| Sample No. | Sample Location | VOC Detected | Concentration (µg/kg)(g) | Detection Limit (µg/kg) | Moisture Content (%) |
|---|---|---|---|---|---|
| SS-9 | Electroless Line (WPR) | Trichloroethene | 14 | 5 | 6.9 |
| SS-10 | Electroless Line (WPR) | None | ND | -- | 6.5 |
| MW-9 | Borehole sample from 5-7 feet | Acetone | 26 | 10 | 9.9 |
| | | Trichloroethene | 6 | 5 | |
| MW-10 | Borehole sample from 3-5 feet | Methylene chloride | 9 | 5 | 8.1 |
| | | Trichloroethene | 17 | 5 | |

(a) mg/kg - milligrams per kilogram
(b) Leachable analysis performed using the Toxicity Characteristic Leaching Procedure
(c) mg/l - milligrams per liter
(d) WPR - Wet Process Room
(e) Not detected
(f) Cu/Sn/Pb - Copper/Tin/Lead
(g) ug/kg - micrograms per kilogram

## Table 4-4

### Summary of Inorganic Ground Water Analytical Data General Circuits, Inc.

| Sampling Location | Sampling Date | Unit | pH Std. Units | Specific Conductivity µmhos (a) | Temperature °C | Copper mg/l (b) | Lead mg/l | Nickel mg/l | Tin mg/l |
|---|---|---|---|---|---|---|---|---|---|
| | | **Detection Limits** | | | | 0.05 | 0.1 | 0.05 | 0.8 |
| **Soil Wells** | | | | | | | | | |
| MW-1 | 14 Nov. 90 | | 7.5 | 550 | 16.5 | -- | -- | -- | -- |
| | 30 Aug. 90 | | -- | -- | -- | ND | ND | ND | ND |
| MW-4 | 14 Nov. 90 | | 7.0 | 799 | 15.0 | -- | -- | -- | -- |
| | 30 Aug. 90 | | -- | -- | -- | ND | ND | ND | ND |
| MW-5 | 14 Nov. 90 | | 7.0 | 810 | 14.5 | -- | -- | -- | -- |
| | 30 Aug. 90 | | -- | -- | -- | ND | ND | ND | ND |
| MW-8 | 14 Nov. 90 | | 7.1 | 2005 | 20.5 | -- | -- | -- | -- |
| MW-9 | 14 Nov. 90 | | 6.3 | 2000 | 21.0 | -- | -- | -- | -- |
| MW-10 | 14 Nov. 90 | | 7.3 | 4200 | 21.0 | -- | -- | -- | -- |
| **Bedrock Wells** | | | | | | | | | |
| MW-2 | 14 Nov. 90 | | 6.7 | 1750 | 17.5 | -- | -- | -- | -- |
| MW-3 | 14 Nov. 90 | | 6.8 | 1300 | 17.5 | -- | -- | -- | -- |
| MW-6 | 14 Nov. 90 | | 6.9 | 1000 | 18.0 | -- | -- | -- | -- |
| MW-7 | 14 Nov. 90 | | 7.1 | 1125 | 16.0 | -- | -- | -- | -- |
| **Additional Locations** | | | | | | | | | |
| FD-1 | 14 Nov. 90 | | 6.9 | 2009 | 17.5 | -- | -- | -- | -- |
| | 4 Sept. 90 | | -- | -- | -- | ND | ND | ND | ND |
| FD-2 | 14 Nov. 90 | | 6.8 | 2029 | 17.5 | -- | -- | -- | -- |
| FS-1 | 14 Nov. 90 | | 7.1 | 2035 | 18.5 | -- | -- | -- | -- |
| FS-3 | 14 Nov. 90 | | 7.3 | 2019 | 18.5 | -- | -- | -- | -- |

(a) micromhos
(b) milligrams per liter

ERM Group

## Table 4-4 (continued)

### Summary of Ground Water Analytical Data for Inorganic Analyses General Circuits, Inc.

| Sampling Location | Sampling Date | Unit | Total Cyanide mg/l | Sulfate mg/l | Sulfide mg/l | Chloride mg/l |
|---|---|---|---|---|---|---|
| | | Detection Limits | 0.005 | 10 | 0.1 | 1 |
| **Soil Wells** | | | | | | |
| MW-1 | 14 Nov. 90 | | -- | -- | -- | -- |
| | 30 Aug. 90 | | ND | 166 | 1.1 | 62 |
| MW-4 | 14 Nov. 90 | | -- | -- | -- | -- |
| | 30 Aug. 90 | | ND | 119 | ND | 61 |
| MW-5 | 14 Nov. 90 | | -- | -- | -- | -- |
| | 30 Aug. 90 | | ND | 149 | ND | 449 |
| MW-8 | 14 Nov. 90 | | -- | -- | -- | -- |
| MW-9 | 14 Nov. 90 | | -- | -- | -- | -- |
| MW-10 | 14 Nov. 90 | | -- | -- | -- | -- |
| **Bedrock Wells** | | | | | | |
| MW-2 | 14 Nov. 90 | | -- | -- | -- | -- |
| MW-3 | 14 Nov. 90 | | -- | -- | -- | -- |
| MW-6 | 14 Nov. 90 | | -- | -- | -- | -- |
| MW-7 | 14 Nov. 90 | | -- | -- | -- | -- |
| **Additional Locations** | | | | | | |
| FD-1 | 14 Nov. 90 | | -- | -- | -- | -- |
| | 4 Sept. 90 | | ND | 1,060 | 3.0 | 136 |
| FD-2 | 14 Nov. 90 | | -- | -- | -- | -- |
| FS-1 | 14 Nov. 90 | | -- | -- | -- | -- |
| FS-3 | 14 Nov. 90 | | -- | -- | -- | -- |

(a) micromhos
(b) milligrams per liter

## Table 4-5
## Summary of Ground Water Analytical Data
## for Organic Analyses
## General Circuits, Inc.

| Sampling Location | Sampling Date | Units | Acetone µg/l (a) | Benzene µg/l | Chlorobenzene µg/l | Chloroform µg/l | 1,1-Dichloroethane µg/l | 1,2-Dichloroethane µg/l |
|---|---|---|---|---|---|---|---|---|
| | Detection Limits | | 10 | 5 | 5 | 5 | 5 | 5 |
| **Soil Wells** | | | | | | | | |
| MW-1 | 8 Nov. 90 | | ND (b) | ND | ND | ND | ND | ND |
| | 30 Aug. 90 | | 19 | ND | ND | ND | ND | ND |
| MW-4 | 8 Nov. 90 | | ND | ND | ND | ND | ND | ND |
| | 30 Aug. 90 | | 38 | ND | ND | ND | ND | ND |
| MW-5 | 8 Nov. 90 | | ND | ND | ND | ND | ND | ND |
| | 30 Aug. 90 | | 24 | ND | ND | ND | ND | ND |
| MW-8 | 8 Nov. 90 | | ND | ND | ND | 5 | ND | ND |
| MW-9 | 8 Nov. 90 | | 2,600 | ND | ND | 6 | 54 | ND |
| MW-9 Duplicate | 8 Nov. 90 | | 1,800 | ND | ND | 5 | 47 | ND |
| MW-10 | 8 Nov. 90 | | ND | ND | ND | 6 | 9 | ND |
| **Bedrock Wells** | | | | | | | | |
| MW-2 | 9 Nov. 90 | | ND | ND | ND | ND | ND | ND |
| MW-3 | 9 Nov. 90 | | ND | ND | ND | ND | ND | ND |
| MW-6 | 9 Nov. 90 | | ND | ND | ND | ND | ND | 6 |
| MW-7 | 9 Nov. 90 | | ND | ND | ND | ND | ND | ND |
| **Additional Locations** | | | | | | | | |
| FD-1 (d) | 8 Nov. 90 | | ND | ND | ND | ND | ND | ND |
| | 1 Oct. 90 | | ND | ND | ND | ND | ND | ND |
| | 4 Sept. 90 | | ND | ND | ND | ND | ND | ND |
| FD-1 Duplicate | 1 Oct. 90 | | ND | ND | ND | ND | ND | ND |
| FD-2 | 8 Nov. 90 | | ND | ND | ND | ND | ND | ND |
| | 1 Oct. 90 | | 12 | ND | ND | ND | ND | ND |
| FS-1 | 8 Nov. 90 | | ND | ND | ND | ND | ND | ND |
| | 1 Oct. 90 | | ND | ND | ND | ND | 14 | ND |
| FS-3 | 8 Nov. 90 | | ND | ND | ND | ND | 35 | ND |
| | 1 Oct. 90 | | ND | ND | ND | ND | 7 | ND |
| SR-FS (d) | 8 Nov. 90 | | ND | ND | ND | 6 | ND | ND |

(a) µg/l - micrograms per liter
(b) ND - not detected
(c) FD-1 sample from 4 Sept. 90 also analyzed for semivolatile organic compounds - non detected
(d) SR-FS - Floor sump in storage room located below Boiler Room

## Table 4-5 (continued)
## Summary of Ground Water Analytical Data for Volatile Organic Compounds
## General Circuits, Inc.

| Sampling Location | Sampling Date | Units | 1,1-Dichloroethene µg/l | 1,2-Dichloroethene (total) µg/l | 1,2-Dichloropropane µg/l | Ethylbenzene µg/l | Methylene Chloride µg/l |
|---|---|---|---|---|---|---|---|
| | Detection Limits | | 5 | 5 | 5 | 5 | 5 |
| **Soil Wells** | | | | | | | |
| MW-1 | 8 Nov. 90 | | ND | ND | ND | ND | ND |
| | 30 Aug. 90 | | ND | ND | ND | ND | ND |
| MW-4 | 8 Nov. 90 | | ND | ND | ND | ND | ND |
| | 30 Aug. 90 | | ND | ND | ND | ND | ND |
| MW-5 | 8 Nov. 90 | | ND | ND | ND | ND | ND |
| | 30 Aug. 90 | | ND | ND | ND | ND | ND |
| MW-8 | 8 Nov. 90 | | ND | 19 | 10 | ND | ND |
| MW-9 | 8 Nov. 90 | | 29 | 8,900 | ND | 6 | 31 |
| MW-9 Duplicate | 8 Nov. 90 | | 22 | 10,000 | ND | 7 | 26 |
| MW-10 | 8 Nov. 90 | | 18 | 2,400 | ND | ND | ND |
| **Bedrock Wells** | | | | | | | |
| MW-2 | 9 Nov. 90 | | ND | ND | ND | ND | ND |
| MW-3 | 9 Nov. 90 | | ND | ND | ND | ND | ND |
| MW-6 | 9 Nov. 90 | | ND | 37 | ND | ND | ND |
| MW-7 | 9 Nov. 90 | | ND | ND | ND | ND | ND |
| **Additional Locations** | | | | | | | |
| FD-1 (d) | 8 Nov. 90 | | 55 | 2,000 | ND | ND | 8 |
| | 1 Oct. 90 | | 51 | 1,300 | ND | ND | ND |
| | 4 Sept. 90 | | 48 | 1,700 | ND | ND | ND |
| FD-1 Duplicate | 1 Oct. 90 | | 52 | 1,300 | ND | ND | ND |
| FD-2 | 8 Nov. 90 | | 100 | 2,100 | 13 | ND | ND |
| | 1 Oct. 90 | | 100 | 1,800 | 12 | ND | ND |
| FS-1 | 8 Nov. 90 | | 680 | 5,700 | ND | ND | 7 |
| | 1 Oct. 90 | | 560 | 5,800 | ND | ND | 9 |
| FS-3 | 8 Nov. 90 | | 15 | 200 | ND | ND | 10 |
| | 1 Oct. 90 | | ND | 83 | ND | ND | ND |
| SR-FS (d) | 8 Nov. 90 | | ND | ND | ND | ND | ND |

(a) µg/l - micrograms per liter
(b) ND - not detected
(c) FD-1 sample from 4 Sept. 90 also analyzed for semivolatile organic compounds - non detected
(d) SR-FS - Floor sump in storage room located below Boiler Room

## Table 4-5 (continued)
## Summary of Ground Water Analytical Data for Volatile Organic Compounds
## General Circuits, Inc.

| Sampling Location | Sampling Date | Tetrachloroethene μg/l | Toluene μg/l | 1,1,1-Trichloroethane μg/l | Trichloroethene μg/l | Vinyl Chloride μg/l | Xylenes μg/l | Total VOCs μg/l |
|---|---|---|---|---|---|---|---|---|
| | Detection Limits | 5 | 5 | 5 | 5 | 10 | 5 | -- |
| **Soil Wells** | | | | | | | | |
| MW-1 | 8 Nov. 90 | ND | ND | ND | ND | ND | ND | 0 |
| | 30 Aug. 90 | ND | ND | ND | ND | ND | ND | 19 |
| MW-4 | 8 Nov. 90 | ND | ND | ND | ND | ND | ND | 0 |
| | 30 Aug. 90 | ND | ND | ND | ND | ND | ND | 38 |
| MW-5 | 8 Nov. 90 | ND | ND | ND | ND | ND | ND | 0 |
| | 30 Aug. 90 | ND | ND | ND | ND | ND | ND | 24 |
| MW-8 | 8 Nov. 90 | 3,400 | ND | ND | 1,900 | ND | ND | 5,334 |
| MW-9 | 8 Nov. 90 | 110,000 | 590 | ND | 130,000 | ND | 62 | 252,278 |
| MW-9 Duplicate | 8 Nov. 90 | 77,000 | 360 | ND | 90,000 | ND | 59 | 179,328 |
| MW-10 | 8 Nov. 90 | 10 | 5 | ND | 19,000 | ND | ND | 21,448 |
| **Bedrock Wells** | | | | | | | | |
| MW-2 | 9 Nov. 90 | ND | ND | ND | ND | ND | ND | 0 |
| MW-3 | 9 Nov. 90 | ND | ND | ND | ND | ND | ND | 0 |
| MW-6 | 9 Nov. 90 | ND | ND | ND | 5 | ND | ND | 48 |
| MW-7 | 9 Nov. 90 | ND | ND | ND | ND | ND | ND | 0 |
| **Additional Locations** | | | | | | | | |
| FD-1 (d) | 8 Nov. 90 | 300 | 46 | ND | 2,900 | 2,200 | ND | 7,509 |
| | 1 Oct. 90 | 450 | 32 | 22 | 2,000 | 1,200 | ND | 5,055 |
| | 4 Sept. 90 | 78 | 45 | ND | 1,900 | 2,100 | ND | 5,871 |
| FD-1 Duplicate | 1 Oct. 90 | 490 | 33 | 21 | 2,200 | 1,300 | ND | 5,396 |
| FD-2 | 8 Nov. 90 | 1,300 | ND | ND | 570 | 680 | ND | 4,763 |
| | 1 Oct. 90 | 1,100 | ND | ND | 400 | 700 | ND | 4,124 |
| FS-1 | 8 Nov. 90 | 770 | 20 | 8 | 3,000 | 720 | ND | 10,905 |
| | 1 Oct. 90 | 410 | 20 | 97 | 2,200 | 540 | ND | 9,650 |
| FS-3 | 8 Nov. 90 | 86 | ND | 220 | 76 | 29 | ND | 671 |
| | 1 Oct. 90 | 52 | ND | 40 | 11 | ND | ND | 193 |
| SR-FS (d) | 8 Nov. 90 | ND | ND | ND | ND | ND | ND | 6 |

(a) μg/l - micrograms per liter
(b) ND - not detected
(c) FD-1 sample from 4 Sept. 90 also analyzed for semivolatile organic compounds - non detected
(d) SR-FS - Floor sump in storage room located below Boiler Room

## APPENDIX C

- **Drawing of Proposed Sampling Locations**

- **Table 1 - Proposed Tasks**
- **Table 2 - Summary of Sampling and Analytical Program**
- **Table 3 - Schedule**

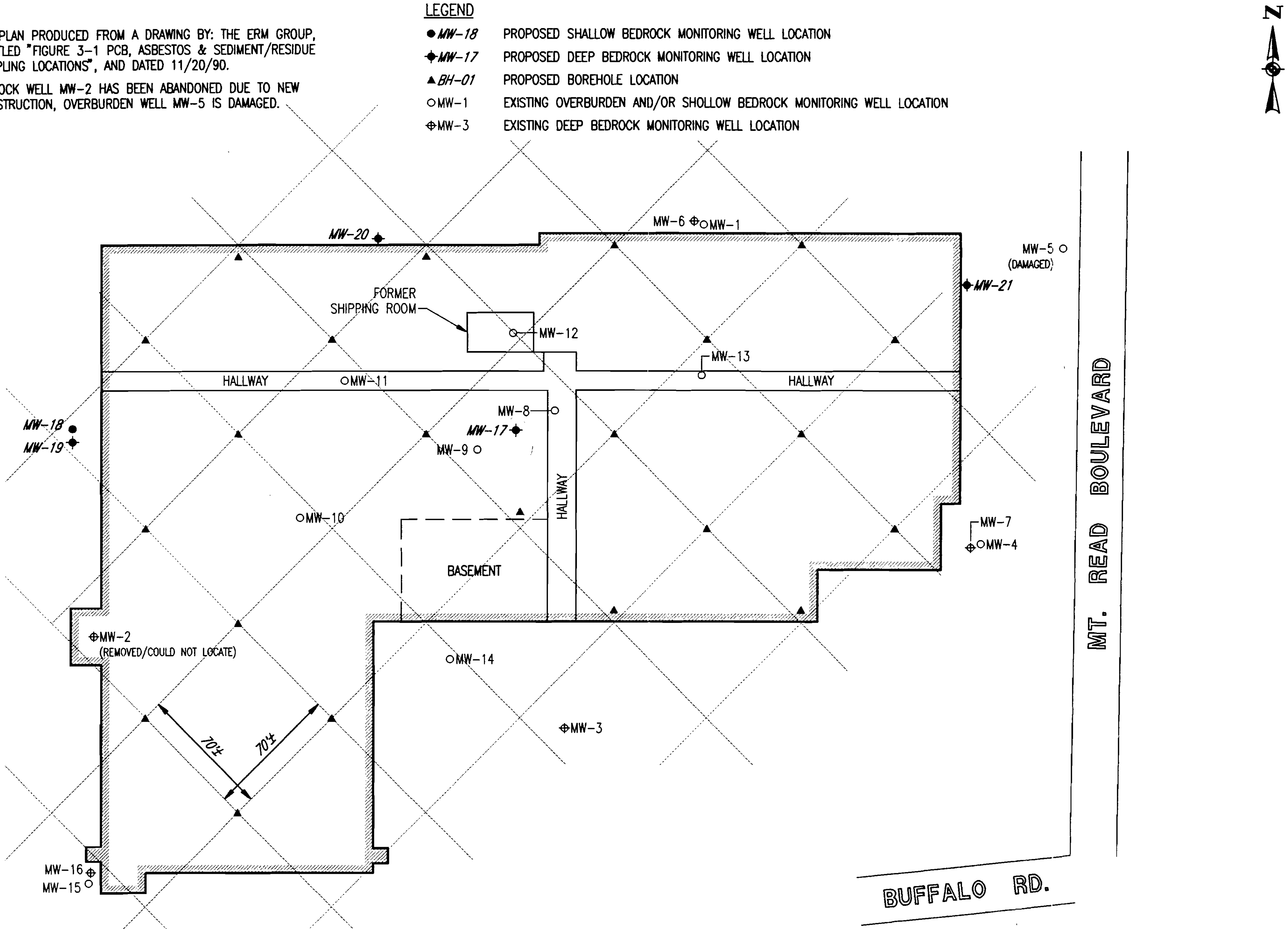
REF1: BORDER12
REF2: REF2
REF3: REF3

NOTES

1. SITE PLAN PRODUCED FROM A DRAWING BY: THE ERM GROUP, ENTITLED "FIGURE 3-1 PCB, ASBESTOS & SEDIMENT/RESIDUE SAMPLING LOCATIONS", AND DATED 11/20/90.
2. BEDROCK WELL MW-2 HAS BEEN ABANDONED DUE TO NEW CONSTRUCTION, OVERBURDEN WELL MW-5 IS DAMAGED.

LEGEND

| | |
|---|---|
| ● *MW-18* | PROPOSED SHALLOW BEDROCK MONITORING WELL LOCATION |
| ✦ *MW-17* | PROPOSED DEEP BEDROCK MONITORING WELL LOCATION |
| ▲ *BH-01* | PROPOSED BOREHOLE LOCATION |
| ○ MW-1 | EXISTING OVERBURDEN AND/OR SHOLLOW BEDROCK MONITORING WELL LOCATION |
| ⊕ MW-3 | EXISTING DEEP BEDROCK MONITORING WELL LOCATION |




**SITE PLAN**

SCALE: 1" = 50'

TIME PLOTTED: FRI MAY 30, 10:20:00 1997
FILENAME: MAGUIR4

| | |
|---|---|
| DESIGNED BY --- | DATE ----- |
| DRAWN BY RJM | DATE DRAWN 5/29/97 |
| SCALE 1" = 50' | DATE ISSUED 5/30/97 |

**DAY ENVIRONMENTAL, INC.**

*ENVIRONMENTAL CONSULTANTS*
*ROCHESTER, NEW YORK*

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

DRAWING TITLE SITE PLAN WITH PROPOSED MONITORING WELL & BOREHOLE LOCATIONS

PROJECT NO.
1275S-97

DRAWING NO.
SR-6

SHEET 1 OF 1

# TABLE 1

## REMEDIAL INVESTIGATION/FEASIBILITY STUDY
## General Circuit Inactive Hazardous Waste Site

## PROPOSED TASKS

| PROPOSED TASK | WORK PLAN SECTION | BRIEF DESCRIPTION |
|---|---|---|
| Overburden Test Borings | 2.1 | Advance 35 to 45 overburden test borings throughout the building to identify and delineate areas of contamination. The test borings will be advanced 14' below floor grade or to refusal. Up to four soil samples will be collected from each probe hole, and scanned with an FID or PID with a 10.6 ev lamp. Up to 37 soil samples will be analyzed (refer to Table 2 - "Summary of Sampling and Analytical Program"). |
| Install monitoring wells | 2.2 | Install one shallow bedrock well; and four deep bedrock wells. |
| Sample and analyze groundwater samples | 2.3 | Obtain one round of samples from the five new wells, and each of the 14 existing wells (refer to Table 3 - "Summary of Sampling and Analytical Program"). |
| Sample for NAPL | 2.3.2 | Obtain samples from the monitoring wells for indications of NAPL. Any NAPL samples obtained will be observed and scanned with an FID or PID with a 10.6 ev lamp. It is planned that two samples will be selected for analysis (refer to Table 2 - "Summary of Sampling and Analytical Program"). |
| Basement Sump Evaluation | 2.4 | Assess hydraulic impact of the basement sump. |
| Develop groundwater potentiometric maps | 2.5 | Obtain static groundwater measurements and develop potentiometric maps. |
| RI report | 3.0 | Preparation of RI report and submission to NYSDEC. |
| Feasibility Study | 4.0 | Upon approval of the RI report by the NYSDEC, a Feasibility Study (FS) will be prepared and submitted to the NYSDEC. |
| Public participation | 5.0 | Implementation of a public participation program. |
| Progress reports | 6.0 | Quarterly progress reports will be submitted to the NYSDEC. |

