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HZM

V00234
Region 1 - Suffolk River

GROUNDWATER INVESTIGATION AND SOIL REMEDIATION WORK PLAN

CORNELL UNIVERSITY
LONG ISLAND HORTICULTURAL RESEARCH AND EXTENSION CENTER

PREPARED FOR:

CORNELL UNIVERSITY
126 HUMPHREYS SERVICE BUILDING
ITHACA, NEW YORK, 14853-3701

PREPARED BY:

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H2M PROJECT CORN 95-01

JUNE 2001

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1.0 INTRODUCTION

Cornell University has initiated a Voluntary Agreement (Agreement) with the New York State Department of Environmental Conservation (NYSDEC) to conduct additional investigation and remediation work at the Long Island Horticultural Research and Extension Center(LIHREC). Cornell requested to enter into the Agreement based upon the results of a November 1997 Preliminary Site Assessment (PSA) performed by Holzmacher, McLendon & Murrell, P.C. (H2M).

In order to comply with the requirements of the Agreement, Cornell University has retained H2M to conduct an additional groundwater investigation and soil remediation program at the LIHREC, located at 3059 Sound Avenue in Riverhead, New York (see Figure 1.1). The "Site", as defined in the Agreement, will be limited to two previously identified areas of concern (i.e , rock drain area and the evaporation pit's overflow leaching pool). A metes and bounds description of the "Site" is presented in Appendix B. The "Contaminants of Concern", as defined in the Agreement, will be limited to pesticides. As such, the focus of the groundwater investigation will be to determine if groundwater has been significantly impacted due to elevated pesticide concentrations previously identified in subsurface soils associated with both the rock drain area and the evaporation pit's overflow drywell. The focus of the soil remediation program will be to document the removal and disposal of the impacted subsurface soils from both the rock drain area and the overflow drywell.

This document is intended to satisfy the Agreement requirement for a work plan for the implementation of the groundwater investigation and soil remediation program at the Site. More specifically, the plan presents a summary of the November 1997 PSA and the general approach and procedures of all investigation activities. The work plan also includes a Quality Assurance Project Plan (QAPP) Plan and a site-specific Health and Safety Plan (HASP). Based upon the

scope of work presented in this work plan, the project goals are to determine the extent, if any, of groundwater contamination resulting from pesticide impacted subsurface soils within the Site, and effectively remediate pesticide impacted subsurface soils within the rock drain area and overflow drywell.

H2M will prepare a summary report upon completion of all site work and laboratory analyses. The summary report will provide a detailed discussion of the groundwater investigation and soil remediation work, together with the results of our findings. If warranted, the summary report will include recommendations for additional investigatory work and/or remedial options.

As proposed, the groundwater investigation will consist of an exposure assessment to determine whether there are any potential environmental receptors within a one mile radius of the Site. Further, one additional downgradient monitoring well (See Figure 4.1) will be installed in order to better define the site specific groundwater flow direction. After allowing the new monitoring well to stabilize for a minimum of five days following development, a round of groundwater monitoring will be conducted. Groundwater samples will be collected for pesticide analyses from the three existing monitoring wells, the new monitoring well, and one of the LIHREC's irrigation wells (S-73265). An additional round of groundwater monitoring will be conducted at each of the monitoring wells and the LIHREC irrigation well no less than 90 days after the initial groundwater monitoring round. Periodic air monitoring will be conducted during all groundwater sampling activities, as appropriate. The soil remediation program will consist of excavation and disposal of the impacted soils identified in both the rock drain area and overflow drywell during the November, 1997 PSA. Restoration of both areas will be accomplished by backfilling with clean sand. All remediation and restoration work will be performed by a qualified environmental contractor. H2M will provide technical oversight during all remediation activities, and collect confirmatory end-point soil samples for pesticide analyses. Continuous air monitoring will be conducted during all soil remediation activities, as appropriate.

Finally, the intended future use of the subject property will be similar to present day operations and land usage (i.e. horticultural research center).

2.0 BACKGROUND

The LIHREC is a horticultural research center administered by Cornell University and the State University of New York. Horticultural research conducted at the facility includes the planting and care of diverse crops in small experimental land plots located both in open fields and in greenhouses. Various pesticides, including proprietary products, were mixed and applied to crops in the different experimental plots. Reportedly, the consistent prior practice has been to rinse pesticide containers emptied of product with water prior to disposal. In most cases, the rinse water was added to the pesticide application tanks. Upon completing a specific pesticide application, the application tank was rinsed clean. The rinsate water from the application tank was discharged into an evaporation pit/drywell system for disposal (See Figure 2.1). Prior to the construction of the evaporation pit/drywell system, rinse water was reportedly discharged to a rock drain area.

2.1 Previous Analytical Results

Results of previous NYSDEC laboratory analyses indicated that endosulfan I, endosulfan II, endosulfan sulfate, and chlordane were detected in an evaporation pit liquid sample at concentrations ranging from 80 to 320 micrograms per liter (ug/l). NYSDEC laboratory analyses of an evaporation pit bottom sample detected heptachlor, alpha chlordane, and gamma chlordane at concentrations of 720,000, 1,900,000, and 2,000,000 micrograms per kilogram (ug/kg) respectively. Other NYSDEC evaporation pit bottom sample analyses detected endosulfan I, endosulfan II, and chlordane at 7,900,000, 2,900,000, and 4,000,000 ug/kg respectively. Finally, NYSDEC analyses of overflow drywell bottom sediments indicated the presence of endosulfan I, endosulfan II, and chlordane.

Analyses performed by a LIHREC-contracted laboratory indicated the presence of chlordane in an evaporation pit liquid sample (529 ug/l), evaporation bottom sediments (251,000 ug/kg), and overflow drywell bottom sediments (75,300 ug/kg).

2.2 November 1997 PSA

In 1997, Cornell retained H2M to conduct a PSA designed to evaluate the nature and extent of the suspected pesticide contamination associated with both the evaporation pit/overflow drywell system and former rock drain area. A summary of the general approach and procedures of all investigation activities is presented in our November 1997 PSA report. The report was presented to NYSDEC and is the basis for the proposed additional groundwater investigation and soil remediation program.

The scope of work consisted of conducting two soil borings in each of the two suspected source areas and the collection of discrete soil samples at fixed intervals. Each soil boring was advanced until groundwater was encountered. Temporary well points were used to obtain groundwater samples at each boring. Based upon the results of the analytical data, one upgradient and two downgradient monitoring wells were installed to further evaluate the nature and extent of the contamination, and to determine whether the LIHREC was the source of the contamination.

Results of the field investigation identified the presence of endosulfan I, endosulfan II, and P,P-DDT at concentrations below NYSDEC Recommended Soil Cleanup Objectives (RSCOs) in the evaporation pit subsurface soils at depths of four and thirty feet below grade. Pesticide concentrations in the soil samples decreased with depth within the soil boring. Pesticides were non-detectable in the groundwater sample collected beneath the evaporation pit. Based upon the analytical data, the subsurface soils beneath the pit have been impacted by pesticides at concentrations below the applicable NYSDEC RSCOs. Therefore, no remedial actions are warranted in this area.

The soil boring completed through the center of the overflow drywell identified the presence of endosulfan I and endosulfan II at concentrations above their respective RSCOs throughout the soil boring. Overall, pesticide concentrations decreased significantly with depth. The highest pesticide concentrations were reported just below the bottom of the drywell (ten feet below grade). At this interval, chlordane was reported at a concentration of 580,000 ug/kg.

Chlordane was the only pesticide (170 ug/l) detected in the groundwater sample at a concentration in excess of its respective NYSDEC Class GA Water Quality Standard of 0.1 ug/l.

Results of the soil borings completed through the rock drain area indicated pesticide concentrations in excess of their respective RSCOs to a total depth of ten feet below grade. P, P-DDT was the only pesticide (0.74 ug/l) detected in the groundwater sample at a concentration in excess of its respective NYSDEC Class GA Water Quality Standard. A site map depicting our 1997 PSA analytical results and proposed groundwater investigation sample locations is presented in Figure 2.1.

3.0 GEOLOGY AND HYDROGEOLOGY

The geologic formations that underlie Suffolk County are composed of a series of thick deposits of unconsolidated water-bearing sediments of late Cretaceous and Pleistocene age. These unconsolidated deposits are underlain by crystalline bedrock of Precambrian age.

There are three primary water-yielding aquifers underlying Suffolk County. These aquifers, from shallow to deep are: (1) Upper Glacial; (2) Magothy; and (3) Lloyd aquifers. The Magothy aquifer has been reported to be semi-confined (confined in areas where the Gardiners clay unit is present). The underlying Lloyd aquifer is confined due to an overlying clay unit identified as the Raritan clay.

The Upper Glacial aquifer, consisting of highly permeable sand and gravel with occasional thin clay beds, has a glacial outwash origin. The saturated section of the Upper Glacial aquifer is approximately 310 feet thick in the LIHREC area of Long Island. Based upon the available data, groundwater occurs at approximately 80 to 90 feet below ground surface (bgs) at the facility.

The Magothy aquifer is the principal water supply aquifer underlying Suffolk County. It consists primarily of lenticular beds of very fine to medium sand that are interbedded with clay, sandy clay, silt and some gravel and sand. Beds of coarse sand with gravel are common in the lower 100 to 150 feet of the aquifer. The Magothy aquifer reaches a thickness of approximately 400 feet beneath the LIHREC area.

Below the Magothy aquifer is the Raritan clay formation. This formation is a significant confining unit above the Lloyd aquifer that consists mainly of clay and silty clay and is approximately 100 feet thick in the LIHREC area. The clay has a very low hydraulic conductivity, but does not totally prevent movement of water between the Magothy aquifer and the underlying Lloyd aquifer.

The Lloyd aquifer is the oldest and deepest water-bearing unit. It rests unconformably on impermeable crystalline bedrock and consists of lenticular deposits of clay, silt, sandy clay, sand and gravel. The upper surface of the Lloyd occurs at approximately 900 feet bgs and is approximately 100 feet thick in the LIHREC area.

4.0 GROUNDWATER INVESTIGATION

To determine whether pesticide contamination previously identified in subsurface soils and groundwater beneath both the overflow drywell and rock drain area has the potential to impact environmental receptors within a one mile radius of the Site, H2M will complete three (3) tasks in conjunction with the groundwater investigation phase of the project. All work performed in conjunction with the groundwater investigation will be conducted in general accordance to the NYSDEC Quality Assurance Guidelines for Voluntary Cleanup Sites, as appropriate. Specifically, the tasks are identified as follows:

1.) Exposure Assessment

2.) Monitoring Well Installation

3.) Groundwater Sampling

4.1 Exposure Assessment

H2M will perform an exposure assessment identifying potential environmental receptors, public and/or private potable water wells, production wells, and any human exposure scenarios that may exist within a one mile radius of the Site. The objective of this task will be to determine whether any potential pathways exist at the site which could pose potentially unacceptable human health risk.

4.2 Monitoring Well Installation

H2M will install one additional groundwater monitoring well downgradient of the two source areas. As proposed, the monitoring well will be located between existing monitoring well MW-2 and Horton Avenue. The well will be constructed to NYSDEC standard specifications as presented in NYSDEC TOGS 4.1.1 (1987). It is recognized that additional monitoring well installations beyond that proposed in this workplan may be required in conjunction with the groundwater investigation at the Site. However, the necessity for additional on or off site well

installations, if any, will be based upon NYSDEC evaluation of the groundwater data obtained after the first round of groundwater sampling and analyses has been conducted.

Upon completing the installation, the new well will be developed utilizing a submersible pump. As part of this task, H2M will also survey the location and elevation of the new well. The objective of this task is to more accurately define the site-specific groundwater flow direction.

The proposed monitoring well location is depicted in Figure 4.1. The specific location of the monitoring well will be coordinated with the LIHREC staff to minimize any impacts to the operation of the experimental fields adjacent to the well, and will be approved by NYSDEC prior to installation. Well construction and installation procedures are described below.

The proposed monitoring well will be installed through the use of a hollow stem auger (HSA) drill rig under the direction of a qualified hydrogeologist and constructed in accordance with NYSDEC specifications for monitoring well installations in unconsolidated formations. Continuous air monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) as required by the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan will be conducted during all monitoring well installation work. A copy of the NYSDOH Generic Community Air Monitoring Plan is attached in Appendix D.

The HSA drilling technique involves drilling a borehole by simultaneously rotating and axially advancing an auger column into unconsolidated geologic materials. A typical auger is constructed by welding continuous spiral blades (flights) to a heavy gauge steel pipe. Couplings are welded onto the ends of the auger, allowing sections to be bolted together. A single auger is five (5) feet long and has a hollow central annular space. When augers are bolted together, the flights on each separate auger line up to form a single continuous flight. During drilling, a cutter head is attached to the end of the lead auger. As the augers are advanced into the ground, the cutter head opens the borehole and directs the cuttings to the auger flights. As the augers rotate, the cuttings are brought to the surface by the continuous flights. All drill cuttings (i.e. soil) generated during the monitoring well installation work will be stockpiled on site. The drill cuttings will be placed upon plastic sheeting with a minimum thickness of 5-7 mil and then

covered with same to avoid potential contamination of surface soil in the staging area. A composite soil sample will be collected from the stockpiled drill cuttings and analyzed for pesticide content to determine whether the soils must be disposed of off site at a permitted facility. Should the laboratory analyses indicate that the soil does not require off site disposal, they will be spread over the ground surface in the general vicinity of the monitoring wells.

Prior to installing the proposed monitoring well, site-specific underground utilities, overhead structures and other surface features which may impede drilling activities will be identified. Appropriate utilities will be contacted for mark outs, if applicable.

