

ERC CONTROLLED MANUAL TRANSMITTAL	Date Prepared: 02/27/96
--	-------------------------

ISOM, DA** 012 H0-09	Transmittal Number: BHI-OP-00073-TR110 Document Number: BHI-OP-00073 Title: GROUNDWATER VERTICAL PROFILE SAMPLING PROCEDURES
----------------------------	--

Instructions: (1) Remove and/or insert indicated procedure/section into manual as shown.
 (2) Sign this form and return it to Procedures Coordination **within 10 working days of receipt.**

Procedure/Section Numbers and Titles	Remove		Insert	
	Rev.	Date	Rev.	Date
BHI-OP-00073, "GROUNDWATER VERTICAL PROFILE SAMPLING PROCEDURES"	--	---	0	02/27/96



Errors and omissions are not the responsibility of Procedures Coordination. Questions concerning format/contents of this document should be referred to J. M. Faurote at 372-9268.

Receipt Acknowledgment

I have complied with the above instructions for this manual.

DN /som
8/8/96

Signature
Date

New address or MSIN if different than listed above: _____

FOLD DOWN TO THE DOTTED LINE--PLEASE DO NOT STAPLE OR TAPE.

RETURN TO: Procedures Coordination, MSIN H0-10
Bechtel Hanford, Inc., 3350 George Washington Way, Richland, Washington 99352
 BHI-DC-001 (01/96)

ERC CONTROLLED MANUAL TRANSMITTAL Date Prepared: 02/27/96

ISOM, DA** 011 H0-09	Transmittal Number: BHI-OP-00073-TR110 Document Number: BHI-OP-00073 Title: GROUNDWATER VERTICAL PROFILE SAMPLING PROCEDURES
----------------------------	--

Instructions: (1) Remove and/or insert indicated procedure/section into manual as shown.
 (2) Sign this form and return it to Procedures Coordination **within 10 working days of receipt.**

Procedure/Section Numbers and Titles	Remove		Insert	
	Rev.	Date	Rev.	Date
BHI-OP-00073, "GROUNDWATER VERTICAL PROFILE SAMPLING PROCEDURES"	--	---	0	02/27/96

Errors and omissions are not the responsibility of Procedures Coordination. Questions concerning format/contents of this document should be referred to J. M. Faurote at 372-9268.

Receipt Acknowledgment

I have complied with the above instructions for this manual.

DA / burn

Signature

8/8/96

Date

New address or MSIN if different than listed above: _____

FOLD DOWN TO THE DOTTED LINE--PLEASE DO NOT STAPLE OR TAPE.

RETURN TO: Procedures Coordination, MSIN H0-10
Bechtel Hanford, Inc., 3350 George Washington Way, Richland, Washington 99352
 BHI-DC-001 (01/96)

BHI-OP-00073

REV: 0

OU: N/A

TSD: N/A

ERA: N/A

Controlled Copy No. 12

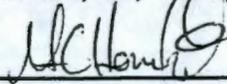
Controlled To: ISom, DA**

APPROVAL PAGE

Title of Document: **GROUNDWATER VERTICAL PROFILE SAMPLING
PROCEDURE**

Author(s): **J. M. Faurote
B. H. Ford**

Approval: **G. C. Henckel, III, Manager, Groundwater Project**


Signature

2/27/96
Date

The approval signature on this page indicates that this document has been authorized for information release to the public through appropriate channels. No other forms or signatures are required to document this information release.

BHI-PC 
02/27/96

GROUNDWATER VERTICAL PROFILE SAMPLING PROCEDURE

Revision No. 0

Issue Date _____

Author(s):

J. M. Faurote
J. M. Faurote

2/15/96
Date

B. H. Ford
B. H. Ford

2/20/96
Date

Concurrence by:

T. D. Anderson
T. D. Anderson
Groundwater Project Engineer

2-21-96
Date

M. A. Buckmaster
M. A. Buckmaster
200 Area Task Lead

2/23/96
Date

K. R. Porter
K. R. Porter
ITM Groundwater Lead

2/26/96
Date

A. J. Knepp
A. J. Knepp
Groundwater Site Investigation Lead

2-23-96
Date

N/A
D. D. Teel
Natural Resources/Risk Assessment Lead

Date

N/A
R. A. Vinson
Groundwater Regulatory Support Lead

Date

R. M. Fabre
R. M. Fabre
Groundwater Field Support Lead

2-23-96
Date

C. H. St. John
C. H. St. John
200 Area Groundwater Safety Lead

2/27/96
Date

S. K. DeMers
S. K. DeMers
Groundwater Rad Engineer

2/27/96
Date

N/A
J. H. Dunkirk
Legal

Date

BHI-OP-00073
Rev. 0

Groundwater Vertical Profile Sampling Procedure

Authors

J. M. Faurote
B. H. Ford

Date Published

February 1996



Prepared for the U.S. Department of Energy
Office of Environmental Restoration and
Waste Management

Bechtel Hanford, Inc.
Richland, Washington

Field Support Work Instructions

Procedure No. BHI-OP-00073

Rev. 0

Effective Date 02/27/96

Page 1 of 8

Groundwater Vertical Profile Sampling Procedure

1.0 PURPOSE AND SCOPE

This procedure provides instructions and requirements for collecting groundwater samples, which are intended for chemical and radiological analysis, from isolated zones within groundwater monitoring wells. Vertical profile sampling is a specialized modification of normal groundwater sampling and incorporates the requirements, equipment, and procedures described in Environmental Investigations Procedure (EIP) 4.1, "Groundwater Sampling" except as modified or appended in this procedure.