# TABLE 2

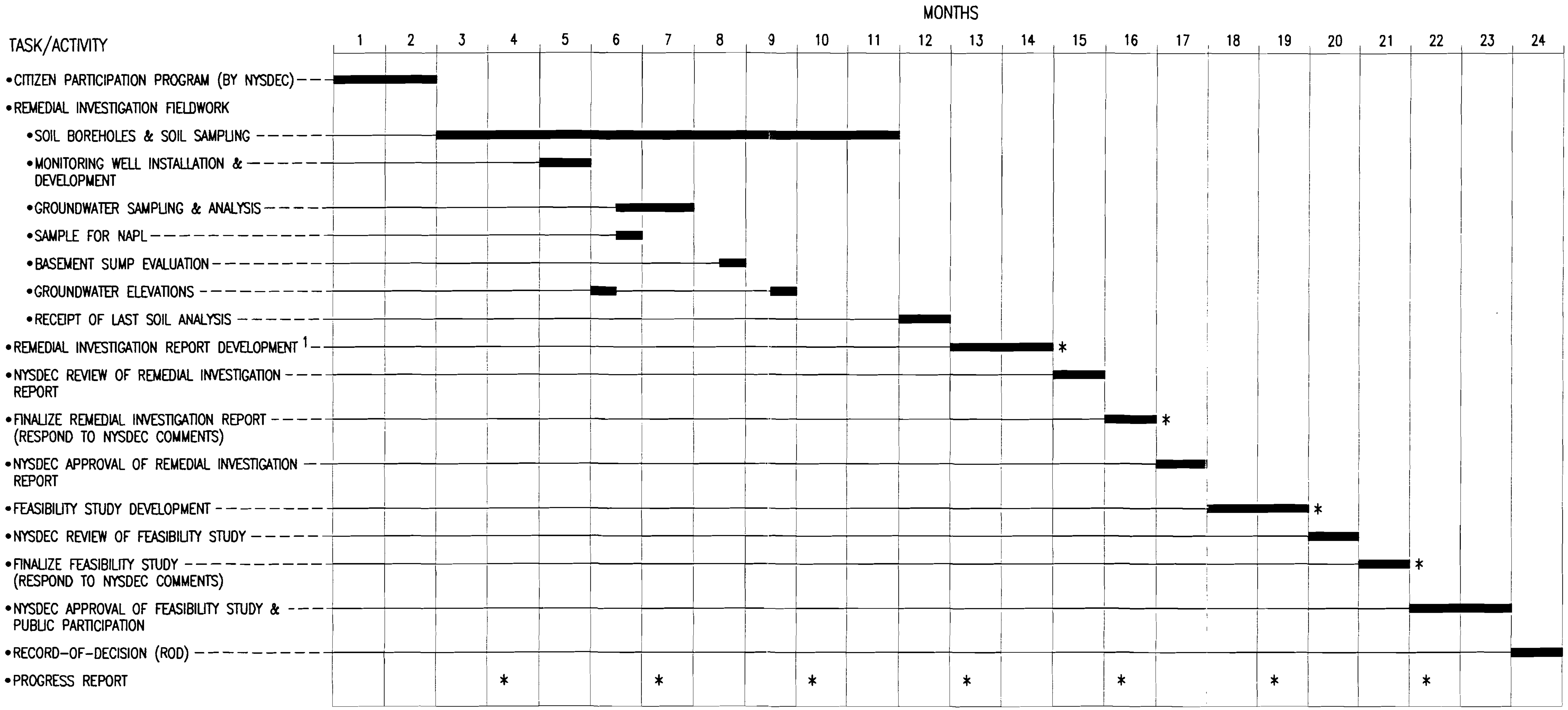
## GENERAL CIRCUITS INACTIVE HAZARDOUS WASTE SITE

## SUMMARY OF ANTICIPATED SAMPLING AND ANALYTICAL PROGRAM

| TYPE OF SAMPLE | # OF SAMPLES | USEPA METHODS |
|---|---|---|
| Soil | Up to 15 | TCL VOCs (ASP Method 95-1) |
| Soil | Up to 5 | TAL Metals (ASP Method CLP-M) |
| Soil | Up to 15 | Chromium and Hexavalent Chromium (ASP Method CLP-M) |
| Soil | 2 | Full TCL/TAL (ASP Methods 95-1, 95-2, 95-3, and CLP-M) |
| Groundwater | 3 | Full TCL/TAL (ASP Methods 95-1, 95-2, 95-3, and CLP-M) |
| Groundwater | 16 | VOCs (ASP Method 95-1); Chromium and Hexavalent Chromium (ASP Method CLP-M) |
| Groundwater (LNAPL) | 1 | Specific Gravity; VOCs (ASP Method 95-1) |
| Groundwater (DNAPL) | 1 | Specific Gravity; VOCs (ASP Method 95-1); Chromium and Hexavalent Chromiun (ASP Method CLP-M) |
| QA/QC MS/MSD | See Section 2.7.3 of the Work Plan | See Section 2.7.3 of the Work Plan |
| QA/QC Trip Blank | See Section 2.7.3 of the Work Plan | See Section 2.7.3 of the Work Plan |
| QA/QC Field Blank (Soil) | 1 | TCL VOCs (ASP Method 95-1); and Chromium and Hexavalent Chromium (ASP Method CLP-M) |

# TABLE 3
## REMEDIAL INVESTIGATION/FEASIBILITY STUDY

General Circuits Inactive Hazardous Waste Site
Anticipated Schedule




∗ DELIVERABLE SUBMITTAL TO NYSDEC

1 This assumes that one round of sampling and analytical testing is sufficient. If additional sampling/testing or treatability studies are warranted, the schedule for subsequent tasks will need to be extended.

Day Environmental, Inc.
May 29, 1997
Maguir.1275S.97

REF1: REF2: REF3:

TIME PLOTTED: FRI MAY 30, 15:25:00 1997
FILENAME: D:\MAGUIR\TIMEL

# APPENDIX D

## Qualifications and Experience of Project Personnel

**DAVID D. DAY, P.E.**

---

**EDUCATION** University of Michigan, M.S. Environmental Engineering, 1975
Michigan State University, B.S. Civil/Sanitary Engineering, 1974

**REGISTRATION** Licensed Professional Engineer in New York
40 Hour OSHA Hazardous Waste Site Worker Training
8 Hour OSHA Hazardous Waste Site Supervisor Training
8 Hour OSHA Hazardous Waste Site Worker Refresher Training
Certified Environmental Inspector
Certified Environmental Specialist

**RESPONSIBILITIES** President, Day Engineering, P.C. As a founder and principal of the firm, Mr. Day is responsible for its overall management and operation. He also provides technical guidance and support to the Industrial Compliance Group, Phase I Assessment Group, and the Phase II/Remediation Group. In addition, he periodically serves as Project Manager on some of the firm's larger or more complicated projects.

**EXPERIENCE** Twenty years of experience working on environmental projects for industry or as a consultant.

**1985 - date** **Day Engineering, P.C. Representative projects include:**

**Hazardous Waste and Hazardous Material Compliance Audit at the Metro-North Harmon Yard Facility.** Project Manager for conducting a compliance audit at the Harmon Yard facility to assess hazardous waste and hazardous material handling and storage. The audit report outlined recommendations for improving the handling and storage of hazardous materials and wastes.

**RCRA Training at Metro-North Railroad Facilities in New York and Connecticut.** Provided training to over 400 railroad personnel on handling and storage of hazardous waste as required by the Resource, Conservation, and Recovery Act (RCRA).

**Hazardous Waste Tank Certification Project at Large Industrial Facility, Rochester, New York.** Project Manager responsible for developing tank certification reports for 50 hazardous waste storage tanks as required by the New York State hazardous waste regulations.

**Remedial Investigation on a New York State Inactive Hazardous Waste Site, Clarendon, New York.** Project Manager for a $300,000 remedial investigation at a site where groundwater is contaminated by volatile organic compounds. Worked with client's attorney to secure funding of this project by insurance companies. The project was completed as required by the New York State Department of Environmental Conservation (NYSDEC) Order-on-Consent.

**Remedial Investigation on a New York State Inactive Hazardous Waste Site, Alton, New York.** Project Manager for a remedial investigation at a site that is contaminated with pesticides. The studies were completed as required by the NYSDEC Order-On-Consent.

**Drain Study at a Major Manufacturing Facility, New York.** Project Manager for conducting a $200,000+ investigation to determine the discharge location (i.e., sanitary sewer, storm sewer, drywells, subsurface, etc.) of the various operations (i.e., processes, floor drains, hub drains, roof drains, sumps, scrubber drains, sinks, etc.) at a 5 million square foot manufacturing facility that contains over 40 buildings. A database was established to identify and track the discharge sources and locations to ensure compliance with local, State, and federal regulations.

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**Phase I Assessments Throughout New York State.** Project Manager to review 700+ environmental assessments conducted for the purpose of real estate transactions. These assessments were conducted on a variety of different types of facilities, including industrial sites, manufacturing operations, and former railroad properties.

**Compliance Audits at Various Industrial Facilities in New York.** Project Manager or technical reviewer for compliance audits conducted at industrial facilities. The compliance audits encompassed all or portions of the following types of environmental issues: air pollution, water pollution, hazardous and solid waste management, tank management, and petroleum handling and storage. The compliance audits have been conducted at a variety of different types of facilities including: plating facilities, auto dealerships, heat treating facilities, packaging/printing facilities, power generating facilities, tool and die operations, and other types of manufacturing operations.

**Remediation at a Scrap Yard, Olean, New York.** Project Manager for investigation and remediation of several hundred drums and containers that were abandoned at a scrap yard. The drums and containers contained a variety of types of hazardous wastes. The investigation and clean-up was conducted and completed under a USEPA Order-On-Consent.

**Investigation and Remediation of Contaminated Soils at a Car Dealership.** Project Manager to investigate and remediate contaminated soils at a car dealership. Negotiations were conducted with the NYSDEC to keep this site from being listed as an Inactive Hazardous Waste Site. Groundwater investigations were conducted to ensure that groundwater contamination did not exist. The soil remediation program involved-site bioremediation of the contaminated soils. Upon completion of the remediation program, the NYSDEC provided written confirmation that no further investigation or work was required.

**Clean-Up of an Abandoned Printed Circuit Board Facility, Rochester, New York.** Project Manager to evaluate the environmental issues involved with an abandoned printed circuit board facility prior to the purchase of the facility by our client. After the purchase of the facility, acted as Project Manager for a $300,000 clean-up of the facility that involved containerizing and disposing of plating solutions and other types of wastes; decontaminating of plating equipment, and other types of industrial machinery; and decommissioning of an industrial wastewater treatment plant. The site has been renovated and is currently being leased by a variety of tenants.

**1975-1985**

**Senior Environmental Engineer, Xerox Corporation.** Responsible for implementing comprehensive environmental programs to insure that manufacturing facilities throughout the United States were in compliance with environmental regulations. Conducted compliance audits of facilities and developed management plans to ensure compliance. Responsibilities also included such things as implementing hydrogeologic investigations and remediation plans; reviewing and signing permits for air emission sources; coordinating the response to spill incidents; evaluating and upgrading industrial wastewater treatment systems to ensure compliance with pretreatment regulations; evaluating hazardous waste management practices; and evaluating the use of alternative raw materials to minimize or eliminate the amount of hazardous wastes generated.

**MEMBERSHIP**

American Consulting Engineers Council
National Society of Professional Engineers
Water Pollution Control Federation
Rochester Engineering Society, Inc.
Environmental Assessment Association

# RAYMOND L. KAMPFF

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| **EDUCATION** | University of Rochester, B.A. Geology, 1974<br>Monroe Community College, Civil Engineering Technology, 1976<br>Various continuing eduction courses and seminars in Hazardous Waste Management, CERCLA/SARA and RCRA Regulations and other technical issues. |
| **RESPONSIBILITIES** | Mr. Kampff has over 17 years of professional experience primarily related to projects involving environmental or geoenvironmental evaluation. Mr. Kampff's work includes environmental studies and remediation at inactive hazardous waste sites, industrial facilities, and municipal sites. He has also been responsible for numerous projects involving environmental assessment related to due diligence evaluations and environmental auditing to assess regulatory compliance. Currently, Mr. Kampff is responsible for the overall technical and administrative direction of the Site Evaluation and Remediation Group for Day Environmental, Inc. Some of his representative projects are described below. |
| **1994 - date** | **Day Engineering, P.C. Representative projects include:**<br><br>**Interim Remedial Measure (IRM) Construction, Confidential Industrial Client: Akron, New York.** Responsible for construction oversight during the implementation of IRM activities at an approximate 3-acre former waste disposal area used to dispose of hazardous and industrial wastes. Work included construction oversight during waste consolidation and capping activities, coordination with the NYSDEC, implementation of design modifications and preparation of various reports and other submittals required by the NYSDEC to document closure.<br><br>**Industrial Facility Audit, Rochester Welding Supply Corporation: Rochester, New York.** Completed a facility audit at this site in conjunction with a Phase I environmental site assessment. The audit was done to evaluate operations and processes. The information obtained was used to evaluate the source of solvents and other chemical constituents that were encountered during the Phase I ESA. Subsequently, a program was designed and implemented to remediate the contamination encountered and to preclude future problems.<br><br>**Remediation of Petroleum Contaminated Soils, DePaul Community Facilities: Rochester, New York.** Responsible for the design and construction of a combined active and passive soil vapor extraction system at this facility being constructed on the site of a former gasoline station. Work included the initial evaluation of subsurface conditions and the assessment of the nature and extent of contamination present within the soil and groundwater underlying the site, development, implementation and monitoring of the combination active/passive soil vapor extraction system. |
| **1977 - 1994** | **Remedial Investigation/Feasibility Study, Batavia Landfill Superfund Site: Batavia, New York.** Responsible for comprehensive studies to evaluate and remediate this former municipal landfill where past disposal of hazardous and industrial waste (spent solvents, metal sludges and waste oils) resulted in its listing as a federal superfund site. Work included the development of detailed work plans, completion of field studies, data evaluation and preparation of various reports including a RI report, public health risk assessment and a FS report.<br><br>**New Buffalo Industrial Park: Buffalo, New York.** Responsible for multi-phase studies during the evaluation and remediation of this 130-acre former railroad yard pursuant to its development as an industrial park. Activities included test borings/monitoring well installation, test pits, in-situ and analytical laboratory testing to characterize this site and develop remedial options. Remedial activities included the inventory, sampling, and removal of more than 500 drums, the isolation of cyanide bearing sludges, and |

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the removal of surfical oil, spilled diesel fuel and other wastes generated during the site's past usage as a railroad yard.

**Petroleum Storage Tank (PST) Permitting at Harrison Division of General Motors Corporation: Lockport, New York.** Pursuant to Article 12 of the New York State Navigation Laws, a groundwater monitoring and reporting plan was developed to evaluate current and future impacts of three 1.25-million gallon PSTs located at the Harrison facility. Following acceptance of the plan by the NYSDEC, a groundwater monitoring system was installed and this system is monitored in accordance to Article 12 requirements.

**York Oil Superfund Site RI/FS: Moira, New York.** Managed several studies to evaluate on-site contamination and off-site pathways at this former waste oil recycling facility where large quantities of PCB-and solvent-laden oils spilled onto the ground and migrated into adjacent wetlands. Studies included a multi-phase program including geophysical explorations, soil and rock test borings, monitoring well installation, analytical testing and computer modeling to evaluate site conditions and develop potential remedial options.

**Buffalo Light Rail Rapid Transit Project:Buffalo, New York.** Responsible for various activities during the design and construction of the 6.7 mile-long system consisting of twin 18-foot diameter rock tunnels, cut and cover surface sections, and associated stations. Duties included subsurface explorations, geologic mapping, geotechnical instrumentation, contractor claim evaluation and studies for foundation recommendations of ancillary structures.

**Major Oil Storage Facility Plan Update, Greater Buffalo International Airport (GBIA):Buffalo, New York.** Responsible for various activities at the existing and former fuel farms at the GBIA. This work included updating of the Spill Prevention Control and Countermeasure (SPCC) Plan, the development and installation of a groundwater monitoring system for the existing fuel farm, the sampling and testing of groundwater samples, the evaluation of geohydrologic conditions, and the development of a groundwater contingency plan in the event of a future spill.

**Environmental Site Assessments and Facility Audits for an Automobile Manufacturer:various locations throughout the United States and Canada.** Responsible for Phase I/Phase II Environmental Site Assessments, regulatory compliance evaluations and remedial activities (i.e., underground tank removal, in-situ treatment systems, etc.) at automobile dealerships and similar commercial facilities.

**Environmental Audit, Great Lakes Press:Dunkirk, New York.** Oversaw environmental studies at this 200,000 square foot facility used to manufacture printing inks and to complete commercial printing. Work included an evaluation of site history back to initial development in the 1800s, a detailed review of regulatory records and an evaluation of current operations to determine regulatory compliance status.

**Environmental Evaluation, Waste-To-Energy Facility: Niagara Falls, New York.** Responsible for comprehensive studies done as part of a due diligence evaluation of this active waste-to-energy facility prior to its purchase. Theses studies included an evaluation of past operations to assess potential environmental concerns, a review of state and local regulatory compliance status and the implementation of site specific studies/sampling to assess the current environmental status of the site and its compliance with applicable environmental regulations.

**EDUCATION** University of Colorado; Boulder, Colorado; B.A. Geology, 1986

**CERTIFICATION** 40 Hour OSHA Hazardous Waste Site Worker
8 Hour OSHA Hazardous Waste Site Supervisor
USEPA/NYSDOL-Certified Asbestos Inspector

**RESPONSIBILITIES** Geologist/Environmental Assessor/Asbestos Inspector: Phase I/Phase II/Remediation Group, Day Engineering, P.C. Mr. Danzinger is responsible for completing Phase I Assessments, Phase II investigations, hydrogeologic studies, and development and implementation of remedial measures. He also serves as the company Health and Safety Officer.

**EXPERIENCE** Mr. Danzinger has over eight years of professional experience working on environmental projects as a consultant.

**1991 - date** **Day Engineering, P.C., Rochester, New York. Representative projects include:**

**Phase II Investigation and Hydrogeologic Study at Former Automotive Sales and Service Facility, Mt. Morris, New York.** Project Manager for a Phase II Investigation and Hydrogeologic study consisting of soil gas surveys, installation of test borings and monitoring wells, in addition to soil and groundwater sampling and analysis. Responsible for project coordination and implementation, and preparation of various reports and other submittals required by the NYSDEC.

**Phase II Investigation and Remediation Services at Former Gasoline Station, Gates, New York.** Responsible for performing a Phase II Investigation at a former gasoline station. Specific tasks included determining the extent of gasoline-contaminated soil, sampling of monitoring wells, identification and evaluation of potential contaminant receptors and migration pathways. Subsequent to Site characterization, developed list of remedial options and cost estimates and assisted in the design, implementation, and monitoring of a soil vapor extraction system (SVES) at this Site. Work included development of a remedial workplan submitted to the NYSDEC and site specific contract bid documents for the construction of the SVES.

**Phase II Investigation at a Packaging Plant, Rochester, New York.** Due to a spill of a volatile organic material at the Site, the NYSDEC under Consent Order required a Preliminary Site Assessment (i.e., Phase II Investigation) to evaluate subsurface impact by the spill and by other potential source areas. Mr. Danzinger assisted in the development of a site work plan and a health and safety plan to be used during on-site fieldwork activities. Mr. Danzinger was also integral in the coordination and implementation of fieldwork, development of monthly status reports to regulatory authorities, interpretation of data, and development of a Phase II report summarizing the findings of the investigation. Based on the results of the Phase II Investigation, the NYSDEC indicated that the Site was adequately characterized, and further investigative and/or remedial work was not required.

**Phase II Investigation and Soil Management Plan, Greece, New York.** Developed and performed a Phase II Study on a former apple orchard being considered for development as a residential subdivision in order to evaluate the extent and magnitude of pesticide and metal residues in soil due to their past use. Evaluated and interpreted the data generated, interfaced with regulatory agencies and developed a soil management plan (SMP) to beneficially use the impacted soil on-site while obtaining residential development approvals.

**Ex-Situ Vacuum Enhanced Bioventing at Former Underground Storage Tank Location, Gates, New York.** Performed a Phase I Environmental Site Assessment at a dry storage facility which identified former petroleum underground storage tanks as a potential environmental concern. Completed a Phase II Study in and around the former locations of USTS. Remediation activities consisted of designing an on-site ex-situ vacuum enhanced bioventing treatment cell, documenting the construction of the remedial system,

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documenting the removal and placement of over 450 cubic yards of petroleum-contaminated soil into the bioventing cell, and monitoring the performance of the bioventing system. The bioventing system is operational, and confirmation test results indicate at least 70% of the contaminated soil has been successfully remediated to date. Regulatory closure is anticipated in 1997.

**Soil Management Plan, Greece, New York.** Completed a Modified Phase I Site Assessment at a property with former agricultural greenhouses that was slated for future commercial development. During the Phase I, elevated levels of pesticides and metals were measured on soil samples collected from the greenhouse areas. Mr. Danzinger developed and performed a Phase II Study that characterized the vertical and areal extent of pesticide and metal residues on the Site. Based on the results of the Phase II Investigation, it was determined that soil containing residual levels of pesticides and metals could be beneficially used and managed on-site as part of the planned development. Mr. Danzinger attended various town board meetings to assist the developer in obtaining Planning Board and Zoning Board approvals. Subsequent to obtaining Town approvals, Mr. Danzinger developed a site-specific soil management plan (SMP) that included a site-specific health and safety plan (HSP). The SMP and HSP were developed to protect nearby residents and construction workers during development activities and to reduce exposure of future Site occupants to residual pesticides and metals beneficially used on-site.

**Phase II Investigation at Active Agricultural Seed Packaging Plant, Honeoye Falls, New York.** Responsible for developing a sampling and analysis plan to evaluate the impact of pesticide and metal use at a seed packaging, treatment facility and mill. Responsible for collecting soil, concrete and wipe samples from in and around existing site structures and product loading areas. Evaluated data and completed a Phase II report summarizing the fieldwork, findings, conclusions, and recommendations.

**Health and Safety Plan (HSP) for Work at an Inactive Hazardous Waste Disposal Site, New York.** Mr. Danzinger was integral in the development of a general and task-specific HSP to be used during fieldwork at a NYSDEC Inactive Hazardous Waste Disposal Site.

**Former Automobile Dealership, Rochester, New York.** Responsible for performing a risk assessment using data generated during a Phase II investigation and previous investigation. The risk assessment was based on the American Society For Testing and Materials (ASTM) Standard E1739-95 for "Risk-Based Corrective Action Applied at Petroleum Release Sites (RBCA)". Draft New York State Department of Environmental Conservation (NYSDEC) risk assessment default parameters, and chemical and toxilogical property values, were incorporated into the risk assessment. Mr. Danzinger successfully used Groundwater Services, Inc.'s (GSI) Tier 2 RBCA Tool kit computer software to manage site data and develop site-specific clean-up levels that were protective of human health and the environment. The results of the risk assessment were used to develop corrective remedial actions at this site. Mr. Danzinger's risk assessment was the first ASTM RBCA assessment accepted by Region 8 of the NYSDEC.

**Landfill Reclamation and Closure Project, Dunkirk, New York.** Mr. Danzinger assisted in the development of a comprehensive work plan, a site-specific health and safety plan, and a beneficial use determination application for the reclamation and closure of a landfill containing scrap steel, metal fines, slag, etc.

**Former Manufactured - Gas Plant, Ontario County, New York.** Mr. Danzinger developed a site-specific health and safety plan for a Supplemental Remedial Investigation at this site, which is contaminated with coal tar, petroleum products, etc. Mr. Danzinger also managed and completed field duties including sediment and surface water sampling, advancement of test borings, ground water monitoring, well installations, etc.

**Soil Management Plan, Henrietta, New York.** Mr. Danzinger developed a site-specific soil management plan (SMP) to be used to manage on-site fill materials, (i.e. construction and demolition debris, and some petroleum contaminated soil) during development of the site as a residential sub-division.

**Phase I Assessments Throughout New York State.** Performed, assisted, and provided technical guidance for over 250 Phase I Environmental Site Assessments (Phase I ESA) conducted for the purposes of real estate transactions. The Phase I ESAs were performed on a wide variety of residential, commercial, industrial and manufacturing facilities (e.g., apartment complexes, landfills, gasoline stations, car dealerships, plastic injection mold facilities, optical manufacturing, machine shops, etc.).

**1989 - 1991** — **Labella Associates, P.C., Rochester, New York Representative projects included:** Phase I Environmental Site Assessments, and Phase II Investigations for private industry and at NYSDEC Inactive Hazardous Waste Disposal Sites.

