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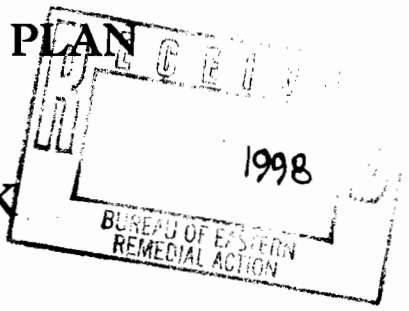
# ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

## REMEDIAL INVESTIGATION/FEASIBILITY STUDY

## QUALITY ASSURANCE PROJECT PLAN




## MACKENZIE CHEMICAL
## CENTRAL ISLIP, NEW YORK

NYSDEC SITE NO.: 1-52-017
JULY 1998

Prepared For:

NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION

50 Wolf Road, Albany, New York 12233-7010
John P. Cahill, Commissioner

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H2M GROUP

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## TABLE OF CONTENTS

**REMEDIAL INVESTIGATION/FEASIBILITY STUDY**

**QUALITY ASSURANCE PROJECT PLAN**

**FOR**

**MACKENZIE CHEMICAL**
**ONE CORDELLO AVENUE**
**CENTRAL ISLIP, NEW YORK**

**NYSDEC SITE NO. 1-52-017**

**JULY 1998**

**TABLE OF CONTENTS (cont'd.)**

**REMEDIAL INVESTIGATION/FEASIBILITY STUDY**

**QUALITY ASSURANCE PROJECT PLAN**

**FOR**

**MACKENZIE CHEMICAL**
**ONE CORDELLO AVENUE**
**CENTRAL ISLIP, NEW YORK**

**NYSDEC SITE NO. 1-52-017**

**JULY 1998**

## TABLE OF CONTENTS (cont'd.)



## TABLES

H2M GROUP

**REMEDIAL INVESTIGATION/FEASIBILITY STUDY**

**QUALITY ASSURANCE PROJECT PLAN**

**FOR**

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**NYSDEC SITE NO. 1-52-017**

**JULY 1998**

## 1.0 - QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN

The overall QA/QC plan objective for the Mackenzie Chemical field investigation is to produce data at the highest level to provide direct support for additional remedial actions, should they be deemed warranted. All sampling activities used directly to support the field investigation will use Level IV Data Quality Objectives. These activities include groundwater sampling and soil/sediment sampling.

Specifically, all data will be gathered or developed using procedures appropriate for the intended use. Standard procedures are used so that known and acceptable levels of accuracy, precision, representatives, completeness and comparability are maintained for each data set. Descriptions of these criteria are presented in the following subsections.

### 1.1 FIELD QA/QC

In order to ensure that data collected in the field is consistent and accurate, standardized forms will be utilized for repetitive data collection, such as depth to water in wells, well locations, etc. These field forms include Well Logging, Field Sampling and Water Level Data Records.

The accuracy of the data collected will be checked by using an additional degree of definition than the minimum wherever possible. For example, if two distances are needed to locate a well, three will be used so that if one distance is inaccurate, the well can still be located and the field measurements can be re-taken. For measurements where this is not possible (i.e., depth to water), measurements will be taken and recorded three times.

Blanks and duplicate samples will be used to verify the quality of the field sampling results. A brief description of these samples follows.

### 1.1.1 BLANK SAMPLES

A field equipment blank will be used to determine the effectiveness of the decontamination of the sampling devices. Analyte free water will be poured into the sampling device and then transferred to sample containers before use in sampling. Field blanks will be analyzed for TCL VOCs (NYSDEC CLP Method 95-1), TCL SVOCs (NYSDEC CLP Method 95-2), TCL PCBs/Pesticides (NYSDEC CLP Method 95-3) and TAL Metals + cyanide (NYSDEC CLP Method 200.7).

