Flushing Industrial Park, Parcels 1, 2 and 3

FLUSHING, NEW YORK

Quality Assurance Project Plan

AKRF Project Number: 30141

NYSDEC BCP Site Numbers: C241051, C241078 and C241079

College Point Boulevard and 40th Road
Flushing, New York

Prepared for:

C.E. Flushing, LLC
118-35 Queens Boulevard
Forest Hills, NY 11375

Prepared by:

AKRF Engineering, P.C.
440 Park Avenue South
New York, NY 10016
212-696-0670

NOVEMBER 2007

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was prepared by AKRF Engineering, P.C. (AKRF), on behalf of C.E. Flushing, LLC, in accordance with the requirements in New York State Department of Environmental Conservation (NYSDEC) Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002, and the guidelines provided by NYSDEC. The QAPP describes the protocols and procedures that will be followed during activities under the Site Management Plans (SMPs) for Flushing Industrial Park (Eastern), Parcel 1 (BCP Site No. C241051), Flushing Industrial Park (Western), Parcel 2 (BCP Site No. C241078), Flushing Industrial Park (Western Waterfront), Parcel 3 (BCP Site No. C241079) and Flushing Industrial Park (Flushing River), Parcel 4 (BCP Site No. C241080). These four Parcels (collectively, the Property) comprise approximately 13.6 acres located on the northwest corner of College Point Boulevard and 40^{th} Road, in Flushing, Queens, New York.

The site was remediated under the New York State Brownfield Program (BCP) in accordance with the Brownfield Cleanup Agreement (Index No. W2-1027-04-10, Site No. C241051; Index No. W2-1028-04-10, Site No. C241078; and Index No. W2-1029-04-10, Site No. C241079). After completion of the remedial work described in the Remedial Action Work Plan, some residual contamination was left in the subsurface on Parcels 1, 2, and 3, which is hereafter referred to as ‘residual contamination.’ Three Residual Management Zones have been established for the Property under the SMP:

- **Residual Management Zone A** consists of backfill material placed during remediation and construction which meets the Site-Specific Action Levels (SSALs), but may exceed the Part 375 SCOs for Restricted Residential Use.
- **Residual Management Zone B** consists of the area beneath the limits disturbed during remediation and construction which is expected to meet the SSALs (based on remedial investigation and endpoint sample results) but may exceed the Part 375 SCOs for Restricted Residential Use.
- **Residual Management Zone C** consists of soil with known concentrations in exceedance of the SSALs.

SMPs were prepared to manage residual contamination at the Site in perpetuity or until extinguishment of the Environmental Easement in accordance with 6 NYCRR Part 375.

Redevelopment of the Property consists of commercial and residential uses on Parcel 1 and 2, and a waterfront esplanade on Parcel 3. The retail and parking structures will occupy a majority of the Property at the bottom floors of the development, with residential towers (potentially including office space and/or community facilities) above these structures. First occupancy of the Property buildings is scheduled for the opening of the parking garage in the spring of 2008.

2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel and AKRF’s subcontractors. Specific personnel will be assigned as work proceeds. If sludge, soil or groundwater showing evidence of suspected contamination (such as discoloration, staining, or odors) is encountered during excavation activities, the area will be treated as a contaminated work area. All personnel who enter the contaminated work area while intrusive activities are being performed will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards with up to date 8-hour refresher training. Health and safety procedures are addressed under a site-specific Construction Health and Safety Plan (CHASP), presented in an attachment to the SMP.

The following sections describe the key project personnel and their responsibilities.

2.1 Project Director

The project director will be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management and decision-making regarding the field program. The project director will communicate regularly with all members of the AKRF project team, the NYSDEC, and C.E. Flushing, LLC to ensure a smooth flow of information between involved parties.

2.2 Project Engineer

The project engineer will be responsible for the following:

- Confirming all invasive work done during the remediation and development (i.e., grading cuts, utility trenches, footings, etc.) is performed in accordance with the contaminant field screening methodology defined in the SMPs;
- Confirming all import of soils from off-site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the SMPs; and
- Confirming all invasive work during the remediation and development was completed in accordance with dust and odor suppression methodology defined in the SMPs.

The project engineer will also communicate regularly with all members of the AKRF project team to ensure a smooth flow of pertinent information.

2.3 Project Manager

The project manager will be responsible for directing and coordinating all elements of the SMPs. The project manager will prepare reports and participate in meetings with C.E. Flushing, LLC and/or the NYSDEC.

