QUALITY ASSURANCE PROJECT PLAN

VENUS ESTATES
90-11 31ST STREET
QUEENS, NEW YORK 11369
NYS DEC SPILL NO. 0800899

H2M Project No.
GIAM 0901

APRIL 2011

Prepared For:

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Department of Environmental Conservation
(NYS DEC)

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VENUS ESTATES, INC.
90-11 31ST STREET
JACKSON HEIGHTS, QUEENS, NEW YORK

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1.0 PROJECT DESCRIPTION

Holzmacher, McLendon, and Murrell, P.C. (H2M) has prepared this Quality Assurance Project Plan (QAPP) to address sampling activities to be performed as part of a Site Characterization Workplan (SCW) at Venus Estates, Inc. (Site No. 241120) located at 90-11 31st Street, Queens, New York.

This QAPP presents procedures to be followed during the sampling and analysis program as well as project organization and personnel responsibilities necessary to carry out these practices. Quality Assurance / Quality Control (QA/QC) and data validation requirements are also summarized in this plan. The site characterization work is being conducted in accordance with the executed Order of Consent and Administrative Settlement dated November 10, 2010 (Index No. R2-0651-10-10).

Based upon information obtained from a site walkthrough and previous reports, Venus Estates is a storefront located in a small urban strip mall that was constructed in 1932 and is identified as Block 1388, Lot 36 on the tax map. The property is rectangular in shape and is predominantly covered by the existing structure, however there is a pedestrian sidewalk to the front and a small vegetated yard to the rear. The building has a basement beneath a portion of the main level utilized for storage and location of the building's boiler.

The leasehold space that is the subject of the environmental issue on-site is New York Dry Cleaners (NYDC). The facility has not performed dry cleaning operations onsite in the past several years and operates as a drop shop where dry cleaning activities are performed offsite.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

H2M, as a professional engineering corporation, has been retained by NYDC to provide environmental consulting services to perform activities summarized within the Site Characterization Workplan Addendum dated March 2011.

For projects involving a field investigation program, a project team is assembled with each team member responsible for specific elements of the work. To ensure that every project is completed with the highest degree of quality, each member of the project team must be aware of the quality assurance objectives for his/her specific element of the work.

The Principal-in-Charge is the direct contact between H2M and the client. The Principal-in-Charge is responsible for overall project technical direction and quality assurance, including:

- Defining project objectives;
- Allocation of resources;
- Establishing chains of command; and
- Periodic evaluation of project.

H2M's Project Manager is responsible for directing and overseeing all technical and administrative elements of the project. This includes:

- Day to day direction, communication and coordination with the project team;
- Review of all project documents;
- Monitoring overall work progress, schedules, project costs; and
- Day to day direction of QA/QC activities.

Reporting directly to the Project Manager is the Field Team Supervisor, who is responsible for directing all field investigation activities. Depending upon the specific project requirements, the field investigation/sampling work is carried out by staff engineers, geologists, hydrogeologists, wetlands specialists, wildlife specialists and/or field technicians.

The Field Team Supervisor is responsible for ensuring that the work performed by the field investigation staff is carried out in a manner consistent with the project QA requirements. Project QA requirements are specified by the NYSDEC and/or the executed consent order. The Field Team Supervisor is also responsible for direction and coordination of subcontractors, which may be utilized for surveying, drilling and geophysical investigations, and acts as an intermediary between the field staff and the analytical laboratory

The Quality Assurance Officer (QAO) operates independently of the Project Manager, reporting directly to the Principal-in-Charge. The primary responsibilities of the QAO are as follows:

- Assist in the development of the work plan and evaluate its effectiveness;

- Monitor work to ensure conformance with the requirements of the work plan;
- Evaluate the need for and, if necessary, conduct field and laboratory QA audits;
- Supervise data validation and review all report deliverables.