Trip blanks will be utilized for each day of sampling. Trip blank vials will be filled in the laboratory using analyte free distilled/deionized water, and will accompany the glassware to and from the laboratory. Trip blanks will be analyzed for VOCs (NYSDEC CLP Method 95-1) only.

The analyte free water used as blanks (for both field and trip blanks) will depend upon the type of analysis. Distilled and deionized water will be used as blanks for the inorganic analysis. For organic analysis, the blanks will be HPLC grade water.

### 1.1.2 DUPLICATE SAMPLES

Matrix spikes (MS) and MS duplicates (MSD) will be collected and submitted to the laboratory as separate samples. One MS/MSD will be collected for every 20 samples, per matrix. Each MS and MSD will be analyzed for TCL VOCs (NYSDEC CLP Method 95-1), TCL SVOCs (NYSDEC CLP Method 95-2), TCL PCBs/Pesticides (NYSDEC CLP Method 95-3) and TAL Metal + cyanide (NYSDEC CLP Method 200.7). A specific task by task breakdown of all duplicate samples and blanks from both Severn Trent Envirotest (mobile lab) and Accredited Laboratories is provided in Table 1.1.2

### 1.1.3 FIELD RECORDS

All information pertinent to any field activities will be recorded in bound, waterproof field notebooks. Duplicates of all notes will be prepared and kept in a secure place away from the site. Proper documentation will consist of all field personnel maintaining records of all work accomplished including the items listed below:

- Date and time of work events
- Purpose of work
- Description of methods
- Description of samples
- Number of size and samples
- Description of sampling point
- Date and time of collection of sample
- Sample collector's name
- Field observations
- Any field measurements with portable instruments

Each sample collected in the field will be labeled using waterproof ink. Each bottle will be labeled with a number, location, parameter to be analyzed, sampling time and date. Packaging, shipping and chain-of-custody requirements for the samples shall be in accordance with National Enforcement Investigation Center (NEIC) procedures.

## 1.2 PREPARATION AND PRESERVATION OF SAMPLE CONTAINERS

The scope of this project necessitates that several types of sampling containers be used. Sample containers will be provided by both Severn Trent Envirotest and Accredited Labs. Each sample container will be provided with a label for a sample identification purposes. The information on the label will include a sample identification number, time, date and initials of the sample collector. All sample containers will be accompanied by a full chain-of-custody.

All sample containers will be thoroughly cleaned prior to sampling. Appropriate sample preservatives will be pre-added in the bottles. Preservatives may vary according to the type of analysis to be performed. Individual procedures are outlined below. It is lab practice to pre-preserve sample containers in order to minimize potential contaminants in the field and to reduce unnecessary sample handling in the field.

## 1.3 DECONTAMINATION

### 1.3.1 DECONTAMINATION ZONE

A decontamination zone will be located at the northeast corner of the property. All decontamination water will be discharged to the ground surface.

### 1.3.2 DECONTAMINATION PROCEDURES

All field equipment, with the exception of drilling equipment, split-spoons, dedicated polyethylene bailers, hoses, pumps, well casings, well screens and personal protective equipment, shall be decontaminated for field use according to the following procedures:

- Non-phosphate detergent and tap water wash
- Tap water rinse
- Distilled/deionized water rinse.
- 10% nitric acid rinse**
- Methanol rinse
- Total air dry or nitrogen blowout
- Distilled/deionized water rinse

**Only if sample is to be analyzed for metals.

Field Decontamination for Drilling Equipment and Split Spoon Samplers:

Field decontamination of drilling equipment and split spoon samplers will consist of steam cleaning and/or a manual scrubbing to remove foreign material and steam cleaning inside and out. These items will then be stored in such a manner as to preserve their pristine condition.

Field Decontamination for Pumps and Hoses:

The procedures for field decontamination of pumps and hoses shall consist of a manual scrubbing to remove foreign materials followed by an Alconox scrub and tap water rinse.

