City of Portland, Oregon

Water Pollution Control Facilities (WPCF) Permit For Class V Stormwater Underground Injection Control Systems

Permit Number: 102830

Decommissioning Procedure

Stormwater Underground Injection Control

December 2006 - Version 2 (May 2012)

Prepared By: **City of Portland, Bureau of Environmental Services**

Summary of Revisions to Draft¹ UIC Decommissioning Procedure,

December 1, 2006

	Description	Corrected Document	Major Amendments
Decommissioning Procedure		Final	General minor text amendments.Figure 1—Sampling Flowchart Deleted
Step 3	Identify UIC Type and Determine Sampling Requirements	Final	 Information for previous Step 3 has been replaced with Appendix A—UIC Decommissioning Sampling and Analysis Plan Appendix A provides detailed sediment and water sampling procedures and analytical laboratory methods for use when decommissioning a UIC
Step 4	Collect Required Samples	Final	- Step now references Appendix A—UIC Decommissioning Sampling and Analysis Plan
Step 5	Review Sample Analytical Results	Final	- Step now references Appendix A—UIC Decommissioning Sampling and Analysis Plan

Summary of 2012 Revisions to UIC Decommissioning Procedure, December 2006², May 2012

	Description	Corrected Document	Major Amendments
Decommissioning Procedure		Final	General minor text amendments.Staffing updates
Step 3	Determine Sampling Requirements	Final	 Step 3 now requires sampling only when the UIC: shows visible evidence of contamination, is within 500 feet of a well, or when the catchment area is within a cleanup site with a confirmed release
Step 4	Collect Samples as Required	Final	Step 4 now references collecting water and sediment samples from within a UIC as determined by the Site Inspection.

¹ UIC Decommissioning Procedure (Draft), submitted to DEQ in October 2005. Prepared by the City of Portland.

² UIC Decommissioning Procedure, December 2006. Prepared by the City of Portland.

UIC Decommissioning Procedure December 2006 - Version 2 (May 2012)

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EXECUTIVE SUMMARY

This UIC Decommissioning Procedure provides the general steps and requirements for decommissioning (i.e., taking out of operation) Class V public underground injection control systems (UICs) in the City of Portland. This procedure is a requirement of the Water Pollution Control Facility (WPCF) permit issued to the City of Portland by the Oregon Department of Environmental Quality (DEQ) on June 1, 2005. All City personnel and contractors conducting UIC decommissioning activities should comply with this procedure to the extent that the requirements apply to the nature and scope of their work.

The procedure has the following twelve steps:

- **Step 1:** Describe General Characteristics of UIC to be Decommissioned.
- Step 2: Conduct Site Inspection of UIC; Note Any Contaminants of Potential Concern.
- **Step 3**: Determine Sampling Requirements.
- **Step 4**: Collect Required Samples.
- **Step 5:** Review Sample Analytical Results.
- **Step 6:** Prepare Follow-up Site-Specific Sampling Plan (if required).
- **Step 7:** Prepare Site-Specific Contaminated Media Management Plan (if required).
- **Step 8**: Develop Alternative Stormwater Management Design for UIC.
- **Step 9**: Prepare and Submit DEQ UIC Pre-Closure Notification Form.
- **Step 10:** Prepare Decommissioning Scope of Work and Select Contractor.
- **Step 11:** Decommission UIC (Field Procedure).
- Step 12: Prepare Closure and Decommissioning Report.

Key personnel for the UIC permit program and their areas of responsibility are identified in Section 3.0

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UIC Decommissioning Procedure Version 2 (May 2012)

1 Introduction and Organization

1.1 Purpose and Applicability

The purpose of this document is to provide the procedure and general requirements for decommissioning Class V public underground injection control systems (UICs) in the City of Portland. The procedure is a requirement of the Water Pollution Control Facility (WPCF) permit issued to the City of Portland by the Oregon Department of Environmental Quality (DEQ) on June 1, 2005. It is part of the comprehensive City of Portland UIC Management Plan (submitted December 2006).

The procedure applies to standard City-owned Class V UICs identified for decommissioning. As defined by the DEQ permit, a standard City UIC is generally considered to be a UIC constructed in accordance with City construction specifications and having adequate separation between the UIC and

with City construction specifications and having adequate separation between the UIC and groundwater. Decommissioning of non-standard UICs will generally follow this procedure, but may require additional information in a site-specific closure work plan. Examples of non-

may require additional information in a site-specific closure work plan. Examples of nonstandard UICs are those that intercept groundwater or have been determined to have adversely impacted soil or groundwater.

This procedure has been developed for use by the designated project mangers from all City bureaus. All City personnel and contractors conducting decommissioning activities must comply with the procedure to the extent that the requirements apply to the nature and scope of their work.

1.2 Regulatory Requirements

Under Oregon Administrative Rules (OAR) 340-044, DEQ developed and issued a WPCF permit for the City of Portland in June 2005. The permit regulates the construction, operations, and maintenance (including alterations and decommissioning) of all of the City's Class V public UICs. The City currently has approximately 9,000 UICs that collect stormwater from public rights-of-way and discharge it to the subsurface. UIC structures are most prevalent in the eastern portion of the City, where the subsurface soils support greater drainage and infiltration rates. For many areas east of the Willamette River, UICs are the only form of stormwater disposal available.

The WPCF permit contains specific criteria and conditions that City-owned UICs must meet [Schedule F, Section 5gg. and OAR 340-044-0015(2)]. Under the permit, the City must identify UICs that are non-compliant with permit conditions and implement corrective actions to address any system deficiencies. Under the City's UIC Management Plan (UICMP), the City will continue to track, update, and refine information related to the UIC system, as part of the *System Inventory and Assessment* Best Management Practice (BMP) under the System Management



As used in this document, UIC

injection control system owned or

means a Class V underground

program element. This information will be used to identify and apply the management practices specified in the UICMP to ensure the UIC system meets permit requirements.

If a City-owned UIC cannot meet the criteria provided in the WPCF permit and cannot be upgraded or altered to meet the criteria, then the UIC system must be decommissioned and stormwater managed using an alternative method. Alternative stormwater management methods must be consistent with watershed health goals and developed in accordance with the stormwater management and disposal hierarchy (Attachment 1) established in the City's *Stormwater Management Manual* (SWMM). UICs that need to be decommissioned may be identified during the course of city projects to upgrade or retrofit facilities, during the comprehensive UIC System Inventory and Assessment BMP (e.g., *Systemwide Assessment Report*, submitted to DEQ on July 15, 2006), or during routine program management activities.

DEQ and the Oregon Water Resources Department (WRD) have regulatory requirements for the decommissioning of subsurface wells. UICs must be decommissioned in a manner that complies with the federal and state prohibition of fluid (stormwater) movement, as outlined in 40 CFR 144.12 and 144.82a and OAR 340-44-0040. Oregon well-abandonment standards are designed to prevent contamination of the well or aquifer beneath the well by surface and subsurface leakage that may carry harmful chemicals or bacteria.

This Decommissioning Procedure has been developed using the following guidance and reference documents.