2.0 REQUIREMENTS

Requirements for normal groundwater sampling specified in EIP 4.1, "Groundwater Sampling" are to be met with the following exceptions and additions:

- Samples are to be collected using a straddle-packer sampling assembly. The straddle-packer configuration and dimensions are to be recorded in the field logbook and/or the Field Activity Reports. The length of the packed-off interval will be used by the field sampler(s) to calculate the estimated purge volume. The estimated purge volume and the depth of the packed-off interval in the well, are to be recorded in the field logbook and Groundwater Sample Report for each zone sampled.
- The flow rate of the water being pumped from the well during purging should be kept to a minimum (preferably less than 0.5 gal/min). Special circumstances (e.g., high turbidity) may require much higher flow rates. For sampling, the flow rate should be kept to a minimum (preferably less than 0.5 gal/min or lower). In no case should the sampling flow rate exceed the purge flow rate.
- All downhole test equipment (e.g., the straddle-packer sampling assembly and sample pump) and the stainless-steel sampling manifolds are to be decontaminated after use at each well in accordance with applicable procedures.

Field Support Work Instructions

Procedure No. BHI-OP-00073

Rev. 0

Effective Date 02/27/96

Page 2 of 8

Groundwater Vertical Profile Sampling Procedure

3.0 EQUIPMENT

Sampling equipment, as specified in EIP 4.1, Section 3.0, "Equipment" may be required for vertical profile sampling as well as the following equipment.

- Straddle-packer sampling assembly
- Purge/sample pump (must be capable of operating at very low flow rates [<0.5 gpm])
- Power supply compatible with the available pump
- Flow metering device (either a mechanical or volumetric [i.e., 5-gallon bucket with stop watch]) able to measure flow at the expected range.
- Riser pipe
- Nephelometric turbidity meter.

The specific description (e.g., size, type, model, range) of this equipment may vary depending on the well and site conditions. Equipment specifications are to be recorded in the field logbook and/or Field Activity Reports.

4.0 PROCEDURE

4.1 Preparation for Field Efforts

Preparation steps are to be completed as specified in EIP 4.1, "Groundwater Sampling", in addition to the following:

Hydrology/Modeling Manager (or designee)

1. Assign a task lead to provide single point-of-contact coordination for sampling operations. The field sampler(s) and pump crew will report to the task lead.
2. Assign a pump team to support the configuration, installation, operation, and relocation within the well of the straddle-packer or sampling assembly and purge/sample pump.

Field Support Work Instructions

Procedure No. BHI-OP-00073

Rev. 0

Effective Date 02/27/96

Page 3 of 8

Groundwater Vertical Profile Sampling Procedure

3. Inform the Project Manager of personnel assignments.

Task Lead

4. Ensure that the pump support team and field sampler(s) have the necessary information and equipment and sufficient lead planning time to ensure the project schedule is met.

Pump Support Team

5. Review well construction information and assemble an appropriate straddle-packer sampling assembly.
6. If time allows, preinstall the straddle-packer sampling assembly and purge/sample pump at the well at a depth interval specified by the task lead and as defined in the Sampling and Analysis Plan (if available). Record straddle-packer sampling assembly configuration and installation information in a Field Activity Report, and provide the information to the Field Sampler for inclusion in the field logbook.

4.2 Sample Collection

Sample collection procedures specified in EIP 4.1, "Groundwater Sampling", will be utilized with the following exceptions:

Field Sampler

1. Enter the straddle-packer sampling assembly configuration and installation depth information in the field logbook. Calculate and record the amount of water that must be removed to equal one packed-off interval in the field logbook and on the Groundwater Sample Report. This amount will be the estimated volume of water that must be removed, under low-volume purging, to provide a representative sample of the packed-off interval.

Pump Support Team

2. When the field sampler is ready, the pump support team will turn on the purge/sample pump and adjust the flow rate to a minimum (preferably 0.5 gal/min or less).

Field Support Work Instructions

Procedure No. BHI-OP-00073

Rev. 0

Effective Date 02/27/96

Page 4 of 8

Groundwater Vertical Profile Sampling Procedure

Field Sampler

3. The first set of pH, conductivity, temperature, dissolved oxygen, and turbidity measurements will be taken shortly after the purge/sample pump has been turned on and the flow rate reduced. Measurement values are to be recorded on the Groundwater Sample Report.