All drilling equipment will be steam cleaned prior to the start of work. The well screen and casing will be decontaminated by steam cleaning unless the well materials have been cleaned and sealed at the factory. The proposed monitoring well will be constructed with four (4) inch I.D. PVC flush-joint risers with a fifteen (15) foot section of 0.010 inch (#10) slot-size PVC well screen. The well screen will extend five (5) feet above and ten (10) feet below the water table.

The annular space around the well screen will be filled with a sand filter pack extending from approximately six (6) inches below the bottom of the screen to a height of approximately two (2) feet above the top of the screen. A two (2) foot seal of bentonite pellets will be placed above the filter pack. The bentonite pellets will be continuously hydrated for sixty minutes prior to installation of a cement/bentonite grout. The depth to the bottom and top of each seal will be measured in the borehole to the nearest 0.1 foot using a weighted tape. The remaining annular space will be grouted with a bentonite/cement slurry. A cement/bentonite surface seal will be constructed by filling the annular space of the borehole and will extend to approximately three (3) feet below grade to ground surface, where a flush mounted well manhole will be installed. A water tight locking cap will be attached to the top of the PVC casing. An eight (8) inch diameter protective steel casing in a cement collar will be installed over the well. A flush to grade steel cover assembly will be set around the well casing. The steel cover will be set into a sloped concrete pad, after the grout has been allowed to set. A well construction diagram will be completed and included as part of the summary report.

The monitoring well will be developed utilizing a submersible pump. Periodic air monitoring for VOCs as required by the NYSDOH Generic Community Air Monitoring Plan will be conducted during all well development work. Development water will be containerized in approximately two DOT-approved 55 gallon drums and staged on site. Liquid samples will be collected from the drums for pesticide analyses to determine the proper disposal method for the material.

Specific conductivity and pH measurements of the development water will be taken until both parameters stabilize to confirm adequate development. All instruments utilized to perform field measurements will be maintained and calibrated as necessary in general accordance with the manufacturer's specifications. Stabilization will be established when two consecutive well volume readings are within ten (10) percent of one other. Turbidity will also be measured, and the well will be developed until a measurement of less than 50 nephelometric turbidity units (NTU) is achieved, or until turbidity stabilizes. Depth of groundwater measurements will be made before and after well development. All field data will be recorded on pre-printed field logs.

Following installation of the new groundwater monitoring wells, a well survey will be performed under the direction of a New York State licensed surveyor. The survey will include all wells to be utilized in the groundwater sampling round in order to more accurately define groundwater flow direction at the subject property. The horizontal distance between each well will be surveyed, and the elevation to the top of the well riser pipe will be measured to the nearest 0.01 foot. In addition, the ground surface elevation will be measured to the nearest 0.1 foot.

4.3 Groundwater Sampling

After allowing the new monitoring well to stabilize for a minimum of five (5) days following development, H2M will conduct a round of groundwater sampling. Periodic air monitoring for VOCs will be conducted during all groundwater sampling work, as required by the NYSDOH Generic Community Air Monitoring Plan. Prior to sampling, depth to

the NYSDOH Generic Community Air Monitoring Plan. Prior to sampling, depth to groundwater will be measured in each monitoring well. This data will be used to develop a groundwater contour map and confirm local groundwater flow direction. Groundwater samples will be collected from each of the three existing monitoring wells, the new monitoring well, and LIHREC irrigation well S-73265. Based upon well certification information provided by LIHREC and Kreiger Well and Pump Corporation (Kreiger), irrigation well S-73265 was installed by Kreiger in 1982. The well was installed to a total depth of 154 feet below site grade, with the screened interval from 134 feet to 154 feet. Static water was determined to be 82 feet below site grade. The well diameter is 10 inches and has a total capacity of 600 gallons per minute. Therefore, based upon the well certification information, irrigation well S-73265 is not screened at the water table, and samples collected from this well will be representative of groundwater quality within a deeper portion of the aquifer.

Depth to groundwater measurements will also be collected at each of the wells after groundwater sampling has been completed. An additional groundwater sampling round will be conducted at each of the monitoring wells and irrigation well no less than 90 days after the initial groundwater monitoring round. The location of the existing monitoring wells and the irrigation well are shown on Figure 4.1, Partial Site Plan.

Sample containers will be provided by H2M Labs, Inc. Each sample container will be thoroughly precleaned at the laboratory prior to sample collection activities. Each container will be provided with a label for sample identification purposes. In order to maintain and document sample possession, standard chain of custody (COC) procedures will be followed and a COC form will accompany the sample containers. For quality assurance/quality control (QA/QC) purposes, a trip blank will accompany the samples and both an equipment (field) blank and a matrix spike/matrix spike duplicate (MS/MSD) sample will be collected. The ten (10) groundwater samples and six (6) QA/QC samples will be analyzed by H2M Labs, Inc. (NYSDOH Lab ID No. 10478) for Target Compound List (TCL) pesticides by SW 846, Method 8081. The analytes reported in Method 8081 are summarized below.

1.) Endosulfan I

2.) Endosulfan II

3.) Endosulfan sulfate

4.) Chlordane

5.) Heptachlor

6.) Alpha Chlordane

7.) Gamma Chlordane

8.) Aldrin

9.) P, P' DDE

10.) Methoxychlor

11.) Toxaphene

12.) O, P DDT

13.) P, P' DDD

14.) P, P' DDT

In assessing the laboratory data, the analytical results will be compared to NYSDEC Water Quality Standards for Class GA groundwater. A sample chart specifying the sample matrix, number of samples to be collected, analysis methods, and data reporting level is presented in Appendix C, Sample Chart.

H2M Labs, Inc. is a NYSDOH-ELAP-CLP certified laboratory. The H2M Laboratory Director has overall responsibility for all operational activities. The H2M Laboratory Quality Assurance Manager will review all data and be responsible for laboratory reports and quality control. In order to validate the data, a Data Usability Summary Report (DUSR) will be prepared by the H2M Laboratory Quality Assurance Manager. The DUSR will be prepared in general accordance to the NYSDEC Division of Environmental Remediation guidance document entitled "Guidance for the Development of Data Uasability Summary Reports." A copy of the DUSR guidance document is attached in Appendix E. All analytical laboratory deliverables will be as per NYSDEC ASP Category B requirements.

placed on the sheet to minimize the possibility of cross contamination from the surrounding soils. The following procedure will be utilized for groundwater sampling:

1.) Prior to purging each well for sample collection, a static water level measurement to the nearest 0.01 foot will be recorded.
2.) To ensure a representative groundwater sample, each well will be purged prior to sample collection. A volume equal to three (3) or more times that of the well casing volume will be purged from the well before collecting analytical samples. A decontaminated stainless steel submersible pump shall be used to remove the required well volume. The pump will be decontaminated utilizing a scrub brush and alconox/distilled water. The pump will then be rinsed utilizing distilled water prior to insertion into the monitoring well. All purge waters will be containerized in DOT-approved 55 gallon drums and staged on site. Liquid samples will be collected from the drums and analyzed for pesticide content. Should the lab analyses indicate that the purge waters do not require off site disposal, all liquids will be discharged onto the ground surface adjacent to the monitoring well.
3.) Groundwater samples will be collected utilizing a dedicated factory cleaned/sealed polyethylene disposable bailer at each sampling location. The bailer will be attached to a dedicated polypropylene rope or nylon line. Field parameters (temperature, pH, turbidity, specific conductivity) will be measured after three (3) bailer volumes of groundwater have been removed. The appropriate analytical sample bottles will then be filled directly from the bailer as soon as it is removed from the well. Field measurements will be recorded on a pre-printed field form. After all sample bottles are filled, they will be appropriately labeled and put in ice-filled coolers for transportation to H2M Labs, Inc. for pesticide analyses. The well cap will be secured and the above process will be repeated at the next monitoring well.
4.) Upon completion of the groundwater sample collection work, a static water level measurement to the nearest 0.01 foot will be recorded.
5.) Periodic air monitoring for VOCs will be performed in general accordance with the procedures outlined in the NYSDOH Generic Community Air Monitoring Plan.

QA/QC samples will be collected and will represent all groundwater sampling locations to assure quality control for the groundwater characterization of the Site. QA/QC sample sets

QA/QC samples will be collected and will represent all groundwater sampling locations to assure quality control for the groundwater characterization of the Site. QA/QC sample sets include one (1) trip blank, one (1) equipment (field) blank, and one (1) MS/MSD. The blank samples will be used to verify the quality of the field sampling results. The trip blank will contain analyte-free water and will be transported to the site without opening the sample container. The trip blank will serve as a check for contamination originating from sample transport, shipping, and from site conditions. The field (equipment) blank will be used to determine the effectiveness of the decontamination of the sampling equipment (i.e. dedicated bailers). Analyte-free water will be poured into the bailer and then transferred to the appropriate sample containers to ensure proper decontamination procedures were followed by the supplier. All information relating to any field activities will be recorded in a bound, waterproof field book or on pre-printed field forms. Proper documentation of field activities will include the following:

1.) Date and time of work events
2.) Purpose of work
3.) Description of methods
4.) Description of samples
5.) Number and size of samples
6.) Date and time of sample collection
7.) Name(s) of field personnel
8.) Field observations
9.) Field measurements
10) Air monitoring results

5.0 SOIL REMEDIATION

Based upon the soil quality data developed during our November 1997 PSA, H2M will prepare a detailed bid specification for remediating the overflow drywell and rock drain area. H2M will review all qualified contractor bids and provide Cornell with recommendations for award. A complete set of the final bid documents, including plans and specifications for the implementation of the remedial activities, will be submitted to NYSDEC prior to the initiation of field activities. Remediation work will include excavation and disposal of the impacted soils and the restoration (i.e.) backfill of both areas. H2M will provide technical oversight during all remediation work and collect representative confirmatory end-point soil samples from both areas. The soil samples will be analyzed for TCL pesticides by SW-846, Method 8081 and Total Organic Carbon (TOC) by H2M Labs, Inc. In order to assess the analytical data, the laboratory results will be compared to NYSDEC Technical Administrative Guidance Memorandum #4046: Determination of Soil Cleanup Objectives and Cleanup Levels. All applicable QA/QC procedures discussed in Section 4.0 (Groundwater Investigation) will be incorporated into the soil remediation field activities, as appropriate. The objective of this task will be to effectively remediate the impacted soils in the two areas of concern. Our summary report will provide documentation that all significantly impacted soils have been removed from both areas of concern, and that there is no longer a significant source of pesticide contamination present at the Site. As required by the NYSDOH, continuous air monitoring for both VOCs and particulates will be conducted during all soil remediation work. The community air monitoring work will be conducted in general accordance to the NYSDOH Generic Community Air Monitoring Plan. A copy of the NYSDOH Generic Community Air Monitoring Plan is presented in Appendix D.

5.1 Overflow Drywell Soil Remediation

Results of our PSA indicated that the highest pesticide concentrations were identified within the top two feet of the drywell. Based upon our discussions with the NYSDEC during a July 19, 1999 meeting, NYSDEC will require that the impacted soils beneath the overflow drywell be excavated to the maximum depth practical using standard excavation equipment and techniques. Based upon the results of our visual observations, the drywell bottom is present approximately 8 to 10 feet below site grade.

Prior to soil removal, H2M will measure the distance to the drywell bottom utilizing a weighted tape in order to accurately determine the quantity of soils removed. H2M will then direct the remediation contractor to remove impacted soils to a depth approximately 5 to 8 feet below the drywell bottom. It is estimated that a total of approximately 10 to 15 cubic yards of soils will be excavated and removed from the drywell. The excavated soils will then be transferred into a roll-off container for transportation to an approved disposal facility. While any concrete rings or domes that are encountered in the course of the remedial work may be utilized to shore the excavation, they will be removed upon completion of the work and properly disposed of off site as per NYSDEC request.

After the impacted soils have been removed, H2M will collect two evenly spaced confirmatory soil samples from the base of the excavation in order to confirm that the remediation is complete. The samples will be analyzed for TCL pesticides by SW-846, Method 8081 and TOC.

In assessing the data, H2M will compare the analytical results to the applicable NYSDEC soil cleanup criteria discussed above to ensure that the impacted subsurface soils have been removed from the drywell. H2M will then direct the contractor to backfill the drywell with New York State Department of Transportation (NYSDOT) certified clean fill. The evaporation pit will also be backfilled with NYSDOT certified clean fill. Should the confirmatory soil sample analytical results not achieve NYSDEC cleanup objectives, additional measures will be considered.

All impacted soil will be disposed of off site at a permitted facility. Waste disposal manifests will be included as an appendix in our summary report to provide documentation that the drywell remediation is complete and that no contaminant source areas remain at the Site.

5.2 Rock Drain Area Soil Remediation

Soil boring results from the PSA indicate that the highest pesticide concentrations were present in the soils from grade to a depth of twelve (12) feet. As proposed, the impacted soils in the rock drain area will be excavated to a depth of twelve feet below grade. It is estimated that a total of approximately 45 cubic yards of impacted soils will be excavated and removed from the rock drain area. All excavated soils will then be transferred to roll-off containers for transportation to an approved disposal facility.

After the impacted soils have been removed, H2M will collect two evenly spaced confirmatory soil samples from the base of the excavation to ensure that the soil remediation work is complete. The soil sample will be analyzed for TCL pesticides by SW-846, Method 8081 and TOC.

The analytical data will be compared to the NYSDEC soil cleanup criteria to ensure that all impacted soils have been removed from the rock drain area. H2M will then direct the contractor to backfill the excavation with NYSDOT certified clean fill, compact, and finish to site grade. In the event that our confirmatory soil sample analytical results do not achieve NYSDEC cleanup objectives, additional measures will be considered.

