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Groundwater Safety and Sampling Procedures

**Division of Water
Watershed Management Branch
Groundwater Section**

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Attachments

- Attachment 1 - Worksite Hazard Assessment form
- Attachment 2 - Workman's Compensation Form IA-1
- Attachment 3 – Supplies and Check List
- Attachment 4 - Bacteria Bench Sheet
- Attachment 5 – Example COC

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1. Executive Summary

This Standard Operating Procedure (SOP) establishes the protocol for sampling groundwater to support programs such as the ambient groundwater network and technical assistance programs, which includes sampling water wells, monitoring wells and springs. The SOP covers general safety of personnel involved in sampling programs, and the step-by-step of each sampling procedure. Following this SOP will ensure that all groundwater data collection and analyses are of a well-documented quality to meet the purposes of these programs. Adherence to this SOP is one of the foundation principles in field activities of the DOW's quality assurance program

2. Purpose and Scope

This document describes the methods and procedures established by DOW to ensure the handling and documentation of groundwater samples is conducted in a standardized, scientifically defensible manner. It also details the procedures for collecting samples from the field for the groundwater program. This SOP falls under and meets the requirements set out in the Department of Environmental Protection (DEP) Quality Management Plan (QMP).

Following this SOP must be done in order to meet standards of legal defensibility, which includes EPA requirements that have been established for groundwater sampling (EPA SESD SOP 2008).

If site-specific conditions (evidentiary requirements) are deemed not necessary by the project manager, these standard procedures may be modified according to the specific quality assurance project plan (QAPP).

All personnel that collect groundwater samples for the Kentucky Division of Water should follow this SOP. If persons outside the division use this manual, additional review measures for those data may be required, and would also be covered under a quality assurance project plan (QAPP), or other quality planning document.

This SOP may be referenced in QAPPs as well as any other document that discusses the management and documentation of groundwater samples.

Groundwater data may be used for water quality assessments by state government, consultants, city and county governments, private citizens and others.

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3. Definitions and Acronyms

DEP – Department for Environmental Protection
DOW – Division of Water
Clean Hands Dirty Hands – A procedure for low-level mercury sampling
COC – chain of custody
DI – Deionized water
ESB – Environmental Services Branch
KELMS – KY Training Database
KRS – Kentucky Revised Statutes
MW – monitoring well
OSHA – Occupational Safety and Health Administration
PWS – public water supply
QAPP – Quality Assurance Project Plan
SDS – Safety Data Sheets
SOP – Standard Operating Procedure
USEPA – United States Environmental Protection Agency
VOC – Volatile Organic Compound

4. Health and Safety

Employees

The guidelines in this section must be followed to insure the safety of all DOW employees sampling groundwater.

The safety protocols in this SOP are written in accordance with those defined by the following manuals: the Field Health and Safety Manual USEPA, Region IV, (1990) which covers safety in all field activities performed in USEPA Region 4 and the Commonwealth of Kentucky Safety and Health Manual (2008). Employees are also trained under the Kentucky Occupational Safety and Health Program (under KRS Chapter 338) statutory authority, and the OSHA 1910.120 HAZWOPER – GENERAL training course before entering any site with potential or known contamination. Samplers should also undergo basic first aid and cardiopulmonary resuscitation (CPR) training and Blood Borne Pathogens training before performing field tasks.

Employees should evaluate site conditions when arriving in the field by completing the Work Site Hazard Assessment form (Attachment 1) to recognize potential hazards and what steps should be taken to minimize the hazard. If you are at a site where your safety is in question, leave the site.

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Sampling

All sample bottles should remain sealed until use. Glass containers should be handled with extreme care; drying hands and bottles before handling may minimize slippage and breakage potential.

Three acids are used during sampling – nitric acid (NO₃), sulfuric acid (H₂SO₄) and hydrochloric acid (HCl). Read the Safety Data Sheets (SDS) for each of these acids before using them for the first time, and anytime you need a refresher on their properties, All SDSs are located on-site at the ESB lab and with the acid storage cabinet in the 150 building at Sower Blvd. Wear latex or nitrile gloves for hand protection and wear eye protection in case of splashing.

As a groundwater sampler, be aware of the following items:

1. Personnel responsible for receiving and storing hazardous chemicals from manufacturers and suppliers will ensure that the containers are marked with the following information:
 - a. Identity of the hazardous chemical(s)
 - b. Appropriate hazard warnings affixed to container
 - c. Name and address of the chemical manufacturer, importer, or other responsible party
2. Labels on containers or hazardous chemicals will not be removed or in any way defaced
3. Any accident must be reported in accordance with Cabinet accident reporting requirements, as outlined on Form IA-1 (Attachment 2)
4. The ESB has a safety and chemical hygiene plan in place that all samplers that perform analysis in the lab must follow and read (DEP 2017)

5. Cautions and Interferences

Sample handling can be a source of contamination within a sampling program, if sample bottles are handled improperly through sampler use, through environmental situations, or through transport conditions. All sample containers should be handled a minimum amount of time it takes to collect a representative sample of groundwater. If sampler handling contamination is a cause for concern for your project, take appropriate precautions, which can include:

- wearing gloves when handling sample equipment
- decontaminate equipment between sites according to proscribed schedule
- use individual bagging of sample bottles per site
- use labels for container labeling, versus writing sample information directly on containers
- A ‘Clean Hands Dirty Hands’ method can be employed (USEPA 1996).
- Avoid collecting samples from swivel faucets and frost-proof hydrants, due to a high likelihood of cross-contamination.