Pump Support Team

4. If the turbidity exceeds 30 (NTU), the flow rate may be increased to allow for a larger volume purge of the packed-off interval. Repeat measurements are to be made at a maximum of every 10 min to evaluate the cleanup of the packed-off interval. When turbidity drops below 30 NTU, the flow rate is to be reduced to the minimum sustainable rate. Record all flow rate settings and changes in the Groundwater Sample Report.

Field Sampler

5. The purge is complete when the pH, conductivity, temperature, dissolved oxygen, and turbidity readings have stabilized. Stability is defined by two consecutive readings within the following tolerances for each parameter:
 - Temperature = ± 0.2 degrees Celsius
 - Conductivity = $\pm 10\%$ $\mu\text{mhos/cm}$
 - pH = ± 0.2 pH units
 - Dissolved oxygen = ± 0.5 mg/L
 - Turbidity = ± 10 NTU

Preferably, sampling should not occur until turbidity has dropped below 5 NTU. This may not occur during vertical sampling, especially in drill-and-test or new-well sampling operations. The task lead may make a field decision to sample in spite of elevated turbidity readings if three interval volumes of water have been removed and all other parameters have stabilized. This decision is to be recorded in the field logbook.

6. If the well pumps dry before one interval volume is removed or before the parameters have stabilized, the following steps are to be taken to collect a sample:
 - a. The pump is turned off

Field Support Work Instructions

Procedure No. BHI-OP-00073

Rev. 0

Effective Date 02/27/96

Page 5 of 8

Groundwater Vertical Profile Sampling Procedure

- b. Wait until the well recharges sufficiently to draw a sample
- c. Turn the pump back on and record the stabilization parameters once
- d. Collect the samples as described in EIP 4.1
- e. If the well runs dry before all the bottles in the bottle set are full, repeat Steps a through d.
- f. If sufficient water does not recharge the well, move to Step 7 and note the problem in the field logbook.

Pump Support Team

7. If insufficient water or no water can be pumped to the surface, the straddle-packer sampling assembly is to be relocated to a depth specified by the task lead and the purging/sampling operation restarted. If the entire well produces insufficient water, note the problem in the field logbook. The task lead is to notify the Sampling Coordinator, Geosciences Group Manager, and Project Manager of the problem.

4.3 After Sample Collection

Following sample collection, the field sampler is to follow the procedure as specified in EIP 4.1 regarding sample bottle handling, documentation, transportation and equipment removal, and handling. Other steps to be taken are as follows:

Pump Support Team

1. Remove pump and straddle-packer sampling assembly from the well unless otherwise directed by the task lead.
2. Decontaminate pump and straddle-packer sampling assembly as required in EIP 6.2 "Field Cleaning and/or Decontamination of Drilling Equipment" before use in another well.

5.0 REFERENCES

BHI-EE-01, *Environmental Investigations Procedures*,
EIP 4.1, "Groundwater Sampling"
EIP 6.2, "Field Cleaning and/or Decontamination of Drilling Equipment"

Field Support Work Instructions

Procedure No. BHI-OP-00073

Rev. 0

Effective Date 02/27/96

Page 6 of 8

Groundwater Vertical Profile Sampling Procedure

6.0 FORMS/ATTACHMENTS

1. Field Activity Report/Well Services (BC-6000-278)
2. Groundwater Sample Report (A-6000-480)

Field Support Work Instructions

Procedure No. BHI-OP-00073

Rev. 0

Effective Date 02/27/96

Page 8 of 8

Groundwater Vertical Profile Sampling Procedure

ATTACHMENT 2 GROUNDWATER SAMPLE REPORT

GROUNDWATER SAMPLE REPORT															
Project: _____				Sampling CY _____				Date _____		Page _____ of _____					
Well Number _____				Quarter: _____				Calculations							
Total Purge Volume (gal) _____															
Purge Flow Rate (gal/min) _____															
Hydrostar (Time On) _____															
Submersible (Time On) _____															
SAMPLES COLLECTED															
<p>Total No. of Bottles _____</p>															
FIELD MEASUREMENTS															
E-Tape = _____			pH Serial No.: _____			Cond./Therm. Serial No.: _____									
Time															
pH															
Temp (°C)															
Cond (µs/cm)															
FIELD OBSERVATIONS															
Weather _____															
General Problems/Unusual Events _____															
Equipment Irregularities _____															
Container Irregularities _____															
Comments _____															
Well capped and locked <input type="checkbox"/> Yes <input type="checkbox"/> No															
Samples Surveyed for Gamma Radiation by HPTs _____															
Samples preserved with ice <input type="checkbox"/> Yes <input type="checkbox"/> No															
Data Recorded by _____				Date _____				Data Checked by _____				Date _____			
Sign and print name				Date				Sign and print name				Date			