

PSTD

FIELD GUIDELINES FOR CORRECTIVE ACTIONS

The following guidelines are to be used only as a guide for fieldwork activities. For detailed requirements, appropriate EPA protocol(s) should be consulted.

All guidelines end with the phrase “**Unless directed to do otherwise by the PSTD**”, even when it is not written.

Any deviation from the PSTD Technical Department’s standards must be approved, in advance, by the Project Environmental Analyst (Hydro) managing the case. If that Hydro is unavailable, the PSTD Technical Manager must approve the change. An e-mail or written letter must document any change. If it is not documented and the change is questioned, it is possible the change will not be approved or reimbursed.

PSTD requirements may defer, in certain situations, to other state agency requirements regarding activities regulated by that agency. For instance, the PSTD adheres to OWRB rules and regulations for installing and plugging monitoring wells. The PSTD also adheres to ODEQ’s jurisdiction and regulation over commercial water wells.

However, OWRB and ODEQ standards are considered the minimum. Therefore, PSTD can, and sometimes does, require practices that may be more stringent than other state agencies. For example, the PSTD requires over-drilling as the acceptable method for plugging monitoring wells, while the OWRB does not. In this instance, the consultant is not only required to meet OWRB minimum standards but, in addition, PSTD requirements as well.

It is the responsibility of the contracting consultant to see that proper protocols are followed in all activities. The consultant is also responsible for ensuring that all necessary equipment is available at the site and that it is used correctly.

Note: The PSTD requires at least 48 hours (two working days excluding weekends and holidays) written notification prior to commencing any field activity. Notification must be made to the PSTD staff member assigned to the case, the designated backups for notifications, and the PSTD Technical Manager. (The designated backups for notifications are listed on the Corrective Action Portal homepage.) The preferred way to make this notification is to e-mail the Hydro and cc the designated backups for notifications, and Technical Manager on that e-mail. One of the PSTD recipients will respond to your e-mail during normal business hours to acknowledge receipt. The consultant should be sure to retain a copy of the notification and acknowledgment for their records. Failure to properly notify can result in field data not being accepted and the work costs not being reimbursed.

Organic Vapor Meter (OVM) Soil-Core Surveying

Previously accepted methods of taking soil vapor readings during site soil screening, such as readings from bagged cuttings, will no longer be approved. The following procedure should be implemented when obtaining soil vapor readings from any continuous soil core:

- If the soil core is not already encased in a plastic sleeve, cover as soon as possible upon exposure to the air to minimize losses to volatilization. The use of plastic wrap or heavy-duty aluminum foil is recommended.
- Mark the protective covering material in the middle of each foot of the core (for example: if the core covers the 0 to 4’ interval, mark it at 0.5’, 1.5’, 2.5’, and 3.5’).

- Utilizing a drill, or similar device, make a hole approximately 1-inch deep without fracturing the core. Consistency in hole size and depth is important. Cover the hole immediately with a gloved finger or rubber test tube stopper. If the core does split, attempt another hole six inches away.
- Take an OVM reading directly from the hole with an instrument protected by a hydrophobic filter. Record the reading two to three seconds after the first response is noted. The reading should be noted directly on the soil core covering and then transferred to field notes after completing the entire section.
- Clean the drill bit or boring device after each use. Allow the instrument to return to background before completing the next hole.
- If denser screening data is necessary, vapor borings can be placed on six-inch spacings. Example: if the core contains only one anomalous “hot-spot” that is bracketed by three of four vapor borings registering zero, vapor data should be collected at locations 6-inches on either side of the anomaly.
- Upon completion of the interval (usually 4 to 5 readings), determine whether any of the cored section of soil is missing. If so, adjust the depths of readings to reflect the un-retrieved section(s) as necessary, record your data and decide whether to obtain a soil sample for laboratory analysis.