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6. Personnel Qualifications and Responsibilities

All personnel should be trained in sample collection methodology and sample handling procedures, using this SOP and all relevant program guidance. Additional sampling method SOPs and individual project QAPPs may include minimum specifications for personnel training and/or experience. When in the field, all new samplers will be accompanied by an experienced sampler, and checks and audits performed until competency is achieved by all project samplers.

Official training records of samplers should be maintained by the Division training coordinator, and field training records should be maintained in individual project files and in the DEP database KELMS.

All persons signing for responsibility of samples using the COC procedures must meet the minimum requirements for project objectives, and state that samples remained under their direct control or supervision.

7. Field Preparation

The following section details general sampling pre-field, or preparations before sampling can take place. The groundwater sampler is responsible for making the sampling site as safe as possible. If you are at a site where your safety is in question, leave the site. Assess the site before you start sampling: look for any potential hazards. Use a Work Site Hazard Assessment Form (Attachment 1) to assist in recognizing hazards and what steps should be taken to minimize the hazard.

The Groundwater Section uses several forms and sign-out sheets to keep track of equipment. The more complicated forms will have SOPs on methods of completion and use. The type of samples collected, the holding times and availability of acceptable labs will dictate the number and types of samples that can be collected in a single trip. These specifics will be outlined in QAPPs.

- a. Use a Groundwater Section Checklist (Attachment 3) to use the correct sampling supplies and equipment.
 - a. Sign out sheets for equipment such as peristaltic pumps, field meters, GPS units, cameras, etc. must be completed every time of use.
- b. Notify the appropriate regional office(s) about when and where you will be working.

8. Step-by-Step Sample Procedure

Step 1. Decontamination

Decontamination must be performed prior to each sampling event using equipment that may become contaminated. The Groundwater Section uses, as much as possible, expendable supplies to keep the necessity of decontamination to a minimum. However, Teflon buckets, ropes used in

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conjunction with the Teflon bucket and field meter probes all must be decontaminated prior to each use:

- i. A detergent, like Liquinox®, wash step may be useful to remove gross dirt and soil.
- ii. Clean with tap water and Liquinox® detergent using a brush, if necessary, to remove particulate matter and surface films.
- iii. Rinse thoroughly with tap water.
- iv. Rinse thoroughly with organic-free water and place on a clean foil-wrapped surface to air-dry.
- v. Wrap the dry equipment with aluminum foil or bag in clean plastic. If the equipment is to be stored overnight before it is wrapped in foil, it should be covered and secured with clean, unused plastic sheeting.

Step 2. Sample Container Labeling

Label containers with a fine point permanent ink pen (e.g., Sharpie™) on the container/bottle, and ultra-fine point for lids and paper labels.

Labeling of sample containers will consist of:

- i. Label Boston rounds on side of container;
- ii. Label 1000ml/950ml amber glass on lid or using the adhesive labels included in the boxes by the manufacturer;
- iii. Label 40ml amber glass using the adhesive labels included in the boxes by the manufacturer;
- iv. Label 120ml on lid or use the adhesive labels included in the box by the manufacturer;
- v. Label 250ml HDPE wide mouth jar on side of container.

Information required for Labels on sample containers will consist of:

- i. Eight-digit well/spring number (AKGWA #)
- ii. Location (site) name, including county
- iii. Parameters for which an analysis is to be made (abbreviated if necessary)
- iv. Preservation method(s)
- v. Date and time of sampling event: (Use 24-hour clock and note if using Central Time instead of Eastern Time)
- vi. Initial(s) of sampler

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Step 3. Containers

Sample container which may be used for the collection of groundwater samples from wells and springs include:

Containers

- i. 1000 (or 950) ml amber glass jars
 - a. Used for collection of water for analysis of pesticides, herbicides and caffeine
- ii. 1000 ml Boston Rounds (HDPE)
 - a. Used for the collection of nutrients, bulk (NO₃-N, NO₂-N and major anions) parameters and total and dissolved metals analysis.
- iii. 40ml amber glass pre-preserved with HCl
 - a. Used for collection of volatile organic compounds (VOCs).
- iv. 120ml amber glass
 - a. Used for collection of glyphosate.
- v. 250ml HDPE wide mouth jar or bottle
 - a. Used for Alkalinity - fill completely leaving no head space
- vi. Sterile 125 mL plastic bottles must be used for bacteria.
 - a. Used for collection of Total Coliforms and e. coli
- vii. 100 ml plastic Bottles (HDPE)
 - a. Used for Radionuclides sample

Cautions

- i. Make sure you have the appropriate container for the intended sample type.
- ii. Sample locations often require multiple containers to cover all requested testing.
- iii. When opened, do NOT touch inside of the container or lid.
- iv. Some containers have preservative added. This may be seen as a little liquid or powder.
- v. ***CAUTION*** This may be concentrated acid.
- vi. Do NOT pour out or rinse out anything from inside the container.

Step 4. Sample Preservation and Filtering

All samples requiring preservation must be preserved as soon as practically possible, ideally immediately at the time of sample collection. If preserved VOC vials are used, these will be pre-preserved with concentrated hydrochloric acid by the manufacturer.