Personal Protective Equipment Decontamination Procedures:

The personal protective equipment decontamination procedure shall consist of the minimum decontamination steps outlined in the Site Health and Safety Plan.

## 1.4 SAMPLE CUSTODY

To maintain and document sample possession, standard chain-of-custody forms and procedures will be followed. A chain-of-custody form contains the signatures of individuals who have possession of the samples prior to, during and after sample collection.

A sample is under custody if:

1. It is in one's actual possession; or
2. It is in one's view, after being in your physical possession; or
3. It was in one's physical possession and then was locked up or sealed to prevent tampering; or
4. It is in a designated secure place restricted to authorized personnel.

Each person involved with the samples will be knowledgeable in all chain-of-custody procedures. A detailed discussion of the stages of possession; (1) field collection, (2) transfer and (3) laboratory custody is presented below:

### 1.4.1 FIELD CHAIN-OF-CUSTODY

Chain-of-custody procedure for (1) field notebook and boring logs, (2) well key chains and (3) environmental samples are included as part of field collection.

Field Notebook and Boring Log Notebook Chain-of-Custody

Dedicated field and log books will be used for the duration of the project. Each field notebook and boring log will be numbered and assigned to the field personnel. All water level data and field notes will be recorded in bound field notebooks. Drilling data will be recorded in boring logs which will be kept in ring binders. Environmental sample chain-of-custody forms will also be kept in a ring binder.

A log of the notebook number, the personnel assigned to the notebooks and their affiliation, and the date and time the notebooks are signed in and out will be kept. Maintenance of the notebook log will be the responsibility of the field hydrogeologist. Sufficient numbers of notebooks will be provided to allow for reviews of the field data by the project hydrogeologist during field operations.

Well Key Chain-of-Custody

The field hydrogeologist will be responsible for placing the locks on the protective casings and maintaining chain-of-custody of the keys. The project hydrogeologist will initiate a log tracking each set of keys from the wells. The log will contain the well number, the date and time the lock was installed on the well, the person who received the key, and the date, time and person to whom the key was given for the duration of the project. Each of the people to whom a key is assigned during the project will maintain a separate chain-of-custody log for the key(s) that they are assigned.

Environmental Samples of Chain-of-Custody

The field sampler initiates the chain-of-custody procedure in the field and is the first to sign the form upon collection of samples.

The field sampler is personally responsible for the care and custody of the samples until they are transferred and properly dispatched. Sample tags shall be completed for each sample, using waterproof ink. All field samples will be subjected to proper preservation, and packaged to preclude breakage during shipment. Every sample shall be assigned a unique identification number that is entered on the chain-of-custody form. Samples can be grouped for shipment using a single form.

The record shall be completed in the field to indicate: project number, unique sample number, sample location (bore hole, depth, grid coordinates, etc.), sampling date and time, person obtaining the sample, and method of sample preservation. The paperwork will be done and checked at an on-site location.

## 1.5 TRANSFER OF CUSTODY AND SHIPMENTS

All environmental samples will be shipped to the analytical testing laboratory in a manner (e.g., Federal Express) which ensures that the samples will be received by the laboratory within 48 hours of sample collection. Severn Trent Envirotest (mobile lab) will be present on site to analyze each of the environmental samples.

All samples will be accompanied by a chain-of-custody record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date and note the time to transfer. This record documents transfer of custody of samples from the sampler to another person, to a mobile laboratory or to the permanent laboratory.

Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in each sample box or cooler. If samples are hand delivered directly to the laboratory, the chain-of-custody forms will be kept in the possession of the person delivering the samples.

For samples shipped by commercial carrier, the chain-of-custody form will be sealed in a watertight envelope, placed in the shipping container, and the shipping container sealed prior to being given to the carrier. The waybill will serve as an extension of the chain-of-custody record between the final field person and receipt in the laboratory.

Whenever samples are split with a facility or regulatory agency, a separate chain-of-custody record will be prepared for those samples and marked to indicate with whom the samples were split.