**1989** — **IMS Engineers & Architects, P.C. Rochester, New York. Representative projects included:** Remedial Investigations at a USEPA Superfund site located in New Jersey; fieldwork at NYSDEC Inactive Hazardous Waste Disposal Sites.

**1988** — **E.I. Corporation, Boulder, Colorado.** Editor, digitizing maps and well logs.

**1987 - 1988** — **E.I. Corporation, Boulder, Colorado.** Cartographic Technician.

**MEMBERSHIP**

National Groundwater Association
Association of Ground Water Scientists and Engineers
New York State Department of Environmental Conservation "Risk Based Corrective Action for Petroleum-Impacted Sites" Advisory Committee

**EDUCATION** A.A.S. Environmental Control Technology, 1988, Monroe Community College

**REGISTRATION** 40 Hour OSHA Hazardous Waste Site Worker
8 Hour OSHA Hazardous Waste Site Supervisor Training
8 Hour OSHA Hazardous Waste Site Worker Refresher Training

**RESPONSIBILITIES** Environmental Specialist Day Environmental, Inc. Mr. Mullin performs work for each of the Groups within the company, including the Industrial Compliance Group, the Process Design Group, and the Site Investigation and Remediation Group.

**EXPERIENCE** Mr. Mullin has over eight years of professional experience working on environmental projects as a consultant.

**1989 - date** **Day Environmental, Inc.** Representative projects include:

**Title V Operating Permit for a Large Manufacturing Facility, Webster, New York.** Conducted site visits to inventory air emissions sources, verify air emission information previously collected, and identify regulated pollutants. Collected field data to determine the emission limiters for specific processes, estimated the anticipated maximum hourly and annual emission rates for each regulated pollutant, and identified sources that must be stack tested to verify emission rates. Collected field data and prepared air permits for emission sources.

**Chemical Bulk Storage Permit for a Large Manufacturing Facility, Webster, New York.** Conducted site visits to identify tanks that are regulated under the Chemical Bulk Storage Program. Obtained information regarding the tank product(s), tank capacity and construction, leak detection and secondary containment equipment, and release/spill history.

**Partial Closure of Hazardous Waste Management Units for a Fortune 500 Manufacturing Facility, Rochester, New York:** Lead technician responsible for documenting the closure of various processes which were regulated by the New York State Department of Environmental Conservation (NYSDEC). Specific responsibilities included review of closure work plans and on-site procedures, conducting site visits, interfacing with on-site representatives and appropriate NYSDEC representatives, and assisting in report preparation.

**Infrastructure Installation Documentation for a Large Metropolitan County in New York State:** Technician responsible for assisting the project leader in providing infrastructure documentation prior to county approval and ownership. Specific tasks included conducting pre-construction meetings with contractors and county officials, review of site drawings, conducting site visits to document sanitary mainline and appurtenance installations, providing project summary status reports to county officials, and interfacing with project leader and manager to resolve site issues and progress.

**Update/Develop Facility Air Emission Source Drawings for a Fortune 500 Manufacturing Facility, Webster, New York:** Lead technician and project team leader involved with developing and updating facility air emission source drawings. Specific tasks included conducting site visits to verify source configuration and location, reviewing existing source data and modifying drawings as required, coordinating various tasks with other team members, interfacing with site representatives, and assisting on development of a drawing data package.

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**Hydrogeologic Investigation and Remediation at Printing Facility, Rochester, New York.** Technician for a Phase II Hydrogeologic Investigation consisting of the permanent closure of underground storage tanks, test pit excavations, soil gas surveys, installation of test borings and monitoring wells, and soil and groundwater sampling and analysis. Assisted in designing a remedial program consisting of a combination of soil excavation and off-site disposal, and on-site soil remediation via the installation and operation of a soil vapor extraction system. Coordinated and documented the removal of contaminated soils, installation of a soil venting system, and monitoring of the soil venting system.

**Remedial Investigation at Metal Scrap Yard, Rochester, New York.** Technician responsible for performing investigative work and implementing remedial actions at a metal scrap yard. The investigation and remedial measures included soil sampling, test borings, test pit excavations, soil removal, and particulate monitoring. Also, assisted with the design of an on-site soil bioventing and soil vapor extraction system. Remedial systems expected to be installed in Fall, 1995.

**Phase II Investigation at a Former Car Dealership, Rochester, New York.** Lead technician responsible for performing and managing fieldwork activities. Fieldwork activities included dye testing floor drains, evaluation of hydraulic lifts, inventorying and sampling of underground tanks, advancing Geoprobe System test borings, performing a soil gas survey, installation of monitoring wells, conduct hydraulic conductivity tests, asbestos sampling, as well as soil and groundwater sampling. Assisted with estimating costs for the closure of hydraulic lifts, cleaning of hydraulic lift pits and floor drains, removal of tanks, asbestos abatement, soil remediation, and groundwater remediation.

**Phase II Soil Remediation Project at a NYSDEC Inactive Hazardous Waste Site, Rochester, New York.** Responsible for coordinating and supervising soil remediation field activities per a NYSDEC approved work plan and OSHA 29 CFR 129.120 regulations. Specific responsibilities being Site Health and Safety Officer; documenting site activity; performing air monitoring activities with FID, PID, and oxygen meters and Drager tubes; conducting sampling activities prior, during and post soil removal activities; and interfacing with contractors and project manager.

**Spill Prevention, Control, and Countermeasure Plan, Machine Shop, Rochester, New York.** Assisted in the development of a Spill Prevention, Control, and Countermeasure (SPCC) Plan. Conducted a site visit to evaluate tanks and facility operations, and evaluate existing secondary containment and spill containment areas. Assisted with the development of the SPCC plan which included identifying specific corrective actions required to bring the facility into compliance with existing regulations.

**Phase I Assessments Throughout New York State.** Performed or assisted on over 100 Phase I Environmental Assessments conducted for the purposes of real estate transactions. The Phase I assessments were performed on a wide variety of industrial and manufacturing facilities (e.g., landfills, printing shops, car dealerships, optical manufacturing, machine shops).

**OSHA HAZWOPER Training.** Assists in presentation of HAZWOPER Training per OSHA regulation 29 CFR 1910.120, providing instruction in the use, operation, and maintenance of personal protective and air monitoring equipment.

**MEMBERSHIP** Water Environment Federation

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| **EDUCATION** | Paul Smith's College of Arts and Science, A.A.S. Forestry/Recreation Lands Management, 1981 |
| **REGISTRATION** | 40 Hour OSHA Hazardous Waste Site Worker Training<br>8 Hour OSHA Hazardous Waste Site Supervisor Training<br>8 Hour OSHA Hazardous Waste Site Worker Refresher Training<br>USEPA/NYSDOL Accredited Asbestos Inspector |
| **RESPONSIBILITIES** | Technician, Day Engineering, P.C. Mr. Dorety primarily performs work for the Process Design Group, the Site Investigation and Remediation Group, and the Phase I Assessment Group. |
| **EXPERIENCE** | Mr. Dorety has five years technician experience in the environmental field with eight years prior experience in construction. |
| **1990 - date** | **Day Engineering, P.C.** Representative projects include: |

**Stream Remediation/Reconstruction Project at the Metro-North Brewster Yard.** Project supervisor during the removal of contaminated sediments from the stream on the property and reconstruction of the subsequent stream bed and bank.

**Confined Space Program at Metro-North Facilities.** One of two technicians assisting with the on-going confined space program at Metro-North. Responsibilities include conducting site visits to identify and inventory the confined spaces, and performing the initial testing and baseline monitoring.

**Stormwater Oil/Water Separator Outfall Sampling at Metro-North Harmon Yard.** Project technician for the sediment sampling program designed to identify the source of the sheen appearing on the water at the outfall.

**Permanent Closure of an Inactive Hazardous Waste Site, Akron, New York.** Project technician that provided coordination of the construction and installation of a cap on a landfill at the site. This work included material acquisition and application methods approval, observing and documenting soil compaction and geomembrane seam testing, and final cover requirements. The project is now complete and Mr. Dorety serves as the project technician for the continuous groundwater monitoring program that is required to be conducted at the site by the New York State Department of Environmental Conservation.

**Groundwater Treatment System for Computer Company, Rochester, New York.** Project technician for the daily operation of a groundwater treatment system utilizing vacuum extraction and biological treatment.

**Remediation of a Scrap Yard, Olean, New York.** Project technician for the investigation and clean-up of several hundred drums and containers which contained various types of hazardous wastes. This project was completed under a USEPA order-on-consent.

**Bioremediation Projects.** Project technician for the construction, operation, and monitoring of several bioremediation projects.

**Asbestos-Related Site Inspections, Sampling Plans, and Asbestos Reports.** Project technician for the identification and sampling of possible asbestos-containing materials during Phase I Environmental Assessments and Pre-demolition Asbestos Surveys, and the subsequent reports outlining findings and abatement recommendations.

**Phase II Environmental Studies.** Project technician for the completion of over 50 Phase II Environmental Studies performed to characterize the presence and extent of contaminants at sites.

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**1986 - 1990** **Avery Engineering and Land Surveying, P.C. Draftsman and Survey Technician**

Responsible for hand and computer-generated drawings of designs developed by the engineering staff. Also, responsible for working with the surveying staff during instrument surveys, project layouts, and as-built location surveys.

**1983 - 1986** **Terence Wilson Construction. Foreman.**

Responsible for crew supervision, blueprint interpretation, and project layout of over 100 residential and commercial construction projects in the Rochester, New York area.

**1982 - 1983** **Lawnmark. Service Technician.**

Responsible for the application of lawncare products and customer services issues.

**1981 - 1982** **Jones Chemical, Inc. Engineering Technician.**

Responsible for the construction supervision of various plant process improvement projects and plant pollution control projects at facilities in the eastern United States.

**EDUCATION**

University of Notre Dame, M.S. Environmental Health Engineering, 1974
Tri-State College, B.S. Civil Engineering, 1971
University of Cincinnati, Architecture, 1963-1968

**REGISTRATION**

Licensed Professional Engineer in New York

**RESPONSIBILITIES**

A principal of the firm, Mr. Hampton is involved with firm management and is responsible for design production, serving as head of the Process Design Group and as a Project Manager on a number of projects.

**EXPERIENCE**

Over twenty-five years of experience encompassing project management, facility evaluation and design, program planning and implementation, operations evaluation, and ordinance and regulatory compliance.

**1987-date**

**Day Engineering, P.C.** Representative projects include:

**Metro-North Railroad Projects.** Project Manager for Harmon Yard Wastewater Treatment Plant biological treatment, chlorination and sludge-drying systems design and operations; Harmon Yard Drum Accumulation Building regulatory compliance and design; Harmon Yard Petroleum Handling Facilities regulatory compliance and design; Brewster Yard Oil-Water Separator(s) System design and operations; Port Jervis Yard Oil-Water Separator System design and construction; Tank Management Plan regulatory compliance and design.

**Monroe County Pure Water Districts Projects.** Project Manager for Irondequoit Bay Sewer Study; five Term and two Bid Multiplier sewer construction contracts; Empire Boulevard Pump Station feasibility and conceptual design; Inspection of Privately-Constructed Sewerage Facilities; Route 259 Sewer Highway Crossing design; and York Street Sewer Replacement design.

**Groundwater Treatment System.** Project Manager for the design and construction of a carbon adsorption system to treat volatile organics contaminated groundwater at a listed New York State Inactive Hazardous Waste Site.

**Groundwater Treatment System.** Project Manager for the operation, over a five-year period, of a vacuum extraction and biological treatment system used to remediate volatile organics contaminated groundwater at a listed New York State inactive hazardous waste site.

**1985-1986**

**Lu Engineering.** Project Manager for over forty separate facility construction/improvement projects for the U.S. Postal Service.

**1973-1984**

**Lozier Architects/Engineers.** Partner/Department Head/Project Manager.

Deputy Project Manager of a Joint Venture which provided program management of a $500 million combined sewer overflow abatement tunnel project.

Project Manager for the facility planning and design of a $35 million, 12 MGD wastewater treatment plant utilizing, and funded for, innovative and alternative technologies; and $11.5 million, 6.5 MGD wastewater treatment plant; and the innovative use of wetlands to provide advanced treatment of wastewater discharge at a U.S. Army facility.

Project Manager for the preparation of the Spill Prevention Control & Countermeasures Plans for approximately 100 facilities for an electrical utility company.

**1971 to 1973**

**Williams Associates/New York State Department of Transportation.** Design Engineer and Construction Inspector.

**Prior to 1971**

**New York State Department of Transportation.** Construction Inspector.

**EDUCATION**

University of Rochester, B.S. Chemical Engineering, 1987
University of California at Berkeley, Graduate Course Work, Chemical Engineering

**REGISTRATION**

40 Hour OSHA Hazardous Waste Site Worker Training
8 Hour OSHA Hazardous Waste Site Worker Refresher Training

**RESPONSIBILITIES**

Senior Engineer, Process Design Group, Day Engineering, P.C. Mr. Kline is responsible for evaluation, development, design, and project coordination for the installation of wastewater treatment and air emissions control systems and support facilities required for environmental regulatory compliance.

**EXPERIENCE**

Ten years of experience, specializing in environmental compliance assessment and corrective systems design.

**1992 - date**

**Day Engineering, P.C. / Day Environmental, Inc.** Representative projects and areas of expertise include:

**SPDES Permit Compliance Management for Railroad Maintenance Facility, Westchester County, New York.** Senior Engineer for: (i) design and installation of biological wastewater treatment system; (ii) evaluation and report on sources of metals in stormwater and treated wastewater discharges; (iii) effluent toxicity testing coordination and review; (iv) effluent contaminant dispersion modelling and evaluation of outfall relocation options; and (v) stormwater drainage/treatment system evaluations.

**Used Oil Management Facilities Design and Permitting.** Senior Engineer for design, specification and permitting of: (i) $500,000 project involving storm sewer modifications and automated facilities construction to remove oil from rail car fueling pad runoff, including oil storage facilities for waste oil burning activities; (ii) $150,000 used oil handling, transport and storage system for transportation maintenance facility; and (iii) New York State Part 360 commercial used oil solid waste transfer facility.

**Controls Automation.** Senior Engineer for design, programming, and implementation of programmable logic controllers and teledialers used for automation, renovation and/or upgrading of various industrial and municipal wastewater treatment systems and system components, including remote interfacing and alarms.

**Wastewater Management Systems Design, Railroad Maintenance Facility, Brewster, New York.** Senior Engineer for: (i) design and implementation of municipal wastewater treatment plant pilot testing and industrial connection; (ii) evaluation of technologies, development of specifications and design, and planned installation and start-up assistance for $750,000 zero-discharge train car wash recycling system.

**Photocopier Manufacturing Facility Pretreatment Systems Assessment, Webster, New York.** Senior Engineer for regulatory compliance audit of metal finishing and industrial wastewater discharge processes and procedures involving six wastewater treatment facilities. Generated compliance management plan and best management practice recommendations to bring facilities into regulatory compliance. Also developed detailed operation and maintenance manual for primary treatment plant and plating facility, and developed and routinely provide 30-hour chemistry training instruction for wastewater treatment plant operators.

**Government Aeronautical Defense Plating Facility, Toledo, Ohio.** Senior Engineer and acting Project Manager for $350,000 project involving: (i) compliance evaluation of metal finishing process air emissions and existing control equipment, resulting in design and implementation of control equipment modifications and installation of additional air pollution control equipment for source control of emissions; and (ii) waste minimization evaluation and engineering for operations area and wastewater treatment system renovations.

**Site Remediation Systems Design.** Senior Engineer for design, development and implementation of various soils and groundwater remediation systems employing soil-vacuum extraction, air sparging, and pump and treat technologies.

*(Over)*

**Air Emissions Control Systems Design.** Senior Engineer for evaluation, design and/or implementation of multiple ventilation and emission control systems for oil mists, paint particulates, chromium, VOC, and clean room applications in the printing and publishing, optics, metal finishing, automotive, bulk powder processing, and transportation industries, among others.

**RACT/MACT Evaluation Completion.** Senior Engineer for completion of multiple Reasonably Available Control Technology (RACT) evaluations required by New York State to obtain regulatory variances from air pollution control requirements. Evaluations include extensive technical and economic evaluation of potential control technologies. Also completed evaluations and developed compliance programs for clients with operational equipment covered under newly published Maximum Achievable Control Technology (MACT) regulations, including those covering solvent cleaning and chromium plating operations.

**Air Emissions Permitting/Emissions Reduction Credits.** Senior Engineer responsible for estimating process emissions from plating, metal finishing, painting and other operations, as necessary for completion of NYSDEC air permits. Also responsible for VOC emissions reduction credit applications to obtain saleable credits for emissions reduction pollution control activities completed at various industrial sites.

**Chemical Bulk Storage Regulatory Assistance.** Senior Engineer for completion of chemical bulk storage facility audits and annual inspections, and provide certifications and spill prevention report documentation.

**Hazardous Waste Reduction Plans.** Senior Engineer for generation of multiple hazardous waste reduction plans, including compliance management plans/schedules, in accordance with state regulations.

**1988 - 1992** **ODNY Incorporated.** Representative projects include:

**Government Aeronautical Defense Facility, Toledo, Ohio.** Project Manager for plating operations wastewater treatment compliance and systems evaluation, and engineering design and installation supervision of a $350,000 systems renovation project. Also responsible for permitting and regulatory coordination, and developed Personnel Training Program, Contingency Plan, and Spill Prevention Control and Countermeasures Plan Amendment to bring operations into environmental regulatory compliance.

**Aviation Production Facility, Longueuil, Quebec.** Project Engineer for environmental compliance and waste minimization evaluations of metal finishing operations. Provided engineering services based on evaluation recommendations to assist in completion of a $2,000,000 systems renovation and wastewater treatment system installation.

**Aircraft Engine Repair Facility Compliance Audit, Bridgeport, West Virginia.** Project Engineer for completion of a full environmental regulatory audit of facilities, processes and operations. Developed a compliance management program/schedule to bring this facility into regulatory compliance.

**Superfund Site Assessments/Remedial Investigations, Niagara Falls, New York.** Project Engineer for: (i) health and safety plan development and on-site coordination of hazardous waste sampling and treatability testing activities; and (ii) drummed waste characterization evaluation.

**Municipal Facilities Site Investigation/Remediation, Batavia, New York.** Project Engineer for contaminant investigation and remedial design activities (petroleum contamination) at a former industrial site desired for construction of a new municipal facilities complex.

**Automotive Parts Production Facility Site Investigation, Lockport, New York.** Project Engineer for state-mandated contaminant site investigation, including well installation, data acquisition and interpretation, and preparation of reports assessing degree and sources of contamination, and remedial recommendations.

**MEMBERSHIP**

Air & Waste Management Association
Water Environment Federation
National Fire Protection Association

**EDUCATION** SUNY Morrisville, A.A.S. Environmental Technology, 1973

**REGISTRATION** 4-A NYS Public Wastewater Treatment Plant Operator #6389
40 Hour OSHA Hazardous Waste Site Worker
8 Hour OSHA Hazardous Waste Site Worker Refresher Training

**RESPONSIBILITIES** Technical Specialist, Day Engineering, P.C. Mr. Roszak is responsible for project coordination, operations management and development of designs for wastewater, stormwater and contaminated groundwater treatment projects.

**EXPERIENCE** Twenty-three years of technical experience, specializing in municipal and industrial wastewater treatment.

**1989 - date** **Day Engineering, P.C.** Representative projects include:

**Wastewater Pilot Study at the Metro-North Brewster Yard.** Project Specialist for a pilot wastewater pumping project to study the impact of railroad yard wastewater on a local municipal wastewater treatment plant, including design, on-site construction coordination, startup and operations management.

**Operations & Maintenance Manuals at the Metro-North Harmon, Brewster and Port Jervis Yards.** Developed Operation and Maintenance Manuals for Brewster Yard stormwater and fueling pad oil/water separators, Harmon Yard stormwater oil/water separator and wastewater treatment facility, and Port Jervis oil/water separator, including standard operating procedures, maintenance scheduling and recordkeeping.

**Oil/Water Separator Project at the Metro-North Harmon Yard.** Project Specialist for a pilot stormwater treatment system at Harmon Yard to remove oil sheen from oil/water separator effluent.

**Fuel Pad Oil/Water Separator Project at the Metro-North Harmon Yard.** Project Specialist for the Harmon Yard fuel pad oil/water separator, including design, construction coordination, startup, and operations management.

**Wastewater Treatment Plant Improvement Project at the Metro-North Harmon Yard.** Project Specialist for improvements to the Harmon Yard sanitary/industrial wastewater treatment plant including development and pilot testing of treatment alternatives, biological treatment design, construction coordination, startup, and operations management.

**Oil/Water Separator Project at the Metro-North Port Jervis Yard.** Project Specialist for the Port Jervis oil/water separator including startup, and operations management.

**Ultrafiltration System Project at the Metro-North New Haven Yard.** Project Specialist for improvements to the New Haven Yard industrial wastewater ultrafiltration system including design, construction coordination, and operations management.

**Miscellaneous Projects at Metro-North Facilities.** Miscellaneous involvement with SPCC plan development, Best Management Practices development, product evaluation, regulatory agency interface, SPDES permit renewals, and treatment systems troubleshooting. Mr. Roszak is extremely familiar with the Metro North Harmon Yard, Brewster Yard, North White Plains Yard and Port Jervis facilities and operations and with Metro-North maintenance personnel.

*(Over)*

**Other Projects**

**Wastewater Equalization System for Kraft Foods, Avon, New York.** Project specialist for a fully automated wastewater diversion system utilizing a motorized valve, variable speed pumping. Ultrasonic level sensing programmable logic controller and remote operator interface via a fiber-optic data highway.

**Groundwater Treatment System for Computer Company, Rochester, New York.** Project Specialist for a five-year treatment project utilizing vacuum extraction and biological treatment of groundwater contaminated with various organic compounds.

**Groundwater Treatment System at Former Circuit Board Manufacturing Facility, Rochester, New York.** Project Specialist for a system utilizing activated carbon to treat contaminated groundwater.

**Campground Water Treatment.** Project Specialist for three YMCA campground water treatment systems including design, construction, and startup.

**Phase I Environmental Assessments.** Completion of over 100 Phase I Environmental Assessments for various industrial and commercial real estate transactions.

**1985 - 1988** **General Foods Corporation**. Utilities Supervisor. Responsible for plant-wide utilities operations and management including boiler and chiller systems, water treatment and distribution, and industrial wastewater treatment.

**1978 - 1985** **Lozier Architects/Engineers**. Technical Specialist. Responsible for treatment plants startup, operator training, and development of O&M Manuals. Also responsible for wastewater treatment troubleshooting and pilot testing.

**1977** **New York State Department of Environmental Conservation**. Instructor of wastewater treatment plant operators.

**1973 - 1976** **Albany County Sewer District**. Shift Supervisor at the 35 MGD North Plant, responsible for routine plant operations including secondary treatment, sludge dewatering, and incineration.

**MEMBERSHIP**

NYS Water Environment Association, since 1977
Chairman, Genesee Chapter 1987-89

**EDUCATION** SUNY Alfred, A.A.S. Construction Engineering Technology, 1983

**REGISTRATION** 40 Hour OSHA Hazardous Waste Site Worker
8 Hour OSHA Hazardous Waste Site Worker Refresher Training

**RESPONSIBILITIES** Design Draftsman, Day Engineering, P.C. Mr. McPhee is responsible for drafting production/management for design in the industrial, municipal, and private sectors. He also assists with technical field work on an as needed basis.

**EXPERIENCE** Ten years of experience with both manual and computer-aided drafting and design (AutoCAD Release 10 & 11), as well as extensive technical field work.

**1992 - date** **Day Engineering, P.C.** Representative projects that Mr. McPhee has worked on include:

**Metro-North Related Projects (Drafting)**

Contingency Plans at the Metro-North Brewster, East Bridgeport, Grand Central Terminal, Harmon, New Haven, North White Plains and Stamford Yards.

Operations & Maintenance Manuals at the Metro-North Brewster, Harmon and Port Jervis Yards.