- a. Filter and preserve appropriate samples according to the following
 - i. For each container of nutrients, add the contents of one vial of H₂SO₄.
 - ii. For each container used for total metals analysis, add the contents of one vial of HNO₃

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- iii. For each sample used for dissolved metals, first filter the sample by running water through a 0.45 micron filter via a two foot length of medical grade silicon tubing. A peristaltic pump is used to induce the water through the filter. After filtration, add the contents of one vial of HNO₃ to the container for preservation of the sample.
 - iv. For each Herbicides/Caffeine sample and each duplicate sample add the contents of one vial of HCl (1:1).
 - v. Place all samples on ice in the coolers
- b. For bacteria samples, follow the procedure below:
- i. Bacteria (total coliform or *Escherichia coli*) are analyzed for various projects and groundwater-related complaint investigations. Bacteria samples can be collected in 100 mL pre-cleaned and pre-preserved plastic containers, or containers free of preservative. Only raw water samples should be collected.
 - ii. If a well or spring is sampled that has a treatment system, ensure that you can collect samples from a bypass valve or pretreatment (i.e. at the spring mouth or from the wellhead).
 - iii. For spring samples, open the container and place it in the water upstream of yourself, facing upstream. Fill precisely to the 100 mL mark on the bottle. For well samples, place the container directly beneath the spigot and fill precisely to the 100 mL mark on the bottle.
 - iv. Sample Dechlorinating Potable water samples that have been treated with chlorine require the addition of sodium thiosulfate to dechlorinate the sample.

Step 5. Sample Handling and Collection

The following precautions should be considered when collecting groundwater samples.

- i. Special care must be taken not to contaminate samples. This includes storing samples in a secure location to preclude conditions which could alter the properties of the sample.
- ii. Always sample from the anticipated cleanest, i.e., least contaminated location, to the most contaminated location. This minimizes the opportunity for cross-contamination to occur during sampling.
- iii. Collected samples must remain in the custody of the sampler or sample custodian until the samples are relinquished to another party.
- iv. If samples are transported by the sampler, they will remain under his/her custody or be secured until they are relinquished.
- v. Documentation of field sampling is done in a field logbook.

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- vi. Chain-of-custody documents (Attachment 5) shall be filled out and remain with the samples until custody is relinquished.
- vii. A clean pair of new, non-powdered, disposable gloves will be worn each time a different location is sampled and the gloves should be donned immediately prior to sampling. The gloves should not come in contact with the media being sampled and should be changed any time during sample collection when their cleanliness is compromised.
- viii. Sample collection activities shall proceed progressively from the least suspected contaminated area to the most suspected contaminated area if sampling devices are to be reused.
- ix. If possible, one member of the field sampling team should take all the notes and photographs, etc., while the other members collect the samples.
- x. The ESB laboratory requires at least 250 ml of sample to run most analyses. Always fill containers at least $\frac{3}{4}$ full, leaving sufficient headspace to prevent accidental freezing and bursting. VOCs require a 40 mL volume container and Glyphosate requires a 150 mL volume container. VOC bottles must be filled completely without air bubbles.

Sampling Groundwater for Volatile Organic Compounds (VOC) Analysis

Groundwater samples for VOC analysis must be collected in 40 ml glass vials with Teflon® septa. The vial may be either preserved with concentrated hydrochloric acid or they may be unpreserved. Preserved samples have a two-week holding time, whereas unpreserved samples have only a seven-day holding time. In the great majority of cases, the preserved vials are used to take advantage of the extended holding time. In some situations, however, it may be necessary to use the unpreserved vials. For example, if the groundwater has a high amount of dissolved limestone, i.e., is highly calcareous, there will most likely be an effervescent reaction between the hydrochloric acid and the water, producing large numbers of fine bubbles. This will render the sample unacceptable. In this case, unpreserved vials should be used and arrangements must be confirmed with the laboratory to ensure that they can accept the unpreserved vials and meet the shorter sample holding times.

- i. The samples should be collected with as little agitation or disturbance as possible.
- ii. The vial should be filled so that there is a meniscus at the top of the vial and absolutely no bubbles or headspace should be present in the vial after it is capped.
- iii. After the cap is securely tightened, the vial should be inverted and tapped on the palm of one hand to see if any undetected bubbles are dislodged.
- iv. If a bubble or bubbles are present, the vial should be topped off using a minimal amount of sample to re-establish the meniscus.

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- v. Care should be taken not to flush any preservative out of the vial during topping off.
- vi. If, after topping off and capping the vial, bubbles are still present, a new vial should be obtained and the sample re-collected.

Filling Sample Containers for Inorganic Parameters

- i. Remove container cap or lid and place top down on clean surface or hold in gloved hand. Do not touch inside of cap or lid.
- ii. Slowly submerge container in water and allow to fill.
- iii. Fill the container up to the neck or shoulder or to the appropriate marking line. Leave headspace unless instructed otherwise.
- iv. Do NOT make the container brim full without headspace.
- v. Do NOT cause the sample to be excessively aerated during collection. This applies especially to sampling for volatile organics.
- vi. Do NOT overflow the container.
- vii. Do NOT cause any preservative to be washed out of the container.
- viii. Certain sample types require preservation be added after collection (see sample submission form).
- ix. Seal the container lid tightly. Do NOT use tape to secure the lid

Step 6. Sampling Groundwater from Water Wells

EPA guidance documents on proper sampling of groundwater in wells and springs, along with guidance on operation of field equipment and sampling domestic and public water supplies can be found at the following web site
<https://www.epa.gov/quality/quality-system-and-technical-procedures-sesd-field-branches>.

