Illinois Environmental Protection Agency

Bureau of Land • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

ILLINOIS EPA RCRA CORRECTIVE ACTION CERTIFICATION

This certification must accompany any document submitted to Illinois EPA in accordance with the corrective action requirements set forth in a facility's RCRA permit. The original and two copies of all documents submitted must be provided.

1.0 Facility Identification

Name: Equilon Enterprises LLC d/b/a Shell Oil Products US
County: Madison
Street Address: 900 South Central Ave
Site No. (IEPA): 1191150002
City: Roxana
Site No. (USEPA): ILD 080 012 305

2.0 Owner Information

Name: Not Applicable
Mail Address:
City:
State: Zip Code:
Contact Name:
Contact Title:
Phone:

3.0 Operator Information

Name: Equilon Enterprises LLC d/b/a SOPUS
Mail Address: 17 Junction Drive, PMB #399
City: Glen Carbon
State: IL Zip Code: 62034
Contact Name: Kevin Dyer
Contact Title: Senior Principal Program Manager
Phone: 618-288-7237

4.0 Type of Submission (check applicable item and provide requested information, as applicable)

☐ RFI Phase I Workplan/Report
☐ RFI Phase II Workplan/Report
☐ CMP Report;
☑ Other (describe): Standard Operating Procedures update

IEPA Permit Log No. B-43R
Date of Last IEPA Letter on Project: October 10, 2017
Log No. of Last IEPA Letter on Project: B-43R-CA-82,88,94,97

Does this submittal include groundwater information: ☐ Yes ☑ No

Date of Submittal: Feb 11, 2019

5.0 Description of Submittal: (briefly describe what is being submitted and its purpose)

Routine Updates to Standard Operating Procedures

6.0 Documents Submitted (identify all documents in submittal, including cover letter; give dates of all documents)

Cover Letter; SOPs 18 & 24

7.0 Certification Statement

(This statement is part of the overall certification being provided by the owner/operator, professional and laboratory in Items 7.1, 7.2 and 7.3 below). The activities described in the subject submittals have been carried out in accordance with procedures approved by Illinois EPA. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

7.1 Owner/Operator Certification

(Must be completed for all submittals. Certification and signature requirements are set forth in 35 IAC 702.126.) All submittals pertaining to the corrective action requirements set forth in a RCRA Permit must be signed by the person designated below (or by a duly authorized representative of that person):

1. For a Corporation, by a principal executive officer of at least the level of vice president.
2. For a Partnership or Sole Proprietorship, by a general partner or the proprietor, respectively.
3. For a Governmental Entity, by either a principal executive officer or a ranking elected official.

A person is a duly authorized representative only if:

1. the authorization is made in writing by a person described above; and
2. the written authorization is provided with this submittal (a copy of a previously submitted authorization can be used).

Owner Signature: _____ Date: _____

Title: Not Applicable

Operator Signature: Kevin Explayer Date: 2/11/19

Title: Senior Principal Program Manager

7.2 Professional Certification (if necessary)

Work carried out in this submittal or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. No one is relieved from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44 (h))

Professional's Signature: _____ Date: _____

Professional's Name Not Applicable

Address _____ Professional's Seal:

City _____

State _____ Zip Code _____

Phone _____

7.3 Laboratory Certification (if necessary)

The sample collection, handling, preservation, preparation and analysis efforts for which this laboratory was responsible were carried out in accordance with procedures approved by Illinois EPA.

