PBS | Engineering + Environmental

November 8, 2012

Washington Department of Ecology
C/o Mr. Thomas Middleton
P.O. Box 47775
Olympia, Washington 98504

Via Email Only: tmid461@ecy.wa.gov

Re: Work Plan to Conduct Additional Phase II Investigation
Former Norge Cleaners, 829 Commerce Avenue, Longview, Washington
PBS Project No. 20275.001 - Phase 0003
Facility/Site No. 6106
VCP Project No. SW1065

Dear Mr. Middleton:

PBS Engineering and Environmental Inc. (PBS) is pleased to provide this work plan for additional Phase II Investigation at the property located at 869 Commerce Avenue in Longview, Washington (subject property/site). Please review this work plan and confirm whether the planned work will meet the substantive requirements of MTCA.

OBJECTIVE

The objective of this investigation is to provide additional data points to assess the vertical and horizontal extent of the contaminated groundwater and soil as well as to address potential vapor intrusion concerns associated with utility trenches. The proposed scope of work is intended to satisfy DOE's requests in a comment letter dated July 9, 2012, and is in conjunction with items discussed during a meeting with the DOE on September 5, 2012, and PBS' previous recommendations in the March 2012 report. The scope of work outlined in this work plan is not intended as a remedial action or a proposed clean up of the site.

UTILITIES RESEARCH

PBS has identified water and electric lines along the western site boundary; with the water line extending to the east along the northern site boundary. In addition there is a potential for natural gas and communication lines to also be located along the western property boundary. According to the City of Longview Water Supervisor (Randy Hamilton) the water line is located between 2 and 6 feet bgs. A sanitary sewer line has been identified to the east of the onsite structure and according to the City of Longview Utility Supervisor (Sewer Division), Craig Craddock, the base of the sanitary sewer line is located at approximately 6 to 6.5 feet bgs. The backfill material for both the water and sanitary sewer lines are reported to be unknown from these sources; however, both Mr. Craddock and Mr. Hamilton indicated it could be composed of native material.

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REGIONAL GROUNDWATER CONTAMINATION SOURCES

PBS will expand upon the original environmental database research conducted in the February 2009 Phase I Environmental Site Assessment. The purpose is to determine if other nearby upgradient sites may have the same contaminants of concern as the Former Norge Cleaner site. The findings of this records review, anticipated to be conducted via DOE's website, will be included in the report for the proposed investigation.

SCOPE OF WORK

PBS proposes to conduct the following scope of work. Prior to drilling, PBS will update the existing health and safety plan (HASP) as appropriate. A utility locate will be requested from public locating services and from a private locator to identify any underground utilities in the vicinity of selected sample locations. All marked underground utility locations will be inspected prior to start of work. It is assumed that the client will inform PBS of knowledge of onsite underground utilities, and will arrange access during regular business hours.

Soil Gas Testing

The purpose of this portion of the investigation is to address the potential for utility corridors in the immediate vicinity of the site to serve as a preferential pathway for vapor migration from contaminated soil and groundwater. PBS will collect four soil gas samples from within or adjacent to utility corridors on the west and north boundaries of the subject property as shown on the attached Figure 1 (SG-1 through SG-4) and described in the Table 1 (attached). The driller will use a hand auger to prepare the sampling site to avoid damaging utilities.

The Washington DOE has published a guidance document[1] that establishes protocols for collecting sub-slab vapor and soil gas samples. PBS will collect the samples in accordance with this document with modifications as needed for leak detection measures. Adjustments to the following protocol may be warranted based on field conditions and will be documented in field notes. Summa canisters will be ordered from the laboratory with flow regulators assuming a flow rate of no more than 200 milliliters per minute (mL/minute). The canisters will be batch-certified for chlorinated volatile organic compounds (VOCs), with the assumption that batch certification will provide adequately low reporting limits.

All work will be conducted by an experienced scientist/geologist and supervised by a Washington-Licensed Geologist. All fieldwork will follow PBS's standard Health and Safety Policies and Procedures, and potential site hazards will be reviewed with subcontractor personnel prior to beginning work.

Sampling Methodology

<u>Drill hole and seal tubing</u>

- Using a hand auger, complete a hole to 2 to 5 feet below ground surface (bgs) (depth dependant on utility corridor research and field findings). Install a temporary casing, attach a gas sampling implant to the base of Teflon tubing, and lower implant and tubing to the base of the hole.