The following steps should be used when collecting groundwater samples from potable water supplies:

- i. Potable groundwater samples will typically be collected from a tap or spigot located at or near the well head or pump house and before the water supply is introduced into any storage tanks or treatment units. Efforts should be made to reduce the flow from either the tap or spigot during sample collection to minimize sample agitation.
- ii. During sample collection, make sure that the tap or spigot does not contact the sample container.
- iii. Place the sample into appropriate containers.
- iv. The sampling tap must be protected from exterior contamination associated with being too close to a sink bottom or to the ground.

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Contaminated water or soil from the faucet exterior may enter the bottle during the collection procedure since it is difficult to place a bottle under a low tap without grazing the neck interior against the outside faucet surface. If the tap is too close to the ground for direct collection into the appropriate container, it is acceptable to use a smaller container to transfer sample to a larger container. The smaller container should be made of glass or plastic, and should be decontaminated to the same standards as the larger container.

- v. Leaking taps that allow water to discharge from around the valve stem handle and down the outside of the faucet, or taps in which water tends to run up on the outside of the lip, are to be avoided as sampling locations.
- vi. Disconnect any hoses, filters, or aerators attached to the tap before sampling. These devices can harbor a bacterial population if they are not routinely cleaned or replaced when worn or cracked.
- vii. Taps where the water flow is not constant should be avoided because temporary fluctuation in line pressure may cause clumps of microbial growth that are lodged in a pipe section or faucet connection to break loose. A smooth flowing water stream at moderate pressure without splashing should be used. The sample should be collected without changing the water flow. It may be appropriate to reduce the flow for the volatile organic compounds aliquot to minimize sample agitation.

Purging

- i. Wells with in-place plumbing are commonly found at residences. The objective of purging wells with in-place pumps is to collect a water sample representative of aquifer conditions.
- ii. Purging is the process of removing stagnant water immediately prior to sampling. For potable water supply sampling, it is recommended to purge the system for at least 15 minutes when possible. Measurements of pH, specific conductance and temperature are recorded at the time of sampling when water quality parameters are required.

Public Water Supply Wells

- i. Municipality water supply plants and large industrial supplies that operate continuously, require no purge other than opening a valve and allowing it to flush for a few minutes. If a storage tank is present, a spigot, valve or other sampling point should be located between the pump and the storage tank. If not, locate the valve closest to the tank. Measurements of pH, specific conductance and temperature and sometimes turbidity are recorded at the time of sampling when water quality parameters are required.

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Step 7. Spring or Surface Water Sampling

Try to get clean samples; don't pick up stirred up material from the last sample (always sample upstream from where you enter stream). Sampling is best done at a point where water is restricted so that it runs more swiftly (when possible). Turbid water will result in cloudy, muddy samples, but try to ensure any turbidity in the sample is from naturally turbid water, not from something stirred up from the bottom.

When spring or surface water samples are required, direct dipping of the sample container into the stream is desirable. Collecting samples in this manner is possible when sampling from accessible locations such as stream banks or by wading or from low platforms, such as small boats or piers. Wading or streamside sampling from banks, however, may cause the re-suspension of bottom deposits and bias the sample.

Wading is acceptable if the stream has a noticeable current (is not impounded), and the samples are collected while facing upstream. If the stream is too deep to wade, or if the sample must be collected from more than one water depth, or if the sample must be collected from an elevated platform (bridge, pier, etc.), supplemental sampling equipment must be used.

A variety of methods can be used, for instance:

- Dipping Using Sample Container
- Buckets

Regardless of the method used, precautions should be taken to ensure that the sample collected is representative of the water body or conveyance. These methods are discussed in the following sections.

Dipping Using Sample Container

A sample may be collected directly into the sample container when the surface or spring water source is accessible by wading or other means. The sampler should face upstream if there is a current and collect the sample without disturbing the bottom sediment. The sampler should be careful not to displace the preservative from a pre-preserved sample container, such as the 40-ml VOC vial.

Buckets

A plastic bucket can be used to collect samples for measurement of water quality parameters such as pH, temperature, and conductivity. Samples collected for analysis of classical water quality parameters including but not limited to Bulk Parameters, Nutrients, Dissolved Metals, Total metals, Pesticides, PCBs, Herbicides, Caffeine, Alkalinity, and Glyphosate may also be collected with a bucket. Typically, a bucket is used to collect a sample when the water depth is too great for wading, it is not possible to deploy a boat, or access is not possible (excessive vegetation or steep embankments) and the water column is well mixed. If the water body is

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usually accessed from a bridge. The bucket is normally lowered by rope over the side of the bridge. Upon retrieval, the water is poured into the appropriate sample containers

Caution should be exercised whenever working from a bridge. Appropriate measures should be taken to insure the safety of sampling personnel from traffic hazards.

Step 8. Field Data Collection

Collect field measurement data: temperature, conductivity, pH, and if spring sampling estimate spring flow in cubic feet per second (cfs).