Name of Laboratory Not Applicable

_____ Date: _____

Signature of Laboratory Responsible Officer

Mailing Address of Laboratory

Address _____

City _____

State _____ Zip Code _____

_____

Name and Title of Laboratory Responsible Officer

AECOM
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20th Floor
St. Louis, MO 63110
USA
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February 11, 2019

Mr. Kenneth E. Smith, PE
Manager, Permit Section
Illinois Environmental Protection Agency
Division of Land Pollution Control
Bureau of Land
1021 North Grand Avenue East
Springfield, Illinois 62794

Routine Updates to Previously Submitted Standard Operating Procedures
Equilon Enterprises LLC dba Shell Oil Products US
Roxana, Illinois
1191150002 - Madison County
ILD080012305
Log B-43R

Dear Mr. Smith:

As part of AECOM Technical Services, Inc.'s (AECOM's) routine quality improvement process, we recently performed a review of some of the Standard Operating Procedures (SOPs) used by field staff performing activities at the investigation sites in Roxana, Illinois. Previously revised versions of SOPs have been submitted to the Illinois Environmental Protection Agency (IEPA), most recently on April 6, 2018. These procedures were originally submitted, as requested by various IEPA correspondences, within various reports and work plans related to the Investigation Site in Roxana, Illinois. We are submitting this package of updated SOPs for your reference and in accordance with proposed revisions to Sections C.7.5 and C.8.4 of the RCRA Post-Closure Permit Application[1] for the Equilon Enterprises LLC d/b/a Shell Oil Products US (SOPUS) facility at the WRB Refining LP Wood River Refinery.

The SOPs included with this submittal are listed below. The SOPs listed received editorial and formatting revisions. A summary of any additional substantive revisions made to the SOPs are included in the table below.

SOP No	SOP Title	Purpose of Revision
18	Low-Flow Groundwater Purging and Sampling	Editorial and formatting
24	Soil and Groundwater Sample Identification, Packaging and Shipping	Editorial and formatting

Below is an SOP summary table, which indicates the most recent revision date for each SOP for your reference.

[1] Class 1* Permit Modification – Section C Revision for SOP Reference (Log No. B-43R-CA-82, CA-88, CA-94 and CA-97) was submitted to IEPA on January 29, 2018. A response to this submittal is still pending as of the date of this submittal.

AECOM

SOP No.	SOP Title	Last Updated
3	Calibration & Maintenance of Field Instruments	2/15/2018
4	Decontamination	2/15/2018
5	Utility Clearance Procedures	7/24/2015
8	Field Reporting and Documentation	4/4/2017
10	Well Gauging Measurements	6/22/2017
11	Groundwater Sampling & Well Wizard Operation	7/21/2015
12	Grouting Procedures	7/23/2015
14	Headspace Soil Screening	7/23/2015
17	Logging	7/23/2015
18	Low Flow Groundwater Purging & Sampling	2/1/2019
20	Well Development	7/21/2015
21	Monitoring Well Installation	7/24/2015
23	Quality Assurance Samples	4/4/2017
24	Soil and Groundwater Sample Identification, Packaging & Shipping	2/1/2019
25	Sample Containers, Preservation & Holding Times	7/23/2015
26	Sample Control & Custody Procedures	6/22/2017
28	Soil Sampling	7/24/2015
29	Soil Probe Operation	7/24/2015
42	Groundwater Profiling	7/22/2015
44R	Soil Vapor Purging & Sampling	4/2/2018
46	Indoor Air Sampling with Canisters	7/23/2015
47	Sub-slab Soil Gas Installation & Sampling with Canisters	4/4/2017
48	SVE Well Data Collection and Sampling	3/6/2018
49	SVE Effectiveness Monitoring at VMPs	3/6/2018
51	Vapor Sample Classification, Packaging & Shipping	6/22/2017
52	Soil Vapor Field Laboratory Screening	3/6/2018
53	Dwyer Digital Manometer	7/23/2015
56	LNAPL Recovery	6/22/2017

Copies of this submittal are being sent separately directly to Amy Butler (IEPA, Springfield) and Gina Search (IEPA, Collinsville).

If you have any questions, please contact Wendy Pennington at wendy.pennington@aecom.com (314-802-1196) or Bob Billman at bob.billman@aecom.com (314-802-1122).