- WPCF Permit (No. 102830) for Class V Stormwater Underground Injection Control Systems; Schedule C, Section 17 and Schedule D, Section 10 (issued by DEQ in June 2005)
- Oregon Administrative Rules (OAR) 340-044-0040: Decommissioning and Conversion Requirements for Underground Injection Systems
- Federal 40 CFR 144.12 and 144.82a: Underground Injection Control Regulations for Class V Injection Wells
- *Guidelines for Characterizing, Closing and Abandoning Shallow Injection Wells* (EPA Region 10 closure manual, March 2001)
- Underground Injection Wells for Stormwater Best Management Practices Manual (Oregon Association of Clean Water Agencies, January 2003)
- City of Portland, Bureau of Environmental Services: UIC decommissioning work plans approved by DEQ, as follows:
 - Underground Injection Control Decommissioning Work Plan, SE 60th and Steele, BES Project No. 7097, April 20, 2005
 - Shallow Underground Injection Control Decommissioning Work Plan and Closure Report, BPA St. Johns Substation, BES Project No. 6781, November 2003
- Oregon Department of Environmental Quality Class V Pre-Closure Notification Form (DEQ\WQ\document # UICclosure-1000, 07/02)

2 UIC Decommissioning Procedure and Work Sequence

This section provides the procedure and work sequence for decommissioning Class V public UICs within the City of Portland.



NOTE: The City must fill out and submit a Class V **UIC Pre-Closure Notification Form** to DEQ at least 30 days before conducting any onsite physical decommissioning work. The form is provided as Attachment 2 to this procedure. The procedure steps identified below include gathering the information needed to fill out and submit the form.

	UIC Decommissioning Procedure and Work Sequence					
Step 1	Obtain and Document General Information of UIC Facility to be Decommissioned.					
	Action/Information Required	Responsibility				
	 Obtain the following information, as necessary and appropriate: UIC Facility name (legal name and/or common name) Owner/operator of UIC—include legal contact and contact information (phone, email, fax). Location of UIC including Address of UIC (physical and mailing address if available) Latitude and longitude UIC BES Hansen Node number (if available and registered) DEQ Identification Number Identify commercial or industrial facilities that may discharge to the subject UIC (also see Step 2) 	Designated Project Manager in coordination with BES CSA team and BES UIC Project Manager				
	 (http://deq12.deq.state.or.us/fs20/). Nature of business using UIC (if any); SIC/NAICS code if known Year of construction/installation UIC design and size (sump, drywell, floor drain, septic tank, drill hole, other) UIC construction depth (total depth of UIC from ground surface and estimated location of perforations) Geologic (soil type) and hydrologic conditions (depth to groundwater) Water level and sediment depth present in the UIC (referenced to bottom of UIC) Vicinity and site maps Zoning designation Size and type of drainage area Average annual stormwater flow into UIC, based on drainage area Tested UIC infiltration design capacity Note: This information will be used to complete and submit the <u>DEQ UIC Pre-</u> Closure Notification Form (Attachment 2). (See Step 9.)					
	Note: Please contact UIC Program staff and the BES Coordinated Site Assessment (CSA) team to obtain the information required in this step.					

Step 2	Conduct Site Inspection of UIC; Note Any Contaminants of Potential Concern.				
	Action/Information Required	Responsibility			
A detailed UIC Site Inspection Checklist has been developed for this activity (s Attachment 3). Experienced BES CSA or UIC staff should perform the inspect purpose of the inspection is to observe the UIC and surrounding area to identify potential pollutant sources (e.g., utility poles, land use activities (gas stations, a garage, etc)) that may discharge to the subject UIC and identify potential constru UIC sampling or decommissioning activities.As noted on Attachment 3, contact BES CSA staff to have them conduct a revier relevant city, state, and federal databases to identify DEQ Environmental Conta Site Information (ECSI) sites, State Fire Marshall hazardous substance lists, spi reports, leaking underground storage tanks (LUSTs), SARA Title III facilities, contaminated sites that could have a direct impact on site drainage.Current and past land use history at the site, as well as interviews with current a staff, can be used to belp identify any contaminants of potential concern		Designated Project Manager in Coordination with BES CSA or BES UIC Project Manager			
Step 3	Determine Sampling Requirements.				
	Action/Information Required	Responsibility			
	 Samples to be collected only when the Site Inspection for the UIC determines: a potential contamination source is identified within the UIC drainage area during the Level 1 Environmental Assessment, the UIC contains free product, or the UIC is located within 500 feet of a domestic well. 	Designated Project Manager in coordination with BES Water Pollution Control Lab (WPCL), BES CSA, or contractor			
Step 4	Collect Samples <u>as Required</u> .				
	Action/Information Required	Responsibility			
	Collect water and sediment sample from within the subject UIC as determined by the Site Inspection, in accordance with Standard Operating Procedures included in Appendix A — <i>UIC Decommissioning Sampling and Analysis Plan</i> , and submit them to the BES Water Pollution Control Laboratory (WPCL)—or the appropriate labfor required analysis. It is recommended that samples be collected and submitted no later than 30-days prior to decommissioning activities so that analytical results are available to assure proper management of any materials removed from the UIC and to assess if the subject UIC has adversely impacted groundwater quality.	BES CSA or WPCL			

Step 5	Review Sample Analytical Results.	
	Action/Information Required	Responsibility
	 Compare analytical results with applicable screening criteria identified in Appendix Aand City of Portland's batch discharge requirements. If all sample results are below applicable screening standards, skip steps 6 and 7 and go to step 8. 	WPCL Staff BES CSA staff
	• <u>If any sample results are above applicable</u> screening standards, determine based on available data and best professional judgement if operation of the UIC has likely adversely impacted soil or groundwater quality (see Appendix A) or if additional investigation is needed (see Step 6). Potential impacts will be evaluated using DEQ's risk-based protocols or other applicable DEQ risk assessment guidance. Detection of soil or groundwater contamination from the UIC will be reported to DEQ within fourteen (14) days of observation or receipt of sampling results. <u>Go to steps 6 and/or 7 below as appropriate.</u>	UIC Program staff
Step 6	Prepare Follow-up Site-Specific Sampling Plan (If Required—See Step 5 Above).	
	Action/Information Required	Responsibility
	Any UIC sample results significantly above applicable screening criteria may require a site-specific follow-up sampling plan. If sampling results are above criteriaconsult with UIC program staff and BES Coordinated Site Assessment team before decommissioning activities commence.	Designated Project Manager in coordination with WPCI
	Any required follow-up sampling plan should be approved by DEQ before additional sampling begins. A registered professional geologist, engineering geologist, or professional engineer must oversee development of the plan.	Staff, BES CSA staff and UIC Program Staff
	If UIC conditions (e.g. non aqueous phase liquid) or sediment/water analytical results indicate that groundwater or soil outside the UIC may have been impacted at a level that would adversely impact the beneficial uses of groundwater:	
	• BES will determine, in consultation with DEQ, if any additional investigation or response actions are required for compliance with the WPCF permit (see UIC Management Plan—Evaluation and Response program element).	
	• BES will, if appropriate, prepare a site-specific Sampling and Analysis Plan to assess potential adverse impacts to groundwater from the UIC (see UIC Management Plan—Evaluation and Response program element).	
	The BES UIC, WPCL and CSA staff will assist, as appropriate, in preparing and implementing follow-up sampling plan requirements	