## 1.6 QUALITY ASSURANCE OFFICER

The QAO for the project is Mr. Richard J. Baldwin. Mr. Baldwin will be responsible for:

A. Informing the NYSDEC DER Bureau of Technical Services (BTS) of the frequency in which he will be present on site during implementation of the field sampling program.

B. Submitting his field check list prior to sampling.

C. Submitting a field audit report for each field check to NYSDEC (DER, BTS).

D. Filling out and signing of the Quality Assurance Officer's (QAO) signature page.

# 2.0 ANALYTICAL PROCEDURES AND LABORATORY TESTING

## 2.1 ANALYTICAL LABORATORY

Environmental samples will be analyzed by Accredited Laboratories and/or Severn Trent Envirotest mobile lab. Accredited is a NYSDOH-ELAP-CLP certified laboratory, proficient in all aspects of the 1995 Analytical Services Protocol. Severn Trent Envirotest's mobile laboratory is equipped with a Hewlett Packard 5890 Series II gas chromatograph (GC). The GC is equipped with a electrolytic conductivity detector (ELCD) for the detection of halogenated volatile organic compounds. Compounds will be quantified using purge-and-trap analysis using EPA SW846 Method 8260 (ELCD). Total analysis time for each sample is approximately 15 minutes.

A copy of this QAPP will be supplied to the laboratories prior to initiating field sampling activities.

## 2.2 PARAMETERS AND FREQUENCY OF ANALYSIS

### 2.2.1 SOIL MATRIX

During probing activities, the split-spoon soil samples will be collected at nominal intervals and select samples will be retained for analysis. H2M will utilize a mobile lab (Severn Trent Envirotest) to analyze select soil samples for TCL VOCs plus trichloropropane. Based on the mobile lab results, select samples will be retained for full CLP TCL/TAL analysis by the analytical laboratory. The TCL analysis includes VOCs, TAL metals, SVOCs, and pesticides/PCBs.

H2M will utilize a mobile lab to analyze the surface soil and drainage structure soil samples for TCL VOCs, plus trichloropropane. Select soil samples will also be analyzed for full CLP TCL/TAL by Accredited Labs. The TCL analysis includes VOCs, TAL metals, SVOCs, and pesticides/PCBs.

### 2.2.2 WATER MATRIX

Groundwater samples (vertical profile wells) for the RI/FS will be analyzed by both the mobile laboratory and the analytical lab. Groundwater samples from the monitoring wells will be analyzed according to CLP procedures by the analytical lab. At a minimum, one (1) round of sampling will occur. The first sampling event will begin one (1) week after all the wells have been installed and developed.

During sampling, strict QA/QC protocols will be followed. A trip blank will be carried along with the VOC samples every day, to determine whether outside contamination has been introduced during sample transport. Trip blanks will be analyzed for TCL VOCs only. A field equipment blank will be collected for each method of sampling. A site-specific MS/MSD sample will also be collected at a minimum of one per every twenty (20) samples collected, and analyzed for all respective parameters. Field tests will include temperature, pH, turbidity and specific conductivity, and will be taken immediately upon sample collection.

### 2.2.3 MOBILE LAB PROCEDURES

A laboratory method blank will be performed daily prior to use of the GC and repeated after every ten sample analyses to verify the absence of system contamination. Method blank results should be less than half the method detection limit (MDL) for each analyte. Compounds found slightly above this concentration may be noted as detected in the blank. Significant blank concentrations will necessitate corrective actions.

Equipment Calibration

The field GC will be calibrated according to the manufacturer's requirements using three-point initial calibration check standards for the targeted compounds. Calibration standards will be run at the beginning of the day, after every ten samples and at the end of the day. Percent recovery (%R) values are calculated for each analyte and compared to the 80-120% criteria. The system will be recalibrated if significant variances are observed.

Quality Control Check Standard

This standard, run daily, is an additional calibration standard from a second source other than the calibration standards used to verify the accuracy of the calibration check standard. %R values are calculated for each analyte and compared to the 80-120% criteria.