Sincerely,

Wendy Pennington
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encl: Revised SOPs 18 and 24
RCRA Corrective Action Certification Form

cc: Amy Butler (IEPA - Springfield, IL)
Gina Search (IEPA - Collinsville, IL)
Kevin Dyer (SOPUS)
Shannon Haney (Greensfelder Hemker)
Project File
Repositories (Roxana Public Library, website)

1. Objective

This document defines the standard operating procedure (SOP) and typical equipment for collection of groundwater samples in monitoring wells, extraction wells, or piezometers using low-flow techniques for Shell projects in Hartford and Roxana, Illinois. The term "Low Flow" refers to the velocity that the groundwater is removed from the soil formation immediately adjacent to the well screen.

In this technique, in order to withdraw water from within the well screen and to lessen drawdown, a pump that minimizes disturbance to the groundwater is operated at a low flow rate. The well is only purged within the screened interval until specific parameters have stabilized. Therefore, the groundwater samples collected are representative of the water bearing formation and hydraulically isolated from the water in the casing. The need to purge three well volumes, as required in traditional techniques, is not necessary with low flow purging and sampling. The low flow procedure described in this SOP is not necessarily applicable for every site or for wells screened in materials with very low permeability.

2. Equipment

The following equipment is typically needed:

- Well construction information for well to be sampled
- Well keys
- Disposable latex or nitrile gloves
- Assorted tools (socket, screwdriver, clamps, etc.)
- New synthetic rope (to alleviate raising and lower of the submersible pump by the electrical wires)
- Pump and required accessories (described in more detail in following section)
- Deep cycle marine battery, or vehicle battery
- Electronic water level indicator or water/product interface probe with 0.01-foot increments
- Graduated cylinder, measuring cup, or similar
- Water quality instrument with appropriate sensors
- Flow-through cell

- Calibration fluids
- Paper towels or Kimwipes
- Trash bags
- Calculator
- Stopwatch
- Panasonic Toughbook®
- Bound field logbook (logbook)
- Waterproof pen and permanent marker
- Plastic buckets
- 55-gallon drums or truck-mounted tank
- Plastic sheeting or similar for clean working surface at each well (i.e. for flow thru cell, sample bottles, etc.)
- Appropriate decontamination equipment (see SOP No. 4)
- Cooler with ice
- Sample containers and labels
- Clear tape
- Groundwater sampling form
- Chain-of-Custody form
- Appropriate health and safety equipment (e.g., photoionization detector (PID))
- Canopy

3. Sampling Procedure

This section provides the step-by-step procedure for collecting groundwater samples in the field. Observations made during groundwater purging and sampling should be recorded in a logbook and Toughbook/Toughpad in accordance with procedures described in SOP No. 8 Field Reporting and Documentation.

The well sampling order should be dependent on expected levels of contamination in each well, if known, and should be determined prior to sampling. Sampling should progress from the least contaminated to the most contaminated well, to the extent possible. Quality assurance/quality control (QA/QC) samples should also be collected during groundwater sampling (SOP No. 23 Quality Assurance Samples).

A. Any reusable equipment used in the sampling procedure that could contact groundwater should be properly decontaminated before each use (see SOP No.4 Decontamination).

B. Equipment should be calibrated based on the manufacturers' instructions. Refer to SOP No. 3 Calibration and Maintenance of Field Instruments for additional information.

C. Before well purging begins, the following steps should be performed at each well:

- Inspect the well and surrounding site for security, damage, and evidence of tampering. If damage or tampering is evident, contact the task or project manager for guidance.
- Place clean plastic sheeting or similar in the work area near the well to keep equipment and sample bottles clean.
- Measure ambient volatile organic compounds (VOCs) background levels in the immediate vicinity of the well (i.e., using a PID or a flame ionization detector (FID) per the Health and Safety Plan (HASP).
- Remove the well cap and immediately measure VOCs at the rim of the well and record the readings in the logbook, in the Toughbook®, and on the groundwater sampling form. Give the water in the well adequate time to reach equilibrium.

D. After the well has reached equilibrium, the groundwater elevation should be measured to the nearest 1/100-foot. The total well depth and screened interval should be obtained from the well construction information. Measuring the total depth prior to sampling should be avoided to prevent resuspension of settled solids in the well casings and to minimize the necessary purge time. The total depth of the well should be confirmed after sampling has been completed, if necessary. A detailed description of monitoring well gauging activities is provided in SOP No. 10 Well Gauging Measurements.