Step 7Prepare Site-Specific Contaminated Media Management Plan if Required	
Action/Information Required	Responsibility
If UIC samples detect contaminant concentrations above naturally occurring backgroun concentration, materials removed from the subject UIC during decommissioning must b managed in accordance with applicable solid and hazardous waste regulations. A Contaminated Media Management Plan (CMMP) describing how impacted media will excavated, handled, stored, transported, or disposed of off-site should be prepared, if needed. This plan should specify where media would ultimately be disposed of and authorization for disposal should be initiated. A Waste Profile Sheet for solid waste disposal at a DEQ permitted landfill is provided as Attachment 4 . This form can also b obtained at http://wmnorthwest.com/landfill/faqs.html	nd be BES CSA Team be and UIC Project Engineer be m an
instructions on developing a CMMP. The CMMP will be provided to the contractor performing the onsite decommissioning work (see Step 10). Consult with DEQ, as	
necessary, during preparation of a CMMP.	
Step 8Develop Alternative Stormwater Management Design for UIC.	
Action/Information Required	Responsibility
 Prior to UIC decommissioning, a plan to manage the stormwater currently discharged to UIC system should be developed (UIC replacement, swale, etc.) and implemented. Thi "alternative plan" will assure proper stormwater management and controls. Alternative storm water management design should consider, but not be limited to, the following: Stormwater management and disposal hierarchy established in the <i>Stormwater Management Manual</i> (Attachment 1), BES policy, Protection of human health and the environment, Permit requirements, Watershed benefits, Compliance with applicable federal, state and local standards, BMP short and long-term effectiveness, stormwater flow, long-term reliability, constructability, implementability, and cost The BES Chief Engineer must approve the alternative stormwater management design(prior to UIC decommissioning. Stormwater management facilities must be properly implemented before on-site decommissioning activities commence. Allow a minimum of 30 days for DEQ design approval. 	o the Designated Project Manager UIC Engineer with BES Engineering Services (concept and final design)
Step 9 Prepare and Submit DEQ UIC Pre-Closure Notification Form.	
Action/Information Required	Responsibility
The DEQ UIC Pre-Closure Notification Form (Attachment 2) for the UIC must be filled out and submitted to DEQ at least 30 days prior to decommissioning a UIC. For any additional information, contact Bethany Nabhan at 823-5524, or John O'Donov at 503-823-7881.	d BES CSA Team or Project Manager van

Step 10	Prepare Decommissioning Scope of Work and Select Contractor.	
	Action/Information Required	Responsibility
	BES Engineering (Designated Project manager) and the UIC Project Manager prepare a scope of work for the bid package. The scope of work will be based on the field procedure identified in Step 11.	CSA on-call contracts
	A contractor is selected in accordance with BES contract procurement procedures. In accordance with BES construction requirements, the selected contractor will prepare and submit a site-specific work plan to BES that includes the following, as necessary and appropriate: decommissioning work methods and sequence of work, a health and safety plan, a transportation management plan, a contaminated medial management plan, an emergency response plan, and any other information requested or required. The site- specific work plan must be consistent with the field procedure shown in Step 11 and with	BES Engineering Services if required
	any other project specifications. BES approves the contractor work plan.	
Step 11	Decommission UIC (Field Procedure).	Responsibility
	 The following steps show the general sequence of work for decommissioning standard public UICs. All UICs will be decommissioned in accordance with this procedure and OAR 340-044-0040: Decommissioning and Conversion Requirements for Underground Injection Systems. Before beginning onsite work, ensure completion of all pre-decommissioning activities (#1 and #2, below). 1) Perform required sediment or water sampling (sediment, water, soil) in accordance with Step 4 of this procedure. Evaluate results to assess if groundwater quality is impacted (see Appendix A) and to characterize sediment and water for disposal purposes. Detection of soil or groundwater contamination from the UIC will be reported to DEQ within fourteen (14) days of observation or receipt of sampling results. 2) Prior to decommissioning a UIC, ensure that approved temporary or permanent alternative stormwater management facilities are in place in accordance with City standard construction specifications. 3) Remove sediment, soil, and water from, or associated with, the UIC (e.g., sediment manhole, lines, inlets) and properly handle, store, transport, and dispose of these materials in accordance with all federal, state, and local regulations and requirements (see Contaminated Media Management Plan). 	Designated Project Manager or Contractor
	 For standard city UICs—remove top cone and first solid concrete section to a depth of approximately 8-10 feet below ground surface—or to a depth approved by the Chief Engineer. Backfill UIC void with Controlled Low-Strength Materials (CLSM), concrete slurry, or other materials appropriate for the site conditions that meet DEQ and WRD requirements. Cover the top of the backfilled UIC with approved geo-fabric material to extend beyond outside of UIC and surrounding backfill. Backfill excavation (approximately 8-10 feet below the ground surface) to access the UIC to the 	

	appropriate grade using materials approved by the Chief Engineer. Clean road-	
	appropriate depth for future utility or road construction as approved by the Chief	
	Engineer Compact backfill material to design specifications and pave over	
	Engineer. Compact backing material to design specifications and pave over.	
	6) Render the UIC system completely inoperable by disconnecting, plugging, and	
	sealing all associated UIC piping in accordance with City standard construction	
	specifications. Wherever feasible and practical (will not cause significant	
	impacts to project budget and schedule or significant impacts to traffic flow),	
	pipe leads directly associated with the UIC and/or sedimentation manhole may	
	be removed during decommissioning activities. Any associated piping or	
	structures left in place will be noted and clearly identified on the City's mapping	
	systems. This information must be documented in the UIC Closure Report and	
	Hansen Database, as required in Step 12 below.	
	7) Prepare a closure report at the conclusion of decommissioning activities (Step	
	12).	
	Note: If downtoring is required, it may be necessary to eaply for a botch discharge permit	
	(see Attachment 5) from the City of Portland and obtain approval prior to	
	decommissioning or dewatering activities. This permit can be obtained from BES's CSA	
	team. Contact Bethany Nabhan at (503) 823-5524 or Ann O'Roke at (503) 823-7230.	
	······································	
Step 12	Prepare Closure and Decommissioning Report.	Responsibility
-		1 V
	At the conclusion and closeout of each UIC decommissioning project, a UIC closure	Designated
	At the conclusion and closeout of each UIC decommissioning project, a UIC closure report will be prepared by BES staff and filed in the UIC Program filing system, per	Designated Project
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	 At the conclusion and closeout of each UIC decommissioning project, a UIC closure report will be prepared by BES staff and filed in the UIC Program filing system, per permit requirements. The closure report should include the following information: Brief summary of UIC condition prior to closurereason for decommissioning. Brief discussion of UIC closure actions taken to ensure the UIC is no longer injecting 	Designated Project Manager in coordination with BES Engineering
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	 At the conclusion and closeout of each UIC decommissioning project, a UIC closure report will be prepared by BES staff and filed in the UIC Program filing system, per permit requirements. The closure report should include the following information: Brief summary of UIC condition prior to closurereason for decommissioning. Brief discussion of UIC closure actions taken to ensure the UIC is no longer injecting fluids into the subsurface. Documentation of proper disposal of contaminated media. Certify by a registered professional geologist, engineer, or approved designated person that the UIC has been properly closed. Pertinent documentation of UIC decommissioning (maps, photographs, waste disposal 	Designated Project Manager in coordination with BES Engineering and BES UIC Project Manager UIC Program
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Section

3 Key Personnel for UIC Decommissioning

This section presents the key personnel for the UIC decommissioning activities and their areas of responsibility. The UICMP (Section 7) presents the staff roles and responsibilities for the UIC Program leadership and major program elements.