2.4 Field Team Leader

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the SMPs, including the Soil Management Plan (SoMP) and CHASP (including the community air monitoring.) He/she will report to the project manager on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be qualified to perform soil screening activities (e.g., be able to detect petroleum or chemical odors and chemical staining and be proficient in the use of monitoring equipment such as a photoionization detector and particulate monitor) and to make the distinction between potentially contaminated and non-contaminated soil based on observations made during soil screening activities. The field team leader will brief the workers in intrusive work areas to make them aware of the potential hazards they may encounter. The field team leader responsibilities will be assigned to appropriate AKRF personnel.

2.5 Project Quality Assurance/Quality Control Officer

The Quality Assurance/Quality Control (QA/QC) officer will be responsible for adherence to the QAPP. He will review the procedures with all personnel prior to commencing any fieldwork and will conduct periodic Property visits to assess implementation of the procedures. The QA/QC officer will also be responsible for having a Data Usability Summary Report (DUSR) prepared for analytical results, if necessary.

2.6 Laboratory Quality Assurance/Quality Control Officer and Project Manager

All laboratory analyses will be performed by a laboratory that is Environmental Laboratory Approval Program (ELAP)-certified by New York State Department of Health (NYSDOH) to perform testing meeting the criteria specified in the NYSDEC's Analytical Services Protocol (ASP). TestAmerica, Inc. is currently the selected laboratory for the project. TestAmerica's laboratory in Shelton, Connecticut is ELAP-certified (NYSDOH Certificate No. 10602) to perform testing under ASP. The laboratory operates a QA/QC program that consists of proper laboratory practices (including the required chain-of-custody), an internal quality control program, and external quality control audits by New York State.

3.0 STANDARD OPERATING PROCEDURES

The following sections describe the standard operating procedures (SOPs) for the activities outlined in the SMPs. During these operations, safety monitoring will be performed as described in a site-specific CHASP.

3.1 Monitoring Well Installation

Sixteen monitoring wells are currently located around the Property, four on Parcel 1, one on Parcel 2, and eleven on Parcel 3. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance. This section outlines the protocol of installation of monitoring wells, should replacement or additional wells be necessary.

The monitoring wells will be installed within hollow-stem auger soil borings; soil samples will be collected during drilling for characterization; however, no laboratory analyses will be performed.. The depth of the wells will be based on existing groundwater elevation data and observations during drilling. Once reaching the desired depth, monitoring wells will be installed in the borings using two-inch diameter PVC well materials according to the following procedure:

- Measure the depth to water in the augers using a Solinst Water Table Meter – Model 101 or equivalent.
- Place PVC riser with a ten-foot length of PVC 0.10-slotted screen at the bottom of the borehole. In determining the amount of screen that will be located beneath the water table, the elevation of the seasonal water table will be considered. The well screen will be situated to provide sufficient water in the well for sampling at all times and to limit sample collection close to the base of the well. It is anticipated that at least five feet of screen will be placed below the water table for each well.
- Install No. 1 sand filter pack around the well screen to a depth of one to two feet above the top of the screen.
- Install a bentonite seal to a depth of one to two feet above the filter pack.
- If adequate depth remains, backfill the remainder of the annular space using a bentonite-cement grout.
- Complete the well with a locking cap.
- Decontaminate the augers between the each well installation as described in Section 3.5.

- Document well installation data (location, depth, construction details, water level measurements) in the field logbook or on field data sheets.

3.1.2 Monitoring Well Development

Following well installation, the new wells will be developed according to the following procedure:

- Measure the depth to water using an oil/water interface probe and the total depth of the well using a weighted tape. Use these measurements to calculate the length of the water column. Calculate the volume of water in the well using 0.163 gallons per foot of water column as the conversion factor for a 2-inch diameter well.
- The well will be developed using a submersible pump and discharge the water to five-gallon buckets. Transfer water from the buckets to 55-gallon drums designated for well development water or the on-site groundwater treatment system.
- During development, collect periodic samples and analyze for turbidity and water quality indicators (pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) with measurements collected approximately every five minutes.
- Continue developing the well until turbidity is less than 50 nephelometric turbidity units (NTUs) for three successive readings and until water quality indicators have stabilized to within 10% for pH, temperature and specific conductivity for three successive readings, or until three well volumes have been purged from the well.
- Document the volume of water removed and any other observations made during well development in the field logbook or on field data sheets.
- Decontaminate the equipment prior to and following development at each well location as described in Section 3.5.