E. Following measurement of the static groundwater elevation, the appropriate equipment will be slowly and carefully placed in the well. If the wells have light or dense non-aqueous-phase liquids (LNAPLs or DNAPLs) and are still to be sampled, care should be

taken to place sampling equipment below or above the NAPL. If NAPL is encountered, contact the task or project manager for further direction.

F. Selection of the proper pump is important for low-flow sampling activities. USEPA guidance (1996) notes that dedicated sampling devices capable of purging and sampling are preferred over any other type of device. In addition, the pump must be capable of flow rates between about 50 and 500 mL per minute. A variety of portable sampling devices are available, such as bladder pumps, peristaltic pumps, electrical submersible pumps, gas-driven pumps, inertial lift foot-valve samplers (e.g. check-ball systems), and bailers. However, some of this sampling equipment has drawbacks or has been specifically rejected for low-flow sampling. The peristaltic pump can only be used for shallow applications and it can cause degassing of groundwater and loss of volatiles. Degassing results in the alteration of pH and alkalinity values as well as some loss of volatiles. Also, USEPA guidance asserts that inertial lift foot-valve type samplers and bailers cause too much groundwater disturbance and may invite unacceptable operator variability. Therefore, these sampling devices should be avoided for low-flow sampling activities.

G. Submersible pumps require a battery as a power source. If a deep cycle marine battery will be used, proceed to **Step H**. If a vehicle battery with the vehicle running will be used for an adequate power supply, the following will be performed:

- The vehicle will be positioned such that it is not over a significant amount of vegetation.
- The parking brake will be applied.
- A fire extinguisher will be staged nearby for easy access, if necessary.
- Personnel will remain in attendance of the vehicle while running so the vehicle may be promptly shut off in case of fire, etc.

H. When placing the equipment in the well, the pump intake should be set as follows. Pump placement is best measured from the top of the well down to the pump. Lowering the pump to the bottom of the well and pulling it up the required distance will cause agitation of the sediment and create unnecessary turbidity in the water.

    a. If the well screen is ≤ 10 feet, place the pump intake near the midpoint of the well screen or water column, whichever is deeper.