Waste disposal manifests will be included as appendix in our summary report to provide documentation that the rock drain area remediation is complete and that no contaminant source areas remain at the site.

The proposed remedial actions described above will be utilized to remove the pesticide impacted soils identified at the Site as a result of our 1997 PSA. Upon receipt of final workplan approval from NYSDEC, the final workplan documents will be certified by a New York State licensed professional engineer, with the intent that the proposed remedial actions can achieve the project cleanup goals.

Upon successful completion of the remedial actions proposed herein, the sources of pesticide contamination at the Site will have been effectively removed. Therefore, the cleanup goals for the project will have been met. The groundwater sampling and analyses proposed in Section 4.0 of this work plan will provide documentation regarding the degree of groundwater contamination, if any, resulting from the previously identified source areas at the Site. The groundwater data will then be evaluated and a determination made as to whether post remedial groundwater sampling and analyses is warranted as remedial alternative at the Site. Should the laboratory data indicate that there is no significant groundwater impact downgradient of the Site, H2M will prepare and submit a formal request to NYSDEC for no further action with respect to the Site.

6.0 PROJECT SCHEDULE

A summary of the project schedule for the proposed groundwater investigation and soil remediation work is provided below.

Within one week of receiving work plan approval from NYSDEC, H2M will begin the exposure assessment and prepare bid specifications for the proposed soil remediation work. With respect to the exposure assessment, activities to be completed include preparation and submittal of Freedom of Information Act (FOIA) applications to review available NYSDEC, Suffolk County Department of Health Services (SCDHS), and Riverhead Water District files. Site visits to these offices can be coordinated with scheduled project field work dependent upon timely receipt of approved FOIA applications. H2M will also review applicable Suffolk County Tax Map information to identify residences that are not connected to the municipal water supply. In addition, H2M will contact our drilling subcontractor to mobilize for the installation of proposed monitoring well (MW)-4 and notify NYSDEC of the start of the drilling work. It is assumed that these activities will be completed in one week.

Work to be conducted during Week 2 will include solicitation of bids from a minimum of three (3) qualified environmental contractors, installation and development of MW-4, and a well survey. Following the installation of the new monitoring well, the grout will be allowed to set for approximately three (3) days and the field survey work will then be performed. The survey will include MW-1 through MW-4 and one irrigation well located north of the Site. The new monitoring well, MW-4, will be developed and allowed to stabilize for a minimum of five (5) days. Finally, a survey drawing depicting the site-specific groundwater flow direction will be prepared. It is assumed that these tasks will be completed in one week.

Work to be conducted during Week 3 will include contractor bid review and a round of groundwater sampling. H2M will review all qualified bids and provide Cornell with recommendations for award of the soil remediation contract. Groundwater samples will be collected from the four monitoring wells and the irrigation well. It is assumed that the groundwater sampling will be completed in one day and the laboratory analyses in one week.

Laboratory analyses of the groundwater samples will be completed during Week 4. In addition, Cornell will enter into a formal agreement with the contractor selected to perform the soil remediation work.

Remediation work at the rock drain and overflow drywell will begin during Week 5. Impacted soils will be excavated and transferred to roll off containers prior to off site disposal. Upon completion of the excavation work, H2M will collect confirmatory soil samples from each location to ensure that the soil remediation is complete. Representative soil samples will also be collected from the roll off containers to characterize the impacted soils for off site disposal. It is assumed that these tasks will be completed in three days and the soil sample laboratory analyses in approximately one week.

Laboratory analyses of the confirmatory and waste characterization soil samples will be completed during Week 6. H2M will then notify NYSDEC and the contractor so that the excavations can be backfilled and the roll off containers removed from the Site.

Work to be completed during Week 7 will include preparation of a draft report summarizing the results of our field investigation and laboratory analyses. It is assumed that the draft summary report will be completed in one week and then submitted to Cornell for review and comment. Assuming that Cornell can complete their review of the draft report in one week (Week 8), H2M will complete and submit the final summary report to NYSDEC in Week 9 of the project.

7.0 PROJECT ORGANIZATION

Project personnel are identified as follows:

1.) Project Administrator : Gary J. Miller, P.E.

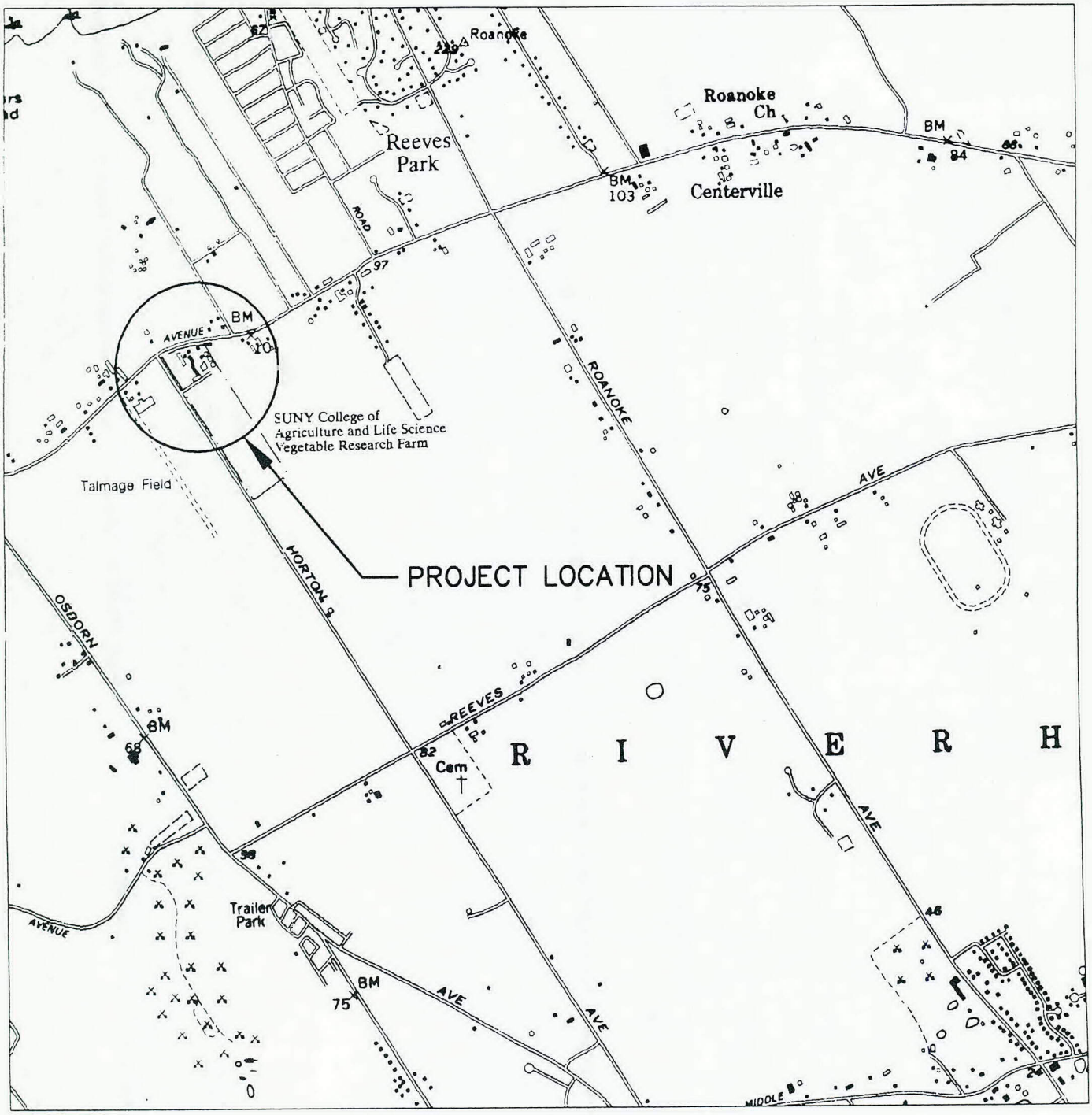
2.) Project Manager: Christopher J. Flynn, B.S.

3.) Quality Assurance Manager: Lynn T. Daniello, B.S.

Resumes for each of the project personnel are presented in Appendix E.

FIGURES

FIGURE 1.1



LOCATION MAP

SCALE: 1" = 2000'

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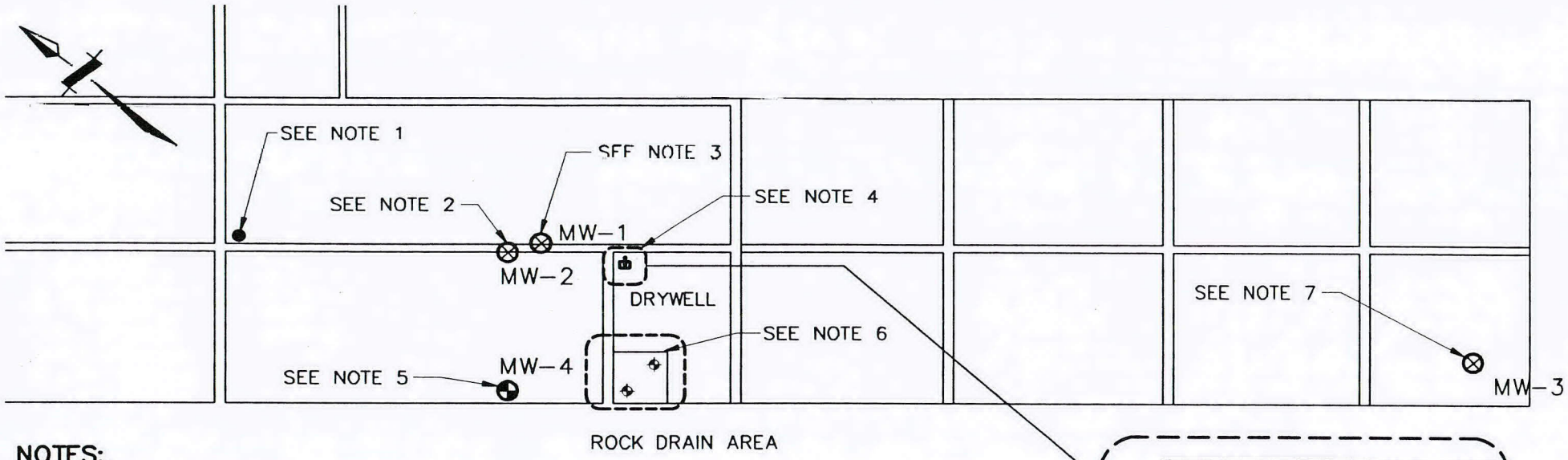
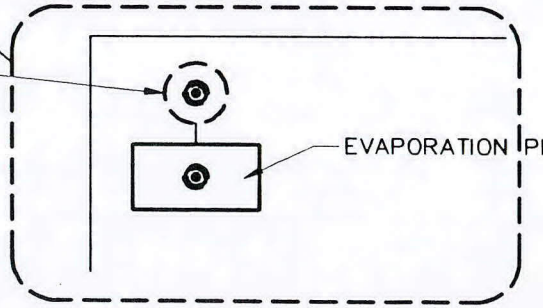
FIGURE 2.1





NOTES:

1. PROPOSED GROUNDWATER SAMPLING LOCATION.
2. PESTICIDE CONCENTRATIONS NON-DETECTABLE. PROPOSED GROUNDWATER SAMPLING LOCATION.
3. PESTICIDE CONCENTRATIONS NON-DETECTABLE. PROPOSED GROUNDWATER SAMPLING LOCATION.
4. HIGHEST PESTICIDE CONCENTRATIONS 10' BELOW GRADE. CONCENTRATION RANGE 2,400 UG/KG (P,P-DDE) TO 580,000 UG/KG (CHLORDANE).
5. PROPOSED GROUNDWATER SAMPLING LOCATION.
6. PESTICIDE CONCENTRATIONS EXCEEDING NYSDEC CLEAN UP CRITERIA TO 10' BELOW GRADE. CONCENTRATION RANGE 2,400 UG/KG (ENDOSULFAN II) TO 86,000 UG/KG (ENDOSULFAN I).
7. PESTICIDE CONCENTRATIONS NON-DETECTABLE PROPOSED GROUNDWATER SAMPLING LOCATION.