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[1] Washington DOE. *(October 2009) Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action.* Toxics Cleanup Program. Publication No. 09-09-047

- Add silica sand around the installed gas sampling implant to at least 6 inches above the implant and slowly remove casing.
- Create a seal around the tubing using hydrated granular bentonite to the surface. Allow at least 30 minutes for the seal to set and the system to equilibrate prior to beginning sampling.

Leak Detection Testing

- Conduct leak detection testing using a helium shroud and a real-time helium meter. Make adjustments to seal as needed. Have samples analyzed for helium at the lab.

Sample Collection

- Connect the tubing leading from the hole to 1) T-valve used for in-line purging, and 2) 1-liter Summa canister with flow regulator.
- Remove two purge volumes using a calibrated syringe.
- Collect sample in the 1-liter Summa canister.

Auger Hole Abandonment

- Abandon the hole by removing implant and tubing and backfilling with hydrated bentonite and an appropriate surface patch.
- Hand auger equipment will be decontaminated prior to use and between samples. New tubing will be used at each location. PBS' representative will wear clean nitrile gloves during the collection of each sample to prevent cross contamination.

Samples will be mailed for second-day delivery to a qualified and appropriately-licensed air laboratory under chain-of-custody documentation. Samples will be analyzed by EPA Method TO-15 Low Level (LL) for chlorinated VOCs (tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, vinyl chloride, 1,4-dioxane) and helium (ASTM Method D1946).

Groundwater and Soil Investigation

The purpose of this portion of the investigation is to assess the vertical and horizontal extent of the contaminated groundwater at both on- and off-site locations as well as assessing soil at on-site locations. This activity may require the use of a flagger for off-site (right-of-way) borings to the west and northwest of the site within the alleyways. Prior to drilling activities, PBS will oversee a camera survey of the building's sanitary sewer line entering the former dry cleaners unit to identify if any laterals are present and to assess the condition of the line for any degraded or damaged areas.

As noted below, the vertical investigation will be limited to approximately 45 feet bgs, due to drill rig limitations with the on-site soils. Based on the results of this proposed investigation, if deeper vertical delineation is warranted, the use of a sonic rig will be required.

Under PBS supervision, a Washington-licensed driller will advance a total of 13 boreholes (B-27 through B-39) on the site and in right-of-way alleys (located between 14th and 15th Avenues) to assess the extent of chlorinated solvent contamination found in soil and groundwater during the previous investigations. Proposed boring locations are shown on Figures 1 and 2. Table 1 (attached) lists the

proposed areas of concern, boring numbers and locations, sample media (i.e., soil, groundwater or soil gas), sampling rationale, and laboratory tests.

For those borings placed in right-of-ways (B-27 though B-33), it will be necessary to obtain a City of Longview right-of-way permit and have flaggers, and potentially a traffic control plan, to provide adequate worker and public safety while drilling activities are conducted.

- The interior borings (B-34 through B-36) will be drilled using a dolly-mounted direct-push drilling unit that can access interior locations without requiring ventilation of exhaust and will be advanced to 15 feet bgs; groundwater samples will be taken from 11 to 15 feet bgs. The exact location of the interior borings will be based on the results of the sanitary sewer line camera scope.
- Boreholes B-27 through B-33 will be placed using a direct-push type drill rig and will be advanced to 15 feet bgs and groundwater samples with be taken from 11 to 15 feet bgs. No soil samples will be collected.
- Boreholes B-37 through B-39 will be placed using a direct-push drill rig and advanced to 45 feet bgs with groundwater samples taken at three discrete depths (11-15, 26-30 and 41-45 feet bgs). Due to the potential for “heaving sands” in this area, the boring will be cased utilizing a dual tube drilling technique and may need to add potable water to keep the sands from heaving and allow for appropriate boring completion within the saturated zone. If potable water is added during drilling operations, PBS will remove at a minimum 1.5 times the amount of water added prior to beginning low-flow sampling activities; a sample of the water added will be taken for laboratory analysis.

PBS will collect continuous soil samples from the proposed locations for field screening by a hand-held photoionization detector (PID), and will log the soils, making note of grain size, color and odor and other relevant observations. Soil samples will be collected from borings B-34 through B-39, as shown on Table 1, using EPA Field Method 5035.

Groundwater will be sampled following PBS’ standard operating procedures (SOP) for low-flow groundwater sampling (attached). As part of the sampling, field parameters will be collected for pH, specific conductance, dissolved oxygen, oxygen-reduction potential (ORP) and temperature.