Oil/Water Separator Project at the Metro-North Harmon Yard.

Fuel Pad Oil/Water Separator Project at the Metro-North Harmon Yard.

Wastewater Treatment Plant Improvement Project at the Metro-North Harmon Yard.

Modification of Storm Sewer System at the Metro-North Harmon Yard.

Wastewater Treatment Facility Chlorination System Modification at the Metro-North Harmon Yard.

Best Management Practices Plan at the Metro-North Harmon Yard.

Construction of Sludge Drying Beds at the Metro-North Harmon Yard.

Outfall Sediment Investigation at the Metro-North Harmon Yard.

Waste Oil Handling\Storage at the Metro-North Harmon Yard.

Wastewater and SPDES Metal Evaluation at the Metro-North Harmon Yard.

Stream Modifications at the Metro-North Brewster Yard.

SPDES Renewal at the Metro-North Brewster Yard.

Brewster Heights Pump Station Pilot Project at the Metro-North Brewster Yard.

Spill Prevention Control and Countermeasures Plan at the Metro-North White Plains Yard.

Storm Water Pollution Prevention Plan at the Metro-North Brewster and North White Plains Yards.

*(Over)*

Tank Management Plan at the Metro-North Brewster and North White Plains Yards.
Parts Wash Station at the Metro-North New Haven Yard.

Oil/Water Separator Project at the Metro-North Port Jervis Yard.

Danbury Groundwater Treatment System at the Metro-North Danbury Yard.

**Other Projects (Drafting)**

Modifications to a pump station and forcemain. Rochester, New York.

Soil vapor extraction system for a scrap yard, Rochester, New York.

Spill Prevention Control & Countermeasures Plan at various wastewater treatment facilities in Monroe County, New York.

Stormwater Pollution Prevention Plan at various wastewater treatment facilities in Monroe County, New York.

Wastewater treatment system renovations for a government aeronautical defense facility, Toledo, Ohio.

Update/develop facility air emission source drawings for a major manufacturing facility in Webster, New York.

Update/develop air permit drawings for a manufacturing facility in Arcade, New York.

**1985 - 1991** O'Brien & Gere Engineers, Inc. Design Draftsman. Responsible for drafting production/management, sanitary sewer evaluation studies, and water and wastewater sampling.

**Other Projects (Drafting)**

Phase II Study at a former Automobile Dealership, Rochester, New York

Supplemental Remedial Investigation for a utility company, Canandaigua, New York

Spill Prevention Control & Compliance plan for a manufacturing facility in Rochester, NY

Stormwater Pollution Prevention Plan for a manufacturing facility in Rochester, New York

Landfill Reclamation & Closure for a manufacturing facility in Dunkirk, New York

Groundwater Remediation for a utility company, Bath, New York

Soil Vapor Extraction System at a former Car Wash/Gasoline Station, Rochester, New York

Preliminary Site Assessment for a Manufacturing Facility in Rochester, New York

Subsurface Investigation at a former Manufacturing Facility, Rochester, New York

**Other Projects (Field Work)**

Provide Inspection Services for the installation of sanitary sewers at various location in Monroe County, New York.

Phase II Investigation at a former Automobile Dealership, Rochester, New York. Technician assisting with advancing Geoprobe System test borings, performing a soil gas survey & development of monitoring wells.

Subsurface Investigation at a former Manufacturing Facility, Rochester, New York. Technician assisting with advancing Geoprobe System test borings & development of monitoring wells.

Phase II Investigation at a Gasoline Station, Geneseo, New York. Technician assisting performing a soil gas survey.

Phase II Investigation at a Gasoline Station, Rochester, New York. Technician assisting with advancing Geoprobe System test borings & performing a soil gas survey.

Phase II Investigation at a former Gasoline Station, Sweden, New York. Technician assisting with advancing Geoprobe System test borings & performing a soil gas survey.

Pond evaluation at a Manufacturing Facility, Rochester, New York. Technician assisting with advancing Geoprobe System test borings.

Davis E. Frederiksen, CIH
1020 Canandaigua Road
Palmyra, NY 14522
(315)-597-5673 (H)
(716)-724-8739 (B)

EDUCATION

1972 AAS Chemical Technology
Broome Community College
Binghamton, NY

1975 BS Chemistry
Rochester Institute of Technology
Rochester, NY

EXPERIENCE

6/91-Present CONSULTANT
Health & Hygiene Services
Palmyra, NY

Responsible for providing comprehensive Industrial Hygiene service to small companies and municipalities as a professional consultant.

6/88-Present SENIOR INDUSTRIAL HYGIENIST
Rochester Gas & Electric Corporation
Rochester, NY

Responsible for the overall compliance with OSHA regulations such as Hazard Communication, Respiratory Protection, Hazardous Waste Operations and Emergency Response, Asbestos, and numerous contaminant exposures. Responsibilities include formulation of company policy, inspection of facilities, training of personnel, and audits of Safty, Health and Environmental compliance. I am also responsible for evaluation of air sample results provided by outside laboratories and company personnel. I was also instrumental in the formation and operation of RG&E's Fitness For Duty Random Drug & Alcohol screening program in compliance with the NRC, DOT and Federal Highway regulations.

5/81-6/88 CERTIFIED INDUSTRIAL HYGIENIST
Aetna Life & Casualty
Hartford, CT

Responsible for management of an 11 state territory from an industrial hygiene standpoint. Responsibilities included industrial hygiene and safety management service for any insured company requesting assistance, evaluation of the results, and formulating corrective action. Surveys were provided for operations such as Foundries, Hospitals, Pharmaceutical firms, as well as general industrial operations. Additional responsibilities included providing training classes to both company and outside personnel in hazard identification, asbestos exposures, air sampling techniques, and laboratory techniques.

CERTIFICATION

1986 - Certified in Comprehensive Practice
Certification # 3388

1989 - Certified Asbestos Handler, NYS
1992 - Certified Asbestos Project Monitor, NYS
- Certified Asbestos Contractor/Supervisor, NYS
1989 - Certified Asbestos Instructor, NYS

PUBLICATIONS/ PRESENTATIONS

"THE USE OF CARBON DIOXIDE MEASUREMENT IN EVALUATING TIGHT BUILDING SYNDROME"
ASHRAE IAQ 87 PRACTICAL CONTROL OF INDOOR AIR PROBLEMS Pg 217-222

"INDOOR AIR QUALITY" NATIONAL SAFETY CONGRESS
1989

"ERGONOMIC STUDIES OF UTILITY WORKERS"
Edison Electric Institute
5/95

"RADON - A CASE STUDY"
Edison Electric Institute
9/95

# APPENDIX E

## Health and Safety Plan

# REMEDIAL INVESTIGATION
# HEALTH AND SAFETY PLAN

## 95 MT. READ BOULEVARD
## ROCHESTER, NEW YORK
## NYSDEC SITE CODE #828085


**Prepared by:** Day Environmental, Inc.
2144 Brighton-Henrietta Town Line Road
Rochester, New York 14623

**Approved by:** Davis E. Frederiksen, CIH
Certification #3388


**Project No.:** 1275S-97

**Date:** May 30, 1997

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## 1.0 INTRODUCTION

The subject property is located at 95 Mt. Read Boulevard, City of Rochester, Monroe County, New York (site). Drawing SR-1 in Attachment A illustrates the location of the subject site.

The site is currently classified as a Class 2 Inactive Hazardous Waste Site (Code #808085) by the New York State Department of Environmental Conservation (NYSDEC). This Health and Safety Plan, hereinafter referred to as the HASP, documents the policies and procedures which protect workers and the public from potential hazards posed by work at this site. Project activities will be conducted in a manner that minimizes the probability of injury, accident, or incident occurrence. The HASP Acknowledgement (Attachment B) will be signed by those who actively participate on this project.

Although the HASP focuses on the specific work activities planned for this site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations may arise that require deviations from the original plan. This flexibility allows modification by Day Environmental, Inc. (DAY) personnel, and health and safety officials.

NOTE: The requirements of the HASP shall apply to all employees, subcontractors and agents of DAY performing work on the project site in regards to the Subsurface Investigation. Additionally, the Site Safety Officer may require compliance with appropriate requirements of this HASP for any other individuals who may be present or visiting the site. Any individual who is unable or unwilling to meet the requirements of this HASP may be excluded from the project site. In the event of a conflict between this HASP and NYSDEC Standards or a Health and Safety Plan developed by subcontractors, the more stringent of the two shall apply.

### 1.1 Site History and Previous Studies

The site was formerly owned and operated by General Circuits, Inc., which manufactured printed circuit boards. The site consists of approximately 3.5 acres of land improved primarily by a single story 120,000 square foot building. The original portion of the building was constructed in the 1920's, and operated as a printing company until the 1960's when printed circuit board manufacturing commenced. The facility is located in a predominantly industrial area of the City of Rochester, and the site and surrounding properties are serviced by public water. The building has been subdivided and leased by several small light-industrial and commercial businesses.

### 1.1.1 Volatile Organic Compounds (VOCs)

In 1990, Environmental Resources Management, Inc. (ERM) conducted a Phase I Environmental Site Assessment of the site. The results of the Phase II study indicated that the overburden groundwater table present beneath the site building was contaminated with various volatile organic compounds (VOCs), including the halogenated VOCs trichloroethene (TCE) and tetrachloroethene (also known as perchloroethene or PCE). According to the ERM report, total VOCs were detected in groundwater samples collected from inside the building at concentrations as high as 252 parts per million (ppm). The source of the suspected VOCs is historical usage of halogenated solvent degreasers that may have been disposed of on the ground prior to the plant expansion. VOCs have not been detected in the shallow overburden wells located outside of the building. While most of the exterior bedrock wells have not contained detectable concentrations of VOCs, low part per billion concentrations of VOCs have been detected in some of the bedrock wells installed outside the building.

### 1.1.2 Chromium

It has been reported that the etching process utilizing chromic acid was performed in former "Shipping Room" from the early 1960's through the early 1970's. According to a former General Circuits Inc. employee, the chromic acid process resulted in the deterioration of underground cast iron and PVC piping that was initially used to transfer the chromic acid between etching machines. During the spring of 1995, part per million concentrations of hexavalent chromium were detected in samples from two overburden wells located inside the building. DAY performed a Subsurface Investigation at the Site during the Fall of 1995. The objective of the Subsurface Investigation was to gather additional data in an effort to further characterize the extent of VOC and chromium contamination at the Site. The results of the Subsurface Investigation indicated that the highest concentration of total and hexavalent chromium was detected in the soil samples collected from inside the former shipping room. The results of one soil sample indicate that at least some of the soils in the unsaturated zone beneath the former shipping room exceed the USEPA TCLP regulatory level for chromium, and that these soils would be considered a characteristic hazardous waste if removed for disposal. Based on the analytical data obtained, the former "Shipping Room" area appeared to be the source of the chromium contamination at the Site. Part per million concentrations of chromium and hexavalent chromium are also present in the groundwater in Monitoring Well MW-8, located immediately downgradient of the former shipping room. However, samples collected from the next-most downgradient well (MW-9) and the basement sump system contained chromium at concentrations of only 38 and 4.5 ug/l respectively. In addition, the concentration of chromium in the basement sump system did not exceed the sewer use effluent limit for chromium of 3,000 ug/l (or 3 mg/l).

As recommended in a January, 1996 Subsurface Investigation report submitted to the NYSDEC, additional investigation and some remediation was performed to further evaluate the chromium contamination at the site. The work included: removing the glass-lined floor drains within the former shipping room, and any sediments within the drains; removing a limited amount of chromium-impacted soil; and disposing of the removed materials in accordance with applicable regulations.

## 1.2 Proposed Scope Of Work

The following field activities will be performed as part of the Remedial Investigation.

1. Advancing Geoprobe boreholes on the Site and collecting associated soil samples.

2. Advancing shallow and deep bedrock wells on the Site using drilling equipment.

3. Collecting various groundwater data and samples from the wells.

4. performing a pump test using the groundwater monitoring wells at the Site.

5. Performing decontamination procedures (decon) of site workers and equipment. The decon water and disposable personal protective equipment (PPE) will be containerized in New York State Department of Transportation (NYSDOT) 55-gallon drums.

## 2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Site Supervisor (SS), Certified Industrial Hygienist (CIH) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP.

### 2.1 Certified Industrial Hygienist

The CIH or designated health and safety specialist is responsible for the contents of the HASP and ensures that the HASP complies with federal, state and local health and safety requirements. If necessary, the CIH can modify the HASP to adjust for on-site changes that affect safety. The CIH will coordinate with the SSO on modifications to the HASP and will be available for consultation when required. The CIH will not necessarily be on site during the field activities.

### 2.2 Project Manager

The PM has the overall responsibility for the project and to assure that the goals of the investigative program are attained in a manner consistent with the HASP requirements. The PM will coordinate with the SS and the SSO to ensure that the investigative program goals are completed in a manner consistent with the HASP.

### 2.3 Site Safety Officer

The SSO has responsibility for administering the HASP relative to site activities, and will be in the field full-time while site activities are in progress. The SSO's operational responsibilities will be monitoring, including personal and environmental monitoring, ensuring personal protective equipment maintenance, and assignment of protection levels. The SSO will be the main contact in any on-site emergency situation. The SSO will direct field activities involved with safety and be responsible for stopping work when unacceptable health or safety risks exist. The SSO is responsible for ensuring that on-site personnel understand and comply with safety requirements.

### 2.4 Site Supervisor

The SS is responsible for field implementation of the HASP. The SS will establish and ensure compliance with site control areas and procedures, and coordinate these supervisory responsibilities with the site SSO.

Note, for the purpose of this investigative program, the aforementioned responsibilities of the SSO and SS may be performed by the same DAY representative.

## 2.5 Employee Safety Responsibility

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use the equipment provided in a safe and responsible manner as directed by the SS.

## 2.6 OSHA Records

Required records are maintained at DAY's Rochester, New York office.

## 2.7 Key Safety Personnel

The following individuals share responsibility for health and safety at the site.

| | |
|---|---|
| Project Certified Industrial Hygienist | Davis Frederiksen, CIH |
| Project Manager | David D. Day, P.E. |
| Site Supervisor/Site Safety Officer | Steven R. Mullin, or Jeffrey A. Danzinger, or J. Joseph Dorety |

## 3.0 JOB HAZARD ANALYSIS

### 3.1 Chemical Hazards

Preventing exposure to toxic chemicals is a primary concern during investigative activities. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage to the point of contact or can act systemically, causing a toxic effect at a part of the body distant from the point of initial contact.

Based on the previous soil and groundwater sampling in and around the former shipping room, potential site contaminants include VOCs (e.g., chlorinated solvents), trivalent chromium, and hexavalent chromium. A list of site specific constituents detected in soil and/or groundwater, or that have been detected or previously used (e.g., chromic acid) at the this site is presented below.

#### 3.1.1 List of Potential Chemical Hazards

| CONSTITUENT | EXPOSURE LIMITS | IDLH | TARGET ORGANS |
|---|---|---|---|
| trichloroethene | 100 ppm PEL | 1000 ppm | eyes, skin, respiratory system, heart, liver, CNS |
| chloroform | 10 ppm TLV | 500 ppm | liver, kidneys, heart, eyes, skin, CNS |
| 1,2-dichloropropane (propylene dichloride) | 75 ppm PEL | 400 ppm | eyes, skin, respiratory system, kidneys, CNS |
| tetrachloroethene | 100 ppm PEL | 150 ppm | eyes, skin, respiratory system, liver, kidneys, CNS |
| methylene chloride | 25 ppm PEL<br>50 ppm TLV | 2300 ppm | eyes, skin, cardiovascular system, CNS, suspect human carcinogen (lung) |
| acetone | 1000 ppm PEL | 2500 ppm (LEL) | eyes, skin, respiratory system, CNS |
| carbon disulfide | 20 ppm PEL | 500 ppm | CNS, eyes, kidneys, liver skin, reproduction system, peripheral nervous system, cardiovascular system |
| 1,1-dichloroethene (vinyldene chloride) | 5 ppm TLV | Not determined | eyes, skin, respiratory system, CNS, liver, kidneys |
| 1,1-dichloroethane | 100 ppm PEL | 4000 ppm | skin liver, kidneys, lungs, CNS |
| 1,2-dichloroethene (total) | 200 ppm PEL | 1000 ppm | eyes, respiratory system, CNS |
| 2-butanone (MEK) | 200 ppm PEL | 3000 ppm | eyes, skin, respiratory system, CNS |
| benzene | 1 ppm PEL | 500 ppm | leukemia, eyes, skin, respiratory system, blood, CNS, bone marrow |
| toluene | 200 ppm PEL | 500 ppm | eyes, skin, respiratory system, CNS, liver, kidneys |
| ethylbenzene | 100 ppm PEL | 800 ppm | eyes, skin, respiratory system, CNS |
| xylene (total) | 100 ppm PEL | 900 ppm | kidneys, eyes, skin, respiratory system, CNS, GI tract, blood, liver |
| vinyl chloride | 1 ppm PEL | Not determined | liver, CNS, blood, respiratory system, lymphatic system, liver cancer |
| chromic acid and chromates | 0.05 $mg/m^3$ TLV | 30 $mg/m^3$ | blood, respiratory system, liver, kidneys, eyes, skin, lung cancer |

Notes:
PEL = OSHA Permissible Exposure Limits (TWA for 8-hour day)
TLV = ACGIH Threshold Limit Value (8-hour TWA concentration)
IDLH = Immediately Dangerous to Life or Health Concentrations
LEL = Lower Explosive Limit in air
CNS = Central Nervous System

The potential routes of exposure for these chemicals include:

- inhalation,
- ingestion,
- skin absorption, and
- skin/eye contact.

The potential for exposure through any one of these routes will depend on the activity conducted. Most likely routes of exposure for the activities to be conducted on site include inhalation and skin contact. The activities most likely to potentially expose workers to these conditions would include installation of Geoprobe overburden boreholes and bedrock wells and soil and groundwater sampling. The main contaminants of concern (COCs) are anticipated to be VOCs and chromium in both soil and groundwater. The VOCs detected at the highest concentration in groundwater at the site are trichloroethene (TCE) and tetrachloroethane (perchloroethene or PCE). Many of the other halogenated VOCs detected at the site are degradation products of these two VOCs. TCE and PCE have ionization potentials of 10.6 eV or less; however, some of their degradation products (e.g., 1,1,-dichloroethane) have ionization potentials of 10.6 eV or higher. During fieldwork activities, the worker's breathing zone will be monitored using a photoionization detector (PID) with a 10.6 eV lamp. In order to monitor for those VOCs with ionization potentials greater than 10.6 eV, a Flame Ionization Detector (FID) will also be used to monitor the workers' breathing zone. The PID and FID readings will determine the level of personal protective equipment (PPE) discussed in Section 5.0 that will b used.

If other chemicals are encountered during the implementation of the proposed investigations, this HASP will be modified to include the chemicals that have been encountered.

## 3.2 Physical Hazards

There are physical hazards associated with this project. Hazard identification, training, adherence to work rules, and careful housekeeping can prevent many problems or accidents arising from physical hazards. The following text outlines physical hazards associated with this project and suggested preventative measures:

- Small Quantity Flammable Liquids - Small quantities of flammable liquids will be stored in "safety" cans and labeled according to contents.

- Slip/Trip/Fall Hazards - Some areas may have wet surfaces which will greatly increase the possibility of inadvertent slips. Caution must be exercised when using steps and stairs due to slippery surfaces in conjunction with the fall hazard. Good housekeeping practices are essential to minimize the trip hazards.

- Electrical Hazards - Electrical devices and equipment must be de-energized prior to working near them. All extension cords must be kept out of water, protected from crushing, and inspected regularly to ensure structural integrity. Temporary electrical circuits must be protected with ground fault circuit interrupters. Only qualified electricians are authorized to work on electrical circuits. Heavy equipment (e.g., backhoe, drill rig) will not be operated within 10' of high voltage lines.

- Noise - Work around large equipment often creates excessive noise. The effects of noise can include:

  - Workers being startled, annoyed, or distracted.

  - Physical damage to the ear resulting in pain, or temporary and/or permanent hearing loss.

  - Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.

  If employees are subjected to noise exceeding an 8-hour time weighted average sound level of 90 d(B)A (decibels on the A-weighted scale), feasible administrative or engineering controls must be utilized. In addition, whenever employee noise exposures equal or exceed an 8-hour, time weighted average sound level of 85 d(B)A, employers must administer a continuing, effective hearing conservation program as described in OSHA Regulation 29 CFR Part 1910.95.

- Heavy Equipment - Each morning before start-up, heavy equipment will be inspected to ensure safety equipment and devices are operational and ready for immediate use.

- Subsurface and Overhead Hazards - Before any drilling, excavation or test boring activity, efforts will be made to determine whether underground utilities and potential overhead hazards will be encountered. Underground utility clearance will be obtained prior to subsurface work.

## 3.3 Environmental Hazards

Environmental factors such as weather, wild animals, insects, and irritant plants always pose a hazard when performing outdoor tasks. The SSO and SS will make every effort to alleviate these hazards should they arise.

### 3.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. In particular:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

Site workers will be encouraged to increase consumption of water and electrolyte-containing beverages such as Gatorade when the potential for heat stress exists. In addition, workers are encouraged to take rests whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased upon worker recommendation to the SSO and SS.

### 3.3.2 Exposure to Cold

With outdoor work in the winter months, the potential exists for hypothermia and frostbite.

Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

## 4.0 SITE CONTROLS

To prevent migration of contamination caused through tracking by personnel or equipment, work areas and personal protective equipment will be clearly specified prior to beginning operations. DAY will designate work areas or zones as suggested by the NIOSH/OSHA/USCG/EPA's document entitled, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities". Each work area will be divided into three zones follows:

- An Exclusion or "hot" Zone (EZ)
- A Contamination-Reduction Zone (CRZ)
- A Support Zone (SZ)

### 4.1 Exclusion Zone

The EZ is the area suspected of contamination and presents the greatest potential for worker exposure. During the subsurface investigation, the EZ will be considered the area where intrusive activities such as advancement of boreholes and/or wells, soil and groundwater sampling, are conducted. Personnel entering the area must wear the mandated level of protection for the area. In certain instances, different levels of protection will be required depending on the tasks and monitoring performed within that zone.

### 4.2 Contamination-Reduction Zone

The CRZ or transition zone will be established between the EZ and SZ. In this area, personnel will begin the sequential decontamination process required to exit the EZ. To prevent off-site migration of contamination and for personnel accountability, personnel will enter and exit the EZ through the CRZ.

### 4.3 Support Zone

The SZ serves as a clean, control area. Operational support facilities are located within the SZ. Normal work clothing and support equipment are appropriate in this zone. Contaminated equipment, or clothing will not be allowed in the SZ. The support facilities should be located upwind of site activities, if possible. There will be a clearly marked controlled access point from the SZ into the CRZ and EZ that is monitored by the SSO and the SS to ensure proper safety protocols are followed.

### 4.4 General

The following items are requirements to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the site.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the EZ and CRZ.

- Hands and face must be washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco, and smoking or other activities which may result in ingestion of contamination.

- A buddy system will be in effect in the EZ. Hand signals will be established to maintain communication, as needed, and will be reviewed periodically.

- During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel provide emergency assistance.

- Visual contact will be maintained between buddies on site when performing hazardous duties.

- No personnel will be admitted into the EZ without the proper safety equipment, training, and medical surveillance certification.

- Personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the SSO or the SS, will be immediately dismissed from the site.

- Proper decontamination procedures must be followed before leaving the site.

## 5.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of personal protective equipment (PPE) which are or may be required at this job site. Day personnel and subcontracted personnel, if warranted, will be trained in the use of the anticipated PPE to be utilized.