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PROPOSED SAMPLING LOCATIONS AND H2M 1997 PSA RESULTS
PARTIAL SITE PLAN

SCALE: 1" = 300'

LEGEND

- MW-4 — PROPOSED MONITORING WELL LOCATION
- ⊗ — EXISTING GROUNDWATER MONITORING WELL
- ● — EXISTING IRRIGATION WELL

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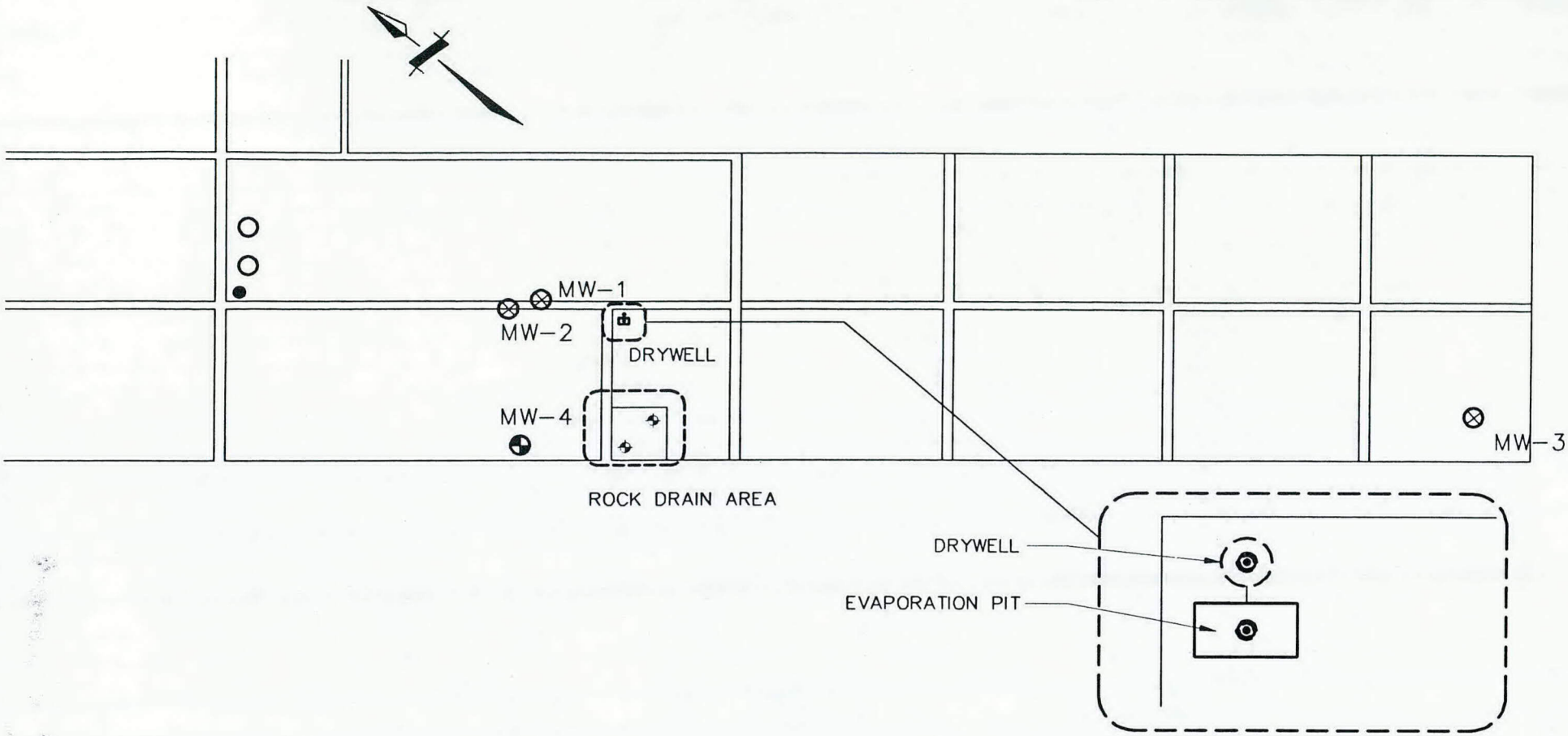
FIGURE 4.1



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PARTIAL SITE PLAN

SCALE: 1" = 300'

LEGEND

- PROPOSED MONITORING WELL LOCATION (MW-4)
- EXISTING GROUNDWATER MONITORING WELL
- EXISTING IRRIGATION WELL
- OUT OF SERVICE IRRIGATION AND SUPPLY WELLS

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APPENDIX A

HEALTH AND SAFETY PLAN

GROUNDWATER INVESTIGATION AND SOIL REMEDIATION HEALTH AND SAFETY PLAN
LONG ISLAND HORTICULTURAL RESEARCH AND EXTENSION CENTER
RIVERHEAD, NEW YORK

JUNE 2001

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GROUNDWATER INVESTIGATION AND SOIL REMEDIATION HEALTH AND SAFETY PLAN
LONG ISLAND HORTICULTURAL RESEARCH AND EXTENSION CENTER
RIVERHEAD, NEW YORK

JUNE 2001

1.0 PURPOSE

The purpose of this Health and Safety Plan (HASP) is to establish a protocol for protecting H2M, its agents, and other on-site personnel involved in groundwater investigation and soil remediation activities from situations which may arise while performing field activities at the Long Island Horticultural Research and Extension Center (LIHREC) located in Riverhead, New York. This plan has been prepared in accordance with the United States Environmental Protection Agency (USEPA) document, "Emergency and Remedial Response Division's Standard Operating Safety Guides", November 1984. The plan establishes personnel protection standards, mandatory operations procedures, and provides contingencies for situations that may arise while field work is being conducted at the site. All H2M field personnel will be required to abide by these procedures. Subcontractor personnel will be provided with a copy of this plan for their consideration.

Personnel performing environmental field work involving chemical substances may encounter conditions that are unsafe or potentially unsafe. In addition to the potential risks associated with the physical, chemical, biological and toxicological properties of the material(s) which may be encountered, other types of hazards (i.e., electricity, water, temperature, heavy equipment, falling objects, loss of balance, tripping, etc.) can have an adverse effect on the health and safety of personnel. It is important that personnel protective equipment (PPE) and safety requirements be appropriate to protect against potential and/or known hazards. PPE will be selected based on the type(s), concentration(s), and routes of personnel exposure from hazardous substances at a site. In situations where the type of materials and possibilities of contact are unknown or the potential hazards are not clearly identifiable, a more subjective (but conservative) determination will be made of the PPE required for initial safety.

2.0 SITE CONDITIONS

The LIHREC is a horticultural research center administered by Cornell University and the State University of New York. Research conducted at the facility includes the planting and care of diverse crops in small experimental land plots located both in open fields and in green houses. Various pesticides, including proprietary products, were mixed and applied to crops in the different experimental plots. Reportedly, once a pesticide container was emptied of its product, the container was rinsed with water prior to disposal. The rinsate water was discharged into the evaporation pit/drywell system for disposal. Additionally, there is a rock-drain area where rinse water had been discharged prior to the construction of the evaporation pit/drywell system.

According to LIHREC records, the evaporation pit/dry well system was constructed in 1979 and consisted of a rectangular poured-concrete treatment pit with dimensions of 10 by 6 by 6 feet. The walls and bottom of the pit were constructed with 6-inch thick concrete. After any solids had settled out of suspension, the liquids within the pit drained into an adjacent drywell (i.e., leaching pool) consisting of two 8-foot diameter, 4-foot high leaching pool rings and one 8-foot diameter, 4-foot high chimney. The base of the leaching pool structure was at approximately 12 feet below ground surface (bgs) according to the LIHREC-supplied drawings.

The approximate location of the rock-drain area is approximately 1,700 feet south of the lab's main buildings and is marked by an area of one to two-inch diameter gravel along the side of one of the facility roads. According to LIHREC, rinsate waters were disposed of in the rock drain prior to the construction of the evaporation pit/dry well system.

2.1 PROPOSED FIELD ACTIVITIES

The field work will consist of drilling one (1) groundwater monitoring well, surveying the elevations of the new and three (3) existing monitoring wells, groundwater sampling of the four (4) wells and one (1) irrigation well, and field oversight of the soil remediation activities associated with the overflow drywell and rock-drain area.

3.0 PERSONNEL SAFETY

Personnel involved in field operations must often make complex decisions regarding safety. To make these decisions correctly requires more than elementary knowledge. For example, selecting the most effective PPE requires not only expertise in the technical areas of respirators, protective clothing, air monitoring, physical stress, etc., but also experience and professional judgment. Only competent, qualified personnel having the technical judgment to evaluate a particular situation and determine the appropriate safety requirements will perform field investigations at the site. These individuals, through a combination of professional education, on-the-job experience, specialized training, and continual study, have the expertise to make sound decisions.

3.1 EDUCATION AND TRAINING

All personnel involved in field work will be trained to carry out their designated field operations. Training will be provided in the use of all equipment, including respiratory protection apparatus and protective clothing; safety practices and procedures; general safety requirements; first aid; and hazard recognition and evaluation. Each individual involved with the field work must provide documentation of training and medical surveillance, as per 29 CFR 1910.120. In addition, each individual must sign an appendix to the Health and Safety Plan, indicating they have read and understood its contents (as included in Appendix A-1).

3.2 HEALTH AND SAFETY MANAGER

The Health and Safety Manager shall be responsible for overall implementation and coordination of the Health and Safety Program for field personnel at the site. Responsibilities include providing adequate manpower, materials, equipment, and time needed to safely accomplish the tasks under the site investigation. The Health and Safety Manager is also responsible for taking appropriate corrective actions when unsafe acts or practices arise. The Health and Safety Manager for the investigation project is Gary J. Miller, P.E. of H2M.

3.3 SITE HEALTH AND SAFETY OFFICER

A designated individual will perform the function of the project Site Health and Safety Officer. Christopher Flynn will serve as the Site Health and Safety Officer during the site work. At all times the Site Health and Safety Officer will report directly to the Health and Safety Manager. As a minimum, the Site Health and Safety Officer will be responsible for the following:

1. Conducting an initial site safety meeting for field personnel.

2. Assuring that all personnel protective equipment is available and properly utilized by all field personnel at the site.

3. Assuring that all personnel are familiar with standard operating safety procedures and additional instructions contained in the Health and Safety Plan.

4. Assuring that all personnel are aware of the hazards associated with the field operations.

5. Inspecting the site for hazards before field operations.

6. Determining personal protection levels including clothing and equipment for personnel and periodic inspection of protective clothing and equipment.

7. Monitoring of site conditions prior to initiation of field activities, and at various intervals during on-going operations as deemed necessary for any changes in site hazard conditions. (Monitoring parameters include, but are not limited to, volatile organic contaminant levels in the atmosphere, chemical hazard information, and weather conditions).

8. Executing decontamination procedures.

9. Monitoring the work parties for signs of stress such as cold exposure, heat stress, or fatigue.

10. Prepare reports pertaining to incidents resulting in physical injuries or exposure to hazardous materials.

Mr. Flynn may designate another qualified H2M employee as Site Health and Safety Officer. All designees will be familiar with all aspects of the HASP and their responsibilities. At all times the Site Health and Safety Officer shall report directly to the Health and Safety Manager.

4.0 LEVELS OF PROTECTION

Anyone entering the investigation site must be protected against potential hazards. The purpose of the personal protection clothing and equipment is to minimize exposure to hazards while working on site. Careful selection and use of adequate PPE should protect the respiratory system, skin, eyes, face, hands, feet, head, body and hearing of all personnel.

The appropriate level of protection is determined prior to the initial entry on site based on available information and preliminary monitoring of the site. Subsequent information may warrant changes in the original level selected. Appropriate equipment to protect personnel against exposure to known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded.

4.1 LEVEL A PROTECTION

The highest degree of protection is used in a Level A situation. It should be worn when the highest available level of respiratory, skin and eye protection is needed. This level of protection is placed in effect when there is no historic information about the site and it is assumed that the worst possible conditions exist. Situations requiring Level A PPE are not anticipated during the groundwater investigation and soil remediation field work.

4.1.1 PERSONAL PROTECTIVE EQUIPMENT

a. Pressure demand, self-contained breathing apparatus, approved by the Occupational Safety and Health Administration (OSHA) and National Institute of Occupational Safety and Health (NIOSH).
b. Fully encapsulating chemical-resistant suit.
c. Coveralls*.
d. Long cotton underwear*.
e. Gloves (outer), chemical-resistant.
f. Gloves (inner), chemical-resistant.

g. Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot.)

h. Hard hat* (under suit).

i. Disposable protective suit, gloves and boots* (worn over fully-encapsulating suit).

j. Two-way radio communications (intrinsically safe).

*Optional

4.1.2 CRITERIA FOR SELECTION

Meeting any of the criteria listed below warrants use of Level A protection:

a. The chemical substance(s) has been identified and requires the highest level of protection for skin, eyes and the respiratory system based on:

(1) Measured (or potential for) high concentrations-of atmospheric vapors, gases, or particulates; or

(2) Site operations and work functions involving high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates.

b. Extremely hazardous substances are known or suspected to be present and skin contact is possible.

c. The potential exists for contact with substances that destroy skin.

d. Operations must be conducted in confined, poorly ventilated areas until the absence of hazards requiring Level A protection is demonstrated.

e. An oxygen deficient atmosphere where the oxygen level is less than 20.9 percent (%) by volume as measured with an oxygen meter. This condition, existing alone, could result in a downgrade to EPA Level B PPE.

f. Total atmospheric readings on a photoionization detector indicate readings above 500 parts per million (ppm) of calibration gas equivalents (cge) of unidentified substances.

4.1.3 LIMITING CRITERIA

a. Fully encapsulating suit material must be compatible with the substances involved.

4.1.4 MINIMUM DECONTAMINATION PROCEDURE

Station 1: Segregated equipment drop.
Station 2: Outer garment boots and gloves wash and rinse.
Station 3: Outer boot and glove removal.
Station 4: Tank change.
Station 5: Boots, gloves and outer garment removal.
Station 6: SCBA removal.
Station 7: Field wash.

4.2 LEVEL B PROTECTION

Level B protection will be used by all personnel entering confined spaces and/or if the conditions outlined in Section 4.2.2 are encountered. Situations requiring Level B PPE are not anticipated during the groundwater investigation and soil remediation field work.

4.2.1 PERSONAL PROTECTIVE EQUIPMENT

a. Pressure-demand, self-contained breathing apparatus or cascade supplied air system (OSHA/NIOSH approved).

b. Chemical-resistant clothing (coveralls and long-sleeved jacket; coveralls, hooded, one or two-piece chemical-splash suit; disposable chemical-resistant coveralls).

c. Coveralls*

d. Gloves (outer), chemical-resistant.

e. Gloves (inner), chemical-resistant.

f. Boots, chemical-resistant, steel toe and shank.

g. Boots (outer), chemical resistant (disposable*).

h. Hard hat (face shield*).

i. Two-way radio communications (intrinsically safe).