Soil Sampling for Gasoline Contamination Using Methanol Preservation

The immediate fixing of gasoline contaminated soil samples in methanol is a highly effective method to acquire much more accurate benzene and TPH-GRO concentration values. In addition, it's an efficient process to both reduce soil waste and time spent sampling. The following procedure, which is based, in part, on EPA Method 5035A, is submitted as guidance for the collection and fixing of soil samples in methanol for laboratory analysis:

- Unless instructed otherwise, obtain at least two 40ml VOA vials containing methanol for preservative per boring. These VOAs will have been pre-weighed and contain an exact volume of methanol (usually 10.00 ml). The containers should be observed to visually verify they contain the proper volume of methanol. The methanol may evaporate from old or improperly stored containers. A disposable HDPE coring device should be used to collect the sample. Because sample weight is integral to the analysis, no additional labels should ever be added to the sample container. A 4-oz glass jar may also be required to be collected. Store and transport all samples cold. (The unpreserved VOA vials specified in EPA Method 5035A are not required because they are for detection levels well below the OCC action levels. The laboratory's reporting limits for soil samples preserved in methanol should be able to meet the OCC action levels when dilution is not required and at least 5 grams of sample is collected.)
- After completing vapor screening on each separate section of the core, determine whether or not sampling is warranted. If yes, remove a VOA vial from the cold container, place it in a test tube rack or similar holder, and loosen the cap.
- At the place on the soil core you wish to sample, cut and/or peel back the protective sleeve or film encasing the core. Use a fine-toothed saw (i.e., hacksaw) to cut open plastic sleeves. Scrape off a veneer of soil, 1/8-inch to 1/4-inch deep, and immediately plunge in the coring tool. After collecting a 5-gram plug of soil, quickly lift the VOA cap, inject the plug into the methanol, and close tightly (make sure no sand or silt is sticking to the sealing edge or on the threads of the glass vial). Temporarily number the sample container until all other sampling is completed.

- When all sampling of a boring has concluded, properly label all sample containers with an indelible marker, return vials to the cold carrier, fill out a chain-of-custody, and transport or ship the samples to the laboratory for analysis.

Monitoring Well Installation

Unless instructed otherwise by PSTD, all monitoring wells drilled for the ORBCA investigation should be completed with 2-inch casing and each well installed to a depth 20 feet. Any change in the diameter or depth, either shallower or deeper, must be approved by the managing Hydro.

- The PSTD requires the installation of all monitoring wells and soil borings be conducted using hollow-stem augers with a split-spoon sampler that is a close-fit inside the hollow stem of the augers.

If due to site-specific conditions, this method of well installation cannot be used, the consultant must contact the PSTD for instructions on how to proceed. The PSTD encourages the development of new technologies. For example, clear plastic sleeves for split spoons, similar to those used with Direct Push rigs, are available, and the PSTD will allow their use.

- A properly calibrated and working organic vapor-monitoring (OVM) device should be used to check all samples.

Vapor meters other than a photoionization detector (PID) must be pre-approved before use. Use of a probe other than 10.6eV must be noted on the logs.

- Monitoring wells must be drilled sufficiently deep to fully assess the site.

If possible, well-screen lengths should be selected to cover the entire smear zone and water table fluctuations. In drilling a new area, it is often difficult to determine water table fluctuation. Normally, 5 feet above and below the smear zone should be sufficient.

First water encountered may not be an appropriate guide when determining well-screen depth. After the first well is installed at a site, it should be possible to more accurately assess the proper screen depth. Using a standardized screen length for all wells at a site should be avoided.

For most monitoring wells or soil borings, groundwater will be encountered within 20 feet of the surface. For sites where groundwater is deeper, refer to PSTD guidelines on groundwater sampling. In cases where it appears that you will have to drill deep to find groundwater, do not drill past the pre-approved depth without first contacting the PSTD Hydro managing the case. If the Hydro cannot be reached, contact the PSTD Technical Manager.

- Each newly installed monitoring well must have a permanent identifying number, such as MW-1, MW-2, etc., or another identifying character, placed in an assessable location on either the well protector or surface pad.
- A complete boring log with detailed lithology descriptions must be prepared for each monitoring well/soil boring.

The individual describing soil lithologies must have the proper training, experience, and tools to complete the sample description and prepare the boring log. As a note, make sure that all equipment batteries are charged, all tools are in working order, and all supplies are on hand before starting work. The PSTD will not reimburse costs for poorly performed work caused by faulty equipment, i.e., a lack of OVM readings because the instrument's battery would not hold a charge.