All soil cuttings, well development water, decontamination, and purge water will be containerized in 55-gallon drums and handled in accordance with all Federal State and local regulations.

3.1.3 Monitoring Well Decommissioning

Well decommissioning, for the purpose of replacement, should be reported to NYSDEC prior to performance. Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC and NYSDOH.

Well abandonment will be performed in accordance with NYSDEC's "Groundwater Monitoring Well Decommissioning Procedures." It is anticipated the "pulling casing" method will be appropriate for monitoring wells used at the site if sufficient casing remains at the ground surface. General procedures for pulling well casings are described below:

- Puncture the bottom of the well if possible; otherwise, perforate the screen and casing to allow grouting of the well.
- Flush the well with water if necessary to remove sand (to prevent "lock-up" as the casing is pulled).
- Pressure grout the well using a tremie pipe lowered to the bottom of the well.

- Use jacks as necessary to loosen the casing from the surrounding formation.
- Lift the casing from the ground, if possible, using a drill rig, back hoe, crane, or other appropriate equipment.
- Add additional grout as casing is pulled to ensure complete grouting of the borehole.
- Record all measurements (depth to water, depth to NAPL), calculations (well volume), and observations in the project logbook and field data sheet, if applicable.
- Decontaminate the equipment following well decommissioning.

3.1.3 Groundwater Sampling Procedures

Groundwater samples will be collected using low-flow purging and sampling methods based on the procedures described in the U.S. EPA's Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers [EPA 542-S-02-001]. Sampling will be conducted according to the following procedure:

- Prepare the sampling area by placing plastic sheeting over the well. Cut a hole in the sheeting to provide access to the well.
- Remove the locking cap and measure the vapor concentrations in the well with a PID.
- Measure the total well depth, depth to water and check for the presence of light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) using an oil/water interface probe. Groundwater samples will not be collected from wells containing measurable NAPL.
- Use the water level and total well depth measurements to calculate the length of the mid-point of the water column within the screened interval. For example, for a shallow well where the total depth is 16 feet, screened interval is five to 15 feet, the sediment sump is 15 to 16 feet, and depth to water is seven feet, the mid-point of the water column within the screened interval would be 11 feet.
- Connect dedicated tubing to either a submersible or bladder pump and lower the pump such that the intake of the pump is set at the mid-point of water column within the screened interval of the well. Connect the discharge end of the tubing to the flow-through cell of a Hydrolab Quanta multi-parameter meter or equivalent. Connect tubing to the output of the cell and place the discharge end of the tubing in a 5-gallon bucket or other container.
- Activate the pump at the lowest flow rate setting of the pump.
- Measure the depth to water within the well. The pump flow rate may be increased such that the water level measurements do not change by more than 0.3 feet as compared to the initial static reading. The well purging rate should be adjusted so as to produce a smooth, constant (laminar) flow and so as not to produce excessive turbulence in the well.
- Transfer discharged water from the 5-gallon buckets to 55-gallon drums designated for well-purge water.
- During purging, collect periodic samples and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen, oxidation-reduction potential, and specific conductivity) with measurements collected approximately every five minutes.

- Continue purging the well until water quality indicators have stabilized to the extent practicable. The criteria for stabilization will be three successive readings for the following parameters and criteria:

Parameter	Stabilization Criteria
pH	+/- 0.1 pH units
Specific Conductance	+/- 3% mS/cm
Oxidation-reduction potential	+/- 10 mV
Turbidity	< 50 NTUs
Dissolved Oxygen	+/- 0.3 mg/l

- If the water quality parameters do not stabilize within two hours, purging may be discontinued. Efforts to stabilize the water quality for the well must be recorded in the field book, and samples may then be collected as described below.
- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing into the required labeled sample containers and place in a chilled cooler. Samples should be collected first for volatile organic compounds (VOCs), then semivoltile organic compounds (SVOCs), and the remaining analyses.
- Collect one final field sample and analyze for turbidity and water quality parameters (e.g., pH, temperature, dissolved oxygen, oxidation-reduction potential, and specific conductivity).
- Once sampling is complete, remove the pump and tubing from the well. Disconnect the tubing and place it back in the well for reuse during the next sampling event. Dispose of the sample filter (if field filtering), PPE and other disposable sampling materials appropriately.
- Decontaminate the pump, oil/water interface probe, and flow-through cell as described in Section 3.5.
- Record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume) and observations in the project logbook or field data sheet.

Where appropriate, trip blanks, field blanks, field duplicates, and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected, as described in Section 4.3.