*Optional

4.2.2 CRITERIA FOR SELECTION

Meeting any one of these criteria warrants use of Level B protection:

a. The type(s) and atmospheric concentration(s) of toxic substances have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection than is required with Level A. These would be atmospheres:

(1) With concentrations immediately dangerous-to life and health (IDLH); or

(2) Exceeding limits of protection afforded by a full-face, air-purifying mask; or

(3) Containing substances for which air-purifying canisters do not exist or have low removal efficiency; and/or

(4) Containing substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.

b. The atmosphere contains less than 20.9 percent oxygen.

c. Site operations make it highly unlikely that the small, unprotected area of the head or neck will be contacted by splashes of extremely hazardous substances.

d. Total atmospheric concentrations in the breathing zone of unidentified vapors or gases range from 50 ppm to 500 ppm (calibration gas equivalence units) on monitoring instruments, and vapors are not suspected of containing high levels of chemicals toxic to skin.

4.2.3 LIMITING CRITERIA

a. Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through skin contact.

b. Use only when it is highly unlikely that the work being done will generate high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin.

4.2.4 MINIMUM DECONTAMINATION PROCEDURES

Station 1: Equipment drop.

Station 2: Outer garment, boots and gloves wash and rinse.

Station 3: Outer boot and glove removal.

Station 4: Tank change.

Station 5: Boot, gloves and outer glove removal.

Station 6: SCBA removal.

Station 7: Field wash.

4.3 LEVEL C PROTECTION

Level C protection will be used by all personnel if the conditions outline in Section 4.3.2 are encountered. Conditions requiring Level C protection are not anticipated during the groundwater investigation and soil remediation field work.

4.3.1 PERSONAL PROTECTIVE EQUIPMENT

a. Full-face, air purifying, canister-equipped respirator (Mine Safety and Health Administration (MSHA) and NIOSH approved).

b. Chemical-resistant clothing (coveralls; hooded, two-piece chemical splash suits; chemical-resistant hood and apron; disposable chemical-resistant coveralls).

c. Coveralls*

d. Gloves (outer), chemical-resistant.

e. Gloves (inner), chemical-resistant.

f. Boots, chemical-resistant, steel toe and shank.

g. Boots (outer), chemical-resistant (disposable*).

h. Hard hat (face shield*).

i. Escape mask*.

j. Two-way radio communications (intrinsically safe)

*Optional

4.3.2 CRITERIA FOR SELECTION

Meeting all of these criteria permits use of Level C Protection:

a. Measured air concentrations of identified substances will be reduced by the respirator to, at or below the substance's exposure limit, and the concentration is within the service limit of the canister.

b. Atmospheric contaminant concentrations do not exceed IDLH levels.

c. Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing.

d. Job functions have been determined not to require self-contained breathing apparatus.

e. Total vapor readings register between 5 ppm cge and 50 ppm cge above background on instruments.

f. Air will be monitored periodically.

g. Cartridges are available and are approved by NIOSH and MSHA for the specific chemical(s) encountered.

4.3.3 LIMITING CRITERIA

a. Atmospheric concentration of chemicals must not exceed IDLH levels.

b. The atmosphere must contain at least 20.9 percent oxygen.

c. Must have sufficient information available regarding specific compounds, and their concentrations, likely to be encountered.

4.3.4 MINIMUM DECONTAMINATION PROCEDURES

Station 1: Equipment drop.

Station 2: Outer boot and glove removal.

Station 3: Canister or mask change.

Station 4: Boots, gloves and outer garment removal.

Station 5: Face piece removal.

Station 6: Field wash.

4.4 LEVEL D PROTECTION

Level D protection has been selected for personnel for this project, except during confined space entries. Should conditions change, re-evaluation of personnel protection will be conducted.

4.4.1 PERSONAL PROTECTIVE EQUIPMENT

a. Coveralls.

b. Gloves*.

c. Boots/shoes, leather or chemical-resistant, steel toe and shank.

d. Boots (outer), chemical/resistant (disposable)*.

e. Safety glasses or chemical splash goggles*.

f. Hard hat (face shield*).

g. Escape mask*.

*Optional

4.4.2 CRITERIA FOR SELECTION

Meeting any of these criteria allows use of Level D protection:

a. No hazardous air pollutants have been measured.

b. Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.

c. Extensive information on suspected hazards/risks are known.

4.4.3 LIMITING CRITERIA

a. The atmosphere must contain at least 20.9 percent oxygen.

4.4.4 MINIMUM DECONTAMINATION PROCEDURE

Station 1: Equipment drop.

Station 2: Hand and face wash.

4.5 DURATION OF WORK PERIOD

The anticipated duration of the work period will be established prior to daily activities. The work will only be performed during daylight hours. Other factors affecting the length of time personnel may work include:

a. Air supply consumption (SCBA-assisted work);

b. Suit/ensemble, air purifying chemical cartridge, permeation and penetration by chemical contaminants; and

c. Ambient temperature and weather conditions.

d. Contractual requirements.

4.5.1 AIR SUPPLY CONSUMPTION

The duration of the air supply must be considered before any SCBA-assisted work activity (Levels A and B) commences. Although the anticipated operating time of an SCBA is clearly indicated on the breathing apparatus the following variables should be considered and work actions and operating time adjusted accordingly:

Work Rate: The actual in-use duration of SCBA's may be reduced by one-third to one-half during strenuous work, e.g. drum handling, major lifting or any task requiring repetitive speed of motion.

Fitness: Well conditioned individuals generally utilize oxygen more efficiently and can extract more oxygen from a given volume of air than unfit individuals, thereby slightly increasing the SCBA operating time.

Body Size: Larger individuals generally consume air at a higher rate than smaller individuals, thereby decreasing the SCBA operating time.

Breathing Patterns: Quick, shallow or irregular breaths consume air more rapidly than deep, regular spaced breaths. Heat induced anxiety and lack of acclimatization may induce hyperventilation, resulting in decreased SCBA operating times.

4.5.2 SUIT/ENSEMBLE, AIR PURIFYING CHEMICAL CARTRIDGE, PERMEATION AND PENETRATION

The possibility of chemical permeation or penetration of chemical protective clothing (CPC) ensembles and air purifying respirators (APR) chemical cartridges during the work mission is always a matter of concern and may limit mission duration. It should be remembered that no single clothing material is an effective barrier to all chemicals or all combinations of chemicals, and no material is an effective barrier to prolonged chemical exposure. Manufacturer recommendations should be followed.

In addition, when performing work in Level C respiratory protection, care should be taken to inspect the respirators prior to usage. The chemical cartridges should be changed, at a minimum, on a daily basis, or when the cartridge becomes dirty, damaged or when breakthrough is suspected.

4.5.3 AMBIENT TEMPERATURE

The ambient temperature has a major influence on work period duration as it effects both the worker and the protective integrity of ensembles (see Section 11.4.1) as well as the operation of the monitoring equipment. When ambient temperatures rise or falls to a level which may hinder personnel performance or becomes a threat to personal safety, consideration should be given to stop work and recommence work when temperatures or conditions are less severe.

5.0 AIR MONITORING PROGRAM

Based upon the results of our PSA, elevated pesticide concentrations were identified in subsurface soils within both the overflow drywell and rock drain area. Remediation of both areas will consist of excavation and removal of the impacted soils. As such, fugitive dusts generated during excavation of impacted soils may also contain significant pesticide concentrations.

Workers potentially at risk include equipment operators and oversight personnel. Periods of potential exposure to respirable particulates are anticipated to be short in duration. The major routes of pesticide exposure within the work zone are dust inhalation and dermal contact. Therefore, the presence of pesticides will be evaluated using a miniram respirable particulate monitor. The presence of volatile organic compounds (VOCs) will be evaluated utilizing a photoionoization detector (PID). Real–time measurements of both volatile organic compounds and respirable particulates will be continuously conducted during all monitoring well and soil excavation work. If necessary, the level of personal protection required in the work zone will be upgraded based upon the miniram readings.

In order to minimize the quantity of fugitive dusts generated during the excavation work, H2M will direct the remediation contractor to lightly spray the soils with water prior to their removal. For worker protection, H2M will continuously monitor the work zone during all monitoring well installation and soil excavation work. Action levels to be utilized for inhalable particulates and VOCs are specified in the NYSDOH Generic Community Air Monitoring Plan presented in Appendix D. Should total inhalable particulate readings and/or total VOC concentrations exceed their respective action levels, work zone conditions and engineering controls will be re-evaluated.

Periodic air monitoring for VOCs and inhalable particulates will be conducted during all groundwater sampling work. All air monitoring work will be conducted in general accordance with the protocols described in the NYSDOH Generic Community Air Monitoring Plan

6.0 DETERMINATION OF THE SITE-SPECIAL LEVEL OF HAZARD

Categories of personnel protection required depend on the degree of hazard and probability of exposure by a route of entry into the body. For this site, the most probable potential route of entry is via inhalation of gases and dermal adsorption of contaminants released from field activities.

Hazardous Substance Data Sheets for chemical constituents which may be encountered at this site have been compiled and are included as Appendix A-2. Based on chemical toxicity information and the concentrations and frequency of individual contaminants identified in preliminary investigations, the compounds which are present and which could potentially pose a concern are limited to pesticides.

VOCs are not expected to pose a significant threat. However, VOCs have relatively high vapor pressures and therefore could volatilize, causing an inhalation concern. Real time air monitoring using a PID will be performed throughout field activities to determine the site specific level of hazard.

Based upon the known site history and disposal practices, the appropriate level of protection for the field operations at the site is Level D. The determination of Level D protection is based on the fact that field work will be performed in open, well-ventilated areas and that the potential for accidents and injuries due to obstructions caused by and/or magnified by the use of level A, B, or C protection (i.e., slip/trip hazards) is greater than the potential for problems associated with exposure from contaminants using level D protection. Level C protection will be used if ambient air monitoring results warrant a protective equipment upgrade (above Level D conditions). The Site Health and Safety Officer will be responsible for requesting an upgrade in the level of personnel protection. The final decision will be made by the Health and Safety Manager.

In addition to potential chemical hazards, potentially greater physical hazards are associated with the field operations. Due to the nature of the field operations, heavy equipment

including drill rigs, excavators, and support trucks will be used throughout the project. Therefore, all personnel should always be aware of vehicles and equipment. All work must be performed in strict accordance with OSHA regulations. Hard hats must be worn at all times around heavy equipment and/or in the vicinity of suspended loads.

7.0 DESIGNATED WORK ZONES

Work zones will be determined prior to commencement of a specific field activity. An area large enough to encompass the activity will be delineated as the work/exclusion zone. Only qualified field personnel with the proper PPE will be allowed into the designated zone.

8.0 DECONTAMINATION STATIONS

A decontamination station will be located in a fixed area to be used for the cleaning of all heavy equipment, vehicles, tools, and supplies required for the completion of field operations. Personnel decontamination procedures for the appropriate levels of protection are described in Section 4.0.

9.0 SITE ACCESS CONTROL

Vehicular access to the site locations is readily attainable. Appropriate traffic controls and barricades will be used in areas of vehicular and pedestrian traffic.

10.0 PERSONAL HYGIENE

The following personal hygiene rules must be followed while performing work at the site:

1. Eating, drinking, chewing gum or tobacco, smoking, or any other practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work area.

2. Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activities.

3. Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

4. No excessive facial hair (i.e., beards), which interferes with a satisfactory fit of the mask-to-face seal, is allowed on personnel required who wear respiratory protective equipment.

5 Contact with contaminated or suspected contaminated surfaces will be avoided. Whenever possible, walking through puddles, mud and discolored surfaces; kneeling on ground; leaning, sitting, or placing equipment on drums, containers, vehicles, or the ground will be avoided.

6. Medicine and alcohol can increase the effects from exposure to toxic chemicals. Prescribed drugs will not be taken by personnel on site where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverage intake will be prohibited during all on-site field operations.

11.0 CONTINGENCY PLAN

Section 11.0 shall serve as the investigation Contingency Plan. It has been developed to identify precautionary measures, possible emergency conditions, and emergency procedures. The plan shall be implemented by the Site Health and Safety Officer.

11.1 EMERGENCY MEDICAL CARE AND TREATMENT

This section addresses emergency medical care and treatment of field personnel, resulting from possible exposures to toxic substances and injuries due to accidents. The following items will be included in emergency care provisions (see Appendix A-3):

a. Name, address and telephone number of the nearest medical treatment facility will be conspicuously posted. Directions for locating the facility, plus the travel time, will be readily available.

b. Names and telephone numbers of ambulance service, police and fire departments, and procedures for obtaining these services will be conspicuously posted.

c. Procedure for prompt notification of the H2M Site Health and Safety Officer.

d. Emergency eyewash fountains and first aid equipment will be readily available on site and located in an area known to all personnel.

e. Specific procedures for handling personnel with excessive exposure to chemicals or contaminated soil.

f. Readily available dry-chemical fire extinguisher.

11.2 OFF-SITE EMERGENCY MEDICAL CARE

The Site Health and Safety Officer shall pre-arrange for access to emergency medical care services at a convenient and readily accessible medical facility and establish emergency routes. The Site Health and Safety Officer shall establish emergency communications with emergency response services.

11.3 PERSONNEL ACCIDENTS

Bodily injuries which occur as a result of an accident during the operation at the site will be handled in the following manner:

a. First aid equipment will be available on site for minor injuries. If the injuries are not considered minor, proceed to the next step.

b. The local first aid squad rescue unit, a paramedic unit, the local hospital and the Site Health and Safety Officer shall be notified of the nature of the emergency.

c. The injured employee shall be transported by the local emergency vehicle to the local hospital.

d. A written report shall be prepared by the Site Health and Safety Officer detailing the events and actions taken during the emergency within 48 hours of the accident.

e. See Appendix A-3 for a list of emergency contacts in the Riverhead area.