3.0 QA OBJECTIVES FOR DATA MEASUREMENT

The primary aim of this plan is to establish the procedures to be followed by project personnel when conducting field sampling and analysis. Quality assurance requires careful planning, organization and the dedication of every member of the firm to the concepts of QA/QC. This must be accompanied by the understanding and coordination of the roles of all personnel involved in a particular project, if this quality objective is to be met. The overall QA objective for the partial closure sampling and analysis associated with the NYDC building is to produce data at the highest level to provide direct support for determining the environmental quality of the areas in question.

4.0 FIELD SAMPLING

Based on communications with Mr. Kevin Sarnowicz of the NYSDEC during a March 30, 2011 telephone conversation the field sampling plan associated with the proposed phase of work is to perform a groundwater investigation in order to determine whether contamination is originating from an off-site source. Groundwater samples will be collected from four (4) temporary monitoring wells surrounding the subject property. There is the potential that these monitoring wells may be installed as permanent wells which will be dependent on the final cost proposals received from contractors.

4.1 Sampling Methodology

Soil borings in regards to the NYDC site will be conducted utilizing direct-push drilling methods in accordance with American Society for Testing and Materials (ASTM) D6282-98, Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations." A Geoprobe® unit will be employed in conjunction with 2-inch outside diameter (OD) cylindrical "macro-core" barrels. The core barrels, fitted with a cutting shoe, will be advanced with a hydraulic drive hammer into the ground to the desired sampling depth. The macro-core sampler will extract samples into the barrel fitted with an acetate liner. As the barrels are removed from the ground, the acetate liner will be removed to permit field screening, soil classification and sample collection. Field screening will include an inspection for visual and olfactory evidence of contamination and field testing with a portable photoionization detector (PID).

Non-dedicated sampling equipment that requires re-use will be cleaned and decontaminated using the following procedure:

1) Detergent wash (e.g., Alconox®) and potable tap water rinse,
2) Double rinse with distilled deionized water.

All decontamination fluids and rinse water will be collected and characterized for proper disposal.

Soil borings will be recorded by the on-site field personnel. Physical characteristics will be documented using preprinted boring log forms, as shown in Appendix A, and will include the following:

- Project name, location and job number,
- Date of boring (start, finish),
- Boring number and driller,
- Sample number and depth,
- Method of advancing sampler,
- Type and size of sampler,
- Description of soil,
- Thickness of observed layers,
- Type and make of equipment (i.e., drill rig, etc.) used, and
- Identification of any samples collected and submitted for laboratory analysis.
-

Soil boring descriptions will be made in accordance with the Burmister Classification System.

4.2 Sampling Plan

Following installation the TWP's will be allowed to stabilize for a period of 24-hour in which purge and sampling will be conducted using a stainless steel submersible style pump via low-flow methodology. During purge Water Quality Indicator Parameters will be recorded at 5-minute intervals at which time parameters have appeared to stabilize over three (3) consecutive readings groundwater samples for submission to New York State Department of Health's Environmental Laboratory Approval Program (ELAP) certified laboratory under chain of custody for chlorinated volatile organic compound analysis (CVOCs) via EPA Method 8260 or equivalent. A trip blank and field blank will be collected and analyzed for Quality Assurance/Quality Control (QA/QC) purposes. All of the planned sampling locations are shown on **Figure 2**.

5.0 DOCUMENTATION AND CUSTODY

Sample preparation, documentation and custody are important elements of any QA/QC program. Without proper sample preparation and accurate documentation and tracking of sample custody, even well planned and properly implemented field sampling programs can generate data open to interpretation. For the purposes of this QA Plan, sample preparation and custody include containerization, preservation, container transfer to field personnel, field handling and sample custody, sample transfer to the laboratory, and internal laboratory custody during sample analysis.

Sample custody is initiated at the designated laboratory where appropriate sample containers and preservatives, if required, are compiled for use by field personnel.

5.1 Sample Containers

Sample containers are provided by the designated laboratory. The proposed scope of analyses performed during field and sampling investigations necessitate the use of 40-ml glass vials. Container materials are selected so that there will be no interference with the analysis to be performed on the given sample. Each sample container will have a label that contains the information necessary to identify the sample. Care must be taken to ensure that the sample locations identified on the Sample Request Form precisely match those on the container and the Chain of Custody. The information to be provided on the container label will include the following, at a minimum:

- A unique laboratory identification number,
- Sample identification,
- Sample location (and depth, if appropriate),
- Sampler's name,
- Date and time of collection, and
- Identification of any preservatives, if applicable.