Chain of Custody forms will include project name, names of sampling personnel, sample number, date and time of collection, sample matrix, signatures of individuals involved in sample transfer, and the dates and times of transfers. All samples will be analyzed using the most recent NYSDEC ASP by a laboratory certified through the NYSDOH ELAP. Analytical data will be submitted in complete ASP Category B data packages.

3.2 Vapor Mitigation System

Exposure to potential residual vapors is minimized by a sub-slab vapor mitigation system installed beneath the building on Parcel 2 which has retail use on the ground floor. The mitigation system design consists of a network of PVC sub-slab depressurization piping placed beneath a vapor barrier. The vapor barrier is polyethylene sheeting. The sub-slab piping consists of a grid of 6-inch diameter perforated PVC pipe connected to eight ductile iron pipe risers with in-line fans and sampling ports. The risers penetrate the foundation building slab at two locations on the northern and southern perimeter to connect to the aboveground, in-line fans and sampling ports located in the building stairwells. An additional 14 sampling ports and system clean-outs are located on the eastern and western building exterior. Warning indicator lights to confirm system operation are located on the building walls adjacent to each of the ground floor in-line fans.

Procedures for operating and maintaining the sub-slab depressurization system are documented in the Operation and Maintenance Plan (Section 4 of the Parcel 2 SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3 of the Parcel 2 SMP). The Monitoring Plan also addresses inspections in the event that a severe condition, which may affect operation of the sub-slab depressurization system, has occurred.

The building on the eastern portion of Parcel 2 is an open-air parking garage. The eastern retail building, which is on Parcel 1 and the eastern end of Parcel 2, has ventilated parking space at cellar level designed to prevent accumulation of potential vapors in accordance with parking garage requirements of the New York City building code. Accordingly, no vapor barrier or sub-slab venting system were required beneath these buildings. Any non-parking areas in the parking areas, such as storage areas or utility rooms, will be ventilated into the garage space for subsequent ventilation. The New York City Department of Buildings requires certification that the ventilation system is operating. The environmental easements on Parcels 1, 2 and 3 include a provision that converting the parking areas to unventilated uses requires an amendment or the extinguishment of this Environmental Easement and NYSDEC and NYSDOH approval.

3.2.1 Sub-slab Depressurization System [SSDS] Operation

3.2.1.1 System Start-Up and Testing

Prior to activating the system, the engineer measured the voltage to the fans to ensure 230V operation. The blowers should be operated using the following procedures:

- Check to ensure that all valves are open;
- Turn on the fans;
- Collect vacuum readings and flow rates until steady state condition is reached;
- Adjust valves to balance system with equitable flow rates and vacuums in each branch of system.

At the initial start-up, all gauge readings, including vacuums and flow rates, will be recorded in the system log book, which will be maintained on the Property. During system start-up, the Design Engineer trained a site representative in system inspection and O&M procedures.

Operation of the system will be temporarily suspended during construction. The system will be reactivated and tested as described above prior to occupancy of the building. Any subsequent start-up of the system (e.g., following an emergency shut-down) will be conducted using the same procedures described above.

The system testing described above will be conducted if, in the course of the sub-slab depressurization system lifetime, significant changes are made to the system, and the system restarted.

3.2.1.2 System Operation: Routine Operation Procedures

The Site Representative will conduct system checks on a routine basis. The routine check will consist of collecting flow rate and vacuum readings to ensure that all fans are operational, and noting any unusual conditions such as leaks or odors. If the system is not functioning properly (i.e., the fans not operational or leaks are noted), the Site Representative will immediately notify an emergency contact of the condition. Phone numbers for the emergency contacts will be posted on-site and on the Routine System Check log sheet provided in Appendix I. Routine checks will be conducted weekly during the first month of operation and quarterly thereafter.

3.2.1.3 System Operation: Routine Equipment Maintenance

Routine inspections will be conducted by the O&M Technician, and will consist of adjusting system components to optimize system efficiency and recording all gauge and meter readings (i.e., flow meter, vacuum/pressure gauges) in the system log book and on Routine Inspection Forms (provided in Appendix I). The vapor sampling ports will be inspected on a quarterly basis at the time of each scheduled vapor sampling event. Any minor damage (e.g., broken valve, cracked piping) will be repaired and documented. Vapor sampling ports will be replaced if leaking or unusable. Quarterly vapor discharge sampling and any required maintenance will also be conducted during routine inspections. Routine inspections will be conducted on a weekly basis during the first month of system operation, and on a quarterly basis thereafter.