11.4 PERSONNEL EXPOSURE

In the event that any person is splashed or otherwise excessively contaminated by chemicals, the following procedure will be undertaken:

a. Disposable clothing contaminated with observable amounts of chemical residue is to be removed and replaced immediately.

b. In the event of direct skin contact in Level D, the affected area is to be washed immediately with soap and water, or other solutions as directed by medical personnel.

c. The Site Health and Safety Officer or other individuals who hold a current first aid certificate will determine the immediate course of action to be undertaken. This may involve using the first aid kit and/or eyewash stations.

11.4.1 WEATHER

Adverse weather conditions are an important consideration in planning and conducting site operations. Hot or cold weather can cause physical discomfort, loss of efficiency, and personal injury. Of particular importance is heat stress resulting when protective clothing decreases natural body ventilation. One or more of the following will help reduce heat stress:

a. Provide plenty of liquids. To replace body fluids (water and electrolytes) lost because of sweating, use a 0.1 percent salt water solution, more heavily salted foods, or commercial mixes. The commercial mixes may be preferable for those employees on a low sodium diet.

b. Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency. Long cotton underwear help absorb moisture and protect the skin from direct contact with heat absorbing protective clothing.

c. Install mobile showers and/or hose down facilities to reduce body temperature and cool protective clothing.

d. In extremely hot weather, conduct non-emergency response operations in the early morning or evening.

e. Ensure that adequate shelter is available to protect personnel against heat, cold, rain, snow, etc.

f. In hot weather, rotate shifts of workers wearing impervious clothing.

11.4.2 HEAT STRESS

If field operations are conducted in the warm summer months, heat related fatigue will be closely monitored. Monitoring of personnel wearing impervious clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. Frequency of monitoring should increase as the ambient temperature increases or as slow recovery rates are indicated. When temperatures exceed 85 degrees Fahrenheit, workers should be monitored for heat stress after every work period. The following screening mechanism will be used to monitor for heat stress:

Heart rate (HR) will be periodically measured by the radial pulse for 30 seconds during a resting period. The HR should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 33 percent. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent.

Heat-related illnesses range from heat fatigue to heat stroke, the most serious. Heat stroke requires prompt treatment to prevent irreversible damage or death. Protective clothing may have to be cut off. Less serious forms of heat stress require prompt attention or they may lead to a heat stroke. Unless the victim is obviously contaminated, decontamination should be omitted or minimized and treatment begun immediately. Heat-related problems can be categorized as:

Heat Rash: Caused by continuous exposure to hot and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat as well as being a nuisance.

Heat Cramps Caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs: Muscle spasms and pain in the extremities and abdomen.

Heat Exhaustion Caused by increased stress on various organs to meet increased demands to cool the body. Signs: Shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.

Heat Stroke: The most severe form of heat stress. The body must be cooled immediately to prevent severe injury and/or death. Signs and symptoms are: red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

Some of the symptoms of heat stress are: hot dry skin, fever, nausea, cramps, red or spotted skin, confusion, lightheadedness, delirium, rapid pulse, convulsions and unconsciousness. For workers suffering from heat stress, the following actions should be taken:

1. Remove the victim to a cool area
2. Loosen clothing
3. Thoroughly soak the victim in cool water or apply cold compresses
4. Call for medical assistance.

11.4.3 COLD STRESS

If field operations are conducted in the cold winter months, cold stress will be monitored. Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit air with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

Frost Nip or
Incipient Frostbite. Characterized by suddenly blanching or whitening of skin.

Superficial Frostbite. Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

Deep Frostbite. Tissues are cold, pale and solid; extremely serious injury.

Hypothermia. Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperatures. Its symptoms are usually exhibited in five stages: (1) shivering; (2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body temperature to less than 95 degrees Fahrenheit; (3) unconsciousness, glassy stare, slow pulse and slow respiratory rate; (4) freezing of the extremities; and finally, (5) death.

11.5 FIRE

The telephone number of the local fire department will be posted along with other emergency numbers conspicuously on-site at all times. (see Appendix A-3). In the event of a fire occurring at the site, the following actions will be undertaken by the Site Health and Safety Officer and the designated fire control personnel:

a. Evacuate all unnecessary personnel from the area of the fire and site, if necessary.

b. Contact the local fire and police departments to inform them of the fire and any injuries, if they have occurred.

c. Contact the local hospital of the possibility of fire victims.

d. Contact the Site Health and Safety Officer, Health and Safety Manager, and the H2M Project Manager.

11.6 PERSONNEL PROTECTIVE EQUIPMENT FAILURE

If any site worker experiences a failure or alteration of PPE that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced to the satisfaction of the Site Health and Safety Officer.

12.0 SUMMARY

The Health and Safety Plan establishes practices and procedures to be followed so that the welfare and safety of workers is protected. It is important that personal equipment and safety requirements be appropriate to protect against the potential or known hazards at a site. Protective equipment will be based upon the type(s), concentration(s), and routes of personal exposure from substances at the site, as well as the potential for hazards due to heavy equipment use, vision impairment, weather, etc. All site operation planning incorporates an analysis of the hazards involved and procedures for preventing or minimizing the risk to personnel. The following summarizes the rules which must be followed:

a. The Health and Safety Plan will be made available to all personnel doing field work on site. All personnel must sign this plan, indicating they have read and understood its terms.

b. All personnel will be familiar with standard operating safety procedures and additional instructions contained in the Health and Safety Plan.

c. All personnel entering the site will be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures and communications.

d. Any required respiratory protective devices and clothing will be worn by all personnel entering work areas.

APPENDIX A-1
HEALTH AND SAFETY PLAN
ACKNOWLEDGEMENT
FORM

I acknowledge that I have read and understand the provisions of this Health and Safety Plan, and that I will, to the best of my ability, abide by the terms of this plan:

Name	Date	Name	Date

APPENDIX A-2

HAZARDOUS SUBSTANCES DATA SHEETS

MATERIAL SAFETY DATA SHEET

EM SCIENCE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer.....:

EM SCIENCE
A Division of EM Industries
P.O. Box 70
480 Democrat Rd.
Gibbstown, N.J. 08027

Preparation Date.: 09/20/93
Date MSDS Printed.: Feb 13, 1997

Information Phone Number.: 609-354-9200
Hours: Mon. to Fri. 8:30-5
Chemtrec Emergency Number: 800-424-9300
Hours: 24 hrs a day

Catalog Number(s):
TCCHL

Trade Name.....:
None
Chemical Name....:
Chlordane Standard
Chemical Family..: Standard Solution
Formula.....:
Mixture

Molecular Weight.: N/A

2. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS #	Appr %
Hexane	110-54-3	85-90
Methylcyclopentane	96-37-7	5-10
CHLORDANE	57-74-9	0.01

Contains 0-5% Methylpentanes (CAS# Not Established).
This product may contain a trace amount of Benzene (0.0002%).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

EXTREMELY FLAMMABLE LIQUID AND VAPOR.
HARMFUL IF INHALED, SWALLOWED OR ABSORBED THROUGH SKIN.
MAY CAUSE DAMAGE TO KIDNEYS, NERVES, AND RESPIRATORY SYSTEM.

CONTAINS MATERIAL WHICH IS A POSSIBLE CANCER HAZARD.

Appearance.....:
Liquid

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

Symptoms of Exposure:
Toxic by ingestion, inhalation and skin absorption.
Vapor inhalation causes irritation of nasal and respiratory passages, headache, dizziness, nausea, central nervous system depression.
Chronic overexposure can cause severe nerve damage.
May cause irritation on contact with skin or eyes.
May cause damage to kidneys.

Medical Cond. Aggravated by Exposure:
Kidney, respiratory and Central Nervous System conditions.

Routes of Entry.....:
Inhalation, ingestion or skin contact.

Carcinogenicity.....:
Contains Chlordane which is a proven animal carcinogen.
Possible Cancer Hazard.

4. FIRST AID MEASURES

Emergency First Aid:
GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.
Skin: Immediately flush thoroughly with large amounts of water.
Eyes: Immediately flush thoroughly with water for at least 15 minutes.
Inhalation: Remove to fresh air; give artificial respiration if breathing has stopped.
Ingestion: Do not induce vomiting; get immediate medical attention.
Remove contaminated clothing and wash before reuse.

5. FIRE FIGHTING MEASURES

Flash Point (F).....: -7F (cc)
Flammable Limits LEL (%).: 1.2
Flammable Limits UEL (%).: 7.5
Extinguishing Media.....:
Dry chemical, CO_2, or "alcohol" foam

Fire Fighting Procedures.:
Wear self-contained breathing apparatus and protective clothing.

Fire & Explosion Hazards.:
Dangerous fire and explosive hazard.
Vapor can travel distances to ignition source and flash back.

6. ACCIDENTAL RELEASE MEASURES

Spill Response:
Evacuate the area of all unnecessary personnel.
Wear suitable protective equipment listed under Exposure / Personal Protection.
Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards.
Contain the release and eliminate its source, if this can be done without risk.
Take up and containerize for proper disposal as described under Disposal.
Comply with Federal, State, and local regulations on reporting releases. Refer to Regulatory Information for reportable quantity and other regulatory data.

EM SCIENCE recommends Spill-X absorbent agents for various types of spills. Additional information on the Spill-X products can be provided through the EM SCIENCE Technical Service Department (609) 354-9200.
The following EM SCIENCE Spill-X absorbent is recommended for this product:

SX0863 Solvent Spill Treatment Kit

7. HANDLING AND STORAGE

Handling & Storage:
Keep container tightly closed.
Refrigerator recommended for storage.
Store in a cool, dry area away from ignition sources and oxidizers.
Do not breath vapor or mist.
Do not get in eyes, on skin, or on clothing.
Electrically ground all equipment when handling this product.
Retained residue may make empty containers hazardous; use caution!

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:

Ventilation, Respiratory Protection, Protective Clothing, Eye Protection
Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved

air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.
Material must be handled or transferred in an approved fume hood or with equivalent ventilation.
Protective gloves must be worn to prevent skin contact (Neoprene or equivalent)
Safety glasses with side shields must be worn at all times.
Impervious protective clothing should be worn to prevent skin contact.

Work / Hygenic Practices:
Wash thoroughly after handling.
Do not take internally.
Eye wash and safety equipment should be readily available.

EXPOSURE GUIDELINES

OSHA - PEL:

Component	TWA PPM	TWA MG/M3	STEL PPM	STEL MG/M3	CL PPM	CL MG/M3	Ski
Hexane	50	180					
Methylcyclopentane							
CHLORDANE		0.5					X

ACGIH - TLV:

Component	TWA PPM	TWA MG/M3	STEL PPM	STEL MG/M3	CL PPM	CL MG/M3	Skir
Hexane	50	176					
Methylcyclopentane							
CHLORDANE							

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point (C 760 mmHg).: 65C
Melting Point (C).....: -95C
Specific Gravity (H20 = 1).: 0.66
Vapor Pressure (mm Hg).....: 125 20C
Percent Volatile by Vol (%): 100%
Vapor Density (Air = 1)....: 3.0
Evaporation Rate (BuAc = 1): 9.0
Solubility in Water (%)....: Slight
Appearance.....:
Liquid

10. STABILITY AND REACTIVITY

Stability.....: Yes
Hazardous Polymerization:
Does not occur.
Hazardous Decomposition.:
CO_x
Conditions To Avoid.....:
Heat; contact with ignition sources.

Materials To Avoid.....:
( )Water
( )Acids
( )Bases
( )Corrosives
(X)Oxidizers
( )Other :

11. TOXICOLOGICAL INFORMATION

Toxicity Data:
None established

Toxicological Findings:
None
Cited in Registry of Toxic Effects of Substances (RTECS)

12. DISPOSAL CONSIDERATIONS

EPA Waste Numbers: D001
Treatment:
Incineration, fuels blending or recycle. Contact your local permitted waste disposal site (TSD) for permissible treatment

sites.

ALWAYS CONTACT A PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

13. TRANSPORT INFORMATION

DOT Proper Shipping Name...:
Flammable Liquid, n.o.s. (contains Hexane & Methyl Cyclopentane)

14. REGULATORY INFORMATION

TSCA Inventory.....:
This product is a "Mixture". CAS number(s) of component(s) NOT listed on TSCA Inventory.
For Research and Development Use only; Not for Manufacturing or Commercial purposes.

Component	SARA EHS (302)	SARA EHS TPQ (lbs)	CERCLA RQ (lbs)
Hexane			1
Methylcyclopentane			
CHLORDANE	Y	1000	1

Component	OSHA Floor List	SARA 313	DeMinimis for SARA 313 (%)
Hexane	Y		
Methylcyclopentane			
CHLORDANE	Y	Y	1.0

15. OTHER INFORMATION

Comments:
None

NFPA Hazard Ratings:
Health : 1
Flammability : 3
Reactivity : 0
Special Hazards:

Revision History:
04/30/91

N/A = Not Available
N/E = None Established

The statements contained herein are offered for informational purposes only and are based upon technical data that EM SCIENCE believes to be accurate. It is intended for use only by persons having the necessary technical skill and at their own descretion and risk. Since conditions and manner of use are outside our control, we make NO WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

CERTIFIED SPECIFICATIONS and
MATERIAL SAFETY DATA SHEET
Dec. 12 1985

SECTION I PRODUCT SPECIFICATIONS

Cat. No. PS-81-1 [redacted]
CAS No. 959-98-8
Other name- Hexachloro norbornene dimethanol cyclic sulfite-alpha isomer
Supplied by CHEM SERVICE, INC., PO Box 3108, West Chester, PA 19381 (215)692-
Lot No. 11-52A Purity 98% Certified by PS
This is to certify that analysis of this sample was made by various chromatographic, spectral and thermal methods. The procedures used are considered to be STATE OF THE ART. CHEM SERVICE INC. guarantees purity until expiration date on the bottle.