KEY PERSONNEL AND AREAS OF RESPONSIBILITY						
Name	Bureau	Contact Phone	Email Address	Areas of Responsibility		
Bill Ryan	BES	503-823-7203	bill.ryan@portlandoregon.gov	<i>Engineering Services Chief Engineer</i> Review and approve UIC corrective action design, UIC decommissioning design and construction documents. Approve decommissioning backfill materials.		
Barbara Adkins	BES UIC	503-823-5737	barbara.adkins@portlandoregon.gov	UIC Program Manager Develop, recommend and oversee implementation of UIC program and policies. Ensure UIC Program management and regulatory requirements are identified, implemented, and maintained in accordance with BES policy and the WPCF permit. Liaison with DEQ and other interested parties regarding the UIC Program. Provide citywide coordination of UIC program requirements. Review and approve UIC plans and documents; ensure adequate resources are allocated to UIC Program		
Joel Bowker	BES UIC	503-823-6997	joel.bowker@portlandoregon.gov	System Monitoring Implement System Monitoring and Evaluation and Response program elements to meet permit requirements and protect groundwater. Develop sampling and analysis plans for decommissioning and corrective actions. Coordinate and communicate sampling and analytical requirements to field (CSA or WPCL) and analytical laboratory staff; and assist with data evaluation and reporting.		
Tracy Rauscher	BES UIC	503-823-7457	tracy.rauscher@portlandoregon.gov	System Management Implement UIC System Management program element to meet permit requirements and protect groundwater. Develop and main UIC Database. Prepare annual UICMP report and associated plans/reports as required. Assist in preparation of corrective action strategies and priorities. Coordinate and communicate UIC Program and WPCF permit needs (stormwater sampling, source investigations, response actions) with applicable BES UIC personnel.		
				<i>Corrective Actions</i> Develop UIC corrective action strategies and plans. Develop and implement UIC decommissioning process and procedures.		

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KEY PERSONNEL AND AREAS OF RESPONSIBILITY						
Name	Bureau	Contact Phone	Email Address	Areas of Responsibility		
				Prepare annual reports and plans as required.		
Bethany Nabhan	BES CSA	503-823-5524	bethany.nabhan@portlandoregon.gov	<i>Coordinated Site Assessment Team.</i> Assist with preparation of DEQ UIC Pre-Closure Forms and Contaminated Media Management Plans. Provides general direction for UIC site assessments.		
John O'Donovan	BES CSA	503-823-7881	john.odonovan@portlandoregon.gov	<i>Coordinated Site Assessment Manager</i> Review and approve CSA plans and procedures as required.		
Ann O'Roke	BES WPCL	503-823-7230	ann.oroke@portlandoregon.gov	Review and approve water batch discharge requests and permits. Assist with water quality sampling and analysis requirements.		

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Appendix A

UIC DECOMMISSIONING SAMPLING AND ANALYSIS PLAN

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UIC DECOMMISSIONING SAMPLING AND ANALYSIS PLAN

A 1.0 PURPOSE

This sampling and analysis plan (SAP) presents the procedures that BES staff and contractors will follow for collecting and analyzing sediment and water samples prior to decommissioning city-owned underground injection control systems (UIC). Sediment and water samples will be collected from a UIC during decommissioning when the UIC meets one the following criteria:

- a potential contamination source is identified within the UIC drainage area during the Level 1 Environmental Assessment,
- the UIC contains free product, or
- the UIC is located within 500 feet of a domestic well.

This purpose of this SAP is to assure samples are collected in a consistent manner prior to decommissioning UICs. This plan was developed in response to the City of Portland Water Pollution Control Facilities (WPCF) permit, issued by the Oregon Department of Environmental Quality (DEQ) (No. 102830).

A 2.0 SCOPE AND APPLICABILITY

The UIC decommissioning sampling strategy, presented in this document, was developed based on conversations between the UIC Program, BES Coordinated Site Assessment (CSA) team, BES Water Pollution Control Laboratory (WPCL), Engineering Services, and DEQ. The primary purposes of the sampling strategy are to meet permit requirements, assure proper management and disposal of any material (*e.g.*, sediments or water) removed during decommissioning activities, and provide guidelines for consistent data interpretation. This sampling and analysis plan should be used when the Site Inspection determines sediment and water samples are required prior to decommissioning a UIC.

This SAP supercedes the following documents:

- <u>UIC Decommissioning Sampling Plan: Category 1 Corrective Actions City of Portland</u>. Letter from BES to DEQ, dated February 6, 2006.
- <u>Decommissioning Activities and Sampling Plan</u>. Letter from BES to DEQ, dated January 10, 2005.
- <u>Decommissioning Procedure for Underground Injection Control Systems</u> (Draft). City of Portland, October 2005.

The WPCF permit requires the City to prepare numerous other plans describing how permit conditions will be implemented. This SAP should be used in conjunction with the following documents, as necessary and appropriate:

- <u>Decommissioning Procedure for Underground Injection Control Systems</u> (Final). City of Portland (submitted to DEQ December 2006).
- *Final Stormwater Discharge Monitoring Plan consists of Sampling and Analysis Plan and Quality Assurance Project Plan.* City of Portland, August 2006.
- <u>UIC Management Plan</u>. City of Portland, December 2006.

A 3.0 SAMPLE COLLECTION PROTOCOLS

This SAP specifically addresses anticipated soil and water sampling to be performed in City-owned UICs prior to UIC decommissioning activities (*i.e.*, completion of DEQ's Pre-Closure Notification form).

- UICs should not be cleaned before water or sediment samples are collected from the UIC.
- The field sampling and decommissioning work should be conducted under a site-specific health and safety plan.

A 3.1. <u>Sediment Sampling</u>

<u>Collect one (1) sediment sample from inside the UIC</u>, in accordance with appropriate BES Standard Operating Procedures (SOP) for soil or sediment sampling, if sediment is present in sufficient amount. SOPs include:

- UIC Program SOP #1.00 Sediment Sample Collection Procedures for UIC Decommissioning (see attached); or
- BES Water Pollution Control Laboratory (WPCL) Field Operations SOP #5.01a Sampling of Soil and Sediment (modified as needed for UIC sampling).

If sediment is not present³, or there is an insufficient volume for analysis, no sample will be collected. It is not recommended that soil samples be collected outside the UIC unless specifically required by DEQ.

The sample will be submitted to the City of Portland's Water Pollution Control Laboratory (supported by City-approved contract laboratories) for analyses (see Section 3.4).

