

Memorandum

To: Matt McClincy, Oregon DEQ
From: John Edwards
CC: John Renda, Ben Hung
Date: October 19, 2006
Re: SOP for Discrete Depth Groundwater Sampling

STANDARD OPERATING PROCEDURE
DISCRETE-DEPTH GROUNDWATER SAMPLING DURING DRILLING

OBJECTIVE

The objective of this document is to define a method for the collection of discrete-depth groundwater samples during drilling. Samples will be collected using the HydroPunch II™ sampling device (QED Environmental Services, Inc.), or an equivalent brand device. A borehole will be drilled and the sampling device will be placed by the drilling subcontractors at the direction of Anchor. Groundwater samples will be collected by Anchor. The borehole will be advanced using rotosonic drilling methods.

MATERIALS

The following materials are required for the collection of discrete-depth groundwater samples using the HydroPunch II™.

- Hydropunch II™ sampling device provided by drilling subcontractor
- Drill rods having an effective I.D. of at least 1.25 inches provided by drilling subcontractor
- 1-inch I.D. stainless steel or disposable Teflon bailer
- Electronic water-level indicator
- Appropriate Sample containers provided by the testing laboratory
- Health and safety equipment

- Materials for decontamination of the sampler between samples

PROCEDURE

The following steps will be followed during the collection of discrete-depth groundwater samples:

1. The drilling subcontractor will advance the borehole to an appropriate depth for the collection of samples. The bottom of the borehole will be approximately 2 feet above the depth from which a discrete water sample is desired.
2. Measure static water level below top of drill casing with an electronic water-level indicator. Record the depth to water and distance from top of casing to ground surface.
3. The drilling subcontractor will prepare the HydroPunch™ sampling device according to the manufacturer's instructions and lower the device to the bottom of the borehole. Drill rod will be sealed with built in gaskets, Teflon tape, or an equivalent sealing method.
4. The drilling subcontractor will drive the sampling device to the proper sampling depth into undisturbed materials below the borehole bottom.
5. The drilling subcontractor will withdraw the rod to expose the screen of the sampling device in accordance with manufacturer's instructions.
6. After waiting a sufficient time to allow the sampler to fill with water, collect a groundwater sample by lowering the bailer through the rods and body of the sampler.
7. Perform field filtering of samples as needed according the Offshore Workplan SAP.
8. Obtain field water quality measurements as required in the Offshore Workplan SAP.
9. In case field conditions limit the volume of groundwater available for samples, the following order will be followed for filling of sample containers.

Sample bottles will be filled from borings GS-01 through GS-04 in this order:

1. Free cyanide
2. Amenable cyanide
3. PAHs
4. VOCs
5. Metals (at GS-02, GS-04 [the 100-foot borings])
6. Additional conventionals
7. Common cations and anions

Sample bottles from borings GS-05 through GS-10 will be filled in this order:

1. VOCs
 2. PAHs
 3. Free cyanide
 4. Amenable cyanide
 5. Metals (at GS-06, GS-08, and GS-10 [the 100-foot borings])
 6. Additional conventionals
 7. Common cations and anions
10. Label all sample containers at the time of sampling with the following information.
- Project name and number
 - Sample station
 - Sample number
 - Date and time of collection
 - Sampler initials
 - Analyses required
11. Store samples at 4°C for transport to the analytical laboratory under chain of custody procedures.

NOTES

- Borehole identification, sample depth, sample date and time will be recorded in the field notebook and on the boring log
- The HydroPunch™ sampling device will be decontaminated according to the decontamination procedures in the Offshore Workplan SAP.
- Sample collection will be performed using procedures consistent with the project Health and Safety Plan
- Investigation-derived waste will be disposed of according to the Offshore Workplan SAP.