SECTION II TOXICITY HAZARD

Rat or mouse LD50 = 76 mg./kg.

SECTION III PHYSICAL DATA

Melting point: 108-110 C

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash point: Data not available
Extinguishing media- Carbon dioxide, dry chemical powder or water spray

SECTION V HEALTH HAZARD DATA

Toxic
All chemicals should be considered hazardous -direct physical contact should be avoided.

FIRST AID- In case of eye or skin contact, flush with copious quantities of water. If inhaled remove to fresh air- give oxygen if necessary. Contact physician.

SECTION VI REACTIVITY DATA

No known incompatibility with other chemicals.
Low reactivity

SECTION VII SPILL OR LEAK PROCEDURES

Spills or leaks: Since the quantity present in this sample is very small, we do not feel that spills or leaks are a significant problem. A leaking bottle can be placed in a plastic bag and normal disposal procedures followed Solutions or liquid samples can be absorbed on vermiculite or sand.

Waste disposal:
Burn in a chemical incinerator equipped with an afterburner and scrubber .

SECTION VIII PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Use appropriate OSHA/MSHA approved safety equipment. Avoid contact with skin, eyes and clothing. Keep tightly closed and store in cool dry place

SECTION IX SPECIAL PRECAUTIONS AND COMMENTS

The above information is believed to be correct but does not purport to be all inclusive. It should be used as a guide in handling the chemical. We strongly recommend that only those who are properly trained in the safe handling of chemicals be permitted to handle this product in any way. CHEM SERVICE INC. should not be held liable for damages resulting from the misuse or careless use of this product.

CERTIFIED SPECIFICATIONS and
MATERIAL SAFETY DATA SHEET
Dec. 12 1985

SECTION I PRODUCT SPECIFICATIONS

Cat. No. PS-81-2 [redacted]
CAS No. 33213-65-9
Other name- Hexachloro-norbornene dimethanol cyclic sulfite-beta isomer
Supplied by CHEM SERVICE, INC., PO Box 3108, West Chester, PA 19381 (215)696-[illegible]
Lot No. 5-186 Purity 98% Certified by PS
This is to certify that analysis of this sample was made by various chromatographic, spectral and thermal methods. The procedures used are considered to be STATE OF THE ART. CHEM SERVICE INC. guarantees purity until expiration date on the bottle.

SECTION II TOXICITY HAZARD

Rat or mouse LD50 = 249 mg./kg.

SECTION III PHYSICAL DATA

Melting point: 208-210 C

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash point: Data not available
Extinguishing media- Carbon dioxide, dry chemical powder or water spray

SECTION V HEALTH HAZARD DATA

No hazard data is available
All chemicals should be considered hazardous -direct physical contact should be avoided.

FIRST AID- In case of eye or skin contact, flush with copious quantities of water. If inhaled remove to fresh air- give oxygen if necessary. Contact physician.

SECTION VI REACTIVITY DATA

No known incompatibility with other chemicals.
Low reactivity

SECTION VII SPILL OR LEAK PROCEDURES

Spills or leaks: Since the quantity present in this sample is very small, we do not feel that spills or leaks are a significant problem. A leaking bottle can be placed in a plastic bag and normal disposal procedures followed Solutions or liquid samples can be absorbed on vermiculite or sand.

Waste disposal:
Burn in a chemical incinerator equipped with an afterburner and scrubber

ECTION VIII PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
· appropriate OSHA/MSMA approved safety equipment. Avoid contact with skin, s and clothing. Keep tightly closed and store in cool dry place

TION IX SPECIAL PRECAUTIONS AND COMMENTS
bove information is believed to be correct but does not purport to be all sive. It should be used as a guide in handling the chemical. We strongly end that only those who are properly trained in the safe handling of ls be permitted to handle this product in any way. CHEM SERVICE INC. not be held liable for damages resulting from the misuse or careless his product.

CERTIFIED SPECIFICATIONS and
MATERIAL SAFETY DATA SHEET
Dec. 12 1985

SECTION I PRODUCT SPECIFICATIONS

Cat. No. PS-81-3 [redacted]
Supplied by CHEM SERVICE, INC., PO Box 3108, West Chester, PA 19381 (215)696-4
Lot No. 1-96B Purity 99% Certified by RS
This is to certify that analysis of this sample was made by various chromatographic, spectral and thermal methods. The procedures used are considered to be STATE OF THE ART. CHEM SERVICE INC. guarantees purity until expiration date on the bottle.

SECTION II TOXICITY HAZARD

No toxicity data is available. Use special care to avoid contact

SECTION III PHYSICAL DATA

Melting point: 182 C

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash point: Data not available
Extinguishing media- Carbon dioxide, dry chemical powder or water spray

SECTION V HEALTH HAZARD DATA

Carcinogen or cancer suspect agent
All chemicals should be considered hazardous -direct physical contact should be avoided.

FIRST AID- In case of eye or skin contact, flush with copious quantities of water. If inhaled remove to fresh air- give oxygen if necessary. Contact physician.

SECTION VI REACTIVITY DATA

No known incompatibility with other chemicals.
Low reactivity

SECTION VII SPILL OR LEAK PROCEDURES

Spills or leaks: Since the quantity present in this sample is very small, we do not feel that spills or leaks are a significant problem. A leaking bottle can be placed in a plastic bag and normal disposal procedures followed Solutions or liquid samples can be absorbed on vermiculite or sand.

Waste disposal:
Burn in a chemical incinerator equipped with an afterburner and scrubber

SECTION VIII PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Use appropriate OSHA/MSHA approved safety equipment. Avoid contact with skin, eyes and clothing. Keep tightly closed and store in cool dry place

SECTION IX SPECIAL PRECAUTIONS AND COMMENTS

The above information is believed to be correct but does not purport to be all inclusive. It should be used as a guide in handling the chemical. We strongly recommend that only those who are properly trained in the safe handling of chemicals be permitted to handle this product in any way. CHEM SERVICE INC. should not be held liable for damages resulting from the misuse or careless use of this product.

CERTIFIED SPECIFICATIONS and
MATERIAL SAFETY DATA SHEET

SECTION I PRODUCT SPECIFICATIONS

Cat. No. PS-78
CAS No. 76-44-8
Other name- Heptachloro-tetrahydro-methanoindene
Supplied by CHEM SERVICE, INC., PO Box 3108, West Chester, PA 19381 (215)6964166
Lot No. 5-131 Purity 99% Certified by PS
This is to certify that analysis of this sample was made by various chromatographic, spectral and thermal methods. The procedures used are considered to be STATE OF THE ART. CHEM SERVICE INC. guarantees purity until expiration date on the bottle.

SECTION II TOXICITY HAZARD

Rat or mouse LD50 = 147 mg./kg.

SECTION III PHYSICAL DATA

Melting point: 95-96 C

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash point: Data not available
Extinguishing media- Carbon dioxide, dry chemical powder or water spray

SECTION V HEALTH HAZARD DATA

Poison by skin absorption, ingestion or inhalation
All chemicals should be considered hazardous -direct physical contact should be avoided.

FIRST AID- In case of eye or skin contact, flush with copious quantities of water. If inhaled remove to fresh air- give oxygen if necessary. Contact physician.

SECTION VI REACTIVITY DATA

No known incompatibility with other chemicals.
Low reactivity

SECTION VII SPILL OR LEAK PROCEDURES

Spills or leaks: Since the quantity present in this sample is very small, we do not feel that spills or leaks are a significant problem. A leaking bottle can be placed in a plastic bag and normal disposal procedures followed Solutions or liquid samples can be absorbed on vermiculite or sand.

Waste disposal:
Burn in a chemical incinerator equipped with an afterburner and scrubber

SECTION VIII PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Use appropriate OSHA/MSMA approved safety equipment. Avoid contact with skin, eyes and clothing. Keep tightly closed and store in cool dry place

SECTION IX SPECIAL PRECAUTIONS AND COMMENTS

The above information is believed to be correct but does not purport to be all inclusive. It should be used as a guide in handling the chemical. We strongly recommend that only those who are properly trained in the safe handling of chemicals be permitted to handle this product in any way. CHEM SERVICE INC. should not be held liable for damages resulting from the misuse or careless use of this product.

APPENDIX A-3

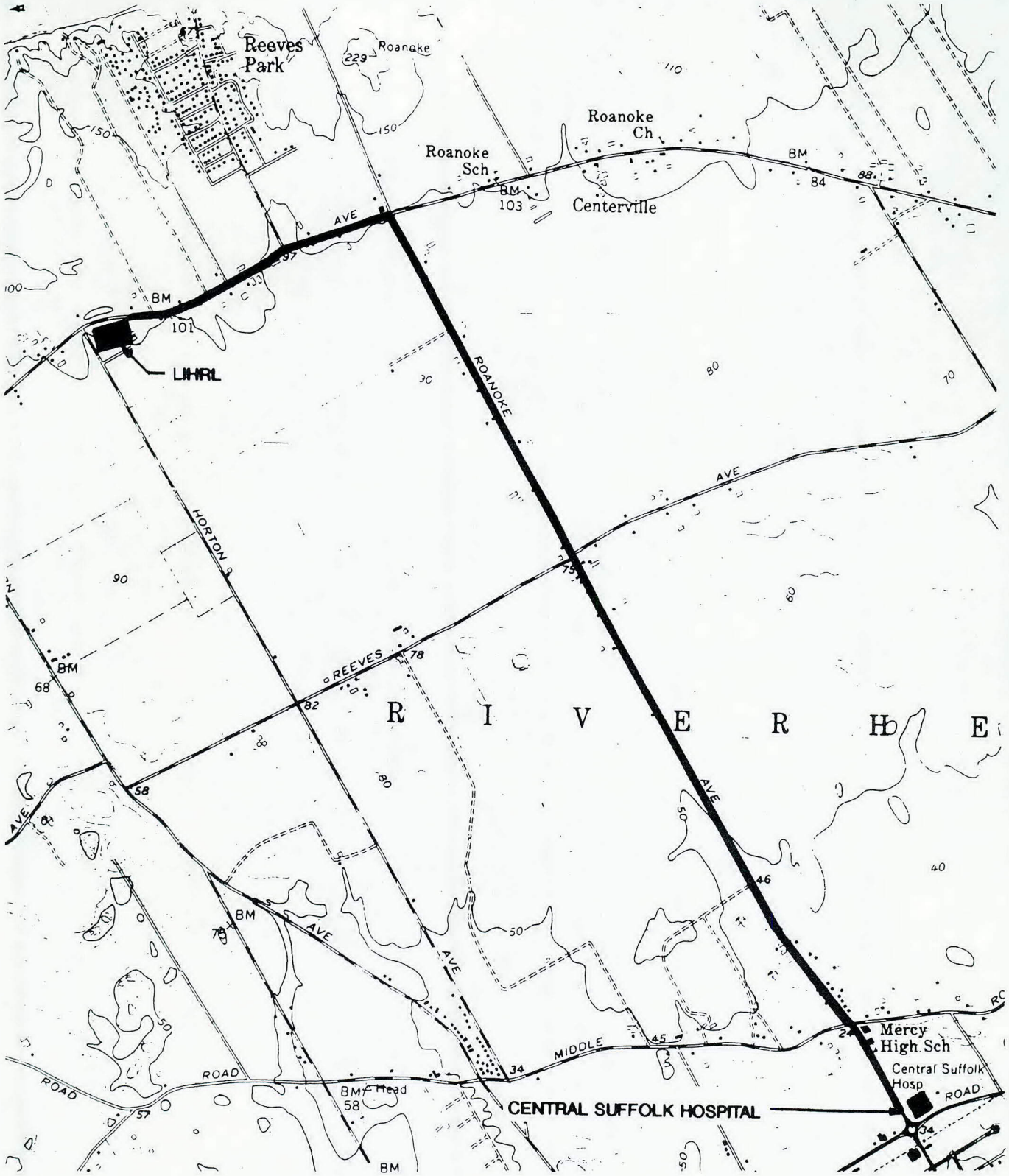
EMERGENCY RESPONSE INFORMATION

EMERGENCY TELEPHONE NUMBERS

All Emergency Rescue Services (Police, Fire, Ambulance)	911
Fire Department (non-emergency)	(631) 727-2751
Riverhead Police (non-emergency)	(631) 727-4500
NYSDEC Emergency Spill Response:	(631) 444-0320
Central Suffolk Hospital (non-emergency)	(631) 548-6000
H2M Project Manager: Christopher J.Flynn	(631) 756-8000, ext. 1484
Health & Safety Manager: Gary Miller	(631) 756-8000, ext.1620

DIRECTIONS TO HOSPITAL

From the LIHRL, turn right (east) onto Sound Ave. Go one block (approximately 0.9 miles) and turn right (south) onto Roanoke Ave. Take Roanoke Ave. south approximately 2.7 miles. The hospital is on the left side of the road. The hospital route map is attached.