A 3.2. <u>Water Sampling</u>

<u>Collect one (1) water sample from the UIC</u>, in accordance with appropriate BES SOP(s) for water sampling, if standing water is present within the UIC^4 . SOPs include:

- UIC Program SOP #2.00 Water Sample Collection Procedures for UIC Decommissioning (see attached); or
- Field Operations SOP #2.02b Grab Sample Collection with Stainless Steel Beaker (modified as needed for UIC sampling);
- Field Operations SOP #2.02c Grab Sample with a Peristaltic Pump (modified as needed for UIC sampling)

If water is not present⁵, or there is an insufficient volume for analysis, no sample will be collected.

³ If there is not enough sediment in the UIC to collect a sample, consult with UIC Program staff for additional sampling that might be required. At this time, for UICs located in and receiving drainage from City right-of-ways, it is not recommended that soil samples be collected outside the UIC.

⁴ To the extent practicable, the field team should assess whether the standing water is a) stagnant water held by the bottom of the sump; b) groundwater (*i.e.*, water level within perforated zone of UIC); or c) stormwater (*i.e.*, slowly infiltrating UIC).

 ⁵ If there is not enough water in the UIC to collect a sample, additional sampling is not required for UICs located in and receiving drainage from City right-of-ways.

UIC Decommissioning Procedure

The sample will be submitted to the City of Portland's Water Pollution Control Laboratory (supported by City-approved contract laboratories (*e.g.*, Test America) for analyses (see Section 3.4).

A 3.3. Additional Sampling

UIC Program, BES Coordinated Site Assessment (CSA), or Field Operations (FO) teams may recommend additional sampling be performed on a case-by-case basis, based on the results of a site inspection or other information reviewed. For example, UICs that collect runoff from industrial or commercial facilities may warrant additional analytical testing, based on pollutants known to be present or suspected at those facilities. No additional sampling should be undertaken without discussion with the decommissioning project manager and UIC Program staff. In addition, field staff may modify the field sampling methods, as needed and appropriate, to optimize the potential of collecting a representative sample. Sampling procedures will be documented in the *Daily Field Report*. Changes or deviations from the SOPs will be discussed in the UIC closure report.

A 3.4. <u>Recommended Sample Analysis</u>

Table A-1 presents the recommended sample containers, volumes, preservation requirements, and holding times based on standard EPA-approved methodologies for decommissioning sampling. The analytical laboratory (*e.g.*, WPCL and Test America) will provide all appropriate sample containers and supplies (*e.g.*, bottle labels, custody seals, coolers) required for sample collection and transport.

A 3.4.1. Sediment Analysis

Analyze one-sediment sample collected from within the UIC (if adequate amounts are available for analyses) for the following:

- <u>Total petroleum hydrocarbons (TPH)</u>. TPH-Dx (*i.e.*, reported as diesel, lube oil, and heavy oil) and TPH-Gx (gasoline) by Northwest Methods⁶. Because sediment may contain organic matter that can inadvertently influence sample results, the use of a silica gel cleanup, or equivalent cleanup is recommended for NWTPH-Dx analyses. The analytical chemist will determine the need for sample cleanup. The silica gel cleanup removes potential polar organic compound interferences from naturally occurring organic matter (vegetable [pine needles, decomposing leaves, etc] and animal products [oils, sugars, and fatty acids]) but does not affect petroleum hydrocarbons, since most are non-polar. Silica Gel Cleanup is recommended for sediments because it removes contributions that are due to algae and decomposing organic matter.
- <u>Polycyclic Aromatic Hydrocarbons (PAHs)</u>, <u>Phthalates, and Pentachlorophenol</u>. DEQ is currently requiring analyses of polycyclic aromatic hydrocarbons (PAHs). Sample cleanup (*e.g.*, silica gel) should be performed as determined necessary by the analytical chemist on the sediment sample and associated quality control samples. While DEQ is not currently requiring analyses of phthalates or pentachlorophenol, we recommend these be included in the EPA 8270-SIM analyses, due to the frequent detection of these compounds in Year 1 of the stormwater discharge monitoring program. Target method reporting limits (MRLs) for these compounds are presented in Table A-2.

⁶ See <u>http://www.deq.state.or.us/wmc/tank/newtph.htm</u> for a description of Northwest TPH Methods.

- <u>Metals</u>. RCRA-8 metals (*i.e.*, arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver), copper, and zinc by EPA Methods 3051/6020. Target MRLs for these compounds are presented in Table A-3.
- <u>Toxicity Leaching Characteristic Procedure (TCLP) or the Synthetic Precipitation Leaching</u> <u>Procedure (SPLP)</u> may be needed for disposal of sediments in a municipal (sanitary) landfill. One of these methods should be considered if the total metal concentration in sediment is greater than 20 times EPA's TCLP concentration for determining if a waste should be considered a RCRA regulated characteristic waste. The TCLP (EPA SW-846 Method 1311) is a more aggressive extraction developed to estimate the mobility of specific contaminants disposed of in municipal landfills. The SPLP (EPA SW-846 Method 1312) was developed to assess the leaching potential of contaminated material when exposed to rainfall. If either leaching procedure is acceptable to the landfill, it is recommended the SPLP be used. *Check with the landfill to determine if the analysis is required* or if knowledge based on the BES Inverness sediment is acceptable for disposal.

A 3.4.2. Water Analysis

Analyze one water sample collected from within the UIC (if adequate amounts are available for analyses) for the following:

- PAHs, phthalates, and pentachlorophenol by EPA Method 8270-SIM. Target MRLs for these compounds are presented in Table A-2. The analytical chemist will determine the need for sample cleanup.
- RCRA-8 metals (total metals), copper and zinc (total and dissolved metals) by EPA Methods 200.8. Target MRLs for these compounds are presented in Table A-3.
- Oil and grease by EPA Method 1664.
- Total suspended solids (TSS) by Standard Method SM 2540 D.

If petroleum product (i.e., non-aqueous phase liquid (NAPL)) is observed in the UIC, a sample will be collected and analyzed for volatile organic compounds (VOCs - EPA method 8260), semivolatile organic compounds (SVOCs - EPA method 8270), hydrocarbon characterization (TPH-HCID), and polychlorinated biphenyls (PCBs - EPA Method 8082).

A 4.0 QUALITY ASSURANCE & QUALITY CONTROL

The target method reporting limits (MRL) for water and sediment samples are presented in Tables A-2 and A-3. Sample weights used for extraction and analysis should be adjusted so that these MRLs are met on a dry weight basis. If these limits cannot be met for non-detected analytes in a sample, the laboratory report should note why these limits were not met (e.g., matrix interference) and the actual MRL achieved for non-detect analytes.

Sample cleanup techniques (silica gel or sulfuric acid) may be employed as determined appropriate by the analytical chemist. Sample cleanup may be performed if the requested MRLs for non-detect analytes cannot be met due to interferences. Sample dilution must be not be used as a substitute for sample cleanup.

The laboratory must take extra care to ensure that phthalate contamination is not a problem during analysis. Steps taken may include extra rinses of glassware with solvent before use, segregation of

glassware used for high- and low-level samples, and ensuring that plastic materials such as gloves do not come in contact with the samples.

A 5.0 DATA INTERPRETATION

The analytical sample results will be interpreted by UIC Program or CSA staff to characterize materials removed from the UIC for appropriate disposal and to evaluate whether operation of the UIC may have adversely impacted groundwater quality. Data interpretation is discussed in the following sections.