- i. Conductivity and pH meters should be put into water as soon as possible when using a bucket or container
- ii. When deploying directly into the stream, put into water after sampling and allow to equilibrate to accurately measure conditions.
- iii. Record the information from the meters after sampling to ensure the most consistent and accurate readings. Note the measurements directly on the COC, and in a notebook.
- iv. In the event that a meter will not work properly, nor calibrate, note the problem in the comments field on the COC and in the notebook.
- v. Fill in Field Measurements section of the COC with the necessary information.
- vi. Rinse the probe with de-ionized water when measurements are complete.

At your last site of the day, complete a final rinse and replace caps on sensors.

Flow estimates are made by estimating the cross-sectional area of the channel and multiplying by the estimated velocity. This requires significant practice and it is recommended to utilize and study USGS documents relative to flow gaging and estimation.

Step 9. Sample Storage and Transport

Samples should be stored in containers that are free of possible contaminants. Some sample containers may be placed inside of sealed food grade plastic bags prior to being stored on ice in coolers to prevent cross contamination. All samples are to be placed on ice in a cooler as soon as possible after collection.

Samples are to be delivered to the Environmental Services Branch (ESB) laboratory in Frankfort, Ky. Except when otherwise directed, by supervisor, for analysis by alternate laboratory when required, for instance Dissolved Gases (i.e., butane, ethane,

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methane and pentane) in groundwater are to be taken to Microbac Laboratory in Louisville, KY for analysis.

Request that your completed COCs be sent electronically to you, your supervisor and the groundwater monitoring program coordinator in the Groundwater Section after the lab is finished with them.

9. Equipment and Supplies

Examples of groundwater sampling equipment may include the following in Attachment 3. Other supplies may be required and will be covered in the project QAPP.

10. Data and Records Management

Results of water chemistry analyses performed by ESB will be stored in their Laboratory Information Management System (LIMS) and a certified report will be sent to the sample collector and the project manager. The results of water chemistry analyses performed by other laboratories should be sent through email to the project manager.

Results of bacteriological analysis performed by the groundwater staff personnel will be recorded on bacteriological bench sheets (Attachment 4). All fields on the bench sheet will be filled out appropriately at the time of analysis. Any changes to entered data should be crossed out with one line, initialed, and dated. If necessary, data qualifying statements for changes must be written on the bench sheet, initialed, and dated. Bench sheets will be retained in laboratory logbooks.

COC records for all samples delivered to a laboratory for analysis shall be retained using the guidelines established in *Standard Operating Procedure for Sample Receiving and Custody* (DES 2007). The original COC records for samples are returned to the project manager following the processing of samples for analyses. Copies of the original COC documentation submitted for shipped samples should be procured prior to shipping the samples.

Copies of the original COC documentation submitted to contract laboratories shall be obtained at the time of delivery of the samples. These COC copies should be stored in electronic project folders under the custodianship of the project manager or other designee.

11. Quality Assurance and Quality Control

The types of quality control samples collected for various projects must be specified in the Quality Assurance Project Plan (QAPP). The purposes of QC samples are to provide information on background conditions, isolate site effects, and evaluate contamination during sample transit or to evaluate field and laboratory variability. Types of QC samples may include:

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Field Duplicate/Replicate Sample: A sample taken from the same location as the ‘regular grab’ sample, at the same time. The sample is used to assess variability of environmental conditions at sampling sites.

Field Split Sample: A sample that is collected by initially collecting twice as much volume as is normally collected and then apportioning, after mixing, into two sets of containers. This type of sample is used to assess analysis variability.

Field Blank: A sample that is prepared in the field using de-ionized or certified ultra- pure water. The water is poured into appropriate sample containers at specific locations during a sampling event. The sample is used to assess potential contamination from the environment, not associated with the source being sampled.

Field Rinsate Blank/Equipment Blank: A sample used to assess the possible contamination level of equipment that is field cleaned and re-used on-site. The sample is taken by rinsing field cleaned equipment with de-ionized water and collecting the rinse water to be submitted for analyses of all constituents that are normally collected using that piece of equipment.

Trip Blank: A sample used to assess the potential contamination level of sample storage containers during transit.

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Attachment 1

DEP WORKSITE HAZARD ASSESSMENT

PART A	
Site Name/Al:	Incident #:
Description of Activities	
PART B	
Check the hazard(s) located at the site being assessed sufficient to require Personal Protection Equipment (PPE).	
I. HEAD LIKELY INJURY/HAZARD 1. <input type="checkbox"/> Struck By 2. <input type="checkbox"/> Struck Against 3. <input type="checkbox"/> Electrical 4. <input type="checkbox"/> Temperature 5. <input type="checkbox"/> Other	I. 29 CFR 1910.135 HEAD PPE 1. Hard hat 2. Hard hat 3. NO GO – Maintain distance 4. Hard hat with winter liner or sweat band, cooling device as required 5. Call supervisor
II. EYES/FACE LIKELY INJURY/HAZARD 1. <input type="checkbox"/> Airborne 2. <input type="checkbox"/> Chemical 3. <input type="checkbox"/> Flash/Light/UV 4. <input type="checkbox"/> Other _____	II. 29 CFR 1910.133 EYES/FACE PPE 1. Safety goggles with side shields, goggles or full face shield as for hazard 2. Review MSDS and determine appropriate eyewear also beware respiratory hazard 3. Non-vented goggles or full face shield filter or tinted lens. Sunscreen for sun exposure 4. Call supervisor