### 5.1 Anticipated Protection Levels

| TASK | PROTECTION LEVEL | COMMENTS/MODIFICATIONS |
|---|---|---|
| Site mobilization | D | |
| Site prep/construction of engineering controls | D | |
| Extrusive Investigative Methods (e.g., collecting measurement, etc.) | D | |
| Intrusive Investigative Methods (e.g., soil and floor drain removal, static water level measurements, soil and groundwater sampling, etc.) | C, or Modified Level D | Based on air monitoring, and CIH, SSO or SS discretion |
| Support zone | D | |
| Site breakdown and demobilization | D, or Modified Level D | |

### 5.2 Protection Level Descriptions

This section lists the minimum requirements for each protection level. Modification to these requirements will be noted above.

#### 5.2.1 Level D

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work clothing as prescribed by weather

### 5.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, or PVC overboots or vinyl booties
- Outer nitrile, neoprene, or PVC gloves over latex samples gloves
- Face shield (when projectiles or splashes pose a hazard)
- Tyvek coverall [Tyveks (Sarans) and PVC acid gear will be required when workers have a potential to be exposed to contaminated liquids or sludges].

### 5.2.3 Level C

Level C consists of the following:

- North air-purifying respirator with North cartridges, or equivalent
- Hooded Tyvek coveralls and/or Tyveks (Sarans) (PVC acid gear will be required when workers have a potential to be exposed to contaminated liquids or sludges)
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, or PVC overboots
- Nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)

### 5.2.4 Level B

Level B protection consists of the items required for Level C protection with the exception that an air-supplied respirator is used in place of the air-purifying respirator. Level B PPE is not anticipated to be required during the subsurface investigation.

### 5.2.5 Level A

Level A protection consists of the items required for Level B protection with the addition of a fully-encapsulating, vapor-proof suit capable of maintaining positive pressure. Level A PPE is not anticipated to be required during the Remedial Investigation.

## 5.3 Supplied-Air Respirators

If air monitoring shows that Level B protection is needed, personnel will wear MSA Model 401 pressure demand self-contained breathing apparatus (SCBA).

## 5.4 Breathing-Air Quality

Code of Federal Regulations 29 1910.134 states breathing air will meet the requirement of the specification for Grade D breathing air as described in the compressed Gas Associated Specification G 7.-1966. A certificate of analysis from vendors of breathing air will be required in order to show that the air meets this standard.

## 5.5 Air-Purifying Respirators

DAY's air-purifying respirators are the North 7700 Series half-mask, and North or SURVIVAIR full-face respirators. Any respirators used will meet the requirements of OSHA 29 CPR 1910.134.

Both the respirator and cartridges specified for use in Level C protection will be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.1025; 29 CFR 1910.134).

Air purifying respirators will not be worn under the following conditions:

- Oxygen deficiency
- IDLH concentrations
- High relative humidity
- If contaminant levels exceed designated use concentrations

## 5.6 Respirator Cartridges

The crew members working in Level C will wear respirators equipped with North air-purifying cartridges, unless otherwise noted. The North cartridge holds approval for:

- Organic vapors <1,000 ppm
- Dusts, fumes and mists with a TWA <0.05 $mg/m^3$
- Asbestos-containing dusts and mists
- Radon
- Radionuclides

## 5.7 Cartridge Changes

Cartridges will be changed a minimum of once daily. However, water saturation of the HEPA filter or dusty conditions may necessitate more frequent changes. Changes will occur when personnel begin to experience increased inhalation resistance or breakthrough of a chemical warning property.

## 5.8 Inspection and Cleaning

Respirators are checked periodically by a qualified individual, and inspected before each use by the wearer. Respirators and associated equipment will be decontaminated and hygienically cleaned after use.

### 5.9 Fit Testing

Annual respirator fit tests are required of personnel wearing negative-pressure respirators. The test will use isoamyl acetate or irritant smoke. The fit test must be for the style and size of the respirator to be used.

### 5.10 Facial Hair

No personnel who have facial hair which interferes with the respirator's sealing surface will be permitted to wear a respirator and will not be permitted to work in areas requiring respirator use.

### 5.11 Corrective Lenses

Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the respirator's sealing surfaces. For workers requiring corrective lenses, special spectacles designed for use with respirators should be worn.

### 5.12 Medical Certification

Only workers who have been certified by a physician as being physically capable of respirator usage will be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on site that require respirator protection. Employees receive a written physicians opinion that they are fit for general hazardous waste operations as per 29 CFR 1910.120(f)(7).

### 5.13 Site Specific Respiratory Protection Program

The Respiratory Protection Program complies with 29 CFR 1910.134. The primary objective of respiratory protection is to prevent atmospheric contamination. When engineering measures to control contamination are not feasible, or while they are being implemented, personal respiratory protective devices will be used.

The criteria for determining respirator need are contained in Section 7.0 of this HASP. The North cartridges will protect employees from the hazardous substances specific to this site. Respirator users are OSHA trained in proper respirator use and will monitor air levels of contaminants to ensure that respiratory protection is sufficient. The SS, CIH, or the SSO will evaluate this HASP weekly to determine its continued effectiveness.

Respirators and cartridges used will provide adequate protection against the hazards for which they are designed in accordance with applicable standards. Persons assigned to use respirators will have medical clearance to do so.

## 6.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

### 6.1 Personnel Decontamination

Decontamination procedures will ensure that material which workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the site. This sequence describes the general decontamination procedure. The specific stages will vary depending on the site, the task, the protection level, etc.

1. Go to end of EZ
2. Wash outer boots and gloves in detergent solution
3. Rinse outer boots and gloves in water
4. Remove outer boots and let dry
5. Remove outer gloves and let dry
6. Cross into CRZ
7. Remove booties and discard
8. Remove Tyvek suit and discard
9. Remove and wash respirator
10. Rinse respirator and hang to dry
11. Remove sample gloves and discard

NOTE: These decontamination procedures may be modified based on recommendations from the SSO or SS.

#### 6.1.1 Suspected Contamination

Any employee suspected of sustaining skin contact with chemical materials will first use an emergency shower, if available. Following a thorough drenching, the worker will proceed to the decontamination facility. Here the worker will remove clothing, shower, put on clean clothing, and immediately be taken to the first-aid station.

#### 6.1.2 Personal Hygiene

Before any eating, smoking, or drinking, personnel will wash hands, arms, neck and face.

### 6.2 Equipment Decontamination

Contaminated equipment will be decontaminated before leaving the site. Decontamination procedures will vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steaming the exterior of the equipment. Personnel performing this task will wear the proper PPE as prescribing by the SSO.

## 6.3 Disposal

Liquids and disposable clothing will be treated as contaminated waste and disposed of properly.

## 7.0 AIR MONITORING

Air monitoring will be conducted in order to determine airborne contamination levels. This ensures that respiratory protection is adequate to protect personnel against the chemicals that are encountered and that chemical contaminants are not migrating off-site. The following air monitoring efforts will be used at the site. Additional air monitoring may be conducted at the discretion of the SSO.

The following chart describes the direct reading instrumentation that will be utilized and appropriate action levels.

| Monitoring Device | Action Level | Action |
|---|---|---|
| | | |
| LEL/$0_2$ - Gastec 1939OX | >10% LEL<br><19.5% $0_2$ | Evacuate area, ventilate, upgrade to Level B if necessary, continue to monitor |
| PID - Photovac MicroTip HL-2000 with 10.6 eV lamp<br>FID - Century OVA Model 128GC | 1-19 ppm unknowns | Workers in Level C and monitor air for benzene, vinyl chloride, chromic acid, hydrochloric acid and phosgene gas using Draeger Indicator Tubes. Depending upon monitoring results, continue with Level C or downgrade to Modified Level D. |
| | 1-500 ppm unknowns | Level C |
| | 500-1000 ppm unknowns | Level B |
| | >1000 ppm unknowns | Level A |

### 7.1 Lower Explosive Limit/Oxygen (LEL/$0_2$) Meter

The removal of the floor drain lines in the former shipping room may involve cutting (e.g., torch), or other high heat-producing activities. If high heat-producing equipment is used during the removal of the floor drains, a potential exists for the decomposition of existing chlorinated solvent vapors. The decomposition of chlorinated solvent vapors can produce potentially toxic levels of hydrochloric acid or phosgene gas. In order to reduce the potential exposure to these decomposition products, solvent vapor monitoring will be conducted prior to any floor drain cutting activities. If greater than 1.0 ppm of solvent vapors is detected prior to cutting activities, monitoring for hydrochloric acid and phosgene gas will be conducted using appropriate Draeger Indicator Tubes. In addition, prior to performing hot work involving welding, cutting, or other high heat-producing operations where flammable or combustible vapors may be present, LEL/$0_2$ measurements will be taken.

## 7.2 On-site Air Monitoring Program

A PID and FID will be used to monitor total volatile organic content of the ambient air. The PID and FID will prove useful as a direct reading instruments to aid in determining if respiratory protection needs to be upgraded and to define the EZ.

The SSO will take measurements before operations begin in an area to determine the amount of VOCs naturally occurring in the air. This is referred to the VOC background level. Levels of VOCs will be measured in the air at active work sites at least once every hour, and at the support zone once every hour when levels are detected above background in the exclusion zone.

For known contaminants only, to determine a protection level from PID/FID data, the SSO will multiply the TLV of the known compound times the PID/FID reading. If PID/FID readings exceed 25 times the TLV, Level B protection will be required. (Note: PID and FID readings do not always indicate the actual air concentration of a compound. Consult the manual, or the CIH for clarification). Also, Draeger Tubes, if commercial available, will be used for monitor for select chemicals with PELs of 1 ppm or lower.

## 7.3 Community Air Monitoring Program

The purpose of the Community Air Monitoring Program is to protect the general public from the potential release of volatile organic compound vapors and/or particulates. In order to minimize the potential for VOCs to impact building tenants, it is anticipated that the interior test borings and monitoring wells will be installed on the weekends, during off-business hours, or in areas of the buildings where tenants are not working.

### 7.3.1 Vapor Emission Response Plan

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the work area. For interior work, VOCs will be monitored continuously at the EZ and CRZ. For exterior work, VOCs will be monitored daily at two-hour intervals at the EZ and CRZ. The readings will be recorded. If the ambient air concentration of VOC vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the VOC vapor level decreases below 5 ppm above background, work activities will resume. During the exterior fieldwork activities (e.g., staging of soil), if the VOC vapor levels are greater than 5 ppm but less than 25 ppm over background at the perimeter of the work area, activities will resume provided the VOC vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm above background. During the interior fieldwork activities, if VOC vapor levels are greater than 5 ppm but less than 25 ppm over background at the perimeter of the work area, the work area will be ventilated in such a manner to reduce VOC vapor levels.

If the VOC vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown. When work shutdown occurs, downwind air monitoring as directed by the SSO will be implemented to ensure the VOC emissions do not impact the building tenants, or the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section described below.

### 7.3.2 Major Vapor Emission

If any VOC levels greater than 5 ppm above background are identified 200 feet downwind from the work area, half the distance to the nearest residential or commercial structure, or in areas in the immediate vicinity where tenants may be exposed, work activities will be halted. If following the cessation of the work activities, or as the result of an emergency, VOC levels persist above 5 ppm above background then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 foot zone), or in areas in the immediate vicinity where tenants are working. If efforts to abate the emission source are unsuccessful, and if VOC levels of 5 ppm above background or greater persist for more than 30 minutes in the 20 foot zone, then the Major Emission Response Plan described below shall automatically be placed into effect. If VOC vapor levels greater than 10 ppm above background are measured 200 feet downwind from the work area or half the distance to the nearest residential or commercial structure, whichever is less, the Major Emission Response Plan shall immediately be placed into effect.

### 7.3.3 Major Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All emergency response contacts listed in Section 8.7 of this HASP will go into effect.

2. The local police authorities will immediately be contacted by the SSO and be advised of the situation.

3. Frequent air monitoring will be conducted at 30 minute intervals within the 20 foot zone. If two successive readings below action levels are measured, the air monitoring may be halted or modified by the SSO.

### 7.3.4 Particulate Monitoring

Major excavation activities that could result in potential particulate releases will not be performed as part of this Remedial Investigation; thus, particulate monitoring is not anticipated at this time. However, if major excavation activities become required, air monitoring will include real-time monitoring for particulates at the perimeter of the work zone. If the downwind particulate level is 150 $ug/m^3$ greater than the upwind particulate level, then dust suppression techniques such a wetting with a fine water mist will be employed. Readings will be recorded and will be available for State (NYSDEC and NYSDOH) and County (MCDOH) personnel to review.

## 7.4 Integrated Air Sampling

Integrated air sampling is not scheduled to be performed during this project, however, it may be performed based on site conditions as designated by the SSO and SS.

## 7.5 Air Monitoring Log

The SSO or his designated representative will ensure that air-monitoring data is logged in a waterproof bound fieldbook. Data will include instrument used, wind direction, work process, etc. The CIH may periodically review this data.

## 7.6 Calibration Requirements

The PID, FID, LEL/$O_2$ meter, and any sampling pumps required with fixed-media air sampling will be calibrated daily prior to use. The information detailing the date, time span, gas or other standard, and name of person performing the calibration, will be recorded in the bound field book.

## 7.7 Air Monitoring Results

Air monitoring results will be posted for personnel inspection, and will be discussed during morning safety meetings.

## 8.0 EMERGENCY RESPONSE

Prior to field activities, the SS and SSO will plan emergency egress routes and discuss them with field personnel.

### 8.1 Emergency Services

A tested system will exist for rapid and clear distress communication. Personnel will be provided concise and clear directions and accessible transportation to local emergency services. A map outlining directions to the nearest hospital is included as Drawing SR-1A in Attachment A).

The following emergency equipment will be present on the site:

- Fire extinguishers
- First-aid kit
- Eye wash bottles

### 8.2 Communication

Each member of the site entry team will be able to communicate with another entry team member at all times. Communications may be by way of the following methods:

- Sound (air horn)
- Electronic (radio, bull horn)
- Visual (hand signals)

The following standard hand signals will be mandatory for personnel regardless of other means of communication:

- Hand gripping throat--**Out of air, cannot breath**
- Hands on top of head--**Need assistance**
- Thumbs up--**OK, I'm alright, I understand**
- Thumbs down--**No, negative**
- Gripping partner's wrist, or gripping both hands on wrist--**Leave area immediately**

### 8.3 Emergency Evacuation From Exclusion and Contamination-Reduction Zones

Any personnel requiring emergency medical attention will be evacuated immediately from EZ and CRZ. Personnel will not enter the area to attempt to rescue if their own lives would be threatened. The SS and SSO decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the injury and the nature of the contaminant.

If decontamination cannot be performed because it may aggravate the injury or delay life-saving treatment, the emergency response personnel will:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel and emergency vehicles.

- Alert emergency and medical personnel to potential contamination; instruct them about specific decontamination procedures.

- Send site personnel familiar with the incident to the hospital with the victim.

## 8.4 First Aid

Qualified personnel only will give first aid and stabilize an individual needing assistance. Professional medical assistance will be obtained at the earliest possible opportunity.

To provide first-line assistance to field personnel in the case of illness or injury, the following items will be made immediately available:

- First-aid kit
- Portable emergency eye wash
- Supply of clean water

## 8.5 Emergency Actions

If actual or suspected serious injury occurs, these steps will be followed:

- Remove the exposed or injured person(s) from immediate danger.

- Render first aid if necessary. Decontaminate affected personnel after critical first aid is given.

- Obtain paramedic services or ambulance transport to local hospital. This procedure will be followed even if there is no visible injury.

- Other personnel in the work area will be evacuated to a safe distance until the site supervisor determines that it is safe for work to resume. If there is any doubt regarding the condition of the area, work will not commence until all hazard-control issues are resolved.

- Notify client of incident.

### 8.6 General Evacuation Plan

In the general case of a large fire, explosion, or toxic vapor release, a site evacuation will be ordered and will follow these steps:

- Sound the applicable alarm and advise client representative.
- Evaluate the immediate situation and downwind direction. Personnel will evacuate in the upwind direction.
- Determine the extent of the problem. Dispatch a response team in protective clothing and self-contained breathing apparatus on site to evacuate any missing personnel or to correct the problem.

### 8.7 Emergency Telephone Numbers

The following telephone numbers will be posted at the site before work begins:

| | |
|---|---|
| Fire Department: | 911 (428-5958) |
| Police Department: | 911 (428-7252) |
| Poison Control Center: | 275-5151 |
| NYSDEC Spills | 226-2466 |
| NYSDOH (Dave Napier) | 423-8071 |
| MCDOH (Joseph Albert)<br>After Hours | 274-6904<br>529-0756 |
| Hospital: | Park Ridge Health System<br>1555 Long Pond Road |
| Hospital Phone Number:<br>·Emergency Dept: | 911 (723-7000)<br>723-7070 |

Directions to the Hospital:

·Turn north on Mt. Read Boulevard;
·Turn left (west) onto Ridgeway Avenue;
·Turn right (north) onto Long Pond Road;
·Hospital is on left (west) side of road.

## 9.0 TRAINING REQUIREMENTS

As a prerequisite to employment at DAY, field employees are required to take a 40-hour training class. This training covers personal protective equipment, toxicological effects of various chemicals, handling of unknown tanks and drums, confined-space entry procedures, and electrical safety. This course is in compliance with OSHA requirements in 29 CFR 1910.120. In addition, employees receive annual 8-hour refresher training, and supervisory personnel receive an additional 8-hour training in handling hazardous waste operations.

Personnel entering the exclusion zone will be trained in the provisions of this HASP and be required to sign the HASP Acknowledgement in Attachment B.

## 10.0 MEDICAL SURVEILLANCE PROGRAM

DAY personnel participate in a medical and health monitoring program. This program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis. A listing of DAY's worker medical profile is shown below. This program was developed in conjunction with a consultant physician. Other medical consultants are retained when additional expertise is required.

The medical surveillance program meets the requirements of the OSHA Standard 29 CFR 1910.120(f).

**TABLE 10.1**

**WORKER MEDICAL PROFILE**

| ITEM | INITIAL | ANNUAL |
|---|---|---|
| Medical History | X | X |
| Work History | X | X |
| Visual Acuity | X | * |
| Pulmonary Function Tests | X | X |
| Physical Examination | X | X |
| Audiometry Tests | X | * |
| Chest X-Ray | X | * |
| Complete Blood Counts | X | X |
| Blood Chem. (SSAC-23 or equivalent) | X | X |
| Urinalysis ("Dip" Only) | X | X |
| Dermatology Examination (As part of exam; not by a specialist) | X | X |
| Electrocardiogram/Stress Test | X | * |

*Recommended every 3 years unless medically required.

### 10.1 Examination Schedule

Employees are examined initially upon start of employment, annually thereafter, and may be examined upon termination of employment. Unscheduled medical examinations are conducted:

- At employee request after known or suspected exposure to toxic or hazardous materials.

- At the discretion of the client, the CIH, SSO, or occupational physician after known or suspected exposure to toxic or hazardous materials.

- At the discretion of the occupational physician.

Nonscheduled medical examinations will include, as a minimum, all items specified above for periodic surveillance examination, with the exception of the chest X-ray, which will be conducted at the discretion of the occupational physician performing the examination.

**ATTACHMENT A**

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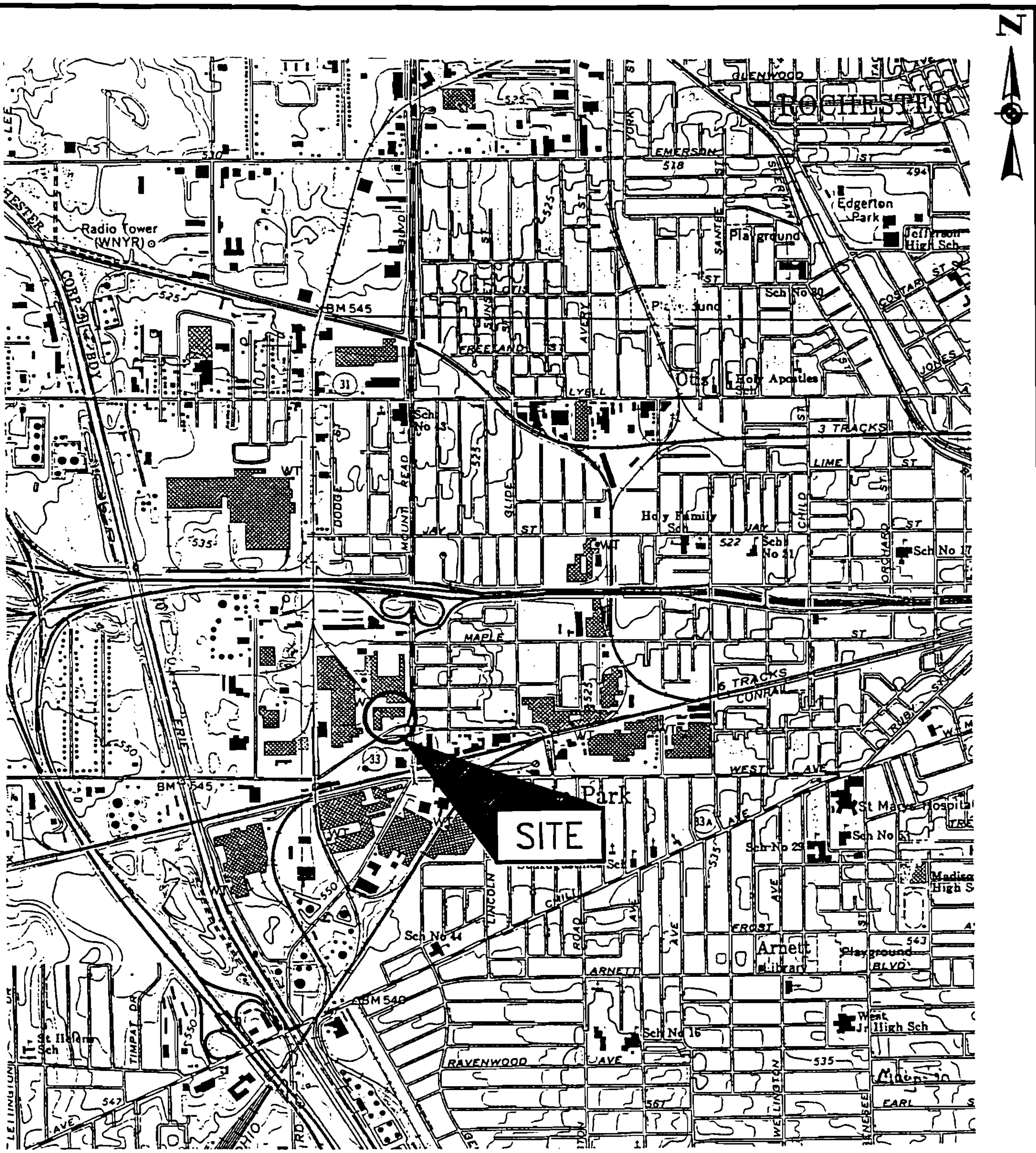
REF3: REF3

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N4307.5–W7737.5/7.5
1971
PHOTOREVISED 1978

| PROJECT NO. | PROJECT TITLE | | DATE |
|---|---|---|---|
| 1275S–97 | 95 MT. READ BOULEVARD<br>ROCHESTER, NEW YORK | **DAY ENVIRONMENTAL, INC.**<br>*ENVIRONMENTAL CONSULTANTS*<br>*ROCHESTER, NEW YORK* | 5/29/97 |
| DRAWING NO. | REMEDIAL INVESTIGATION/<br>FEASIBILITY STUDY | | DRAWN BY |
| SR–1 | DRAWING TITLE | | SCALE |
| SHEET 1 OF 1 | PROJECT LOCUS MAP | | 1" = 2000' |