Surrogates

Surrogate standards are added to all samples, standards and blanks to measure the potential for matrix interferences. %R values are calculated for each analyte and compared to the 80-120% criteria. Large deviations will necessitate reanalysis of samples.

Duplicate Samples

One field duplicate sample and one laboratory duplicate sample will be analyzed for every twenty sample locations. The duplicate sample will be obtained immediately following the sample slated for analysis and designated by the appropriate grid node location "-Dup". Duplicate samples will determine the variability, if any, inherent in the sampling procedure. Relative Percent Difference (RPD) values are calculated and compared to the 50% acceptance limit.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

Ten percent of the samples analyzed each day are spiked with a mid-level standard. The %R values are calculated for each spiked analyte and compared to a criteria of 75-125%.

Verification Samples

One sample per twenty will be returned to the base laboratory for confirmation analysis for volatile organic compounds using EPA SW846 Method 8260.

## 2.3 LABORATORY PROCEDURES

### 2.3.1 CALIBRATION PRACTICES

Instruments and equipment used in the mobile laboratory and Accredited Laboratories are controlled by a formal calibration program. The program verifies that equipment is of the proper type, range, accuracy, and precision to provide data compatible with specified requirements. All instruments and equipment which measure a quantity (with performance expected at a stated level) are subject to calibration. Calibration may be performed by lab personnel using reference standards or externally by calibration agencies or equipment manufacturers.

Implementation of the laboratory calibration program is the responsibility of the Laboratory Manager and Analysts. The Laboratory QA Manager shall review the implementation of the program.

There are two (2) types of calibration pertinent to these laboratory procedures - operational and periodic.

1) Operational Calibration which is routinely performed as part of instrument usage, such as the development of a standard curve for use with an Atomic Absorption Spectrophotometer. Operational calibration is generally performed for instrument systems.

2) Periodic Calibration is performed at prescribed intervals for equipment such as balances and ovens. In general, equipment which can be calibrated periodically is a distinct single purpose unit and is relatively stable in performance.

Whenever possible, recognized procedures, such as those published by American Society for Testing and Materials (ASTM) or USEPA, or procedures provided by manufacturers shall be utilized.

### 2.3.2 EQUIPMENT IDENTIFICATION

Equipment that is subject to calibration shall be uniquely identified so that calibration records can be designated with a specific instrument.

### 2.3.3 CALIBRATION FREQUENCY

Instruments and equipment shall be calibrated at prescribed intervals and/or as part of the operational use of the equipment. Frequency shall be based on the type of equipment, inherent stability, manufacturer's recommendations, values provided in recognized standards, intended use, effect of error upon the measurement process, and prior experience.

### 2.3.4 CALIBRATION REFERENCE STANDARDS

Two (2) types of reference standards are used within the Accredited laboratory for calibration - physical and chemical:

1. Physical Standards, such as weights for calibrating balances and certified thermometers for calibrating working thermometers and ovens, are generally used for periodic calibration.

2. Chemical Standards are primarily used for operational calibration.

Whenever possible, physical and chemical reference standards shall have known relationships to nationally recognized standards (e.g., National Bureau of Standards) or accepted values of natural physical constants. If national standards do not exist, the basis for the reference standard shall be documented.

### 2.3.5 CALIBRATION FAILURE

Equipment that fails calibration or becomes inoperable during use shall be removed from service and segregated to prevent inadvertent use, or shall be tagged to indicate it is out of calibration. Such equipment shall be repaired and satisfactorily recalibrated before reuse.

### 2.3.6 CALIBRATION RECORDS

Records shall be prepared and maintained for each piece of equipment subject to calibration. Records demonstrating accuracy of reference standards shall also be maintained.