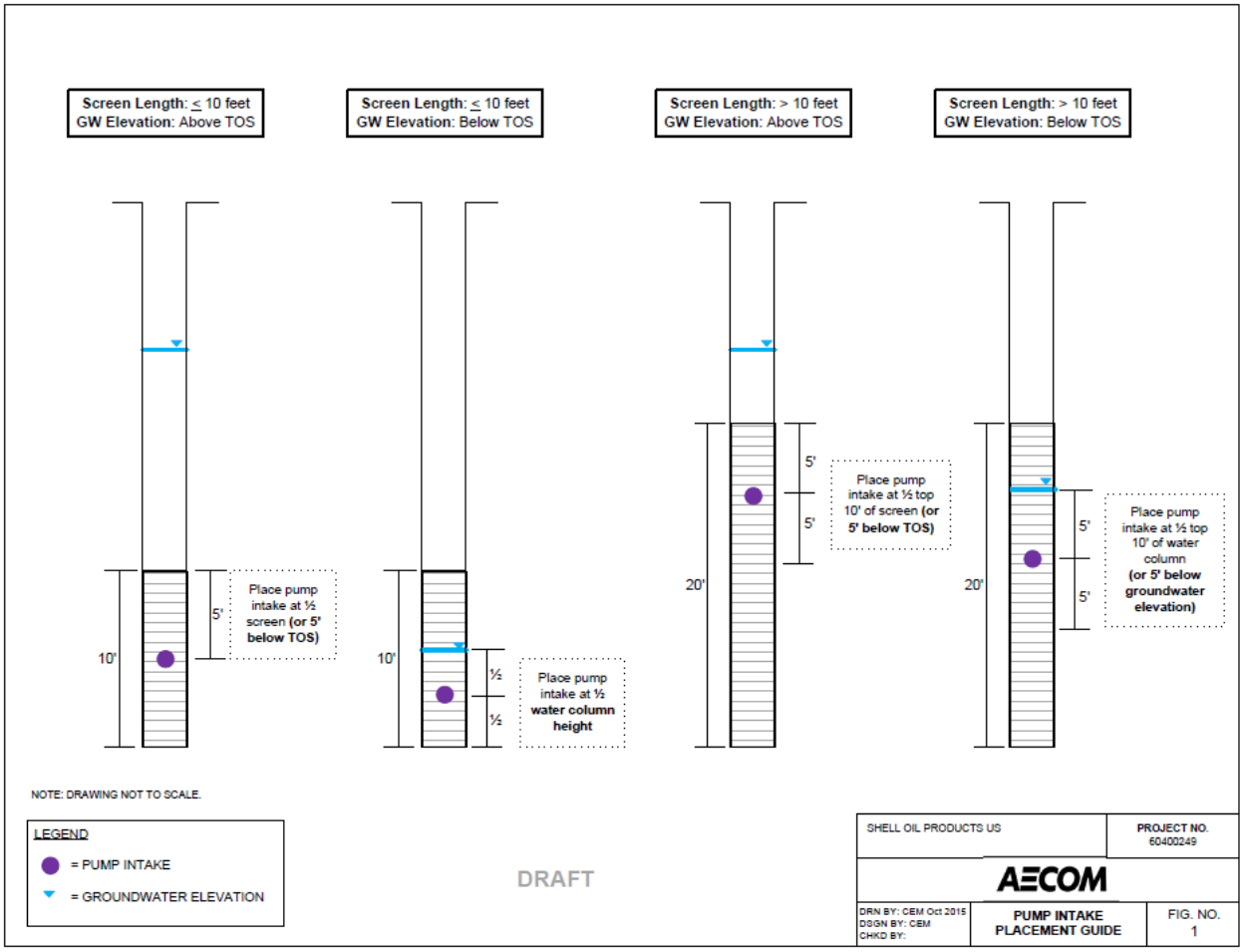
- *Pump intake (saturated screen) = depth to top of screen + ½ screen length*
- *Pump intake (open screen) = depth to top of water + ½ water column height*

b. If the well screen is > 10 feet, place the pump intake near the midpoint of the upper 10 feet of the well screen or water column, whichever is deeper.

- *Pump intake (saturated screen) = depth to top of screen + 5 feet*
- *Pump intake (open screen) = depth to top of water + 5 feet*

(if water column height is <10 feet, + ½ water column height)

c. In situations in which contaminants of interest are known to concentrate in a certain location of the screened zone (i.e. at the bottom), it may be desirable to position the pump intake to target this zone instead.



I. Tubing should be connected from the pump to a flow-through cell. Then, calculate the volume of water to fill the flow-through cell. According to American Society for Testing and Materials (ASTM) Standard D 6771 (2002), the frequency of measurements should be equal to the time required to completely evacuate one volume of the cell (minimum). This ensures that independent measurements are made.

J. The pump should be started at a low flow rate, approximately 50 to 100 mL/min or the lowest flow rate possible. The pumping rate can be increased up to 500 mL/min as long as significant drawdown does not occur (200 to 300 mL/min is the optimum flow rate for sampling VOCs).

K. Water level measurements should continue as calculated until the measurements indicate that significant drawdown is not occurring. According to ASTM standards (2002), allowable drawdown should never exceed the distance between the top of the well screen and the pump intake. Including a safety factor, also provided by ASTM, drawdown should actually not exceed 25% of this distance. This ensures that water stored in the casing is not purged or sampled. For example, for a 4-foot screen (saturated), the pump should be placed at the midpoint of the screen (two feet from the top of the screen to the pump intake). With a safety factor of 25%, this would require drawdown not to exceed six inches.

   If drawdown surpasses 25% of the distance from the pump intake to the top of the screen even while pumping is occurring at the lowest flow rate possible, samplers should refer to project specific criteria.