Sampling bottles to be utilized during this investigation are laboratory prepared using approved cleaning techniques with quality control certified by the vendor. The bottles used will be verified as non-contaminated by filling representative bottles with distilled water and analyzing the bottles for the parameters that would be analyzed using the specific bottle type. If any analytes are detected, the entire affected lot will be discarded and not used until the source of contamination is identified and remedied. Verification data is maintained on file at the laboratory.

5.2 Sample Preservation

Sample preservation is dependent upon the specific type or suite of analyses to be performed. A summary of sample container types and preservation methods is presented in Section 7.2. Sample preservatives will be added in the laboratory prior to shipment and identified on the sample bottle labels. Field personnel are responsible for verifying the addition of preservatives by visually examining the sample bottles, sample bottle labels, and the chain of custody. Any discrepancies will be reported immediately to the laboratory and field personnel will not use the bottles in question.

After samples are collected and transferred into their respective sample bottles by field personnel, the samples are packed on ice, maintained at 4°C, and delivered to the laboratory within twenty-four hours of collection. Samples will be maintained in a refrigerator (4°C) in the laboratory prior to analysis.

5.3 Preparation of Sample Bottles and Coolers

Coolers used for sample transport will be scrubbed clean prior to use with a non-contaminating detergent followed by a thorough rinse with organic-free distilled water. Coolers will then be dried before packing and use. All sample bottles are purchased new and specially cleaned and certified by the vendor. All glass containers to be used will be individually packaged in "bubble-wrap" to prevent breakage during transport.

5.4 Custody Transfer to Field Personnel

A standard chain of custody form is utilized for documenting the receipt, tracking and compilation of sample data. The chain of custody (COC) procedure begins with the preparation of the sample bottles. After the sample bottles have been prepared, the cooler to be used will be sealed with custody tape and an external chain of custody form prepared. At a minimum, the following information will be included on the COC at the time of shipment to field personnel:

- Container types including preservatives, if required;
- Number of containers required at each sample location for each analysis, including matrix spike/matrix spike duplicates (MS/MSD), trip blanks and field blanks;

- Any distinctive sample identification requirements;
- Sample custodian's signature with a date and time of relinquishment;
- Receiver's signature with a date and time of receipt.

Sample coolers will be provided to H2M directly from the laboratory. At this point, field personnel are in custody of the sample bottles.

5.5 Custody Transfer to Laboratory

Upon completion of field sampling, field personnel pack sample bottles, including any blank or duplicate samples, and seal the cooler with custody tape. Any breakage of bottles must be noted on the comment section of the COC. If lab prepared glassware is not to be submitted back to the laboratory for analysis, the line designating the unused sample bottles must be crossed-out with a single line through the entry, and the correction initialed by the person in custody of the samples. All corrections to the COC must be made with a single line through the incorrect entry and must be accompanied by the initials of the person in custody of the samples.

Field personnel must verify that the identification labels on the sample bottles and the COC are identical, and that all sample bottles are accounted. Any discrepancies must be resolved before relinquishing custody of the samples. Once the field personnel are satisfied that the samples are ready for submittal to the lab, the cooler will be returned to the laboratory.

Upon receipt of the sample cooler at the laboratory, the sample custodian examines the exterior of the cooler to ensure that sample integrity has not been impacted. Once the laboratory is satisfied that the sample integrity has not been compromised, a lab sample custodian signs and dates the COC to acknowledge receipt of the samples. The field personnel, when hand delivering samples, shall also sign and date the COC acknowledging that they have transferred custody of the samples to the laboratory.

6.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLES

There are generally three types of QA/QC samples collected during field sampling programs: blank samples, duplicate samples, and spiked samples. Each of these types of samples serves a specific purpose. Blank samples provide a measure of contamination that may have been introduced into a sample set in either of two ways:

- in the field while the samples were being collected or transported, or
- in the laboratory during sample preparation or analysis.