A 5.1. Sediment Results

A 5.1.1. Adverse Impacts to Groundwater

DEQ is currently requiring that soil/sediment sample results be compared to EPA Region 9 Preliminary Remedial Goals⁷ (PRGs) for soil "migration to groundwater" using a dilution/attenuation factor (DAF). DEQ is requiring that a DAF of 1 (*i.e.*, no dilution) be used when groundwater is present in the UIC or within 10 feet of the bottom of the UIC and a DAF of 20 when the separation distance (*i.e.*, distance between groundwater and the bottom of the UIC) is greater than 10 feet to assess if groundwater may be impacted. Sediment sample results should also be compared to the Risk-Based Concentrations (RBCs) presented in DEQ's guidance (2003) for *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*. DEQ's RBCs for potential leaching of contaminants in soil to groundwater are based on a DAF of approximately 60.

The analytical data presentation and subsequent evaluation should focus primarily on the common and priority pollutants, presented in Table 1 of the permit. BES considers the EPA PRG and DAF values to be too conservative for many situations. Therefore, BES will be working with DEQ to develop screening values that are more appropriate for examining potential impacts to soil or groundwater outside of the UIC. The uncertainties associated with comparing detected concentrations to conservative screening values should be presented (*e.g.*, see page B-52 of DEQ's guidance document) with the data comparison (*i.e.*, written closure report).

Metal concentrations may also be compared to region background⁸ values, if appropriate.

A 5.1.2. Waste Disposal

The primary purpose of the sediment sampling is for waste characterization to assure appropriate management and disposal of any material removed from the UIC during closure activities. If any sediment sample concentrations are above the waste disposal criteria for disposal to a DEQ permitted solid waste landfill (*e.g.*, Waste Management-Hillsboro Landfill), BES will notify DEQ, as required, by Oregon statute. Waste disposal will be documented in the UIC closure report.

A 5.2. <u>Water Results</u>

A 5.2.1. Adverse Impacts to Groundwater

The WPCF permit requires stormwater discharged to City-owned UICs meet concentrations protective of drinking water. If the maximum allowable discharge limits, (MADLs), defined in Table 1 of permit, are met, groundwater should by definition not be adversely impacted by stormwater discharges. Water

⁷ EPA Region 9 PRGs can be obtained from: http://www.epa.gov/region9/waste/sfund/prg/

⁸ For metals, DEQ typically uses soil concentrations for Clark County presented in Washington Department of Ecology's report "*Natural Background Soil Metals Concentrations in Washington State*" (Publication #94-115, October 1994) for screening purposes.

sample results should be compared to the MADLs presented in Table 1 of the permit. The comparison should be limited to only those compounds listed in Table 1 of the permit. BES believes this direct comparison is overly conservative, since the UIC water concentrations are not representative of stormwater water discharged from the UIC to the subsurface. The water samples are most likely representative of stagnant water in direct contact with sediments collected in the bottom of the UIC sump. Water concentrations may also be compared to the RBCs presented in DEQ's guidance (2003) for *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*. The uncertainties associated with comparing detected concentrations to conservative screening values should be presented (*e.g.*, see page B-52 of DEQ's guidance document) with the data comparison (i.e., written closure report).

A 5.2.2. Waste Disposal

The primary purpose of water sampling is to assure appropriate characterization and disposal of any water (or other liquids) removed during closure activities. Results should be compared to the BES batch discharge requirements (City of Portland, Decommissioning Procedure for UICs—Step 3). If water sample results do not meet the requirements for discharge to the City's sanitary sewer system, BES will dispose of the water in an appropriate manner and in accordance with local, state or federal laws. BES will document and report this to DEQ in the UIC closure report.

A 5.3. <u>Need for Additional Investigation</u>

If UIC conditions (*e.g.*, non aqueous phase liquid) or sediment/water analytical results indicate that groundwater or soil outside the UIC may have been impacted at a level that would adversely impact the beneficial uses of groundwater:

- BES will determine, in consultation with DEQ, if any additional investigation or response actions are required for compliance with the WPCF permit (see UIC Management Plan Evaluation and Response Program Element).
- BES will, if appropriate, prepare a site-specific Sampling and Analysis Plan to assess potential adverse impacts to groundwater from the UIC (see UIC Management Plan –Evaluation and Response Program Element).

A 6.0 REPORTING UIC SAMPLING RESULTS

The results of the UIC sampling will be presented in a brief report (UIC Pre-Closure Report or UIC Closure Report) in accordance with Step 12 of the *Decommissioning Procedure for Underground Injection Control Systems* (December 2006). The report will document decommissioning activities, the results of additional samples, if any, and disposal documentation.

Media	Compound/Compound Class	EPA Method	Analytical Laboratory	Container Type	Container Volume	Preservation Requirements	Technical Holding Time
Water	PAH, Phthalates & Pentachlorophenol	EPA 8270SIM	Test America	Amber Glass	3- 1 Liter (1 extra in case of breakage)	Cool to 4°C <u>+</u> 2°C	7 days (extraction) 40 days (analysis)
	RCRA-8 Total Metals + Copper & Zinc	EPA 200.8	WPCL	Wide-mouth Nalgene	500-mL	HNO ₃ to pH<2; Cool to 4° C +2°C	6 months
	Dissolved Metals + Copper & Zinc	EPA 200.8	WPCL	Wide-mouth Nalgene	500-mL	HNO ₃ to pH<2; Cool to $4^{\circ}C + 2^{\circ}C$	6 months
	Oil & Grease	EPA 1664	WPCL	Wide Mouth Clear Glass	1 Liter	HCl to pH<2; Cool to 4°C <u>+</u> 2°C	28 days
	Total Suspended Solids	SM2540 D	WPCL	Plastic	1 pint with handle	Cool to 4°C +2°C	7 days
Sediment	Diesel Range Hydrocarbons	NWTPH-Dx	WPCL	Amber Glass	1 - 4oz	Cool to 4°C <u>+</u> 2°C	14 days
	Gasoline Range Hydrocarbons	NWTPH-Gx	Test America	Amber Glass	1 - 4oz	Cool to 4°C <u>+</u> 2°C	14 days
	PAH, Phthalates & Pentachlorophenol	EPA 8270SIM	Test America	Amber Glass	1 - 4oz	Cool to 4°C <u>+</u> 2°C	7 days (extraction) 40 days (analysis)
	RCRA 8 Total Metals + Copper and Zinc	EPA 3051/6020) WPCL	Amber Glass	1 - 4oz	Cool to 4°C <u>+</u> 2°C	6 months
	TCLP	EPA 1311	WPCL	Use total r	metals jar	NA	6 months

Table A-1: Recommended Sample Containers, Lab Method, Volumes, Preservation, and Holding Times