Soil samples will be collected in sterile laboratory-provided 4-ounce containers and methanol-preserved volatile organic analysis (VOA) vials and sealed with Teflon lids. Groundwater samples will be placed in hydrochloric acid (HCl)-preserved VOA vials. All samples will be stored on ice for the duration of fieldwork and transport to the laboratory for analysis. Soil and groundwater samples will be analyzed for volatile organic compounds (VOCs) using EPA Method 8260B under regular turnaround time (7 to 10 business days).

All sampling equipment will be decontaminated prior to use and between samples. At each groundwater sampling point, new disposable polyethylene tubing will be used. PBS’ representative will wear clean nitrile gloves during the collection of each sample to prevent cross contamination. Upon completion of sampling, temporary boreholes will be backfilled and sealed with bentonite to six inches below grade, and covered with an appropriate surface patch. It is estimated that fieldwork will require two days to complete.

Fieldwork for the investigation activities described above is expected to require 4 to 6 days to complete.

Investigation-Derived Wastes
Soil and purged groundwater/decontamination water (investigative-derived waste or IDW) will be contained in separate 55-gallon drums. A sample of the water will be taken following completion of the investigation to determine appropriate disposal.

INDOOR AIR SAMPLING
Per the September 5, 2012, meeting at DOE's office, and in conjunction with the new cleanup levels established by DOE for PCE and TCE in the last year, additional indoor air sampling for additional characterization in the former grocery store unit is not warranted. It was agreed during the September 2012 meeting that the space can be occupied by a new tenant without on-going monitoring or adjustments to building conditions. DOE did request a follow-up air sampling event once the tenant is occupying the space.

CLEANUP LEVELS
During the September 2012 meeting at DOE, it was agreed that the most recent proposed cleanup levels (CULs), submitted August 22, 2012, can be used for future reporting. Once the extent of contamination has been delineated, DOE will review and formally authorize the CULs for this project.

REPORT
The results of this additional investigation will be provided in a report. This document will include a description of the field methods and activities, provide tabulated results of the sampling compared to applicable screening criteria, and, if necessary, provide recommendations for further work. It will include figures showing the site layout and sampling locations along with the chain of custody and analytical reports.

The data will be submitted to DOE's Environmental Information Management (EIM) system. PBS has submitted all previous quarterly groundwater monitoring data, and is in the process of getting investigation data uploaded.

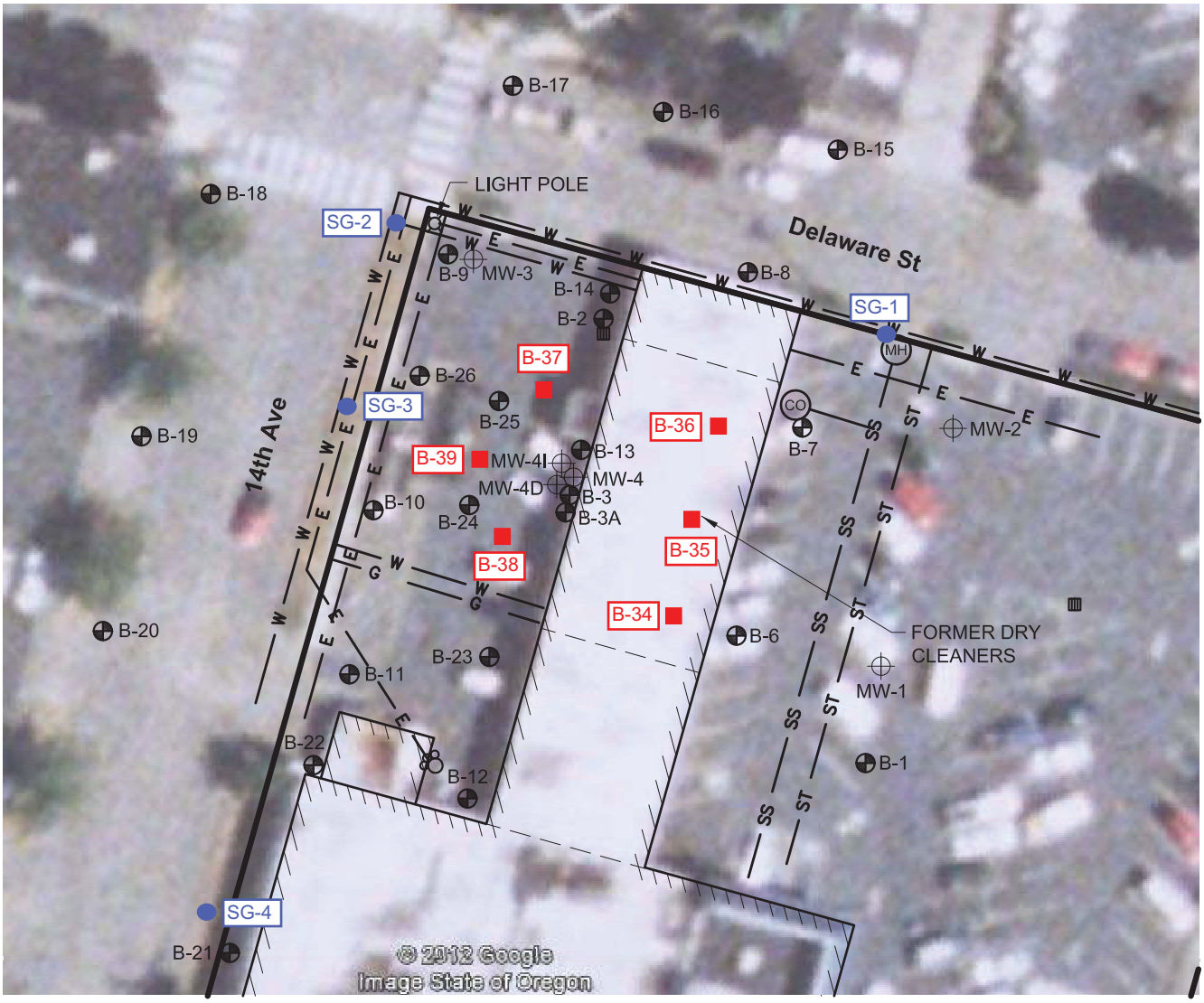
Sincerely,
PBS Engineering + Environmental