   If drawdown is encountered in exceedance of the above scenario and does not stabilize, contact the task or project manager for further guidance.

L. Allow water to flow through the flow-through cell. Parameter readings should be documented on the groundwater sampling form, in the logbook and/or in the Toughbook/Toughpad. The time between parameter measurements is calculated as follows:

$T = \frac{V}{Q}$, where

T = time between measurements (minutes)

V = volume of the flow-through cell (liters)

Q = purge flow rate (liters per minute)

M. Sampling should be in accordance with a Work Plan or other project specific documentation or approved Agency correspondence. However, in most cases, purging will continue until specific parameters have stabilized over three consecutive flow-through cell volumes or until a specific time requirement is met, whichever happens first. **Table 1** provides guidelines that may be used for parameter stabilization as specified by USEPA, ASTM, and in the Nielsen and Nielsen Technical Guidance on Low-Flow Purging and Sampling and Minimum-Purge Sampling (Nielsen and Nielsen, 2002). These guidelines are to be used in combination with professional judgment. **Table 2** provides the guidelines to be used for groundwater sampling activities on Shell projects. **Table 2** combines relevant stabilization guidelines from **Table 1** in combination with limitations in accuracy for readings collected by the Troll9500 (typical low flow equipment used on the Shell groundwater projects).

Table 1. Stabilization Guidelines for Low-Flow Sampling

Parameter	Stabilization Guidelines		
	EPA	**ASTM**	**Nielsen & Nielsen**
DO	+/- 10%	+/- 10% or +/-0.2 mg/L, whichever is greatest	+/- 10% or +/-0.2 mg/L, whichever is greatest
ORP	+/- 10 mV	+/- 20 mV	+/- 20 mV
PH	+/- 0.1 units	+/- 0.2 units	+/- 0.2 units
Specific Conductivity	+/- 3%	+/- 3%	+/- 3%
Temperature	Not Specified	Not Specified	+/- 0.2 ºC
Turbidity	+/- 10%	Not Specified	Not Specified

Table 2. Stabilization Guidelines used for GW Sampling

Parameter	Stabilization Guidelines (using above standards combined with Troll9500 accuracies)
DO	+/- 10% or +/-0.2 mg/L, whichever is greatest
ORP	+/- 20 mV
PH	+/- 0.2 units
Specific Conductivity	+/- 5% or +/-2µs/cm
Temperature	Not Specified; Monitor and record
Turbidity	Visually Sediment Free, when practical; Monitor and record

N. After the relevant parameters have stabilized, the flow-through cell should be disconnected or bypassed for sampling. If, after a considerable number of readings have been taken, parameters have not stabilized, samplers should contact the task or project manager for further guidance. For Rand and Roxana GW sampling activities, contact the Task Manager after two hours of purging for further guidance.

O. A canopy or modified sampling order should be utilized, as feasible, in an effort to shield the flow-through cell from the weather and elements that may interfere with stabilization parameter readings (i.e. sun and wind). When temperature is not being used as a stabilization parameter, care should still be taken to shield the flow-through cell from the sun so temperature can more accurately be monitored for anomalous readings.

P. A new pair of disposable latex or nitrile gloves should be put on immediately before sampling.

Q. Verify sample bottles, including lids and seals, are intact. This can be done by removing and replacing bottle lid and also inspecting lid for presence of seal, if applicable.

R. During sampling, the sample shall be collected directly from the tubing (e.g. sample shall not flow through the flow-through cell while filling bottle sets), do NOT allow the sample tubing to come into contact with the sample bottles, and do NOT place sample bottles on the ground (e.g., place bottles in plastic tub or similar).