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		Sediment	Water
<u>Analyte</u>	CAS Number	MRL (µg/kg)	<u>MRL (µg/L)</u>
Acenaphthene	83-32-9	10	0.1
Acenaphthylene	208-96-8	10	0.1
Anthracene	120-12-7	10	0.1
Benzo(a)anthracene	56-55-3	10	0.1
Benzo(a)pyrene	191-24-2	10	0.1
Benzo(g,h,i)perylene	191-24-2	10	0.1
Benzofluroanthenes		20	0.1
Chrysene	218-01-9	10	0.1
Dibenzo(a,h)anthracene	53-70-3	10	0.1
Fluoranthene	2-6-44-0	10	0.1
Fluorene	86-73-7	10	0.1
Indeno(1,2,3-cd)pyrene	193-39-5	10	0.1
Naphthalene	91-20-3	10	0.1
Pentachlorophenol	87-86-5	50	1.00
Phenanthrene	85-01-08	10	0.1
Pyrene	129-00-0	10	0.1
Di(2-ethylhexyl)phthalate	117-81-7	20	2.0
Butyl benzyl phthalate	85-68-7	20	2.0
Diethyl phthalate	84-66-2	20	1.0
Dimethyl phthalate	131-11-3	20	1.0
Di-n-butyl phthalate	87-74-2	20	2.0
Di-n-octyl phthalate	117-84-0	20	1.0

Table A-2: UIC Decommissioning Method Reporting Limits PAHs, Phthalate and Pentachlorophenol Analyses ⁹

⁹ Polycyclic aromatic hydrocarbons (PAH), phthalates, and pentachlorophenol will be analyzed using EPA Method 8270-SIM (selected ion monitoring)

Table A-3: UIC Decommissioning Method Reporting Limits Metals Analyses

SEDIMENTS (EPA METHOD 3051/6020)

	EPA	Sediment
<u>Analyte</u>	<u>Method</u>	<u>MRL (mg/kg)</u>
Arsenic	6020	0.50
Barium	6020	0.10
Cadmium	6020	0.10
Chromium	6020	0.50
Copper	6020	0.25
Lead	6020	0.10
Mercury	6020	0.010
Selenium	6020	1.00
Silver	6020	0.10
Zinc	6020	0.50
TCLP Lead	1311/6010	0.10 mg/l

WATER (EPA METHOD 200.8)

EPA	Water
Method	<u>MRL (µg/L)</u>
200.8	0.045
200.8	0.1
200.8	0.1
200.8	0.4
200.8	0.2
200.8	0.1
200.8	0.005
200.8	0.5
200.8	0.1
200.8	0.5
	EPA Method 200.8 200.8 200.8 200.8 200.8 200.8 200.8 200.8 200.8 200.8 200.8 200.8



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 RGS

UIC PROGRAM STANDARD OPERATING PROCEDURE

SEDIMENT SAMPLE COLLECTION PROCEDURES FOR UIC DECOMMISSIONING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures for collecting sediment samples from an Underground Injection Control (UIC) sump using a direct-push probe or non-mechanical sampling devices. The samples generated using these procedures may be submitted for laboratory analysis as grab samples or may be composited, as needed.

2.0 SCOPE AND APPLICABILITY

The methodologies discussed in this SOP are applicable to using hand sampling equipment or direct-push technologies to sample UIC sediments, potentially beneath standing water.

3.0 EQUIPMENT AND MATERIALS

The following is a list of required equipment for collecting UIC sediment samples:

- Bucket Auger (Hand Auger)
- Stainless steel spoon
- Large stainless steel bowl
- Site files detailing UIC locations and UIC construction information
- Latex or vinyl gloves (analyte specific)
- Chain-of-Custody, Field Data Sheets, or Daily Field Record forms
- Laboratory-supplied sampler containers
- Cooler and ice ("wet ice" or blue ice)
- Tape measure

4.0 PROCEDURE

The following procedures explain how to collect UIC sediment samples with a bucket auger; or direct-push sampler. All sampling equipment and containers used in this SOP should be decontaminated prior to any sampling activities. Proper decontamination procedures are described in BES Field Operations *SOP 7.01a -Decontamination of Sampling Equipment*.

4.1 Sampling UIC Sediment Using a Bucket Auger



Common types of bucket augers (hand augers)

The following procedures define steps to be taken when using a bucket auger to collect a sediment sample from a UIC sump. Sampling should not occur outside of the sump, unless all subsurface utility lines in the vicinity are marked. Hand auger methods are described below:

- 1. Determine the depth to water in the UIC using BES Field Operations SOP 3.01a Groundwater Level Measurement, and record on the Sampling Record form.
- 2. Determine the depth to the top of sediment using a weighted measuring tape or tape measure; record depth on the Sampling Record form. Determine if there is enough sediment to sample by subtracting the "depth to sediment" measurement from the estimated total depth of the UIC sump. Sampling should be attempted if more than 0.5 feet of sediment are present. If there is not enough sediment in the UIC sump to collect a sample, record on *Sampling Record* form.
- 3. To the extent practicable, the field team should assess whether the standing water is a) stagnant water held by the bottom of the sump; b) groundwater (i.e., water level within perforated zone of UIC); or c) stormwater (i.e., slowly infiltrating UIC).
- 4. Assemble the appropriate sampling containers.
- 5. Put on new clean gloves.
- 6. Lower the bucket auger into the UIC until it encounters sediment. Advance the auger using a clockwise twisting motion being sure to keep auger aligned vertically. When auger is full remove from the UIC and empty sediment into the stainless steel bowl or stainless steel bucket (for sample compositing).
- 7. Record notes and observations of the soil conditions on the *Field Data Sheet* or *Daily Field Record* forms. Observations should include a description of the sediment (consistency, grain-size, etc.), depth below ground surface from where sediment is extracted, and any discoloration or odors.
- 8. Repeat Steps 6 and 7 as necessary to the appropriate depth. Continue advancing the auger to total depth of the UIC sump, to the extent practicable.
- 9. After advancing the auger hole and logging the sediment cuttings, determine the appropriate depth of the sediment sample(s) for chemical analyses. Advance the auger to the appropriate sampling depth for discrete sample collection, withdraw sampler from the boring. Place sampler in the boring and advance as before, using a twisting motion. Withdraw auger from the hole.
- 10. With as little agitation as possible, place soil sample in the appropriate lab-supplied sample container(s) and place into chilled cooler for delivery to the laboratory
- 11. If collecting a composite sample, use auger to collect subsamples or aliquots from the desired depth range, and place into a clean decontaminated stainless steel bowl or bucket. Use a stainless steel spoon to homogenize the portions of the sample, by thoroughly mixing the material, and transfer into sample containers.
- 12. When the boring is completed, place soil cuttings back into the UIC.

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- 13. Record the sampling date and time on the *Chain-of-Custody*, and a description of sampling location(s) and conditions encountered on the *Field Data Sheet* and/or *Daily Field Record* forms.
- 14. If proceeding to another sampling location, decontaminate auger per Field Operations SOP 7.01a Decontamination of Sampling Equipment.