For instruments and equipment that are calibrated on an operational basis, calibration generally consists of determining instrumental response against compounds of known composition and concentration or the preparation of a standard response curve of the same compound at different concentrations. Records of these calibration can be maintained in several ways:

1. The calibration data can be kept with analytical sample data.

2. A log book can be prepared for each instrument which contains all calibration data.

Method 1 provides response factor information, etc., directly with the analytical data so that the data can be readily processed and verified. Also, the raw data package is completed as a unit.

Method 2 provides an on-going record of calibration undertaken for a specific instrument; however, to process and verify the analytical data, the log must be used in conjunction with the raw data.

For operational calibration of instrumentation used for this project, calibration data will be included with the raw analytical data and maintained in project files.

## 2.4 ANALYTICAL METHODS

The analytical procedures for the parameters associated with this project will be from the "New York State Department of Environmental Conservation Analytical Services Protocol, September 1989 12/91 Revisions".

1) "Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration", IFB WA 85-J680, USEPA CLP, July 1987 Revision.

2) "Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration", SOW No. 785 USEPA CLP, July 1987.

3) "Statement of Work for Semi-Volatile Analysis, Multi-Media, Multi-Concentration", SOW USEPA CLP, 1987.

## 2.5 LABORATORY DATA PROCESSING AND REPORTING

### 2.5.1 REVIEW OF DATA PROCESSING

The following is a discussion of the method to be used for reviewing (checking) data processing. At least 20% of all data shall be checked in this manner. If, during the checking process, errors are determined, checking shall be completely (100%) performed for the data set.

The analyst performing the data processing shall give an independent analyst the data package. The package shall include, as appropriate, raw data, data sheets, strip charts, computer input/output, calculations, sources for input parameters such as response factors, etc.

The independent analyst (checker) shall review the data for:

1. Appropriateness of equations used.

2. Correctness of numerical input.

3. Numerical correctness of all calculations. This will be conducted by reperforming numerical computations.

The checking process must be thorough enough to validate that the results are correct. If the checker disagrees with any part of the computations, the checker shall mark through the number with a single line and place the revised number above it.

Any changes made by the checker shall be back-checked by the originator. If the originator agrees with the change, no action is necessary. If the originator disagrees, the originator and checker must resolve the difference so they agree with the result presented.

### 2.5.2 DATA REDUCTION

Laboratory data reduction and analysis for organic analyses involves relating a "peak area" to the mass of a constituent. This is accomplished by digital computers. The computer hardware and software is designed to allow the analyst to create libraries or files of calibration standards, and then compare raw sample data against these libraries to produce a report which contains the identification and qualification of constituents present in the sample. The computer-reduced data are manually checked by the analysts.

Inorganic analyses are performed with instruments of varying electronic sophistication, but in all instances, data reduction and analysis involves essentially the generation of a standard calibration curve, and then comparing the instrument readout against the calibration curve to obtain a "Quantity" of constituent. The concentration is then manually calculated. The calculated results are manually entered into the computer system.

For laboratory reporting, the results of the inorganic analyses are entered in a computer and the report is printed. The organic analyses are typed. All reports list the date the sample was received, date collected and the date reported.

### 2.5.3 DATA REPORTING

The following are applicable to data presentation:

1. The final presentation shall be checked in accordance with data verification requirements and approved by the Laboratory QA Manager.

2. Data presentation will include:

    a) Sample identification number used by Accredited and/or the sample identification provided to the laboratory (if different).

    b) Chemical parameters analyzed, reported values, and units of measurements.

    c) Detection limit of the analytical procedure, if the reported value is less than the detection limit.

    d) Data for a chemical parameter are reported with consistent significant figures for all samples.

    e) Results of QC sample analysis, if appropriate.

    f) Footnotes referenced to specific data, if required to explain reported values.

The format for reporting will follow the NYSDEC CLP procedures.

The laboratory QA officer will provide the Project Manager and the Quality Assurance Officer with a QA summary sheet including a narrative of data rejection or acceptance.