TIME PLOTTED: THUR MAY 29, 09:50:00 1997
FILENAME: MAGUIR3

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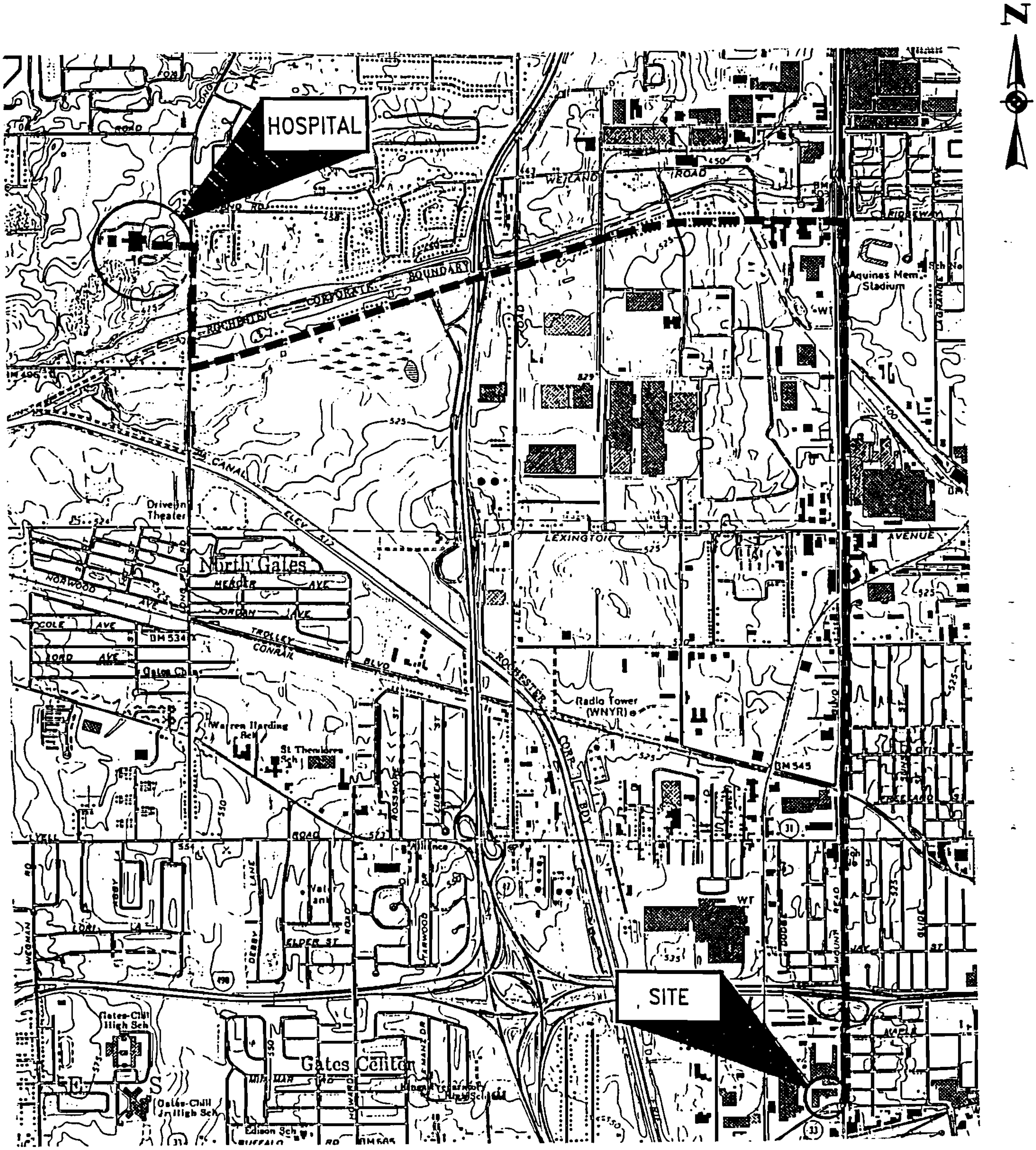


DRAWING PRODUCED FROM: ROCHESTER WEST, N.Y.
N4307.5–W7737.5/7.5
1971
PHOTOREVISED 1978

| PROJECT NO. 1275S–97 | PROJECT TITLE 95 MT. READ BOULEVARD ROCHESTER, NEW YORK | DAY ENVIRONMENTAL, INC. | DATE 5/29/97 |
|---|---|---|---|
| DRAWING NO. SR–1A | REMEDIAL INVESTIGATION/ FEASIBILITY STUDY | *ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK* | DRAWN BY |
| SHEET 1 OF 1 | DRAWING TITLE ROUTE TO HOSPITAL | | SCALE NO SCALE |

## ATTACHMENT B

## HEALTH & SAFETY PLAN ACKNOWLEDGEMENT

I, the undersigned, have received and read a copy of the document entitled, "Remedial Investigation, Health and Safety Plan, 95 Mt. Read Boulevard, Rochester, New York, NYSDEC Site Code #828085", and fully understand and agree to follow the requirements of this HASP.

Signed: ______________________________

Date: ______________________________

# APPENDIX F

## RECRA Environmental, Inc.
## Quality Assurance Program
## (Including Chain-of-Custody)

UNCONTROLLED COPY



# RECRA ENVIRONMENTAL, INC.

# CORPORATE QUALITY ASSURANCE MANAGEMENT PLAN

August 1996

## PREPARED BY

Recra Environmental, Inc.
Quality Assurance Department
Amherst, New York
Pittsburgh, Pennsylvania
Houston, Texas

Thomas T. Osterman
Vice President - LabNet Operations

Mark F. Marcus
Vice President - Quality

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TABLES

# *1.0 QUALITY POLICY*

The Corporate Quality Policy and a subset of those Quality Elements used in this Quality Assurance Management Plan are given as follows:

## 1.1 Quality Policy

Recra Environmental, Inc. will strive to understand and deliver to our clients information that fulfills their environmental regulatory and business needs. This is achieved by the generation of defensible data, that is both timely and cost effective. It is our goal to use these quality principles to improve all aspects of our business by: (1) implementation of new ideas that enhance our performance on client needs; (2) continuous assessment of practices that are used by Recra, our subcontractors and suppliers; (3) corrective action for problem resolution and modification of procedures based on this resolution.

## 1.2 Organization

The organization of a company is directly responsible for its performance. Key elements of organization are planning, communication, cooperation, and coordination. Each functional unit must reflect these elements in its operation, while at the same time, perform its tasks efficiently, safely and in accordance with customer needs and any applicable rules and regulations. The organization must set and enforce policy, provide direction and leadership, and have a means to self-critically analyze and effect positive change. The organization must have provisions for administering to staff needs and concerns.

## 1.3 Sampling and Custody

Quality assurance procedures for sampling and chain of custody for those samples are needed to insure the traceability, defensibility, and integrity of the final information provided to the customer. Possession and control of the customer's samples and all associated data must be documented from the time the sample is created until final disposition.

## 1.4 Instrumentation

The equipment and instrumentation that a company uses must be properly maintained, calibrated and operated by trained staff. There must be sufficient capacity to meet current customer needs and accommodate unexpected surges in workload or mechanical breakdowns. Documentation and traceability of maintenance and calibration is essential. Compatibility with new and forthcoming methods, as well as upgradability, is highly desirable.

## 1.5 Standard Methods

Most analytical programs performed by Recra's environmental laboratories testing services result from state or federal regulatory or enforcement requirements. Standard Methods most frequently used by Recra originate within these agencies, most notably the U.S. Environmental Protection Agency. If the standard method is not followed exactly, or if a performance-based method is employed, a standard operating procedure must be written and historical set of QA data (detection limits, precision and accuracy, etc.) must be documented for defensibility.

### Standard Operating Procedures

SOP's exist for all methods and procedures in place at Recra including those used in analytical operating departments and other departments such as program management, report writing, sample receiving, etc. A standard operating procedure usually contains the purpose and scope of an activity, what shall be done, how it shall be done, what materials, equipment and documents shall be used and how it shall be controlled and recorded. Standard operating procedures should be agreed upon, be accessible to personnel and understood by all those who interface with their operation.

## 1.6 Quality Control

Quality Control is achieved by using a single unified company Quality Assurance Plan at each local laboratory. Approval of the Quality Assurance Plan is at the corporate staff level with input from all local quality officers and laboratory directors. The local quality officers review and monitor the implementation of quality control practices for individual local areas of operations. Each method requirement regarding issues such as detection limits, accuracy, and precision is continually being reviewed. The unified approach and on going evaluation insure that quality control is maintained at an acceptable level throughout each operating unit.

## 1.7 Data Validation

This is accomplished by local internal review of analytical documentation provided at each site. Data validation procedures assure that the requirements of the appropriate method, SOPs, client and company Quality Assurance Plans are met. The local quality officer will be available to assist operating personnel in interpreting the way that these requirements apply to daily work.

## 1.8 Record Keeping and Document Control

Quality records provide information on the achievement of the quality objectives, the level of customer satisfaction or dissatisfaction, the results of quality system evaluation, the corrective action and its effectiveness and the training of personnel. All records should be verified, readily retrievable, retained for a designated period of time and protected from damage while in storage. All documentation should be legible, dated, clear, readily identifiable and carry authorization status. Traceable records and documentation enhance the defensibility and reproducibility of the data we produce.

### Data Reporting

The processed and reviewed results available to the Report Writing Department are subsequently compiled into the client required deliverables format. Program Management Department further reviews the assembled results for overall compliance, completeness, usability and conformance to special client requirements, if any. Through AIMS™, electronic data delivery is available if the clients require it.

## 1.9 Confidentiality

The service provider-customer relationship can only exist when both parties exhibit elements of respect for each others privacy. All information transmitted between the parties either in verbal or written form must be held in strict confidence by all personnel involved. A "need to know" basis must be established within the organization to limit dissemination of confidential information. To further protect the confidentiality of the customer, each report shall contain the following statement:

*"This data report shall not be reproduced, except in full, without the written authorization of the client."*

## 1.10 Audits

Audits of methods and practices are provided by each local quality officer. These include submitting proficiency single blind samples to the laboratory and reviewing practices for conformance with approved methods. Double blind proficiency samples are submitted to each operating laboratory by the corporate quality staff. Performance, system, and method audits are also conducted by clients and various regulatory agencies.

The laboratories also have a comprehensive laboratory computer system called Analytical Information Management System (AIMS™). It electronically captures and processes analytical results with a real time data auditing subprogram. The current version of the auditor performs up to 74 checks on 100% of the data appropriate to the validation issue. Deficiencies observed during any of these procedures are provided to the laboratory director and line managers for corrective action.

## 1.11 Corrective Action

The need for corrective action is indicated when internal or external facility audits, method audits, or proficiency analyses reveal any shortcomings in the laboratory area or procedure. Proposed corrective actions are reviewed by the local quality officer and implemented by the laboratory director. Follow up evaluations indicate the success of corrective actions.

### Continuous Improvement

Continuous improvement of the level of quality provided to our clients is insured by communicating information between local quality officers and the corporate quality staff. Identified deficiencies in policies or practices at any operational unit are shared so that any related issues can be addressed at each of the laboratory sites. Suggestions for new or modified Standard Operating Procedures, systems, and other protocols are communicated to each local laboratory director who evaluates the impact on local operation and implements changes, as necessary.

# 2.0 ORGANIZATION

## 2.1 History and Legal Entity

Recra Environmental, Inc. began operations as Recra Research, Inc. in July of 1977. Our name is derived from a landmark law - The Resource Conservation and Recovery Act (RCRA) adopted in 1976. Recra was sold to Browning-Ferris Industries, Inc. (BFI) in 1983 and became a wholly-owned subsidiary of BFI's Hazardous Waste Subsidiary, CECOS International, Inc. In June of 1986, Recra became an independent corporation and now operates under the name Recra Environmental, Inc.

It acquired Chester LabNet in May of 1995 and now operates out of six (6) locations listed in Table 2.1. The laboratory division is now called Recra LabNet.

## 2.2 Business Organization:

The business organizational structure of our company is presented generically in Table 2.2. This reflects our mission to be a vertically integrated business with partnerships to our clients, suppliers, owners, professionals, community, directors, and shareholders.

The operations segment of the company operates with authority and responsibility to perform work for our clients and produce products (information) that fulfill their needs.
The sales, marketing, program management, information systems and quality groups are all independent of operations, but have clearly defined dotted line responsibilities to operations for the purpose of assisting them in completing their tasks for our clients as shown in the generic organization chart Table 2.3.

## 2.3 Laboratory Organization:

The organization of the company is the most critical factor in our ability to achieve our quality principles. Elements of organization covered by this policy include structure, coordination, communication, planning, and cooperation.

The laboratory organization represents most of our staff and resources and is the basis of our business. It is managed by a Senior Vice President of the company with oversight for all of the laboratories. Each laboratory has a Laboratory Director responsible for the operations of that specific laboratory. The organization of the laboratory is dependent on the nature of their

## TABLE 2.1

## RECRA ENVIRONMENTAL, INC.
## BUSINESS ORGANIZATION
## FACILITIES

| | | |
|---|---|---|
| 1. | Recra Environmental, Inc.<br>10 Hazelwood Dr.<br>Amherst, NY 14228<br>Phone 716-691-2600<br>FAX 716-691-3011 | Corporate Headquarters<br>Sales and Service NE Region<br>Laboratory |
| 2. | Recra LabNet<br>8300 Westpark<br>Houston, TX 77063<br>Phone 713-266-6800<br>FAX 713-974-5491 | Sales and Service Gulf Region<br>Laboratory |
| 3. | Recra LabNet<br>3000 Technical Center Rd.<br>Monroeville, PA 15146<br>Phone 412-825-9833<br>FAX 412-825-9727 | Sales and Service Central Region<br>Laboratory |
| 4. | Recra LabNet<br>39201 Schoolcraft Rd.<br>Livonia, MI 48150<br>Phone 313-542-4010<br>FAX 313-542-4050 | Program Management<br>Laboratory |
| 5. | Recra LabNet<br>2248 East Enterprise Pkwy.<br>Twinsburg, OH 44087<br>Phone 216-405-1525<br>FAX 216-405-1523 | Program Management<br>Laboratory |
| 6. | Recra Environmental Canada<br>1217, Royale Ave.<br>Beauport, Quebec<br>Canada G1E 2B2<br>Phone 418-666-8484<br>FAX 418-663-3792 | Affiliated Operation |

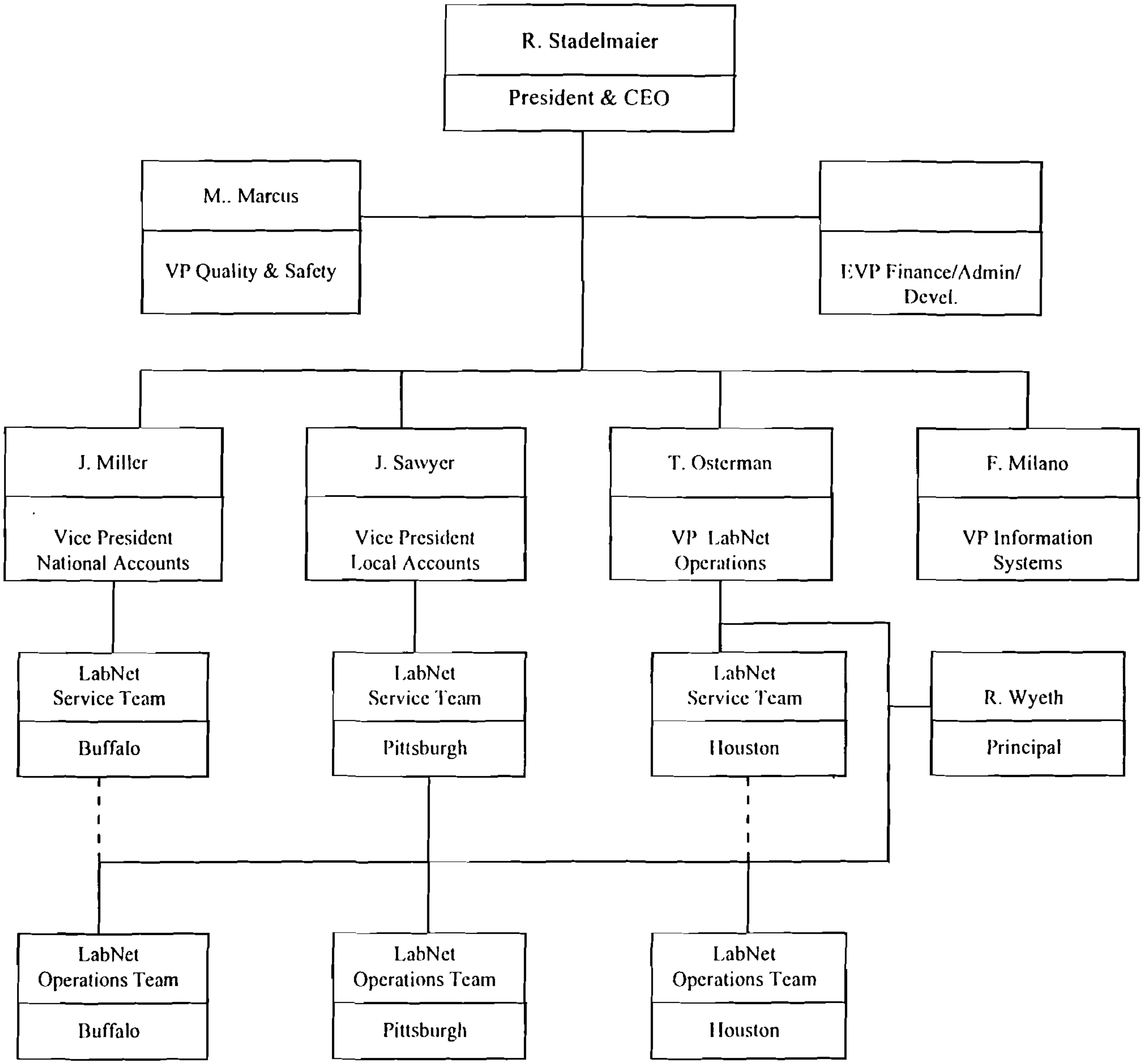
TABLE 2.2

RECRA ENVIRONMENTAL, INC.
BUSINESS ORGANIZATION

Under revision at date of issue.

CONFIDENTIAL

SCHEDULE IV
ORGANIZATIONAL CHART

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business and may be organized by shift or analysis disciplines.

Organizational structure should be well defined and be vertical with clear indication of delegation/backup and delineated flat to minimize overhead. Direct and indirect structure should be clearly defined. Structure is best demonstrated with organization charts for corporate, location and groups at these locations. Organization charts should contain the date, job titles and incumbents in those key positions. They will be updated as changes in the organization are made.

Job descriptions for each employee establishes the responsibilities and requirements for each position. They should include the delegation-of-authority and minimum requirements for the positions. These requirements should be addressed in their curriculum vitae or resumes. Organization charts and job descriptions are used with new employee orientation to enhance and assure coordination for all of our activities.

Regular staff communication should be held and documented. The form of this communication can include meetings, E-Mail/AIMS™ bulletin board, memos, or verbal. The key issues are that it should be continuous, two-way, and paths for problem identification established delegation of authority routes as defined by organization charts with clearly defined release points to assure employees the ability to get the issue resolved.

Planning should occur at all levels of the organization for a number of timeframes. Long range structural plans, annual plans and quarterly plans are developed at the corporate level. At the location level, long range project and weekly/daily planning are necessary. Planning must be proactive and flexible to a changing environment.

A successful organization requires cooperation among all of the elements of the organization. This requires that structure elements be flexible enough to assist each other. The coordination between structure groups is a proactive task not left to chance. Communication between groups in all forms and levels is central to cooperation. Planning must include affected structure units to assure cooperation.

## 2.4 Quality Organization:

The Quality Assurance Unit consists of one independent on-site position at each laboratory with direct responsibility as defined by the following functions. They also have on-site responsibility to assist operations with quality issues. The staff reports to the Corporate Director of Quality who is responsible for the development, implementation and maintenance of this policy. This unit reports directly to the President and CEO of Recra Environmental, Inc. This structure is used to keep the Quality Unit independent of operations. The attached organization chart shows this relationship, but also emphasizes the close working tie between the laboratory and Customer Service segments with the Quality Assurance Unit member at that facility.

The principle responsibility of the Quality Assurance Unit is the assessment of the implementation of all aspects of this Quality Policy. This assessment will be done by developing a set of audits based on this policy. These audits include system, performance, proficiency samples, certification and approval, on-site visits, and assistance to laboratory for self audit. These audits are then used as an objective set of criteria for evaluation. As issues are identified, the Quality Assurance Unit will use their resources to assist in the corrective action plan to resolve the assessment issue. The Quality Assurance Unit is also tasked with a leadership role in promoting continuous improvement, they work with operational staff on the identification of ideas and assist in their implementation.

# *3.0 SAMPLE CUSTODY*

## 3.1 Sample Receiving

Recra's chain-of-custody procedures are based upon the National Environmental Information Center (NEIC) policies and procedures (EPA-330/9-78-001-R). Full-time sample custodians are assigned the responsibility of sample control for the laboratory. It is the responsibility of the sample custodians to receive all incoming samples at the laboratory. Once received, the custodians determine and document the condition of the samples received, the associated paperwork, such as chain-of-custody sheets, is completed and the chain-of-custody forms are signed.

On receipt of samples their temperature is taken, recorded and any deviation from 4°C greater than $\pm$ 2°C are recorded and communicated to the appropriate program manager. Acid/base preserved samples are measured for pH (with the exception of volatile organics which are measured at the time of analysis) and, if outside required limits, the program manager is notified to communicate to the client and receive directions with respect to preservation by the laboratory. This will be documented for the record of those samples. Inventory on contents against chain-of-custody is made and any discrepancies noted including broken samples, incorrect bottle materials, preservatives, and headspace on VOA samples.

Once the sample shipment has been inspected and any irregularities resolved, the sample shipment is ready to be logged in. For laboratory purposes, a single sample shipment from a specific client constitutes a single job. The shipment may contain one or many samples, and may have arrived in a single container or in many shipping containers.

For the log-in process, the Sample Custodian performing the logging in, needs the field chain-of-custody with whatever corrections required to be made during the inspection and resolution steps.

The custodians will also insure that the samples are appropriately subsampled for the specific parameters of interest, consistent with the applicable program or protocols if such splitting and procedures were not previously accomplished. Documentation is maintained for all inter- and intra-laboratory sample tracking by the laboratory sample custodians through AIMS™. Samples that are received after the custodians have finished their respective work shifts, will be inspected by designated shift supervisory personnel who take possession of samples, sign the chain-of-custody forms and place the entire shipment into secure refrigerated storage.

## 3.2 Sample Control

The sample custodians then place the samples into secure, limited access storage (refrigerated storage, if required).

Consistent with the analyses requested on the chain-of-custody form or other documentation, analyses will begin in accordance with the appropriate methodologies. Samples are removed from storage only after internal chain-of-custody sign-out procedures are followed. All remaining sample (and empty sample bottles when the available volume is consumed) is returned to secure and limited access storage, log-in time and date entered.

## 3.3 Sample Disposal

Upon completion of the entire analytical work effort, samples are ultimately disposed of by the sample custodians. Generally, the length of time that samples are held is thirty (30) days after reports are submitted to the client, or a period of time consistent with specific contract terms and conditions. Whenever possible, samples, particularly those of a hazardous nature, are returned to the client or the client's designee.

Sample or sample bottle disposal only occurs upon approval of the Laboratory Director or his designee. All empty sample bottles are disposed of as non-hazardous solid waste consistent with the empty container provisions of RCRA after their labels have been obliterated of client information. All liquid and solid samples requiring disposal are reviewed prior to authorization for disposal. If the samples are hazardous by characteristic (reactive, corrosive, ignitable or toxic) or are a TSCA/PCB waste, appropriate controlled disposal is accomplished. Recra is a permitted generator of hazardous wastes and has disposal contracts with subtitle-C TSD facilities. Full documentation of each step of the disposal process, consistent with the requirements of RCRA and Recra SOPs are monitored by Recra's Environmental Health and Safety Officer. All records including manifest are maintained.

The drums of disposed samples without containers are sampled for waste identification. The samples are composited and TCLP and characteristics are determined. The drum set is then labelled and managed, based on these results.

For other non-characteristically hazardous or non-TSCA materials, Recra will review the available analytical results for the samples in question and dependent on the presence of and/or concentration of hazardous constituents will either dispose of materials as hazardous wastes, or exercise its options to dispose of the materials as non-hazardous waste.