Michael Golden
Project Scientist

Reviewed by: Heidi Yantz, LG, PBS

Attachments: Figure 1 - Proposed On-Site Sample Location Map
Figure 2 - Proposed Off-Site Sample Location Map

Table 1 - Sampling Objectives
PBS' SOP - Low-Flow Sampling of a Groundwater Monitoring Well



LEGEND

B-1	BORING NUMBER AND LOCATION	W	WATER LINE
	CATCH BASIN	SS	SANITARY SEWER LINE
MW-1	MONITORING WELL NUMBER AND LOCATION	ST	STORM LINE
MW-4D	DEEP MONITORING WELL NUMBER AND LOCATION	E	ELECTRIC LINE
B-27	PROPOSED BORING NUMBER AND LOCATION	G	GAS LINE
SG-1	PROPOSED SOIL GAS NUMBER AND LOCATION		

0' 25' 50' 100'

SCALE: 1" = 50'

PREPARED FOR: LAKEWAY INVESTMENTS

PBS

PROJECT # 20275.001

DATE OCT 2012

PROPOSED ON-SITE SAMPLE LOCATION MAP

869 COMMERCE AVENUE
LONGVIEW, WASHINGTON

FIGURE 1

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Source: 2012 Google, Image State of Oregon

LEGEND

- B-27 PROPOSED BORING NUMBER AND LOCATION

NOT TO SCALE

PREPARED FOR: LAKEWAY INVESTMENTS

PBS

PROJECT # 20275.001

DATE OCT 2012

PROPOSED OFF-SITE SAMPLE LOCATION MAP

869 COMMERCE AVENUE
LONGVIEW, WASHINGTON

FIGURE 2

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Table 1 – Sampling Objectives
Additional Phase II Investigation
Former Norge Cleaners – 869 Commerce Avenue, Longview, Washington