4.1 Sampling UIC Sediment Using a Direct-Push Probe

The following procedures define steps to be taken when using a direct-push technology rig (e.g. GeoprobeTM) to collect a sediment sample from a UIC sump. Sampling should not occur outside of the sump, unless all subsurface utility lines in the vicinity are marked. Direct-push methods are described below:

- 1. Determine the depth to water in the UIC using BES Field Operations SOP 3.01a Groundwater Level Measurement, and record on the Sampling Record form.
- 2. Determine the depth to the top of sediment using a weighted measuring tape or tape measure; record depth on the *Sampling Record* form. Determine if there is enough sediment to sample by subtracting the "depth to sediment" measurement from the estimated total depth of the UIC sump. Sampling should be attempted if more than 1 foot of sediment are present. If there is not enough sediment in the UIC sump to collect a sample, record on *Sampling Record* form.
- 3. Assemble the appropriate sampling containers.
- 4. Put on new clean gloves.
- 5. Have driller lower the drill rod and split spoon or equivalent sampler into the UIC until it encounters sediment. Push or drive the sampler into the sediment the length of the sampler (e.g., 2.5 feet). When sampler is full, retract sampler from the UIC.
- 6. Open the sampler on a clean surface (e.g., visqueen).
- 7. Record notes and observations of the soil conditions on the *Field Data Sheet* or *Daily Field Record* forms. Observations should include a description of the sediment (consistency, grain-size, etc.), depth below ground surface from where sediment is extracted, and any discoloration or odors.
- 15. Repeat Steps 6 and 7 as necessary to the appropriate depth. Continue advancing the sampler to the total depth of the UIC sump, to the extent practicable.
- 16. After advancing the auger hole and logging the sediment cuttings, determine the appropriate depth of the sediment sample(s) for chemical analyses. Advance the sampler to the appropriate sampling depth for discrete sample collection.
- 17. If collecting a composite sample, use auger to collect subsamples, or aliquots, from the desired depth ranges, and place into a clean decontaminated stainless steel bowl. Use a stainless steel spoon to homogenize the portions of the sample, by thoroughly mixing the material, and transfer into sample containers.
- 18. When the boring is completed, place sediment cuttings back into the UIC.
- 19. Record the sampling date and time on the *Chain-of-Custody*, and a description of sampling location(s) and conditions encountered on the *Field Data Sheet* and/or *Daily Field Record* forms.
- 20. If proceeding to another sampling location, decontaminate auger per Field Operations SOP 7.01a Decontamination of Sampling Equipment.

5.0 POTENTIAL PROBLEMS

When collecting sediment samples, it may be impossible to drive a hand auger or other hand sampling equipment through hard material or surfaces. If refusal is encountered, a sample will not be collected.

When collecting sediment samples, a common problem is failure of the sampler to retain the sample. This will result in the sediment falling out while the sampler is raised to the surface. If this occurs, reattempt the sample or use sample catchers, as appropriate.

If sediment conditions in the UIC preclude the use of a hand auger or a direct-push probe, other collection methods may be required. Refer to Field Operations *SOP 5.01a – Sampling of Soil and Sediment* for additional sample collection techniques and associated equipment.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL

The sampler and drill rod should be decontaminated thoroughly with Alconox, or equivalent, prior to lowering it into the UIC. Care should be taken to keep the sampler from being cross contaminated, placed on the ground surface, etc.



City of Portland Bureau of Environmental Services UIC Program SOP No. 2.00 Revision No.:__0 Date: ____12/01/06 Author: _____RGS

UIC PROGRAM STANDARD OPERATING PROCEDURE

WATER SAMPLE COLLECTION PROCEDURES FOR UIC DECOMMISSIONING

1.0 PURPOSE

This Standard Operating Procedure (SOP) provides guidelines for the collection of a representative water sample from an Underground Injection Control (UIC) sedimentation manhole or sump UIC using a disposable bailer.

2.0 SCOPE AND APPLICABILITY

The following procedure pertains to the proper methods for using disposable bailers (or equivalent) to collect water samples that represent water quality within the UIC system. The method for the collection of a representative sample of water from a UIC is described below.

3.0 EQUIPMENT AND MATERIALS

The following is a list of required equipment for sampling a UIC using a disposable bailer:

- Disposable (weighted polyethylene or Teflon) bailers (or equivalent container such as a stainless steel bucket, or polyethylene jar)
- Bailer emptying device
- 5-gallon bucket
- Sampling Record form for each UIC
- Site files detailing UIC information and location
- Braided nylon string
- Latex gloves
- Groundwater Level Indicator
- Chain-of-Custody, Field Data Sheets, or Daily Field Record forms
- Laboratory-supplied sampler containers
- Cooler and ice ("wet ice" or blue ice)

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4.0 PROCEDURE

The following procedures define steps to be taken when sampling an individual UIC:

- 1. Determine the depth to water in the UIC using BES Field Operations *SOP 3.01a Groundwater Level Measurement*, and record on the Sampling Record form. If there is not enough water in the UIC to collect a sample, record on Sampling Record form.
- **2.** To the extent practicable, the field team should assess whether the standing water is a) stagnant water held by the bottom of the sump; b) groundwater (i.e., water level within perforated zone of UIC); or c) stormwater (i.e., slowly infiltrating UIC).
- 3. Put on clean, unused latex gloves. Tear open plastic covering at top of bailer and tie braided nylon line to bailer using a bowline or other secure knot. Take bailer out of bag and place into the UIC, lowering to the water level. Allow the bailer to fill up and sink below the water level, however do not allow bailer to touch the bottom of UIC, if possible. Cut braided nylon line allowing enough line to work with, and tie the end to your wrist. Using braided nylon line, pull up bailer from the UIC looping the line around both hands. Do not let the line touch any surfaces, other than the inside of the UIC casing. Replace line if it contacts any surface other than the UIC casing. Pour bailer full of water into 5-gallon bucket. Do not allow bailer to touch bucket. Repeat using the same procedure.
- 4. To collect the sample from the bailer, raise the filled bailer to surface and use friction fit baileremptying device to release water from bottom into appropriate sample containers. If collecting samples for VOC analyses, use the VOC sample removal device to minimize sample disturbance. Use the following order to collect samples: VOCs (if collected), other organics, nutrients (if collected), and metals.
- 5. Place samples in chilled cooler for delivery to the laboratory for analysis. Fill out and complete attendant chain of custody documentation.

5.0 POTENTIAL PROBLEMS

Careful attention should be employed during the extraction of purge volumes so as to avoid possible contamination of the UIC. By not following specified requirements pertaining to decontamination and proper sampling methodology, the accuracy of the sampling procedure can be jeopardized. Cross contamination of the UIC itself may occur through the introduction of unclean sampling equipment and by introducing foreign material (e.g., dust, dirt, and organic material) into the UIC from ground level. Such activity will negatively affect the representiveness of the samples

If a bailer or other equipment falls down an open UIC attempt to recover the equipment by using a fishing hook attached to the nylon line to hook the item.

6.0 QUALITY ASSURANCE & QUALITY CONTROL

The probe on the water level indicator should be decontaminated thoroughly with Alconox, or an equivalent nonphosphate cleaner, and deionized water prior to lowering it into the UIC. Use a new bailer for each UIC. Use only clean, unused bailers, and string at each UIC.

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Attachment 1

STORMWATER MANAGEMENT AND DISPOSAL HIERARCHY

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Attachment 2

DEQ UIC PRE-CLOSURE NOTIFICATION FORM

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Attachment 3

CITY OF PORTLAND UIC SITE CHECKLIST

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Attachment 4

WASTE PROFILE SHEET

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BATCH DISCHARGE REQUEST FORM

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