- In addition to sample descriptions and OVM readings, the soil-boring log should also contain the following data:

- Diameter of the borehole.
 - Diameter of the casing.
 - Top and bottom of the well screen.
 - Method of drilling, e.g. hollow stem, solid stem, etc.
 - Depth to first encountered water.
 - Total depth of the hole.
 - Headspace vapor readings at regular intervals. The PSTD recommends, at a minimum, 2-foot intervals.
 - Sample descriptions **must** include USCS Symbol, color, grading (sorting), moisture content, odor, and any other significant characteristic.
 - Survey information for the location and elevation of the well (boring).
 - Other data commonly included on a soil-boring log.
- While installing any monitoring well, soil boring, or push-pull probe, proper decontamination (decon) procedures must be followed.
 - All drilling and sampling tools must be cleaned before arriving at the site. If auger flights will be used repetitively, each flight must be deconned before reuse. Steam or high-pressure hot water is the preferable washing media. However, the PSTD recognizes this is not always possible. Whatever method is used, the augers must be adequately deconned between uses.
 - Sampling tools must be deconned prior to each use by washing in two, separate containers, each dedicated for the decontamination washing process. Wash water will contain a washing agent, such as Alconox® or another environmentally safe agent, designed for that purpose. Dishwashing detergent is **not** acceptable. Sampling tools must then be rinsed in clear water, in a dedicated container used only for rinsing.
 - The wash and rinse water must be changed between boreholes.
 - All decon water should be collected, stored, and disposed of in an appropriate manner (such as drummed with groundwater waste).
 - A correctly filled-out and signed OWRB Monitoring Well Completion Report or Plugging Report for monitoring wells must be submitted after installation or plugging of any monitoring well, soil boring, or push-pull hole. A copy of this form(s) is to be included in the report generated for the installation activity.
 - Over-drilling is required when plugging monitoring wells. Over-drilling refers to the casing in the well. The same size or larger auger used in the installation of the borehole shall be used to drill out the well. Using a smaller bit, or smaller diameter augers is not acceptable.

Geotechnical Samples

When geotechnical samples are required to be collected, one sample should be collected from the vadose zone, and another sample should be collected from the saturated zone, from an area **not** impacted by the release (particularly in the case of fraction organic carbon content). The vadose zone sample should be collected from the least permeable zone that might act as a vapor barrier, and the saturated zone sample should be obtained from the most permeable zone and most probable zone of chemical migration. Each sample should be analyzed using the appropriate method for the following:

- fractional organic carbon content (FOC)
- volumetric water content (vadose zone only)
- dry bulk density
- specific gravity
- porosity (calculated)
- sieve analysis **with** hydrometer test

Developing and Sampling Monitoring Wells

- All wells must be constructed according to OWRB rules.
- All wells should be developed before sampling.

The purpose of developing the well is to remove as many fines as possible from the filter pack and surrounding formation to ensure that sampled groundwater is naturally occurring groundwater. The proper method of development depends on many variables but must involve surging the saturated zone. The well should be surged, and the surged water removed until the produced water is reasonably clear and turbidity meter readings stabilize to less than a 10% variance between a minimum of four consecutive readings. Other groundwater parameters (temperature, pH, conductivity, DO, etc.) should have also similarly stabilized.

- Bailing or pumping three well-bore volumes is **not** an acceptable method of development, nor is bailing a 4-inch well with a 2-inch bailer.
- For low-flow sampling, the collection of temperature, conductivity, and pH data are required for each well, and submitted in the report for each event.
- If circumstances require, well development will be allowed prior to adding the bentonite seal.

If it is impractical to re-deploy the drilling rig or another type of developmental rig to the site after the grout has had time to cure, it is permissible to develop the well after placement of the sand-pack. However, after such development, the top of the sand-pack **must** be re-tagged to ensure its top is positioned at a proper depth.

- When recovery in a monitoring well is so slow that development might not be practical, please contact the PSTD for further help and direction.
- All wells should be purged, if possible, before groundwater samples are collected. The implementation of low-flow sampling is highly recommended for monitoring wells with low hydraulic conductivity.