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<p>III. RESPIRATORY</p> <p>LIKELY INJURY/HAZARD</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> Oxygen Deficiency 2. <input type="checkbox"/> Airborne Particles 3. <input type="checkbox"/> Dusts 4. <input type="checkbox"/> Fumes 5. <input type="checkbox"/> Mists 6. <input type="checkbox"/> Airborne Contaminants 7. <input type="checkbox"/> Gases 8. <input type="checkbox"/> Vapors 9. <input type="checkbox"/> Combinations 10. <input type="checkbox"/> Temperature 11. <input type="checkbox"/> Other _____ 	<p>III. 29 CFR 1910.134 RESPIRATORY PPE</p> <ol style="list-style-type: none"> 1. NO GO 2. NO GO unless in DEP Respiratory Protection Program (RPP) 3. Same as #2 4. Same as #2 5. Same as #2 6. Same as #2 7. Same as #2 8. Same as #2 9. Same as #2 10. Cold temps-cover mouth/nose, Hot temps-SCBA or supplied air (tempered) 11. Call supervisor <p>NOTE: If in the RPP follow proper respirator selection protocols and procedures for any item checked above.</p>
<p>IV. HAND/ARM</p> <p>LIKELY INJURY/HAZARD</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> Cut/Abrasion/Puncture/Gash 2. <input type="checkbox"/> Electrical 3. <input type="checkbox"/> Chemical 4. <input type="checkbox"/> Biological 5. <input type="checkbox"/> Temperature 6. <input type="checkbox"/> Sunburn 7. <input type="checkbox"/> Body Fluids 8. <input type="checkbox"/> Cumulative 9. <input type="checkbox"/> Strain 10. <input type="checkbox"/> Other _____ 	<p>IV. 29 CFR 1910.138 HAND/ARM PPE</p> <ol style="list-style-type: none"> 1. Gloves-canvas, leather, mesh, Kevlar 2. NO GO – Maintain distance 3. Review MSDS and determine appropriate gloves/sleeves or coveralls 4. Clothing/gloves/coveralls/barrier cream repellent 5. Gloves/clothing 6. Wear long sleeves, gloves or sunscreen 7. Latex/nitrile gloves (review Bloodborne Pathogen Plan -BBP) 8. Gloves/restraints 9. Adequate tools/assistance from others 10. Call supervisor

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<p>V. FOOT/LEG</p> <p>LIKELY INJURY/HAZARD</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> Cut/Abrasion/Puncture/Gash 2. <input type="checkbox"/> Electrical 3. <input type="checkbox"/> Chemical 4. <input type="checkbox"/> Biological 5. <input type="checkbox"/> Temperature 6. <input type="checkbox"/> Struck By/Against 7. <input type="checkbox"/> Strain 8. <input type="checkbox"/> Other _____ 	<p>V. 29 CFR 1910.136 FOOT/LEG PPE</p> <ol style="list-style-type: none"> 1. Approved safety shoe/proper clothing 2. NO GO – Maintain distance 3. Review MSDS and determine proper PPE 4. Coverall/barrier cream/repellant 5. Insulated footwear/clothing adequate for hazard 6. Safety shoes/adequate clothing proper techniques/assistance 7. Adequate tools/ assistance from others 8. Call supervisor
<p>VI. TORSO/WHOLE BODY</p> <p>LIKELY INJURY/HAZARD</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> Cut/Abrasion/Puncture/Gash 2. <input type="checkbox"/> Electrical 3. <input type="checkbox"/> Chemical 4. <input type="checkbox"/> Biological 5. <input type="checkbox"/> Temperature 6. <input type="checkbox"/> Struck By/Against 7. <input type="checkbox"/> Body Fluids 8. <input type="checkbox"/> Strain 9. <input type="checkbox"/> Cumulative 10. <input type="checkbox"/> Slip/Trip/Fall 11. <input type="checkbox"/> Same Level 12. <input type="checkbox"/> Different Level 13. <input type="checkbox"/> Entrapment 14. <input type="checkbox"/> Immersion/Submersion/Water 15. <input type="checkbox"/> Permit Required Confined Sp. 16. <input type="checkbox"/> Other _____ 	<p>VI. 29 CFR 1910. MISC. STANDARDS</p> <p>-</p> <ol style="list-style-type: none"> 1. Adequate clothing 2. NO GO – Maintain distance 3. Review MSDS and determine proper PPE 4. Proper clothing/barrier cream/repellant 5. Cold-insulated jacket/coat, heat-appropriate clothing, work/rest intervals 6. Protective clothing, warning devices, guards 7. Protective apron/coveralls review BBP Plan 8. Proper work habit, assistance, appropriate tools 9. Body mechanics, proper tools, workstations 10. Proper footwear, harness/tether/lifeline, assistance 11. Same as # 10 12. Same as # 10 13. NO GO - Do not enter 14. Personal flotation device, tether/lifeline 15. NO GO 16. Call supervisor