Sample labels, chain-of-custody forms, sample receiving, SOP indexes, sample container types, and preservation requirements and holding times are included in the QAMP Supplement of this document.

# *4.0 INSTRUMENTATION*

The instrumentation and measurement equipment that the company uses must be properly calibrated, maintained and operated by qualified staff to generate information that fulfills our clients' needs and is defensible. Traceability and documentation of calibration and maintenance is essential to achieve this goal. There must be sufficient capacity to meet current client requirements and preplans in-place to accommodate unexpected surges in workload or utilization. Compatibility with new and forthcoming methods and upgradability are highly desirable considerations when selecting additional equipment.

## 4.1 Calibration

The goal of our laboratories is to achieve traceability to a certified reference standard for each determination that we make. To the extent possible we will purchase calibration standards that are certified and have documented traceability to NIST Standard Reference Materials. When this is not possible, the next level of traceability will be calibration standards that are traceable to a reference material. The cost of these two approaches will be evaluated against acquisition of Standard Reference Materials or reference materials and evaluation of our calibration materials against these. The next level of desirability are "certified standards" which document purity of materials used for standards and NIST traceability of weights used to prepare calibration solutions. These represent the current status of calibration standards available for the environmental testing laboratory.

Calibrations are made from these materials by using documented serial dilutions of standards. These working standards are assigned expiration dates and not used beyond that time. Their correctness is also validated with an independent calibration check which is a routine laboratory evaluation. This independent check is from a different vendor, different lot, and different original source, where possible. An additional goal of the independent check standard is to establish traceability to standard Reference Materials.

A further validation of our calibration procedures is our on-going participation in certification programs and internal blind and double blind performance evaluation samples. Successful performance on these samples is a verification that our entire system is in control, including valid calibration.

The type and frequency of calibrations is dictated by the specifications in the methods that are used. Detail of calibration is found in each method or SOP used for the determination.

If none exists for a procedure, the manufacturer instructions will be used. If no such guidance is given, a calibration procedure will be developed and verified against an independent known material and written into the SOP for that procedure.

Measurement equipment includes all of those things used to make measurements, but are not classified as instruments. This includes, but is not limited to, balances, glassware, and thermometers. Volume, mass and temperature measurement are traceable to NIST references. Class A glassware is used for volume measurements or calibrated against delivery mass, as for example, repipetters.

Laboratory balances are annually serviced and calibrated under the manufacturer's service contract. Additional balance performance evaluations are conducted routinely by comparison against NIST Class S certified weights. ASTM E617-81 is used as the performance criteria for our laboratory balances. Unacceptable performance requires service adjustments. Both balance service and daily calibrations are recorded and documented in designated Laboratory Balance Calibration Logbooks.

Laboratory thermometers are calibrated against NIST certified thermometers and recorded in the designated Laboratory Thermometer Calibration Logbook. Laboratory drying ovens, incubators, refrigerators, etc., contain calibrated thermometers. Refrigerator readings are recorded at least once a day in Laboratory Refrigerator Temperature Logbooks. Drying ovens, incubators, and water bath temperatures are recorded before and after every use. Unacceptable deviations from any desired temperature requires immediate corrective action.

Laboratory pure water is generated by a commercial on-line water purification system consisting of mixed resin deionizing and carbon filtration cartridges. Cartridges are routinely replaced and serviced by the manufacturer or as indicated by an on-line resistivity indicator or laboratory method blank contamination. All water purity information is recorded in the manufacturer's service file. Daily checks of conductivity are done on the water to demonstrate it is of ASTM Type II conductivity specification.

### 4.2 Maintenance/Service

Instruments and equipment used for environmental analyses have evolved and matured considerably since the inception of preventative maintenance concepts by the Food and Drug Administrative as incorporated into GLP's. The analytical procedures are also prescriptive to the point that unreliable instruments are not useable for analyses. This concept forces and drives the maintenance issue. The concept of preventative maintenance has been replaced by the better service concept of instrument redundancy at Recra LabNet. Recra LabNet now has sufficient instrumentation for back-up reduncancy which results in more reliable performance.

Our laboratories maintain an adequate set of instruments, which are maintained and correct operation verified on a continuous basis.

Each instrument has a maintenance logbook which contains the operating history of that instrument. The initial pages are the routine maintenance procedures performed by laboratory staff. Initially, routine maintenance procedures are drawn from the instrument manufacturer manuals. As the instrument is used and experience accumulated, these routine maintenance procedures will be modified, with supervisor's approval, to current practice.

The next section of the log is instrument data, including serial numbers, accessories, installation date and documentation. The remainder of the log will be on-going information on maintenance, demonstration of operation and documentation of problems including service calls and reference by number and date to service documents. Each out of service excursion will be followed with documentation that the instrument is again performing correctly to predetermined criteria as defined by methods or SOPs. Out of service equipment must be visibly tagged so that it is not used until repaired.

All analytical balances are under a service agreement with the manufacturer or their authorized representative to provide emergency service, preventive maintenance and calibration on at least an annual basis. All S-weights used for daily balance quality assurance verification are also re-calibrated on an annual basis and certificates of such calibration are maintained on file by the Laboratory Director.

All temperature control devices are monitored daily or twice daily for proper methods or certification required temperature compliance. All thermometers used for these purposes are either purchased with NIST traceable thermometer certification or are re-calibrated annually against Recra's NIST traceable thermometer. SOPs exist for monitoring of all temperature control devices. Failure to maintain appropriate requirements dictates immediate service by authorized representatives for said equipment. When necessary, samples, extracts, or analyses are moved to other properly functioning temperature controlled devices to maintain appropriate quality assurance and control.

Examples of both instrument-type maintenance and calibration logbooks are contained in the QAMP Supplement.

## 4.3 Inventory

Each laboratory will maintain a current inventory of its instrumentation and major equipment ($500 or more). This inventory must include the description of equipment and accessories including manufacturer and model number, the serial numbers of the equipment (including accessories) and a location code keyed to a laboratory floor plan to locate that equipment. The inventory should be updated with each addition of equipment or removal of equipment for other than service (transfer, loss, theft). A proactive annual inventory is also required. Each inventory should be dated and initialed by those taking the inventory.

Special attention must be paid to radioactive sources such as electron capture detectors to assure compliance with license provisions for wipe testing and inventory.

A current equipment inventory is included in the QAMP Supplement.

# 5.0 ANALYTICAL PROCEDURES

Recra's environmental laboratories perform analyses for clients that are responding to local, state or federal regulatory or enforcement needs. The defensibility of these data is enhanced when standard methods are followed. The Standard Methods that are most frequently used by our laboratories originate within these agencies, most notably the U. S. Environmental Protection Agency.

When methods are not detailed enough or require choices, scientific and legal defensibility require that Standard Operating Procedures be prepared and followed that document the laboratory's actual procedure so that it could be reproduced by an independent laboratory.

## 5.1 Standard Methods

Recra's laboratories participate in the U.S. Environmental Protection Agency CLP Program, have been deemed technically acceptable by the U.S. Army Corps of Engineers Missouri River Division, Navy FESC, AFCEE, U.S. Department of Agriculture, the New York State Department of Environmental Conservation, the New Jersey Department of Environmental Protection, the NY Department of Transportation and are certified by numerous state or environmental or health departments, as well as by various industrial clients through participation in audit and/or performance evaluation programs. The current list is in the QAMP Supplement. Consistent with these certification or approval programs, Recra performs a wide variety of test procedures in addition to U.S. Environmental Protection Agency protocols. The analytical methods illustrating those procedures most commonly employed within our laboratories are listed below:

1. Current U.S. Environmental Protection Agency Contract Laboratory Program (CLP) protocols for analysis of organic (target compound list) and inorganic (target analyte list) hazardous constituents.

2. "Test Methods for Evaluating Solid Waste; Physical/Chemical Methods - Laboratory Manual" SW-846, 3rd Edition, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, September, 1994 (or as revised/updated).

3. "Guidelines Establishing Test Procedures for the Analysis of Pollutants", 40 CFR 136 (Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977) (as most recently amended).

4. "Methods of Chemical Analysis of Water and Wastes", U.S. Environmental Protection Agency, Office of Environmental Monitoring and Support Laboratory, EPA-600/4-79-020, Revised, March 1983.

5. "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", U.S. Environmental Protection Agency, Office of Environmental Monitoring and Support Laboratory, EPA-600/4-82-057, July 1982.

6. "Methods for the Determination for Organic Compounds in Drinking Waters", U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring Systems Laboratory, EPA-600/4-88/039, Revised July, 1991 (with Supplements).

7. "Analytical Services Protocol", New York State Department of Environmental Conservation, Document No.: 0102, Volumes 1-8, Lawrence T. Baily, Editor; September 1989 with 12/91 Revisions (or as revised/updated).

8. Standard Methods for Examination of Water and Wastewater, Current Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, Washington, DC.

9. Annual Book of ASTM Standards, Section 11, Volumes 11.01, 11.02, 11.03, 11.04, American Society for Testing and Materials (ASTM), Philadelphia, PA (most recent edition).

10. "NIOSH Manual of Analytical Methods", 3rd Edition, U.S. Department of Health and Human Services, National Institutes for Occupational Safety and Health, August 1987.

11. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA-600/4-84-041, April 1984.

Standard Methods used must be the most current and authorized for use. New Methods or revisions will be tracked through the regulatory process. Our real world experience will be used to comment on proposed new or improved procedures and we will actively participate in the development of new methods and the process of standardization. A listing of the analytical methods used by Recra is included in the QAMP Supplement.

When a Standard Method must be modified, the reason for the modification must be documented. An evaluation by the laboratory manager and the Quality Assurance Manager is made to determine if the modification affects the method compliance status. A decision is also made to determine the need for a verification study to demonstrate the modifications viability. The final Standard Method decision is to determine the need for an SOP to cover this procedure.

## 5.2 Standard Operating Procedures

Standard Operating Procedures are used instead of Standard Methods when procedural detail of the Standard Methods must be specified to allow the experiment to be reproduced by someone else or when no Standard Method exists for that procedure.

Standard Operating Procedures should be written by those people who actually perform the procedure. They are the only ones who have the detail necessary for preparation. Standard Operating Procedures must reflect current practice, they must be revised and retrained upon modification of the procedure before it is implemented. The content of each Standard Operating Procedure is as follows:

Recra Control Document Header
Confidentiality Copyright
Introduction
Scope/Application
Summary of Method
Definitions
Interferences
Safety
Equipment and Supplies
Reagents and Standards
Sample Collection, Preservation, and Storage
Quality Control
Calibration/Standardization
Procedure
Data Analysis/Calculations
Method Performance
Pollution Prevention
Waste Management Procedure
References
Attachments: Tables, Figures, Flow Charts, Validation Data, etc.

Analysts will be trained for writing Standard Operating Procedures. Their work product will be reviewed and approved by the department supervisor, the Laboratory Director, and

Quality Assurance Unit.

Each analyst performing a standard method and standard operating procedure will have documented training in that method, and will be frequently challenged for their ability to generate correct data utilizing blind, double blind, reference materials, quality control samples, and observations by supervisors that methods are being performed as written. Each analyst will have a methods book that contains their copies of the Standard Methods they perform and documentation of their training and recertifications on these methods.

A current list of Standard Operating Procedures used by Recra, the training program and the Standard Operating Procedure for writing Standard Operating Procedures are appended in the QAMP Supplement.

# *6.0 QUALITY CONTROL*

## 6.1 Quality Control Procedures

The quality control procedures that may be used by our organization consist of predetermined metrics of performance selected as indicators of quality. A metric is routinely measured, principles of statistical quality control are applied, warning and action limits are established and predetermined corrective actions are taken, where necessary. This process is also used to identify and monitor continuous improvement ideas.

The laboratory part of our organization has established quality control practices that are described in this current policy. This policy is used to assure that predetermined levels of precision and accuracy have been achieved. Other potential areas for evaluation may also include contamination, detection limits, instrument performance parameters, control charting, completeness, representativeness and comparability. These criteria and those specified in client data quality objectives or those stated in the methods are used. The achievement of these quality control goals are an on-going and continuous demonstration.

The achievement of quality control goals is the direct responsibility of each Recra employee who generates data covered by this policy. It is their supervisors' responsibility to determine that their staff are using these quality control goals. The quality assurance unit has responsibility to review staff and supervisor's performance and report to management on the achievement of these goals.

A minimum set of quality control elements will be performed with all analyses. Method required quality control requirements are added to this miminum set. As data quality objectives are established for a project, Table 6.1 will be used to recommend various quality elements available to clients. Each project will have clearly defined predetermined QC work and limits defined. The following is a description of the quality control practices used by Recra LabNet in its laboratories.

## 6.2 Quality Control Practices

*Assessment of Precision*: The following experiments can be performed to assess the precision of our laboratory results.

Duplicate Sample: A sample of sufficient size is mixed to maximize homogeneity and split into at least two portions which are prepared and analyzed. The minimum frequency is every twenty samples, or each batch if less than twenty.

TABLE 6.1
Quality Control Parameters

| Quality Control Parameters | Minimum Requirements | Recommended Level | Highest Level |
|---|---|---|---|
| Precision | | | |
| Field Duplicate Matrix Spike | | X | |
| Laboratory Dup Matrix Spikes | X | | |
| Field Matrix Spike | | X | |
| Control Check Sample | | | X |
| Round Robin | | | X |
| Accuracy | | | |
| Standard Reference Material | | | X |
| Reference Material | | X | |
| Performance Evaluation Sample | | X | |
| Laboratory Matrix Spike | X | | |
| Field Matrix Spike | | X | |
| Isotope Dilution | | | X |
| Standard Addition | | X | |
| Independent Measurement | | | X |
| Maximize Value | | | X |
| Matrix Destruction | | | X |
| Isotope Equilibrium | | | X |
| Contamination | | | |
| Reagent Blank | X | | |
| Method Blank | X | | |
| Field Blank | | X | |
| Trip Blank | | X | |
| Bottle Blank | | X | |
| Storage Blank | X | | |
| Sample Equip. Rinsate | | | X |
| Detection Limits | | | |
| Practical Detection Limit | | | X |
| Instrument Detection Limit | | X | |
| Method Detection limit | | X | |
| Laboratory Quantitation Limit | X | | |
| Contract Required Quantitation Limit | X | | |
| Estimated Quantitation Limit | | X | |
| Client Detection Limit | | X | |
| Test Detection Limit | | | X |
| Reporting Limit | | X | |
| Laboratory Method Detection Limit | | X | |
| Instrument Performance Parameters | | | |
| Calibration | X | | |
| Instrument Performance | | | X |
| Control Charts | | | |
| Check Sample | X | | |
| Duplicate | X | | |
| Spike Duplicate | X | | |

Duplicate Matrix Spike: A homogeneous sample is split and spiked with analytes at concentration of interest. The sample is then prepared, analyzed and evaluated for precision.

Control Check Samples: A sample of known concentration is analyzed at high frequency (i.e., one per batch, per day) and evaluated for precision.

Round Robin Samples: A set of the same samples can be sent to each laboratory for analysis. The range of results is a precision evaluation for laboratory network. This can be as basic as comparison of results from the same performance evaluation sample, or the results of real samples to establish laboratory consensus values with associated range as an indication of intralaboratory precision.

*Assessment of Accuracy*: The following procedures can be used to estimate the accuracy of the determination:

Standard Reference Material: A material of matching matrix with analytes of interest at certified values analyzed in a manner identical to actual samples is the best measure of accuracy. Standard Reference Materials are exclusively produced by National Institute of Standards on Technology (NIST). The goal of our laboratories is to have NIST traceability to all of our determinations.

Reference Materials: Stable homogeneous materials that are extensively analyzed by many laboratories and a consensus value established. Our laboratories' ability to make determinations at the consensus value is an estimate of our accuracy.

Performance Evaluation Samples: Performance evaluation samples are either reference materials when the study starts or become reference material after the study by consensus value.

Matrix Spikes: A sample can be spiked with the analytes of interest, prepared and analyzed to determine the ability to recover the spike. These results are an indicator of the accuracy of the laboratory but not a quantitative determination of the accuracy.

Isotope Dilution: Isotopically stable (non-radioactive) compounds of interest are added to the sample and GC/MS performed. Although not chromatographically resolved they are mass resolved. This technique has the advantage of the same compounds analyzed simultaneously and resoluable from the sample constituents.

Standard Addition: Is similar to matrix spike but done at several (at least 3) concentrations covering a twenty fold range. Careful analysis of the results linearity, and "y" intercept yields key information about accuracy of results.

Independent Measurement: A key element in NIST SRM preparation is a totally independent method assay to verify results. This works better for a major, and minor consistent level, but is very difficult at trace and for multi analyte methods.

Maximize Value: This approach is based on the accurate value being the maximum number determined. Variables in the experiment are evaluated until the maximum analyte concentration is achieved, which corresponds to the highest accuracy.

Total Destruction of Matrix: The matrix destroyed down to the ionic level if instrumentally measured with no interference will yield results of higher accuracy. This approach applies to metal and stable organic compounds.

*Assessment of Contamination*: The following experiments can be performed to determine potential sources of contamination to sample analyses.

Reagent Blank: Analyses are performed on new lot numbers of reagents or, on a scheduled basis (laboratory water), are performed to determine level of contamination.

Method Blank: A sample free of analytes, but processed with all of the reagents as an actual sample with that batch, is analyzed for all of the analytes of interest.

Field Blank: An analyte free reagent sample is treated like a sample in the field to detect any contamination associated with field operations.

Trip Blank: Usually a volatile blank sample sent out and returned with actual samples to monitor potential contamination. It should be noted that holding times are monitored from the time of sample collection not trip blank preparation date.

Bottle Blank: Each lot of sampling bottles are analyzed for potential contamination. A clean trip blank, storage blank, or field blank could also serve this role.

Storage Blank: The correct lot number glassware is filled with analyte free matrix and stored in a parallel manner (time, temperature and handling) as samples it is being used to monitor.

Sample Equipment Rinsate: To demonstrate decontamination of usable sampling equipment, a rinsate blank is prepared by rinsing the sampling equipment prior to taking the next sample.

*Detection Limits*: It is necessary to demonstrate that the laboratory is able to detect and quantitate analytes at specific regulatory or client required limits. The following are some detection limits that may be applied to our results.

Practical Detection Limit (PDL): The lowest actual concentration of an analyte detectable on a given instrument at a level which exceeds the signal to noise ratio. Derived by analyst experience and observation of response.

Instrument Detection Limit (IDL): A theoretical, statistically derived minimum concentration of a substance that can be measured. Obtained by calculating 3 times the standard deviation of replicate analyses of a standard solution directly injected on an instrument. Defined by Protocol, Method, Instrument and Time Period, at least quarterly for metals and annually for organics.

Method Detection Limit (MDL): The theoretical, statistically derived minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. Obtained from analysis of seven replicates of a matrix spike carried through the entire analytical procedure and multiplying the standard deviation by the appropriate one-sided 99% t-statistic. Defined by Protocol, Method, Instrument, and Time Period, at least annually for each matrix type.

Practical Quantitation Limit (PQL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy. Generally 3-5 times the MDL. Laboratory derived by Protocol, Method and Instrument.

Contract Required Quantitation Limit (CRQL): The minimum level of quantitation acceptable under a given protocol. Laboratory PQL's must meet or be lower than this required limit. (Under SW-846 the CRQL is considered the EQL - Estimated Quantitation Limit). Defined by Protocol.

Estimated Quantitation Limit (EQL): The minimum level of quantitation acceptable under USEPA SW-846 Third Edition. Laboratory PQL's must meet or be lower than this required limit.

Client Detection Limit (CDL): The minimum level of quantitation acceptable under a given client's quality assurance project plan. Often imposed by regulatory agencies. Defined by Client.

Test Detection Limit (TDL): The detection limit assigned to a particular standard test profile in AIMS. This is protocol based and can be the IDL, LMDL, EQL, or CRQL.

Reporting Limit (RL): The detection limit which appears on the data form in the final data package. This can be the IDL, MDL, LMDL, EQL, CRQL, or CDL.

Laboratory Method Detection Limit (LMDL): A common set of MDL's by protocol, method, laboratory (facility) and time period. Not defined by instrument. Derived using the most elevated MDL obtained from all instruments for a given compound.

Laboratory Practical Quantitation Limit (LPQL): A common set of PQL's by protocol, method, laboratory (facility) and time period. Not defined by instrument. Derived using the most elevated PQL obtained from all instruments for a given compound.

*Instrument Performance Parameters*: Instrumentation can be evaluated through the use of specific quality control procedures that could include;

Calibration: Initial and on-going calibration are continuous demonstrations of suitable instrument operation.

Instrument Performance: A specific standard used to bracket timeframes of satisfactory performance. The measurements are fundamental indicators such as absolute response, retention times, plate counts. Predetermined limits are set and corrective action required before analyses may proceed.

*Control Charts*: Statistical quality control practices including charting can be used to assist in the attainment of these quality control goals. The following are some of the charts that can be used.

Quality Control Check Sample: The criterion for out-of-control results are determined at ±3 standard deviation after at least 15 measurements. Warning limits at two deviations should also be determined and all data above/below warning limits should be addressed. Out-of-control limit requires corrective actions.

$$Standard\ Deviation = \frac{\sqrt{n\sum_{i=1}^{n} Xi^2 - \left(\sum_{i=1}^{n} Xi\right)^2}}{n(n-1)}$$

n = number of measurements
Xi = individual measurement

Histogram: Plot of number of occurrences at each standard deviation range. It is used to establish trending of systematic errors.

Duplicate Control Chart: This shows the percent error of the results for each set of duplicates. Method, laboratory or client limits should be established. Out-of-limit results must be addressed by corrective action.

$$\frac{X_2 + X_1}{2} = \bar{X}$$

$$\frac{X_2 - X_1}{\bar{X}} \times 100 = \%Error$$

$\bar{X} = Mean \quad X_2 = HigherResult \quad X_1 = LowerResult$

For multi procedures pooled results may be used for charting but individual out-of-control analytes must be addressed.

Spike Control Charts: Spiked sample results should be charted by calculation of % Recovery. Control limits set by method, by client or laboratory must be established. Out-of-control limit exceedance must be addressed by corrective action.

$$\frac{X_T - X_S}{X_{spike}} X\ 100 = \%\ Recovery$$

$X_t$ = Concentration measured for sample and spike
$X_s$ = Concentration of sample
$X_{spike}$ = Theoretical spike concentration

*Completeness*: a measure of the amount of valid data obtained from a measurement system, compared to the amount that was expected to be obtained under correct/normal conditions.

Generally, the established criteria at Recra for completeness [100(a÷b), where a is number of useable data points and b is total possible data points] is 90%. In specific instances completeness criteria on a project specific basis is presented in a project specific quality assurance plan or quality assurance project plan (QAPjP) and the criteria maybe either greater than or less than 90%.

*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. The analytical testing laboratory can only address this issue through analyses of samples presented to them generally in the form of replicate samples, blind duplicates or sample composites.

*Comparability*: expresses the confidence with which one data set can be compared to another. Comparability of data sets is a function of numerous variables. These variables include laboratory errors and biases, the representativeness of the samples, and the inherent "population variance" within the data set of which the samples are a part. Comparability, in a general sense, is valuable but is difficult to apply with any certainty, confidence or specificity. Representativeness of data is a function of both field and laboratory variance. The field or sampling variance is often a significant if not majority contributor to the overall variance between results. The remaining variance in the data is attributable to both systematic and random laboratory error. To the extent possible these latter errors are controlled by the QA/QC activities illustrated within (and measured by) the precision and the accuracy of the analysis.

*Quality Control Project Plan*: A minimum set of these quality control elements will be performed with all analyses. Method required quality control requirements are added to this minimum set. As data quality objectives are established for a project, each project will have clearly defined predetermined QC work and limits defined.

The QAMP Supplement contains the current quality control data for the methods that our laboratories perform.