Duplicate samples provide a quantitative measurement of the reproducibility of sample results and as such, provide a mechanism for measuring the accuracy of sample collection and laboratory analysis procedures.

Spiked samples can be used in several ways; the most common of which are the determination of parameter recoveries and reproducibility of results. Parameter recoveries are important in discussing data usability and the possible use of pseudo-correction factors for site sample results. Under this investigation only blank samples will be utilized.

6.1 Blanks

There are four basic types of blank samples: trip blanks, field blanks, laboratory calibration blanks, and laboratory reagent (or method) blanks. Only trip blanks and field blanks are utilized by field sampling personnel.

Trip blanks are used to indicate potential contamination due to migration of volatile organic compounds (VOCs) from the air on the site or in the sample shipping containers into the sample. A trip blank consists of laboratory distilled and deionized water in a 40 ml glass vial sealed with a Teflon septum. The blank accompanies the empty sample bottles to the field as well as the samples returning to the laboratory for analysis.

Field blanks, also identified as “equipment blanks,” are used to determine if certain field sampling or cleaning procedures (e.g., decontamination of field equipment) result in cross-contamination of site samples. Like the trip blank, the field blank is a sample of distilled and deionized water taken to the field with empty sample bottles and analyzed with the site samples. However, unlike the trip blank, the field blank sample is prepared in the field. The field blank will be poured through or over the sampling equipment after the equipment has been decontaminated. The field blank will be containerized and labeled in the same manner as other site samples. One (1) field blank per 20 field samples will be collected and submitted to the laboratory for the same analysis parameters as the field samples.

7.0 ANALYTICAL PROCEDURES AND LABORATORY TESTING

7.1 Analytical Laboratory

Environmental samples will be analyzed by H2M Labs, Inc., a New York ELAP approved and ASP certified laboratory.

7.2 Sample Analysis

All groundwater will be analyzed by H2M Labs and will include a NYSDEC ASP category B data package that documents the quality of the analytical work. A summary of the desired parameters, methods of analyses, required sample container, preservative and maximum holding time is shown in Table 7.2.1 for water matrices. The sample containers required for VOC analysis will be filled so that there is no headspace in the sample container. Water sample containers for VOC's will be sealed with Teflon lined septum cap.

Table 7.2.1. Water Matrix Analysis Requirements and Methods

Parameter	Method	Container	Preservative	Max. Holding Time*
VOCs	ASP 2000 8260 B	(2)-40 ml vial	Cool, 4°C; HCl to pH<2	7 days

*All holding times from VTSR as per NYSDEC ASP Category B.

8.0 CALIBRATION PROCEDURES

8.1 Calibration Practices

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

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

There are two types of calibration pertinent to the laboratory procedures to be utilized during the analysis of samples from the NYDC investigation. These are operational and periodic.

1) Operational calibration which is routinely performed as part of the instrument usage, such as the development of a standard curve for use with an Atomic Absorption (AA) Spectrophotometer or Inductively Coupled Plasma (ICP) Spectrophotometer. Operation calibration is generally performed for instrument systems.

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

Whenever possible recognized procedures, such as those published by ASTM, USEPA, or the equipment manufacturers shall be utilized.

8.2 Calibration Frequency

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

8.3 Calibration Reference Standards

Two (2) types of reference standards are used by H2M Labs for calibration. These are physical and chemical.

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

2) Chemical Standards are primarily used for operational calibration.

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

8.4 Calibration Failure

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

8.5 Calibration Records

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

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

1) The calibration data can be kept with analytical sample data.
2) A logbook can be prepared for each instrument that contains all calibration data.

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

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

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

9.0 DATA REDUCTION, VALIDATION AND REPORTING

9.1 Data Reduction

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

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

9.2 Data Usability & Validation

Data validation is a process in which field and analytical data quality is assessed relative to the data quality objectives. The validation process examines the acceptability or validity of data, and assesses data usability. Although data validation usually refers to analytical laboratory data, the same review process is applied to all field-generated data.