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<p>VII. AUDITORY</p> <p>NOISE LEVEL</p> <p>1. <input type="checkbox"/> Ambient Level above 85 dBa</p> <p>2. <input type="checkbox"/> Impact Level above 85 dBa</p> <p>3. <input type="checkbox"/> Other _____</p> <p>NOTE: Noise level rule of thumb: If you are within 2-3 feet of someone and you have to yell to communicate you are above 85 dba.</p>	<p>VII. 29 CFR 1910.95 HEARING PROTECTION</p> <ol style="list-style-type: none"> 1. Appropriate NRR ear plugs or muffs 2. Appropriate NRR ear plugs or muffs 3. Call supervisor
<p>PART C</p> <p>GO: <input type="checkbox"/> NO GO: <input type="checkbox"/></p> <p>COMMENTS:</p>	
<p>PART D</p> <p>CERTIFICATION</p> <p>I certify this WORKSITE HAZARD ASSESSMENT was conducted, reviewed and/or updated. Appropriate Personal Protective Equipment was utilized per hazards noted or anticipated.</p> <p>_____</p> <p style="display: flex; justify-content: space-between;">SignatureDate</p>	

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Attachment 2

IA-WORKERS COMPENSATION – FIRST REPORT OF INJURY OR ILLNESS

General	Employer (Name & Address incl. zip)		Carrier/Administrator Claim Number		Report Purpose Code								
			Jurisdiction	Jurisdiction Claim Number									
	Insured Report Number		Employer's Location Address (if different)		Location No.								
	Sic Code	Employer FEIN			Phone No.								
Carrier/Claims Admin	Carrier (Name, Address & Phone Number)		Policy Period		Claims Admin (Name, Address & Phone Number)								
			To										
			<input type="checkbox"/>	Check if self insured									
	Carrier FEIN	Policy Number or Self-Insured Number		Administrator FEIN									
Agent Name & Code Number													
Employee/Wage	Legal Name (Last, First, Middle)		Date of Birth	Social Security Number		Date Hired	State of Hire						
	Address (Incl. Zip)		Sex		Marital Status		Occupation/Job Title						
			<input type="checkbox"/>	Male	<input type="checkbox"/>	Unmarried/Single/Div.							
			<input type="checkbox"/>	Female	<input type="checkbox"/>	Married	Employment Status Active						
	<input type="checkbox"/>	Unknown	<input type="checkbox"/>	Separated									
	Phone		No. of Dependents		<input type="checkbox"/>	Unknown	NCCI Class Code						
Wage Rate \$	<input type="checkbox"/>	Day	<input type="checkbox"/>	Month	# Days Worked/WK	Full Pay for Date of Injury?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No			
	<input type="checkbox"/>	Week	<input type="checkbox"/>	Other	# Hrs Worked per Day	Did Salary Continue?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No			
Occurrence	Time Employee Began Work	<input type="checkbox"/>	A	Date of Injury or Illness	Time Occurred		<input type="checkbox"/>	AM	Last Work Date	Date Employer Notified		Date Disability Began	
		<input type="checkbox"/>	P				<input type="checkbox"/>	PM					
	Employer Contact Name/Phone Number			Type of Illness/Injury			Part of Body Affected						
Did Injury/Illness Exposure Occur on Employer's Premises?			Yes	<input checked="" type="checkbox"/>	Type of Illness/Injury Code			Part of Body Affected Code					
			No	<input type="checkbox"/>									

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Department or location where accident or illness exposure occurred		All Equipment, Materials, or Chemicals Employee was using when accident or illness exposure occurred.				
Specific Activity the Employee was engaged in when the accident or illness exposure occurred.		Work Process the Employee Was Engaged in when accident or illness exposure occurred.				
How injury or illness/abnormal health condition occurred. Describe the sequence of events and include any objects or substances that directly injured the employee or made the employee ill.					Cause of Injury Code	
Date Returned to Work	If Fatal, Date of Death	Were Safeguards or Safety Equipment Provided?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
		Were they used?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
Treatment	Physician/Health Care Provider (Name & Address)		Hospital (Name & Address)		Initial Treatment	
					0	<input type="checkbox"/> No Medical Treatment
					1	<input type="checkbox"/> Minor: By Employer
					2	<input checked="" type="checkbox"/> Minor Clinic/Hosp
					3	<input type="checkbox"/> Emergency Care
Other	Witness to Accident (Name & Phone Number)				4	<input type="checkbox"/> Hospitalized > 24 hr.
					5	<input type="checkbox"/> Future Major Medical/Lost Time Anticipated
	Date Administrator Notified	Date Prepared	Preparer's Name & Title		Preparer's Phone Number	
IA-1 (2/95)		SEE NEXT PAGE FOR IMPORTANT STATE INFORMATION/SIGNATURE				

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EMPLOYEE SIGNATURE:
IA-1 (2-95)



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Attachment 3

Containers and Supplies

Containers

- 1000 (or 950) ml amber glass jars
 - Used for collection of water for analysis of pesticides, herbicides and caffeine
- 1000 ml Boston Rounds (HDPE)
 - Used for the collection of nutrients, bulk (NO₃-N, NO₂-N and major anions) parameters and total and dissolved metals analysis.
- 40ml amber glass pre-preserved with HCl
 - Used for collection of volatile organic compounds (VOCs).
- 120ml amber glass
 - Used for collection of glyphosate.
- 250ml HDPE wide mouth jar or bottle
 - Used for Alkalinity - fill completely leaving no head space
- Bacteria sample containers
- Radionuclides sample containers