3.2.1.4 System Operation: Non-Routine Equipment Maintenance

An inspection and evaluation of the system will occur whenever there is a shutdown of the vapor mitigation system or after any severe condition such as flooding occurs on the Property. Any damage or operational problems and steps taken to correct the problems will be noted in the field book and reported in the Annual Site Management Report.

The active SSDS will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSDS may be submitted by the property owner based on data that justifies such request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

3.2.2 Sub-Slab Depressurization System Monitoring

A visual inspection of the accessible portions of the SSDS will be performed on a quarterly basis. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS has been reported or an emergency occurs that is deemed likely to affect the SSDS. Inspection frequency is subject to change by NYSDEC and NYSDOH. A complete list of components to be checked is provided in the Periodic Inspection Log presented in Appendix I of the SMPs.

3.2.3 Vapor Sampling Event Protocol

Vapor samples will be collected directly from sample ports in the vent risers for the vapor mitigation system. The samples will be collected using 1-liter or 6-liter Summa canisters equipped with flow regulators to allow sample collection over a 15-minute period. The vapor samples will be collected using the following procedure:

- Attach new, clean 1/8-inch inside diameter polyethylene tubing to the sampling port and open the sample port valve.
- Open the inlet on a labeled Tedlar bag and attach it to the discharge end of the tubing. Allow the bag to fill approximately two-thirds full and close the inlet valve. Detach the bag and close the valve on the vent stack sample port.

- Field screen the Tedlar bag for VOCs by attaching the sample port to the PID probe using a new section of polyethylene tubing. Allow the PID pump to draw the soil gas sample into the meter; record the measurement once the readings have stabilized.
- Connect the tubing on the stack sample port to the inlet of a labeled Summa canister equipped with a flow regulator and vacuum gauge. Record the vacuum reading from the vacuum gauge on the canister at the beginning of the sampling period. Open the valve of the canister first, and then open the valve on the system sample port to initiate sample collection. Record the initial vacuum reading and sampling start time in the log book.
- At the end of the sampling period and prior to the vacuum gauge returning to ambient pressure, close valve, remove flow-rate controller and vacuum gauge, install cap on canister, and record time.
- Place canister in shipping container for transportation to laboratory.
- Document sample locations and measurements in the field logbook and on field data sheets.

Ambient air samples will be collected using 1-liter or 6-liter Summa canisters equipped with flow regulators to allow sample collection over a 15-minute period. The ambient air samples will be collected using the following procedure:

- Place Summa canister at ground level at an upwind or downwind location.
- Record the vacuum reading from the vacuum gauge on the canister at the beginning of the sampling period. Open the valve of the canister, and record the initial vacuum reading and sampling start time in the log book. Allow the canister to fill with ambient air.
- At the end of the sampling period and prior to the vacuum gauge returning to ambient pressure, close valve, remove flow-rate controller and vacuum gauge, install cap on canister, and record time.
- Place canister in shipping container for transportation to laboratory.
- Document sample locations and measurements in the field logbook and on field data sheets.

3.3 Decontamination of Equipment

All sampling equipment will be either dedicated or decontaminated between sampling locations. The decontamination procedure for sampling equipment will be as follows:

1. Scrub using tap water/Simple Green™ mixture and bristle brush;
2. Rinse with tap water;
3. Scrub again with tap water/ Simple Green™ and bristle brush;
4. Rinse with tap water;
5. Rinse with distilled water; and
6. Air-dry the equipment, if possible.

3.4 Field Instrumentation

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the Property for referencing proper operation, maintenance and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork, if applicable. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 ppm isobutylene standard gas.

4.0 QUALITY CONTROL AND LABORATORY PROCEDURES

4.1 Laboratory Methods

An ELAP Certified laboratory will be used for all chemical analyses in accordance with DER-10 2.1(b) and 2.1(f), i.e., Category B Deliverables and CLP ELAP Certification will be required for confirmatory (post remediation) samples and final delineation samples and Category A deliverables (or Spills Category) laboratory data deliverables will be required for all other analyses (e.g., waste characterization sampling). The basic laboratory methods, sample container type, preservation, and applicable holding times are outlined below.