Location	Sample Number	Soil Sample Depth (feet bgs)[1]		Laboratory Analysis	Purpose
To the west of the site in the alleyway located offsite between 14th and 15th Avenues; south of Delaware Street.	B-27	NA		VOCs 8260	Assess horizontal extent of groundwater contamination to the west and northwest of the site
	B-28				
	B-29				
	B-30				
To the west/northwest of the site in the alleyway located offsite between 14th and 15th Avenues; north of Delaware Street.	B-31				
	B-32				
	B-33				
North interior portion of former dry cleaners unit; along the sanitary sewer line	B-34	2-3 6-8			Assess horizontal and vertical extent of soil contamination and identify if a source area is located beneath the structure. Assess horizontal extent of groundwater contamination
Central interior portion of former dry cleaners unit; along the sanitary sewer line	B-35	2-3 6-8			
South interior portion of former dry cleaners unit; along the sanitary sewer line	B-36	2-3 6-8			
In paved area to west of strip mall portion of on-site structure (~25' to the northwest of MW-4)	B-37	2-3 6-8	Groundwater Sample Depths 11-15 26-30 41-45		Assess horizontal and vertical extent of soil contamination and vertical extent of groundwater contamination to the west of the presumed source area (MW-4)
In paved area to west of strip mall portion of on-site structure (~25' to the southwest of MW-4)	B-38				
In paved area to west of strip mall portion of on-site structure (~25' to the west of MW-4)	B-39				

Table 1 - Continued

Location	Sample Number	Soil Sample Depth (feet bgs)[1]	Laboratory Analysis	Purpose
Adjacent to sanitary sewer line along the northern site boundary	SG-1	No soil or groundwater, soil gas samples will be taken from 2 to 5, depending on field findings	Chlorinated VOCs (TO-15)	Characterize potential for soil vapor/gas be migrating along utility trench/corridor
Adjacent to water and electric lines located near the northwestern site boundary	SG-2			
Adjacent to water and electric lines located near the western site boundary and to the west of MW-4	SG-3			
Adjacent to water and electric lines located near the western site boundary to the south of the contaminated area	SG-4			

[1]Groundwater samples will be taken in all borings from the upper portion of the aquifer at approximately 10 feet bgs with the exception of B-37, B-38, and B-39 which will be sampled at the depths shown above (as well as SG-1 through SG-4 which are soil gas samples).
bgs = Below ground surface
VOCs = Volatile organic compounds by EPA Method 8260B (soil samples collected using EPA Field Method 5035)
Chlorinated VOCs = Chlorinated volatile organic compounds (vinyl chloride, trans-1,2-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trichloroethene, 1,4-dioxane and tetrachloroethene by EPA Method TO-15 LL)
NA = Soil will not be sampled from this location, only groundwater delineation is of concern.

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STANDARD OPERATING PROCEDURE
GROUNDWATER SAMPLING USING LOW-FLOW SAMPLING TECHNIQUES

1.0 BACKGROUND AND PURPOSE

Groundwater samples are collected from monitoring wells and temporary borings for analysis of physical and chemical parameters, either by using field observations and portable equipment and/or using off-site laboratory analytical methods. Groundwater is typically purged prior to sample collection to ensure that water sampled is representative of the formation. Traditional groundwater sampling methods required removal of multiple casing volumes of water, resulting in large quantities of water requiring disposal and increasing the potential for volatilization of organic compounds due to a high pump rate. The agitation from this removal could increase turbidity as well.

Low-flow purging and sampling methods were developed to minimize purge water volume and reduce the potential for contaminant volatilization. Low-flow techniques have become the industry standard for collecting a groundwater sample because the method minimizes turbidity and produces a more representative groundwater sample. Although it is preferable to use pumps dedicated to specific wells, low-flow techniques can be achieved with a portable pump.

The procedures in this Standard Operating Procedure (SOP) are specific to standard monitoring wells with a single-slotted interval. This SOP is generally acceptable for use with temporary borings.

2.0 EQUIPMENT LIST

1. Well lock keys
2. Groundwater Sampling Field Form
3. Electronic water level probe
4. Interface probe (if dense or light non-aqueous phase liquids are [DNAPL or LNAPL] is present)
5. Knife or scissors
6. Decontamination equipment
7. Site map and health and safety plan
8. Personal Protection Equipment (PPE) appropriate for the site
9. Submersible pump or peristaltic pump and associated equipment
10. Compressed gas source (Nitrogen or air compressor), battery source, or generator and fuel
11. Control box
12. Disposable tubing, if necessary
13. Field water quality monitoring equipment
14. Buckets or containers for purge water and drum labels
15. Sample containers, labels, packaging material

3.0 PROCEDURE

Low-flow techniques rely on stabilization of field water quality parameters to determine when groundwater is representative of aquifer conditions. Measurement of groundwater quality

parameters occurs in a closed system in which groundwater does not come in contact with open air; dissolved oxygen (DO), oxygen-reduction potential (ORP), and pH measurements are sensitive to reactions with the atmosphere. A flow-through cell (flow cell) serves as this closed system and is used to measure field parameters prior to collecting groundwater samples. Stabilization of selected parameters indicated that conditions are suitable for sampling to begin.