S. The constituents should be sampled for in the order given below:

- VOCs – Vials should be filled completely so that the water forms a convex meniscus then capped so that no air space exists in the vial. Turn the vial over and tap it to check for bubbles. If air bubbles are observed in the sample vial, remove the lid and attempt to fill the vial two more times, (being careful not to dump out any groundwater currently in the vial). If air bubbles are present twice more, discard the sample vial and repeat the procedure with a new vial. If, after three attempts, air bubbles are still in the vial, make a note of this and place the vial in the cooler.
- Gas sensitive parameters (e.g., ferrous iron, methane, alkalinity)
- Semivolatile organic compounds, pesticides, polychlorinated biphenyls, and herbicides
- Petroleum hydrocarbons
- Metals (unfiltered)
- Explosives
- Any filtered analytes (use in-line filters if possible) – About 100-1000 mL should be purged through the filter prior to sample collection

T. Check sample bottle cap tightness and verify the lid of the sample bottle is not cross threaded.

U. Wipe off sample bottles to remove any dirt, moisture and/or contamination that may have become adhered to the outside of the bottle.

V. Label each sample bottle. Each sample should be identified with the Sample ID, location, analysis number, preservatives, date and time of sampling event, and sampler.

W. Place all samples on ice in a cooler to maintain the samples at approximately 4oC as described in SOP No. 25 Sample Containers, Preservation and Holding Times.

X. The sample time and constituents to be analyzed for should be recorded in the logbook, in the Toughbook®, and on the groundwater sampling form.

Y. Chain-of-custody procedures should be started (SOP No. 26 Sample Control and Custody Procedures).

Z. Ship the cooler to the laboratory for analysis within 24-48 hours of sample collection in accordance with the procedures described in SOP No. 24 Sample Classification, Packaging and Shipping.

AA. Sample equipment should be decontaminated (SOP No. 4 Decontamination).

BB. PPE and other disposable supplies will be collected within a trash bag and disposed appropriately. Check with IDW Coordinator for further instructions.

4. References

ASTM 2002, Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations, ASTM D6771-02, American Society for Testing and Materials. West Conshohocken, PA.

Nielsen, David and Nielsen, Gillian. Technical Guidance on Low-Flow Purging and Sampling and Minimum-Purge Sampling. Second Edition. NEFS-TG001-02. April 2002.

USEPA. 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. EPA/540/S-95/504. OSWER, April 1996.

1. Objective

This document defines the standard protocols for soil and groundwater sample identification, labeling, packaging, and shipping for Shell projects in Hartford and Roxana, Illinois. This SOP serves as a supplement to work plan, sampling and analysis plan or other project documentation, and is intended to be used together with several other SOPs.

2. Equipment

The following equipment is typically needed for sample identification, packaging and shipping:

- Chain of custody form
- Sample bottles (laboratory provided)
- Sample labels
- Water proof pen or similar
- Trash bag or similar for lining cooler
- Bubble wrap
- Ice
- Re-sealable storage bags
- Custody seal
- Clear packing tape
- Shipping label
- Waterproof cooler

3. Procedures

Sample Identification

Samples collected during site activities shall have discrete and site specific sample identification code (ID). These sample IDs are necessary to identify and track each of the many samples collected for analysis during the life of project. In addition, the sample IDs can be used in a database to identify and retrieve the analytical results received from the laboratory.

Each sample is identified by a unique code which indicates the specific project, site identification, sample location number, sample matrix identifier, sample depth, and/or date. If used, sample matrix identifiers may include the following:

GP - Geoprobe

GWP - Groundwater Profile

PZ - Piezometer

MW - Monitoring Well

CPT – Cone Penetrometer Testing

ROST - Rapid Optical Screening Tool

VMP - Vapor Monitoring Point

TB - Trip Blank

EB - Equipment Blank

DUP - Duplicate Sample

MS - Matrix Spike Sample

MSD - Matrix Spike Duplicate Sample

An example of the sample identification number codes for a groundwater monitoring well sample collected for field analysis for the Shell Sites will be:

MW13-PROJ-070713-EB.

Where "MW" indicates Monitoring Well, "13" indicates the well location, "PROJ" indicates the abbreviated project name (ROX, WRR, etc.), "070713" indicates the date, and "EB" indicates an equipment blank.