In order to ensure that data collected in the field is consistent and accurate, standard reporting forms are utilized. These forms are then checked by the Field Team Supervisor to confirm that the information is complete and that any calculations are correct. A minimum of 20% of the field data reports is checked in this manner. If, during the initial review process, errors are identified, the remaining 80% of the data set are reviewed. Items to be checked by the reviewer will be dependent on the type of data being reported, but in general include the following:

- Proper sampling methods and equipment were employed
- Proper sample preservation methods were followed
- Chain of custody information is complete
- Proper QA/QC samples were utilized.
- Equipment decontamination procedures were followed, and
- Instruments were properly calibrated.

The final analytical laboratory category B data package generated as part of the planned partial closure activities at Watson will be evaluated for data validation by a third party.

9.3 Data Reporting

The following are applicable to data presentation:

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

2.) Data presentation will include:

   a) Sample identification number used by H2M Labs and/or the sample identification provided to the laboratory (if different).

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

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

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

   e) Results of QA/QC sample analysis, if appropriate.

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

The format for reporting will follow the NYSDEC ASP category B data package.

QAPP APPENDIX A

SOIL BORING LOG FORM

H2M Associates, Inc.
Phone: (862) 207-5900 / Fax (973) 334-0507

WELL / SOIL BORING LOG

Project:
Location:
Drilling Contractor:
Driller/Helper:
H2M Representative:
Boring Location:

Date:
Boring Dia.
Casing Dia.
Depth of Well:
Sample Type:
Screened Int:
HammerWt/Fall:
Drill Rig:
Drill Method:
Well Permit #:

Depth (feet)	Sample #	Blows/6"	Recovery (in)	Moist Cont.	PID	Depth of Change	Soil Identification	Remarks	Well Const.
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
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QAPP APPENDIX B

QC LIMITS FOR SPIKING AND SURROGATE COMPOUND

Volatile Organic Compounds (VOCs), Method 8260B - Water (ug/l)

Lab Fortified Blank (LFB)		QC Limits (%R)	
Analyte	Spike Concentration	Low	High
1,1,1-Trichloroethane	50	66	126
1,1,2,2-Tetrachloroethane	50	77	120
1,1,2-Trichloroethane	50	82	116
1,1-Dichloroethane	50	77	114
1,1-Dichloroethene	50	67	120
1,2-Dichloroethane	50	76	120
1,2-Dichloroethene (total)	100	78	128
1,2-Dichloropropane	50	81	115
2-Butanone	50	74	121
2-Hexanone	50	76	119
4-Methyl-2-pentanone	50	79	121
Acetone	50	71	125
Benzene	50	77	116
Bromodichloromethane	50	78	118
Bromoform	50	75	121
Bromomethane	50	50	136
Carbon disulfide	50	61	126
Carbon tetrachloride	50	64	126
Chlorobenzene	50	72	124
Chloroethane	50	71	116
Chloroform	50	75	119
Chloromethane	50	70	114
cis-1,3-Dichloropropene	50	79	116
Dibromochloromethane	50	75	125
Ethylbenzene	50	68	128
Methylene chloride	50	80	112
Styrene	50	72	124
Tetrachloroethene	50	59	133
Toluene	50	70	125
trans-1,3-Dichloropropene	50	77	120
Trichloroethene	50	72	121
Vinyl chloride	50	66	117
Xylene (total)	150	78	133

VOCs (continued), Method 8260B - Water (ug/l)

MS/MSD		QC Limits (%R)		RPD
Analyte	Spike Concentration	Low	High	
1,1-Dichloroethene	50	61	145	14
Benzene	50	76	127	11
Chlorobenzene	50	75	130	13
Toluene	50	76	125	13
Trichloroethene	50	71	120	14

Surrogates		QC Limits (%R)	
Analyte	Spike Concentration	Low	High
1,2-Dichloroethane-d4	50	76	114
4-Bromofluorobenzene	50	86	115
Toluene-d8	50	88	110