Purging can be done with a clean new bailer, or it can be done with a down-hole pump. If a pump is used, it must be thoroughly decontaminated between wells. Pumping plain water through the pump is **not** proper decontamination.

- Do **not** use electrical tape, duct tape, or anything similar on down-hole equipment.
- The repetitive use of dedicated bailers is not allowed. Bailers or tubing may **not** be stored inside the well casing.

Sampling Methods

- Soil samples should be collected in accordance with EPA Method 5035A for BTEX and TPH-GRO. Laboratory analysis of BTEX should be performed in accordance with EPA methods 8021 or 8260. Laboratory analysis of TPH-GRO should be performed in accordance with the OK DEQ GRO method.
- Water samples should be collected in accordance with EPA Method 5030C for BTEX and TPH-GRO. Laboratory analysis of BTEX should be performed in accordance with EPA methods 8021 or 8260. Laboratory analysis of TPH-GRO should be performed in accordance with the OK DEQ GRO method.

- TPH-DRO samples should be collected and analyzed in accordance with the OK DEQ DRO method.
- Alternatively, TPH can be sampled and analyzed in accordance with method TNRCC 1005 as long as the laboratory's reporting limit meets the OCC action levels for low-concentration samples. (Note for soil samples, a 10-gram sample collected with a coring device and placed in unpreserved, pre-weighed VOA vials is required for method TNRCC 1005, instead of a 5-gram sample in pre-weighed VOA vials preserved in methanol as required for the EPA Method 5035A.)
- All samples should be analyzed by a laboratory with current ODEQ accreditations for the matrix, method, and analyte of the specific analysis being performed unless prior approval is obtained from the PSTD.

Disposal

Soil and groundwater wastes produced during corrective actions at a site must be sampled before it is removed from the site for disposal.

- Water generated by site activities may not be run through a filtration system and discharged without first being sampled and tested for levels of required chemicals of concern.
- A discharge permit from the appropriate agency must be obtained prior to any on-site discharge.
- Small volumes of soil generated during the installation of borings should be stored on-site in approved steel drums.
- If soil wastes are to be spread on-site, pre-approval must be obtained from the PSTD.
- A completed PSTD Waste Disposal Form must be submitted for all material disposed of, including dates and original signatures. A copy of this form is available on the OCC website.
- All disposal, as well as disposal methods, must be pre-approved.

Construction Activities

Construction activities should be carried out in a safe and efficient manner. All state, federal (including OSHA), or local rules and regulations must be followed. The type of activity being performed, the type of site, and the location of the site will determine activity requirements. For example, if concrete is being replaced at a truck stop, requirements for replacement concrete will differ from replacement concrete at a convenience store with primarily automobile traffic.

It is the consultant's responsibility to make sure all required activities are performed in a professional manner. Therefore, the consultant, or his/her representative, must have knowledge of site construction practices and is required to be immediately available at all times corrective action activities are taking place.

- Proper construction procedures are required at all PSTD sites.
- "Site Restoration" involves restoring a site to its **original** condition to the extent practicable. Should a site owner wish to do something in conjunction with PSTD activities, those activities will be considered and may be allowed. However, pre-approval by the PSTD is still required.
- At excavation projects, compaction of replaced soil is required. Therefore, an independent company that regularly performs compaction testing on soils must conduct the testing.

- When replacing concrete, slump testing of **every** load is required. An independent company that regularly performs slump testing must conduct the testing. Costs incurred for slump testing will be reimbursed.
- Concrete that tests at more than a 6-inch slump should not be placed.

After conducting the initial slump test, **absolutely no** water should be added to the load without the load being re-slumped.

- After concrete is placed and cured, the PSTD may require cores to be taken for strength testing.
 - If the PSTD requires coring and testing, reasonable costs for these activities will be reimbursed.
 - If the consultant orders the coring and testing, costs will **not** be reimbursed by the PSTD unless, as a result of that coring and testing, the concrete is shown to meet requirements.
 - If, as a result of testing, the concrete is found not to meet standard strength requirements, costs associated with the placement of the concrete will **not** be reimbursed, and the consultant may be required to remove and replace the concrete at their expense.