This method requires care when placing a portable pump and/or tubing in the well to minimize disturbance to the water column. Low-flow purge and sample methods call for low pumping rates (0.1 to 0.5 liter/minute) to reduce drawdown. A drawdown of less than 0.3 feet in the water column, once the pumping rate has stabilized, is desirable; however depending on the lithology, this is not always possible. At a minimum, the depth-to-water should be stabilized for three consecutive readings taken between 3 to 5 minutes apart (in conjunction with the stabilization of the other parameters).

For monitoring wells, sampling should proceed as follows:

1. Note the general condition of the well. Check well for security damage or evidence of tampering and record pertinent observations. Note any maintenance tasks that should be completed, such as well cap or padlock replacement.
2. Open the well and wait a minimum of five minutes for water levels to approach an equilibrium state with atmospheric pressure before taking any measurements.
3. Measure the depth to water relative to the marking on the well casing. If there is no mark, use the north side of the casing. Record the water level on the field form. Note if DNAPL or LNAPL is present.
4. If using a portable pump setup, slowly lower the pump or tubing to the midpoint of the screen or sample interval. Secure the pump or tubing to prevent it from moving. Skip this step if using dedicated pumps.
5. Hook up the control box, compressor or nitrogen tank with regulator, or peristaltic pump, and flow cell with field water quality monitoring equipment. Put the water level probe in the well so water levels can be measured as you are pumping. Start the pump and adjust the pumping rate to between 0.1 and 0.5 liters per minute (using a measuring cup to calculate the flow rate). Begin recording readings on the field sheet. Be sure to purge the amount of water in tubing before taking readings or a sample. Monitor water levels as well as groundwater parameters.
6. During purging, take readings every 3 to 5 minutes. Record readings on the field form. Purging is considered complete when the groundwater parameters have stabilized for three consecutive readings.

Field Parameter	**Stabilization Goal**
Temperature	+/- 3%
Specific conductance	+/- 3% mS/cm
pH	+/- 0.1 pH units
DO	+/- 10% *or* +/- 0.3 mg/L
ORP	+/- 10 millivolts
Depth to Water	+/- 0.3 feet

7. Measure turbidity of the sample water using field instruments prior to sample collection and upon any obvious visual changes in turbidity during sample collection.
8. The water sample must be collected before the water passes through the flow cell. Disconnect the tubing from the flow cell and directly fill the sample containers. If you are

collecting samples for volatile organic compound (VOC) analysis, you may need to decrease the pump rate; if this is the case, other samples should be collected first. Fill unpreserved bottles first. Filtered samples should be collected after all other samples have been collected.

9. Groundwater samples for dissolved metals analyses can be field filtered with a 0.45 micron filter directly connected to the tubing. Mark “field filtered” or “FF” on the bottle label, field form, and chain of custody.
10. Prior to filling or just after filling, label each bottle and make sure it is properly sealed. Place in a cooler with ice and pack for transportation.
11. As necessary, pull pump and discard tubing. Decontaminate the pump based on the SOP for the site.
12. Close and lock the well.
13. Make sure all information is completed on the groundwater field form and sign and date it.
14. Dispose of all purge and decontamination water in the appropriate containers.

For temporary borings, the goal of minimizing the drawdown may not be obtainable for the following reasons:

- The narrow temporary casing (often 1-inch PVC) can prevent monitoring groundwater level measurements (insufficient room in the temporary casing to install a water level meter)
- Excessive fines (silt and clay) may be present in the temporary screened interval because the boring has not been developed in the manner of a constructed monitoring well.
- Excessive suspended sediment in the water column may prevent a peristaltic pump from operating at a low flow rate (the peristaltic pump often quits working at very low flow rates).

For these reasons, temporary borings should be sampled by utilizing the lowest flow rate possible and monitoring field parameters as indicated above to indicate when sampling is appropriate. All other procedural steps should be completed as appropriate to a temporary boring scenario.

References:

Puls, R.W. and M.J. Barcelona, 1996, GROUNDWATER ISSUE PAPER: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures; U.S. Environmental Protection Agency, EPA/540/S-95/504.

Yeskis, D. and Bernard Zavala, GROUNDWATER ISSUE PAPER: Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, U.S. Environmental Protection Agency, EPA 542-S-02-001, May 2002