# *7.0 DATA VALIDATION*

This policy describes the validation procedures that are used by our laboratories. This process starts at the point of sale with definition of data quality levels offered by our laboratories. The project management team then establishes Data Quality Objectives (DQO) that include the level of validation required by client. The laboratory then uses these DQOs to establish the level of validation. Standard methods are used and method criteria become validation goals. Validation is done by everyone from sample receiving through all aspects of the laboratory operation and report preparation. This validation is confirmed by management at each step, reviewed by Quality Assurance Unit and electronically enhanced, by the AIMS™ data validator.

## 7.1 Sales/Project Management:

The validation process starts with the creation of a clear set of expectations with our client relative to the services they are purchasing. Definition of specific data quality objectives (DQO) then become the validation criteria for the projects.

Upon initiation of a project or program, the Project Manager shall review and confirm with the customer those DQOs pertaining to the project. Information required for a complete review includes the Analytical Services Quotation Form generated by the Sales/Marketing Department, a project specific Sampling and Analysis Plan, a Quality Assurance Project Plan and any documented communications between the customer and organization at that point. DQOs are coded into AIMS™ for future project specific validation. Project specific DQOs which deviate from normal laboratory operations shall be confirmed with the customer and communicated to the laboratory prior to the beginning of the project.

## 7.2 Analytical Laboratory:

The analysts have prime responsibility and accountability for the correctness and completion of their data. Each laboratory analyst has responsibility for QA/QC functions at his/her level and within his/her assigned tasks. The reduction of data, it's validation and the ultimate reporting of results are aided greatly by Recra's proprietary data management system installed throughout the laboratories. This system is referred to as the Analytical Information Management System or AIMS™. The current functionality of AIMS™ includes sample login and receipt, analytical batching and scheduling, holding time monitoring, sample analyses status as well as the report preparation and data validation functions described here. Initial review by the analyst and/or supervisor is completed in relation to compliance with methodology and acceptability of precision and accuracy results. Review at the supervisor/manager level includes these elements as well as detailed data validation and review of data acceptability based upon internal QC criteria and project DQOs.

## 7.3 AIMS™:

Upon completion of the data entry, personnel are required to review and validate the entries against raw data. The AIMS™ System is utilized to validate the generated data against project specific requirements. If other laboratory data systems are used (such as Ward or Formaster) the data is validated against similar programs. As the validator is reviewed, detected non-compliancies must be investigated by either lab or data entry personnel. If the errors can be corrected, these values are entered into the AIMS™ system. If non-compliances exist due to sources outside of the lab's control (such as matrix effects), notations are made on the validator report and the information is communicated to the client within the contents of the case narrative. Validator performs checks against project specified DQOs in AIMS™, whether protocol, lab or client based.

As rules can be defined, they are incorporated into the AIMS™ validation. This electronically checks these defined rule sets for compliance. This is real time prior to report preparation. It identifies that data not matching the rule-set and permits maximum utilization of staff for problem resolution. Each AIMS™ validator issue must be addressed. We believe that this is an ideal, objective evidence process for validation. It's electronic, deals in real data and uses defined facts and operations on 100% of the data.

## 7.4 Report Writing:

The processed, reviewed, validated, and approved results available to the Report Preparation Department are subsequently compiled into the client required deliverables format. This department further reviews the assembled results for overall compliance, completeness, usability and conformance to special client requirements, if any.

## 7.5 Quality Assurance Review:

Primary review by the operations personnel and secondary review within the Report Writing Department is followed by tertiary review in the Program Management Department to confirm the overall acceptability of the data in the form to be presented to the client. Reports routinely bear the signature of the Program Manager. The Program Manager uses the resources of the organization including the Laboratory Manager, Quality Assurance Unit, and AIMS™ Validator to assist in this review.

A representative number of reports are reviewed by the facility QA officer for overall assessment of compliance with DQOs and this QAMP. As this validation process identifies issues, the QA officer will initiate corrective action or continuous improvement initiatives.

# *8.0 RECORDS AND REPORTS*

Quality records provide information on the achievement of the quality objectives, the level of customer satisfaction or dissatisfaction, the results of quality system evaluation, the corrective action, and the training of personnel. All records should be verified, readily retrievable, retained for a designated period of time and protected from damage while in storage. All documentation should be legible, dated, clear, readily identifiable and carry authorization status. Traceable records and documentation enhance the defensibility and reproducibility of the data we produce.

## 8.1 Types of Records

Quality records should be complete such that an individual can follow activities from sample collection and receipt to data reporting and establish the degree of confidence associated with that data. The types of records to be maintained include but are not limited to the following categories.

### 8.1.1 Quality Documentation

- Quality Policy
- Quality Assurance Management Plan
- Standard Quality Policies
- Standard Operating Procedures
- Quality Assurance Reports to Management
- Corrective Action Reports
- Quality Control Charts
- Internal and External Audit Results
- Certification Records

### 8.1.2 Sample Receiving and Custody

- Internal and External Chain-of Custody
- Transportation/Shipment Records per DOT Regulations
- Sample Disposal Records/Hazardous Waste Manifest
- Analytical Services Request Form

### 8.1.3 Laboratory Analysis Documentation

- Laboratory Benchsheets and Injection Logbooks
- Standard Preparation Logbooks

- Instrument Printouts/Chromatograms
- Instrument Maintenance Logbooks
- Training Records
- Standard Operating Procedures
- Computer Records on Magnetic Media
- Analytical Data Report
- AIMS™Data Validator

#### 8.1.4 Program Management Documentation

- Telephone Logbooks and Records
- Records of Correspondence and Meetings
- Quality Assurance Project Plans
- Analytical Data Reports
- Corrective Action Documentation

### 8.2 Data Recording

The manner of maintaining records in the various departments will differ with the methods of analysis and the level of business function involved. However, all sample and analytical activities are documented and the information maintained according to specific regulatory requirements and Recra Standard Operating Procedures.

#### 8.2.1 Logbooks

Certain records are maintained in permanently bound, sequentially paginated logbooks by the analysts performing the procedures. These logbooks contain the original observations, calculations (if required), calibration and quality acceptance criteria, and derived data from the real time analytical procedures. These logbooks become a permanent record of laboratory work and must be traceable.

Laboratory logbooks are issued, inventoried and archived by the Facility Quality Assurance Manager. Each logbook is reviewed for completeness, legibility and compliance at least every other week by the appropriate area supervisor or his/her designee. When completed or closed out, logbooks are archived for a seven year period of time.

#### 8.2.2 Instrument Printouts

Many instrumental procedures produce printed graphs or profile reports. These instrument files are maintained both electronically and in hardcopy format.

Sample specific hardcopy printouts must contain the date and time of analysis, the identification of the analyst, the unique sample identification number and the instrument file identification. These hardcopy printouts are maintained in the project job file and placed under secure storage for a seven year period of time.

Electronic back-up procedures of all instrumental files are performed on a daily basis and archived on diskette in secure offsite storage. These electronic files are maintained for a period of at least 3 years.

#### 8.2.3 Analytical Information Management System (AIMS™)

Much of the analytical data and sample specific information is directly entered either manually or via electronic transfer from the instrument into Recra's proprietary software AIMS™. These data are considered part of the permanent record of laboratory work and must be traceable. Modifications to data entered into AIMS™ is monitored using Good Automated Laboratory Practices (GALP) and a record in the data system is maintained of the individual, date and reason for any such modifications. All AIMS™ records are maintained on the network system for a period of nine months at which time they are electronically archived on diskette and transferred to secure offsite storage for a period of seven years. Additionally, a daily electronic back-up procedure is performed and these daily files are maintained in secure storage.

### 8.3 Corrections to Documents

All laboratory documents shall be maintained using good laboratory practices. No logbook pages shall be torn out. Corrections or additions to documents, supporting documents and raw data are made by drawing a single line through the error and entering the corrected information. Corrections and additions to supporting documents and raw data are initialed and dated. No information is written over, obliterated or rendered unreadable. Unused portions of documents are "z'd" out, and appropriately dated and initialled.

### 8.4 Project/Job Files

File organization, preparation, review and archival procedures are employed for each individual job. Project/job files begin prior to or at the time of sample receipt and contain all information specific to that particular job. Each job file is reviewed for protocol and client specific QC requirements stipulated by contract, in the appropriate method or other sections of the manual. Job files ultimately contain all pertinent information relative to the performance of work on that job. Job files include but are not limited to original chain of custody documents, analytical services request forms, analytical receipt resolution forms (if required), copies of all logbook pages relative to the job, chromatograms, instrument tracings, spectra, calibration information, job exception forms (if required), client communicates and final reports as issued to the client. These job files are maintained for a minimum of seven years. All documents are maintained in a secure fashion and access to said information is controlled by a Document Control Standard Operating Procedure and the designated facility document control custodian.

## 8.5 Controlled Document Distribution

To guarantee use of the most current policies and procedures by Recra personnel, several documents are distributed under a controlled document policy. These documents include the Quality Policy, this Quality Assurance Management Plan and the Standard Operating Procedures. These documents receive a control number and are distributed to those employees who need to be apprised of the information. The distribution list of individuals along with the documents control number are maintained by the facility Quality Assurance Manager. Revisions and subsequent addendum are also distributed to the appropriate personnel and the old versions are retrieved and archived.

## 8.6 Revision of Controlled Documents

The revision process for technical or documentation procedures is accomplished as needed or according to updates and changes in regulatory requirements. These updates in the form of revised controlled documents are distributed and controlled as described above.

# *9.0 CONFIDENTIALITY*

Environmental analyses are purchased from Recra by clients who are meeting regulatory requirements or evaluating potential issues. This information and the identity of our client must be treated in a legally confidential manner. This process starts with personnel ethics, is further evaluated with respect to electronic and physical handling of their information by Recra.

## 9.1 Personnel Ethics and Integrity

Recra Environmental, Inc., as an environmental testing company is dependent upon the honesty and integrity of every employee within the organization. All Recra personnel are obligated to treat all data or results based on information from a client as property of the client. In support of this obligation, Recra maintains an "Ethics and Data Integrity Agreement" as well as a "Confidentiality Agreement" with each employee of the company contained in the QAMP Supplement. Improper communication of client specific information outside the workplace is considered a violation of these agreements, is subject to disciplinary action and may be the basis for dismissal.

## 9.2 Facsimile and Electronic Transmission

All analytical data and information provided to and for Recra's customers is to be held in strictest confidence including information transmitted via telephone facsimile or electronically.

9.2.1 Procedures to ensure confidential treatment of information transmitted via facsimile include but are not limited to:

- Inclusion of the following (or similar) confidentiality statement on the facsimile cover page.
  *"This facsimile transmission is intended only for the individual or entity to which it is addressed, and may contain confidential information belonging to the sender. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution or the taking of any action in reliance on the contents of this information is strictly prohibited. If you have received this transmission in error, please immediately notify us by telephone to arrange for the return of these documents."*

- Verification of the client "fax" number prior to transmission.
- Maintenance of transmission documents in project file.

9.2.2 Transfer of information using electronic media such as Compuserve, Internet Freenet, etc. are within Recra's scope of capabilities, however, these services do not provide for confidential treatment of data. Procedures to ensure confidentiality of information transmitted electronically include but are not limited to:

- Written authorization from the customer. A completed standard legal release is required prior to electronic transfer.

## 9.3 Customer Access to AIMS™

Recra Environmental, Inc. extends to our customers limited access to the proprietary information management system, AIMS™. This access is intended to afford the customer preliminary analytical as well as process tracking information on a real time basis. Confidentiality of other customer information is protected using the following measures.

- Each customer is assigned an entry code which limits their data base access.

- The entry code corresponds to an internal Recra customer number. Only data which contain the appropriate customer number can be accessed.

- The customer entry code allows for viewing privileges only. Editing of information and/or print-outs of data can not be obtained through this access.

## 9.4 Analytical Data Reports

Recra maintains a copy of the customer project files and all associated analytical data in secure storage. All final analytical data reports are the property of Recra's contracted customer and shall not be surrendered to a third party in part or in full without written authorization. To further protect the confidentiality of the customer, each report shall contain the following statement.

*"This data report shall not be reproduced , except in full, without the written authorization of the client."*

# *10.0 AUDIT*

## 10.1 Overview

Auditing practices are at the central core of a quality assurance program. All aspects of this Quality Policy are evaluated by determination of a set of metrices to measure performance, followed by periodic evaluation of those metrices, use of the defect results for corrective action and continuous innovative implementation with measurement constituents the continuous improvement element of this program. Audits are classified as either internal assessments or external assessments, how they are conducted and how we respond to their findings are described.

## 10.2 Internal Assessments

Internal Assessments consists of the following elements with responsible staff identified:

- Bench QC-Analyst
- Method Compliance SOP - Supervisor
- Validation - Supervisor
- System Audit - Manager
- Performance Audits - Quality Assurance Unit
- Implementation of Quality Policy - Manager
- Assessment of Implementation - Quality Asssurance Unit

Each member of the staff has a role in internal assessment. Metrices for each operation and covering each element of this Quality Plan and these Standard Quality Policies must be established. The internal assessment then consists of continuous or frequent measurement of the metric and corrective action as required, a periodic evaluation is also needed for continuous improvement of our procedures.

Management must establish a self-audit schedule to assess the implementation and on-going performance of their staff relative to this Quality Policy.

The Quality Assurance Unit has audit responsibility to determine that self-audits are being performed by staff and management. Additionally, they will provide and evaluate blind and double blind performance evaluation samples. They will also assist and assess corrective actions and continuous improvement relative to self-audit.

## 10.3 External Assessment:

External Assessment consists of the following elements:

- State Certifications
- Government Agency Approvals
- Client Audits
- Independent Organizational Assessments ($A_2LA$, ISO, etc.)
- Performance Evaluation Samples

External assessments are made by a variety of organizations. In general, these assessments should be scheduled with the laboratory so that appropriate staff are present to support the audit activity. If possible, an agenda for the audit should be agreed upon so that appropriate data and staff are prepared to respond.

An opening session is recommended in which introductions are made, agenda is finalized and ground-rules established for the audit. The audit group will be accompanied at all times by laboratory management and Quality Assurance. Staff may be questioned but a reasonable tone and level is expected. The assessment should be limited in its disruption of laboratory operations.

An exit session with a briefing of findings should be done. This is followed by a written audit. The laboratory management will respond to these written comments. Their response will be definitive around issues and where corrective action is to be taken, date certain commitments will be made in the response.

The Quality Assurance Unit will review the audit and response. Action items will be tracked and as resolution occurs, they will notify the external assessor of closure.

## 10.4 Corrective Action:

During internal or external audits, issues will be identified. These issues will then be addressed by corrective actions. A corrective action should be a written plan with date-certain goals. These goals will be assessed by the Quality Assurance Unit for implementation.

## 10.5 Continuous Improvement:

The self-audit and external audits should be reviewed for trends. Regulation changes affecting quality assessment criteria are also reviewed against current practice for implementation. Management and Quality Assurance Unit should be making continuous changes for improvement in our quality and therefore our audit performance.

# *11.0 CORRECTIVE ACTION*

There are many areas of the laboratory functions which may require corrective action. The decision to undertake corrective action, and the ensuing action must be documented so that traceability can be maintained. The point of origin for the corrective action varies, depending upon the mode of detecting that such action is necessary. However, it is frequently the role of the Quality Assurance Unit to initiate such action, simply because it is this unit which is most exposed to the malfunctions of the laboratory as they reflect upon the data produced. Those actions that affect the quality of the data will be recorded and the record maintained by the Quality Assurance Unit.

It will be the responsibility of the laboratory to take all actions necessary to ensure the integrity of the data prior to its issuance to the client. If a corrective action should become evident after the data has been issued, Recra Program Managers shall coordinate with the client Project QA Officer, the appropriate laboratory personnel and the facility QA/QC Manager as to the data affected and the type of corrective action to be taken.

## 11.1 Identification of Potential Problems

Corrective action is the responsibility of every Recra employee. Quality control limits are set so that the analysts at the bench can identify issues and take predetermined actions. Work is reviewed for issues by supervisors, laboratory management, the quality assurance unit and project managers before it is released to clients. Additionally, an electronic validation operates on 100% of our data before release. At any step in the review, an issue can be identified and corrective action taken to resolve this issue.

Issues for corrective action are also identified during contact outside of Recra LabNet. Performance evaluation samples are run for state, federal, and private industrial clients as well as internal blind and double blind samples. Tolerance results are addressed by corrective action. System audits are performed by clients, certifying agencies, and internally. Issues that are identified become corrective actions. Clients have our data reviewed by various techniques. If a review identifies an issue, that issue becomes a corrective action.

### 11.1.1 Procedures for Detection or Implementation

Procedures for the detection or implementation of corrective actions may include, but are not limited to one or more of the following actions:

- Review of logbooks or raw data
- Review of calculations and calibrations
- Review of graphs, chromatogram or spectra
- Review of final products (data) against project or criteria specifications
- Re-sampling due to client or regulatory requirements
- Re-extraction or re-analysis of the affected samples
- Recalibration of instruments
- Instrument maintenance
- Correction to data entry
- Retraining
- Evaluation of Standard Operating Procedures
- Narration to the client

### 11.1.2 Continuing Calibration Outside Acceptance Range

When the continuing calibration is outside the acceptance range, the analyst will prepare and analyze a new initial calibration curve.

The data on samples following the unacceptable continuing calibration will be rejected and these samples will be reanalyzed after the new initial calibration curve has been constructed (GC/MS). For other methods (GC, Metals, Wet Chemistry), all samples analyzed since the preceding acceptable calibration verification will be re-analyzed.

### 11.1.3 Method Blanks Exceed Method Detection Limit But Are Below Quantitation Limit

When laboratory blanks exhibit the presence of a target analyte at a level exceeding the method detection limit, but still below the quantitation limit, the responsible Laboratory Department will check the reagents used to determine if contamination or interferences are due to impurities in the reagents. If this is the case, the reagent batch will be discarded, and new reagents from fresh containers will be used. If the reagents appear to be sufficiently pure, the cleanliness of the laboratory will be checked to establish if the source of problems may have been contamination of the apparatus. The data for samples associated with the blank will be accepted.

### 11.1.4 Method Blank Exceeds the Quantitation Limit

When the laboratory method blank exceeds the quantitation limit, the analysts will check for potential contamination of reagents and apparatus. If the reagents are contaminated, the existing batch will be rejected, and a fresh batch, from new containers will be prepared. If the problem arose from the apparatus, whether glassware or instrumental, the problem will be corrected within the analytical section, and the correction documented before any further analyses can be undertaken.

The data associated with the failed method blank will not be accepted. The samples will be reanalyzed to produce acceptable data. If the sample's holding time is passed, the reanalyses will be performed, both sets of data will be submitted to the client and the QC problem will be discussed in the narrative.

The Recra Program Managers shall be notified at the time of the occurrence in order to communicate the QC discrepancy to the affected client.

### 11.1.5 Spiked Blank Exhibits Recoveries Outside the Acceptance Criteria

When the laboratory control standard or spiked blank does not meet the acceptance criteria, the calculation and the preparation of the spiked blank will be checked. If nothing is wrong with the calculations, the calibration of the instrument or method shall be checked. If the instrument is within calibration, the samples will require repreparation for the inorganic parameters. For the organic analyses the batch of samples will be checked carefully. If the recoveries of sample specific spikes, surrogates and other laboratory control samples are within the QC limits, repreparation and/or reanalysis may not be required. A discussion of any decision not to perform reanalysis shall be presented in the report narrative.

### 11.1.6 Surrogates and Sample Spikes Exhibit Recoveries Outside the Acceptance Limit

When recoveries from spiked samples are outside the acceptance limits, but the laboratory spike blank is within the acceptance criteria, the poor recovery or enhanced apparent recovery may be due to matrix affect. This information will be included in the report to the client. If the recoveries of surrogates are outside the QC limits, the sample will be reprepared and reanalyzed, and if the same phenomenon is observed, it will be assumed that the failure to meet recovery criteria is due to the matrix effect and both data will be reported.

If upon repreparation and reanalysis, the surrogates are within the QC limits it will be assumed that the QC failure was due to laboratory error and only the second set of data shall be presented to the client.

## 11.2 Control Chart Exhibits a Regular Trend

By their very nature, the individual points that make up the control chart for any analyte vary randomly about a mean value. The control chart is used to assess the acceptability of recovery data on the basis of historical data. The control chart is also used to warn the analyst that some systematic error or deviation in the method may be occurring.

When successive points on the control chart form a steady pattern, either increasing or decreasing, it is assumed that a change has occurred in the analytical scheme. Even if all the points are within the control limits, a warning will be issued by the Quality Assurance Unit to the responsible section of the laboratory to investigate the cause of the pattern. If in fact a change has occurred in the method, and if the change indicates an improvement in recoveries (an improvement is defined as approaching complete recovery, not necessarily an upward trend), then a new control chart will be established, and subsequent data will be compared to the new control chart limits. If a change has occurred that worsens the recovery, it will be the responsibility of the Laboratory Department Manager to assure that a return to the previously used techniques is made in his/her section, as long as method compliance can be maintained.

## 11.3 Poor Performance on an Internal or an External Performance Evaluation Test

Internal Blind QC Check samples are issued on a routine basis by the Quality Assurance Unit, using known spiked solutions (Purchased from certified commercial supplier) to determine the performance in every section of the laboratory. External performance evaluation is either done through a contract required performance audit, or through voluntary participation in interlaboratory studies.

When the achieved results on these audits fall below acceptable standards, a thorough review of the system will be initiated. The Quality Assurance Unit is responsible for the coordination of the process. The first step will consist of a complete review of the documentation of the job, followed by a recalculation of the results. This process will be performed by the personnel of the appropriate laboratory sections. When the results of the review are complete, a memo will be issued to the Facility Quality Assurance Manager, itemizing the deficiencies that have been identified. If no deficiencies have been identified, the difficulty may be with the performance of the analyst with the analytical method, or incorrect preparation of the audit sample.

The manager of the analytical section will be responsible for investigating the source of the problem if it is internal to the section. His/Her findings and the corrective action taken will be reported to the Facility Quality Assurance Manager. Following the implementation of the corrective action, the Quality Assurance Unit will issue a new performance evaluation audit, sample, prepared from fresh standards, preferably from a different source that the first one submitted. Successful completion of the second performance evaluation sample shall supply documentation of effective corrective action. If the second performance evaluation is unacceptable, further investigation and corrective action shall be required.

## 11.4 Corrective Actions Initiated by Internal or External System Audits

Deficiencies in either an internal or external systems audit shall be recorded by the QA/QC personnel and a mutually agreed upon timeframe for response and corrective action shall be coordinated with the Laboratory Director. It is the responsibility of the Laboratory Director to investigate the deficiencies, implement corrective actions and prepare a written response which shall be submitted to the QA/QC personnel by the agreed due date. A follow-up in-house system audit will be performed by the QA/QC personnel to verify that the corrective actions have been implemented.

## 11.5 Corrective Actions Initiated by Customer Request

The Program Management Department maintains the communication link between Recra and the Customer. Information received by the Program Manager from the customer which requires corrective action shall be documented and such documentation shall be forwarded to both the Laboratory Director and Facility Quality Assurance Manager. The Program Manager and Laboratory Director shall coordinate an effective corrective action with the customer, and the QA/QC personnel shall verify implementation of the corrective action.

## CHAIN-OF-CUSTODY

**RECRA LABNET, a division of Recra Environmental, Inc.**

*CHAIN OF CUSTODY RECORD*

| PROJECT NO | SITE NAME | | | | | NO OF CONTAINERS | | | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLERS (SIGNATURE) | | | | | | | | | | | | | | |
| STATION NO | DATE | TIME | COMP | GRAB | STATION LOCATION | | | | | | | | | |
| | | | | | | | | | | | | | | |
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| RELINQUISHED BY (SIGNATURE) | DATE/TIME | RECEIVED BY (SIGNATURE) | RELINQUISHED BY (SIGNATURE) | DATE/TIME | RECEIVED BY (SIGNATURE) |
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| RELINQUISHED BY (SIGNATURE) | DATE/TIME | RECEIVED FOR LABORATORY BY (SIGNATURE) | DATE/TIME | REMARKS | |

Distribution: Original accompanies shipment copy to coordinator field files