SOURCE: USGS 7.5' QUADRANGLE

SCALE: 1" = 2000'

APPENDIX B

METES AND BOUNDS

DESCRIPTION OF THE "SITE"

Proposed Legal Description for Cornell University
Long Island Horticultural Laboratory *STUDY AREA.*
(encompassing dry well, evaporation pit & drain area)

Commencing at the Point of Beginning; said point being on the Easterly side of Horton Avenue near the Southwesterly corner of Land of Cornell University and being the following three courses and distances from the corner formed by the northerly side of Reeves Avenue and the Easterly side of Horton Avenue;
North 32°39'05" West, a distance of 2092.18 feet;
thence North 32°06'35" West, a distance of 1415.51 feet;
thence North 33°02'50" West, a distance of 279.74 feet to a point;

Thence from said Point of Beginning; along the Easterly side of Horton Avenue North 33°02'50" West, a distance of 400.00 feet;
thence North 56°50'05" East, a distance of 400.00 feet;
thence South 33°02'50" East, a distance of 400.00 feet;
thence South 56°50'05" West, a distance of 400.00 feet to the Point of Beginning. Containing 3.7 ACRES, more or less.

APPENDIX C

SAMPLE CHART

GROUNDWATER INVESTIGATION

AND

SOIL REMEDIATION

CORNELL UNIVERSITY – LIHREC
CALVERTON, NEW YORK

Sample Matrix	No. of Samples	Analysis Methods	Data Reporting Level
Groundwater	10	TCL Pesticides, EPA Method 8081	NYSDEC ASP Category B
Quality Assurance/ Quality Control	2 Trip Blanks	TCL Pesticides, EPA Method 8081	NYSDEC ASP Category B
Quality Assurance/ Quality Control	2 Equipment (*Field*) Blanks	TCL Pesticides, EPA Method 8081	NYSDEC ASP Category B
Quality Assurance/ Quality Control	2 Matrix Spike/ Matrix Spike Duplicates	TCL Pesticides, EPA Method 8081	NYSDEC ASP Category B

APPENDIX D

COMMUNITY AIR MONITORING PLAN

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all <u>ground intrusive</u> activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

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APPENDIX E

PROJECT PERSONNEL RESUMES

GARY J. MILLER, P.E.

Vice President, Director of Environmental Services

PROFESSIONAL EXPERIENCE

H2M (1980 - Present)

EDUCATION

B.S., Engineering Technology and Civil-Environmental, Virginia Polytechnic Institute and State University, 1976

A.S., Mechanical Technology, CUNY-Queensborough Community College, 1974

Dale Carnegie Leadership Training for Managers Course, 2000

REGISTRATION/CERTIFICATIONS

Licensed Professional Engineer- New York, 1989

Hazardous Materials Manager - Master Level

Health and Safety Operations at Hazardous Waste Sites (OSHA)

Asbestos Abatement Inspector/ Management Planner/Project Designer

MEMBERSHIPS

Air and Waste Management Association

Hazardous Waste Action Coalition

Institute of Hazardous Materials Management

Water Pollution Control Federation

PROFESSIONAL PAPERS

Miller, Gary J. **Closure of Industrial Facilities Containing Hazardous Wastes.** New York Water Pollution Control Association, Winter Meeting, January 1989.

Miller, Gary J. **Design of Hazardous Materials Storage Facilities.** Spill Control and Hazardous Materials Conference, New Haven, Connecticut September 1983.

Mr. Miller has over 20 years experience in the field of environmental engineering covering a broad range of projects including solid and hazardous waste management, water and wastewater treatment, air pollution control, hazardous material storage, groundwater investigations and site remediation. As head of H2M's Environmental Engineering Division, Mr. Miller oversees and provides technical direction on major environmental projects.

His experience at H2M includes all aspects of project engineering and management including engineering studies, economic analyses, treatability studies, design, construction and startup. He has been responsible for projects ranging from landfill leachate collection and methane venting systems for municipal clients to wastewater treatment, air pollution control and hazardous waste management for private industrial clients.

He also has extensive experience inspecting and auditing industry for environmental compliance. He has worked closely with a spectrum of industries including petrochemical, pharmaceutical, food processing, printing, metal finishing and plating, printing circuit board and electronics, semiconductor, communications and commercial waste treatment. He is a specialist in assisting industrial clients with RCRA and other regulatory compliance programs including the storage and handling of hazardous materials, hazardous material response, and health and safety issues.

Mr. Miller has directed numerous site investigations utilizing a variety of techniques including soil gas surveys, geophysical surveys, soil borings, monitoring wells and groundwater modeling to assess environmental impacts and implement effective remediation programs. Site investigation projects have ranged from Phase I and II environmental assessments as part of property transactions to remedial investigations/feasibility studies at state and federal Superfund sites. Selected experience includes:

- Study of wastewater collection, treatment, disposal facilities for the NYC Transit Authority. Inspections and sampling of fueling, washing, maintenance, repair and painting facilities at 20 bus depots of varying sizes and age located in NYC's five boroughs.
- Preparation of design plans and specifications for bulk chemical storage facilities at Pall Corporation's East Hills manufacturing facility. Design elements included indoor and outdoor bulk storage tanks, containerized and gas cylinder storage, spill containment, automated chemical distribution and inventory control systems.
- Preparation of RCRA permit application, including personnel training program, waste analysis plan, contingency plan and closure plan for a waste solvent reclamation facility. The application was approved and a permit issued by the USEPA.
- Hazardous waste lagoon closure at a northern New Jersey manufacturing facility. The project involved developing a NJDEP approved closure plan, technical specifications and bid documents, and directing the closure of five lagoons containing over 250,000 gallons of hazardous wastes.

(continued)

- Phase II site investigation at a Suffolk County, New York metal plating facility, conducted under an order-on-consent with the NYSDEC. Investigation included an evaluation of suspected source areas, a groundwater monitoring program and preparation of the site's HRS score.
- Preparation of engineering reports, design plans and specifications for upgrade of a 60,000 gpd industrial wastewater treatment system at a Long Island metal finishing facility.
- RCRA closure of a large manufacturing facility in Poughkeepsie, New York. The closure work included a series of soil borings and monitoring wells to examine soil and groundwater quality of the site. H2M also evaluated alternative methods for dealing with petroleum contaminated soils. Alternatives included off-site disposal, off-site treatment and in-situ bioremediation.
- Remedial investigation at an automobile parts manufacturing facility in Queens County, New York. The project involved development of work plans, including HASP, field sampling and quality assurance/quality control, and the installation of soil boring and monitoring wells to assess the nature and extent of site contamination.
- Remedial design studies at a major NPL Superfund site in Massachusetts. As part of a multi-consultant remedial design team, H2M developed and implemented a field testing program to measure gaseous emissions from a specific source area. H2M also developed and implemented a groundwater treatability study assessing oxidation and air stripping as the primary unit treatment operations and biological treatment and ion-exchange as polishing operations.
- Preparation of design plans, technical specifications and bid documents for a soil vapor extraction system designed as the final phase of an ongoing remediation program at the site of a former manufacturing facility.
- Feasibility study at a State Superfund Site in Hicksville, New York. The feasibility study evaluated various alternatives, including soil vapor extraction, air sparging and bioremediation for the in-situ treatment of soil impacted by chlorinated solvents.

Prior to joining H2M, Mr. Miller was an operations manager involved in the mechanical and electrical checkout and startup of multiple hearth furnaces, waste heat boilers, wet scrubbers and sludge handling equipment. He was also responsible for operations training, performance, emissions and acceptance tests and served as construction superintendent responsible for coordination and supervision of all subcontractors and vendors in the construction of Nichols Herreshoff multiple hearth carbon regeneration, lime recalcining and sludge incinerators. ■

CHRISTOPHER J. FLYNN

Project Hydrogeologist

PROFESSIONAL EXPERIENCE

H2M (1984 - Present)

EDUCATION

B.S., Wildlife/Fisheries, Minor in Biology, Frostburg State College, 1984

A.A.S., Natural Resources Conservation, Community College of the Finger Lakes, 1981

CERTIFICATION

Health and Safety Operations at Hazardous Waste Sites (OSHA)

As a hydrogeologist, Mr. Flynn specializes in site investigation and remediation projects. He is responsible for soil gas surveys, environmental assessments, groundwater studies, underground storage tank removals, hazardous waste removal and disposal projects, and oil/gasoline spill remediation. Mr. Flynn is experienced in field sampling and oversight, and is certified for Health and Safety Operations at Hazardous Waste Sites.

Mr. Flynn's recently completed projects include:

- Removal and installation of underground chemical storage tanks at an industrial facility, excavation and disposal of 70,000 cubic yards of construction and demolition debris at an illegal dump site, oil spill investigations for NYCHA facilities
- Obtained NYSDEC spill closure approvals for former industrial facility, former NYC bus maintenance garage, and volunteer fire department property.
- Conducted large site remediation for industrial facility involving drum and container removal, sanitary system remediation, underground storage tank removals, and disposal of petroleum contaminated soils.
- Obtained NYSDEC approval for contained-in non-hazardous determination for 500 tons of contaminated soils at active industrial facility.
- Conducted gasoline spill investigation and remediation at former service station site. Directed excavation of 300 tons of contaminated soil and removal of 10,000 gallons of contaminated groundwater. Obtained and received NYSDEC spill closure approval. Afterwards, construction of a 60-story apartment building proceeded.
- Directed excavation and removal of underground storage tanks and contaminated soils in former New York City parking garage.
- Directed investigation and remediation of former New York City bus fueling and wash facility. Obtained NYSDEC approval for free product removal as compared to soil excavation, resulting in approximately $100,000 cost savings to client.

Prior to joining H2M, Mr. Flynn was a fishery technician for U.S. Army Corps of Engineers involved in the radio tracking of upstream progress of salmon spawning runs. ■

LYNN T. DANIELLO

QA/QC Manager, Project Manager

PROFESSIONAL EXPERIENCE

H2M (1984 - Present)

EDUCATION

Graduate study in Geophysics, Texas A&M University

B.S., Earth Science, Adelphi University

MEMBERSHIPS

Geological Society of America

Ms. Daniello's responsibilities include the day to day management of laboratory procedures and reporting of results. Her duties include the monitoring of performance standards in QC and QA, monitoring the validity of the analysis performed in the laboratory and the data generated to assure reliable results and to provide technical guidance and education and direction to the laboratory staff.

She is project officer and primary contact for our routine analytical services contract with the New York City Department of Sanitation. She has successfully completed courses in Microsoft Access for the development of automating various client electronic deliverables.

Prior experience at H2M included wet chemical analyses on water and wastewater samples. She is proficient in both routine and CLP analyses and reporting for phenols, cyanide and metals and primary operator of the Technicon inorganic analyzer. She assisted in the bacteriology laboratory in recording and interpreting results, operated the Applied Research Laboratories ICP and was special project coordinator for the inorganic chemistry section. She successfully completed an Applied Research Laboratories 3410 ICP training course and the New York State Department of Health basic environmental health course. ■

APPENDIX F

NYSDEC DIVISION OF ENVIRONMENTAL REMEDIATION: GUIDANCE DOCUMENT FOR THE DEVELOPMENT OF DATA USABILITY SUMMARY REPORTS

New York State Department of Environmental Conservation
Division of Environmental Remediation

Guidance for the Development of Data Usability Summary Reports

Background:

The Data Usability Summary Report (DUSR) provides a thorough evaluation of analytical data without the costly and time consuming process of third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use.

Though the substitution of a DUSR for a full third party data validation may seem to be a relaxation of the Division's quality assurance requirements, this is definitely not the case. The development of the DUSR must be carried out by an experienced environmental scientist, such as the project Quality Assurance Officer, who is fully capable of conducting a full data validation. Furthermore, the DUSR is developed from a full New York State Department of Environmental Conservation Analytical Services Protocol (NYSDEC ASP) Category B or a United States Environmental Protection Agency Contract Laboratory Protocol (USEPA CLP) deliverables package.

The DUSR and the data deliverables package will be reviewed by the Division's Quality Assurance Unit. In most cases, we expect that this review will result in agreement or with only minor differences that can be easily reconciled. If data validation is found to be necessary (e.g. pending litigation) this can be carried out at a later date on the same data package used for the development of the DUSR.

Personnel Requirements:

The Environmental Scientist preparing the DUSR must hold a Bachelors Degree in a relevant natural or physical science or field of engineering and must submit a resume to the Division's Quality Assurance Unit documenting experience in environmental sampling, analysis and data review.

Preparation of a DUSR:

The DUSR is developed by reviewing and evaluating the analytical data package. During the course of this review the following questions must be asked and answered:

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

2. Have all holding times been met?

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

4. Have all of the data been generated using established and agreed upon analytical protocols?

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

6. Have the correct data qualifiers been used?

Evaluation of NYSDEC ASP Matrix Spike Blank (MSB) data - If the MSB recovery is less than the ASP criteria, the positive results should be qualified as J, estimated biased low. If the MSB recovery is less than the ASP criteria, but greater than 10%, the nondetects should be qualified J, biased low. If the MSB recovery is less than 10%, the nondetect data must be rejected.

Any Quality Control exceedances must be numerically specified in the DUSR and the corresponding QC summary sheet from the data package should be attached to the DUSR.

All data that would be rejected by the EPA Region 2 Data Validation Guidelines must also be rejected in the DUSR.

Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples and the analytical parameters. Data deficiencies, analytical protocol deviations and quality control problems are identified and their effect on the data is discussed. The DUSR shall also include recommendations on resampling/reanalysis. All data qualifications must be documented following the NYSDEC ASP '95 Rev. guidelines or the EPA Region 2 data validation guidelines.

Contact Tim LeBarron of the Division of Environmental Remediation Quality Assurance Group at (518) 457-3363, with any questions on the preparation of a DUSR.

Revised 9/00

H2M GROUP

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