The project abbreviation, sample sequence, sampling locations, and sample type will be established prior to field activities for each sample to be collected. On-site personnel will obtain assistance from the Task or Project Manager in defining any special sampling requirements.

Sample Labeling

Sample labels will be filled out as completely as possible by a designated member of the sampling team prior to beginning field sampling activities each day. The date, time, sampler initials/signature should not be completed until the time of sample collection. All sample labels shall be filled out using waterproof ink, preferably black. Below is information typically included on a sample label:

- Sampler's company affiliation
- Project/Site location

- Sample identification code
- Date and time of sample collection
- Analyses required
- Method of preservation or preservative (if any)
- Sample matrix (i.e., soil, groundwater, surface water)
- Sampler's signature or initials.

The sample bottle will be wiped off to remove any dirt, moisture and/or contamination that may have become adhered to the outside of the bottle. Labels will be affixed to the sample bottle(s). Clear tape will be applied in order to keep the label attached to the sample and to keep the label legible. If waterproof or weatherproof labels are used to label sample bottles, clear tape is NOT required. If a sample bottle displays a tared weight from the laboratory, clear tape will NOT be used.

Sample Packaging and Shipping

For packaging and shipping of air or soil vapor samples, refer to SOP No. 51 Vapor Sampling Classification, Packaging and Shipping. For packaging and shipping of LNAPL samples, refer to SOP No. 58 Westhollow LNAPL Sampling. Below describes packaging and shipping procedures for water and soil samples.

After sample collection, each container will be labeled as described above, and then stored on ice at 4°C (+/- 2°C) in an insulated cooler until packed for shipment to the laboratory. Coolers will be lined with a trash bag or similar and either the ice or the sample bottles will be bagged in sealed storage bags, or as otherwise recommended by the laboratory.

Caps of sample bottles will be checked for proper tightness and to verify the lid of the sample bottle is not cross threaded. Sample bottles will be wiped off to remove any dirt, moisture and/or contamination that may have become adhered to the outside of the bottle. To the extent possible, the sample containers will be placed in re-sealable storage bags and wrapped in protective packing material (bubble wrap). Samples will then be placed right side up in a lined cooler with ice and a completed chain-of-custody (COC) form (placed in a separate zip-locked bag). The COC may be specific to the samples included within each shipping container or may be comprehensive of all samples collected during a particular day/sampling period, regardless of the number of shipping containers.

A custody seal will be placed over the lid and body of the cooler on the side from which the cooler is opened. The cooler will be wrapped with clear packing tape, including over the custody seal, for delivery to the laboratory. Samples will be hand delivered or shipped by overnight express carrier for delivery to the analytical laboratory. All samples must be shipped for laboratory receipt and analyses within specific holding times. This may require daily shipment of samples with short holding times. The temperature of all coolers will be measured upon receipt at the laboratory. A temperature blank may be included in each cooler for temperature measurement purposes, per laboratory specific requirements.

Sample Documentation and Tracking

Field Notes - Documentation of observations and data acquired in the field will recorded on field sampling sheets, in a bound field logbook and/or in a Toughbook/Toughpad to provide a permanent record of field activities. Refer to SOP No. 8 Field Reporting and Documentation for additional information.

Sample Chain-of-Custody - During field sampling activities, traceability of the sample must be maintained from the time the samples are collected until laboratory data are issued. The sampling team member(s) will be responsible for initiating and filling out the COC form during sample collection. Information on the custody, transfer, handling, and shipping of samples will be recorded on a COC form. The COC should contain project and sample specific information. Sample labels should be checked against the COC to ensure everything intended for analysis is listed on the COC.

A member of the sampling crew will sign the COC form over to the person or party responsible for delivery of the samples to the laboratory, retain a copy of the COC form, document the method of shipment, and send the original COC form with the samples. Additionally, an electronic copy of the COC should be forwarded to applicable project contacts (e.g., task manager, project chemist, etc.). Each time custody of the samples is transferred, the COC should be signed by both parties. Refer to SOP No. 26 Sample Control and Custody Procedures for additional information about COCs.