### 2.5.4 REVIEW OF DATA REPORTING

Review of data reports is required to verify that information reported by Accredited. corresponds with processed analytical results. Review is only required of the data as it is presented for issuance. Intermediate steps performed after the processed data are checked to prepare the data report (such as data summaries) do not require validation.

After the draft data report is prepared (generally in tabular form), the reported results should be checked against the reviewed processed data so that transcription errors do not occur. The checking process follows:

1. Using the draft report, all data entries are checked. The checker is not required to be independent of the work because only the transcription from the reviewed data to the data report is being checked.

2. The draft data report should be checked so that the items cited for data presentation are complete and correct. Corrected entries are marked through with a single line and the correct entry provided. The reviewer will indicate that corrections have been made in the report by placing a second check mark by the correction after comparing the change with the revised copy. The checker shall sign and date every page of the data report in ink.

3. Use of the draft data report results in a check-print which should be maintained as a record to demonstrate the review.

4. If computer output is used directly as the data report without further transcription, only the input requires review.

After checking of the data report is complete, it is given to the Laboratory QA Manager or designated representative for final review. This step is not intended for verifying the reported data. This review is intended to determine that the report meets project requirements. The data report is approved for issue by the Laboratory QA Manager.

### 2.5.5 DOCUMENTATION, DATA REDUCTION AND REPORTING FIELD DATA

All information pertinent to any field activities will be recorded in bound, waterproof field notebooks. Duplicates of all notes will be prepared each night and kept in a secure place away from the site. Proper documentation will consist of all field personnel maintaining detailed records of all work accomplished including:

(1) data and time of work events
(2) purpose of work
(3) names and addresses of people relevant to the project
(4) description of all methods
(5) description of all samples
(6) number and size of samples collected
(7) description of sampling point
(8) date and time of collection of sample
(9) sample collector's name
(10) reference to site map and/or photograph
(11) field observations
(12) any field measurements with portable instruments.

Each sample collected in the field will be labeled using waterproof ink. Each bottle will be labeled with a number of location, parameter to be analyzed, sampling time and date. The field hydrogeologist will be responsible for ensuring that hydrogeological data are properly recorded.

The data reporting scheme and key individuals who will handle the data are as follows:

(1) data collection by the field hydrogeologist
(2) data reduction, also by the field hydrogeologist
(3) data review by the Project Manager
(4) data validation by independent qualified validator
(5) data usability by the QA officer
(6) Final data interpretation by project manager

### 2.5.6 DATA VALIDATION

Data validation will be performed by Ms. Judy Harry of Laboratory Validation Services. Data review starts with an analyst, independent of the data acquisition and processing, reviewing and confirming that data processing has been correctly performed. It continues through verifying that the reported analytical results correspond to the data required and processed. The data validation report will present the critical points with respect to compliance with data holding times, detection limits, and quantification values. All validation procedures and reports will conform to NYSDEC approved methods.

# TABLES

**TABLE 1.1.2**

**MACKENZIE CHEMICAL**
**QA/QC SAMPLE SUMMARY**

| TASK ID | MOBILE LAB | | | CLP LAB - FULL QA/QC | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | NUMBER OF SAMPLES | BLIND DUPLICATE | FIELD BLANK | NUMBER OF SAMPLES | BLIND DUPLICATE | TRIP BLANK | FIELD BLANK | MS | MSD |
| Surface Soil Sampling | 21 - VOCs - Soil | 2 | 1 | | | | | | |
| Drainage Structure Sampling | 20 - VOCs - Soil | 1 | 5 | 12 - TCL/TAL - Soil | 1 | 3 | 4 | 1 | 1 |
| Off-Site Vertical Profile Wells | 64 - VOCs - GW | 3 | 9 | 6 - TCL/TAL - GW | 1 | 1 | 1 | 1 | 1 |
| Groundwater Sampling | | | | 15 - TCL/TAL - GW | 1 | 2 | 2 | 1 | 1 |