Laboratory Analytical Methods for Analysis Groups

ANALYSIS GROUP	MATRIX	PARAMETER	EPA METHOD	SAMPLE CONTAINERS	PRESERV.	HOLDING TIMES
Vapor Analysis Parameters	air	VOCs	TO-15	1 or 6 liter Summa canister	None	14 days
Potential Soil Analysis Parameters	solid	TCL VOCs	8260	2 oz. clear glass Septum	4°C	14 days
		TCL SVOCs	8270	8 oz. clear glass	4°C	14 days
		TAL Metals	1311/6010/7470	8 oz. clear glass	4°C	14 days
		PCBs	8082	8 oz. clear glass	4°C	14 days
		Pesticides	8081	8 oz. clear glass	4°C	14 days
Groundwater Analysis Parameters	liquid/ sludge	TCL VOCs	8260	(2) 40 ml clear glass vial	HCl, 4°C	14 days
		TCL SVOCs	8270	3L amber glass	4°C	7 days
		TAL Metals	6000/7000 series	500ml plastic	HNO_3,4°C	6 months (28 days for Hg)
		PCBs	8082	1L amber glass	4°C	7 days
		Pesticides	8081	1L amber glass	4°C	7 days

Other analyses that may be required by the disposal facility will be in accordance with the appropriate EPA method using the parameter-specific sample containers, preservation and holding times.

4.2 Sample Handling

This section provides protocols for sample identification, sample labeling and shipping, and sample custody. Sampling procedures, sample identification and characterization, and sample observations (evidence of contamination, PID readings, soil classification) will be recorded in the field log book.

4.2.1 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody documents and laboratory reports using an alpha-numeric code. All samples will be identified with a prefix of "CE" to designate the C.E. Flushing, LLC Property. Groundwater samples will be identified by the monitoring well number. Waste characterization samples collected from 55-gallon drums will be identified by the drum number (e.g., DRUM 1 or DRUM 2) followed by a sample type designation (LQ for liquid and SD for solid).

The designation "CE" will be added at the end of the designation for matrix spike/matrix spike duplicate samples. The field duplicate samples will be labeled with a dummy sample location to ensure that they are submitted as blind samples to the laboratory. The dummy identification will consist of the sample type followed by a letter. For duplicate soil boring samples, the sample depth will be the actual sample depth interval. Trip blanks and field blanks will be identified with "TB" and "FB", respectively.

Examples of the sampling identification scheme are identified below:

Examples of Sample Names

Sample Description	Sample Designation
Endpoint sample EP-110 collected from 6 to 7-foot depth	CE-EP-110 (6-7)
Duplicate sample collected from monitoring well MW-28	CE-MW-28
Vapor sample collected from sampling port 1	CE-Vapor 1
MS/MSD duplicate sample from monitoring well MW-28	CE-MW-28 MS/MSD
Liquid waste characterization sample collected from drum number 7	CE-DRUM 7 - LQ

4.2.2 Sample Labeling and Shipping

Samples to be analyzed in the laboratory will be placed in the required laboratory-supplied sample containers. All sample containers will be provided with labels containing the following information:

- Project identification;
- Sample identification;
- Date and time of collection;
- Analysis(es) to be performed; and
- Sampler's initials.

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. At the start and end of each workday, field personnel will add ice to the coolers as needed. Soil gas samples will be placed in containers that do not contain ice. Soil or groundwater samples will be shipped to the laboratory once to twice per week. Soil gas samples will be shipped to the laboratory at the end of each work day.

The samples will be prepared for shipment by placing each sample in a plastic bag, then wrapping each container in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the chain-of-custody form. Samples will be shipped overnight (e.g., via Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a custody seal to ensure that the coolers remain sealed during delivery.

4.2.3 Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on chain-of-custody (COC) forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; signatures of individuals involved in sample transfer; and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in. A sample COC form is attached in Appendix A.

4.3 Quality Control Sampling

In addition to the laboratory analysis of the groundwater and endpoint samples, additional analysis will be included for quality control measures, as required by the Category B or Category A sampling techniques. These samples may include equipment blanks, trip blanks, matrix spike/matrix spike duplicates (MS/MSD) and blind duplicate samples. Equipment blank, MS/MSD and duplicate samples will be analyzed for the same parameter set for which the samples will be analyzed. If the requested parameters include VOCs, a trip blank will be analyzed for volatile organic compounds only. Quality control sampling in accordance with the disposal facility requirements will be performed when collecting samples for disposal characterization.

5.0 DATA REVIEW

As part of the laboratory deliverables, data validation will be performed in accordance with the USEPA ASP Category B guidelines. Since ASP Category B deliverables will be provided by the laboratory, a Data Usability Summary Report (DUSR) for data validation will not be prepared.

QAPP Appendix A

Sample Chain of Custody Form