Preservatives

- Sulfuric Acid
 - Concentrated (98%) sulfuric acid (in 2ml vials) is used to preserve samples collected for Nutrients (NH₃, TKN, TOC, and Total Phosphorus) analysis.
- Nitric Acid
 - A 70% concentration of nitric acid (in 2ml vials) is used to preserve samples collected for dissolved and total metals analysis.
- Hydrochloric Acid
 - 5 ml plastic vials of 1:1 concentration hydrochloric acid used to preserve Herbicides/Caffeine

Other Supplies

- | | |
|--|---------------------------|
| • Field meters for pH and conductivity | • Teflon bucket and ropes |
| • Camera | • RAD alert meter |
| • Gloves | • Compass |
| • GPS | • Flashlight |
| • Filters and filtering apparatus | • Level |
| • Coolers with Ice | • Binoculars |
| • Maps | |
| • Field Sheets | |
| • COCs | |
| • DI water | |

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Attachment 4

Bacteria Laboratory Bench Sheet

Bacteria Lab Bench Sheet		Method: SM9223	Page of				TOTAL COLIFORM			E. coli			Calculated cfu/100 mL (dilutions)
Month/Year:		Analysis Info	Sample ID/Sample Source	Sample Info	Date/Time Read	Analyst (initials)	24 Hrs		cfu/100 mL	24 Hrs		cfu/100 mL	
Collection Info	Collector (initials)						L C	S C		L C	S C		
Sample #: 16001		Date:		Volume:	Date:								
Coll. Date:		Time:		Dilution Factor:	Time:								
Coll. Time:		Analyst:											
Sample #: 16002		Date:		Volume:	Date:								
Coll. Date:		Time:		Dilution Factor:	Time:								
Coll. Time:		Analyst:											

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Attachment 5

Groundwater Chain of Custody

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CHAIN OF CUSTODY RECORD
ENERGY AND ENVIRONMENT CABINET
DIVISION OF WATER - WATERSHED MANAGEMENT BRANCH - GROUNDWATER SECTION
Billing Codes: (Groundwater), WPC0603Z, (Drillers Program) 1300BACO, (Pesticides MOA) PC0400Z-A948, Other:

Site Identification (Check if One-time site <input type="checkbox"/>) Location: _____ County: _____ AKGWA #: _____ AI #: _____ Incident #: _____ Lat.: _____ Long. : _____ Elev.: _____ ft	Collection Date/Time Date: _____ Time: _____ Weather: _____	Field Measurements pH _____ SU Specific Conductance _____ μ S Temperature _____ $^{\circ}$ C Discharge (units) _____ Dissolved Oxygen _____ mg/L Turbidity _____ NTU Barometric Pressure _____ in/Hg H ₂ S _____ ppm Methane _____ % LEL
---	---	---

Sampler ID(s): _____

Division for Environmental Services Samples			
Analysis Requested	Container Size, Type	Preservation Method	Parameters
	1000 mL HDPE Boston Round	Cool to 4 $^{\circ}$ C	Bulk Parameters: Chloride, Conductivity, Fluoride, Nitrate-N, Nitrite-N, pH, Sulfate, TSS, TDS, Ortho-P
	1000 mL HDPE Boston Round	H ₂ SO ₄ Cool to 4 $^{\circ}$ C	Nutrients: NH ₃ / TKN / TOC/Total Phosphorous
	1000 mL HDPE Boston Round	Filtered, HNO ₃ Cool to 4 $^{\circ}$ C	Dissolved Metals by ICP: Plus: Arsenic, Lead, Mercury, Selenium
	1000 mL HDPE Boston Round	HNO ₃ Cool to 4 $^{\circ}$ C	Total Metals by ICP: plus Arsenic, Lead, Mercury, Selenium
	1000 mL Amber Glass	Cool to 4 $^{\circ}$ C	NP Pesticides/Pesticides/PCBs Methods 507/508
	1000 mL Amber Glass	5 ml HCl Cool to 4 $^{\circ}$ C	Herbicides/Caffeine
	250 mL HDPE Wide Mouth	Cool to 4 $^{\circ}$ C NO HEAD SPACE	Alkalinity
	Three - 40 mL Amber Glass	50% HCL Cool to 4 $^{\circ}$ C	VOCs
	125 mL Amber Glass	Cool to 4 $^{\circ}$ C	Glyphosate
	Two - 1000 mL Amber Glass	5 ml HCl Cool to 4 $^{\circ}$ C	Duplicate (only collect if requested)
	Three - 40 mL Amber Glass	50% HCl Cool to 4 $^{\circ}$ C	Dissolved Gases: Butane, Ethane, Methane, Propane

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Signatures:

Relinquished by: _____ Date: _____ Time: _____

Received by: _____

Relinquished by: _____ Date: _____ Time: _____

Received by: _____

Relinquished by: _____ Date: _____ Time: _____

Received by: _____

Sample #: _____ Report #: _____ **DISCARD SAMPLES UPON COMPLETION**

Preservatives:	Comments:
H ₂ SO ₄ _____ (Expiration Date)	
HNO ₃ _____ (Expiration Date)	
HCl _____ (Expiration Date)	

Preparation Date/Time	Billing Code
Date: _____	<input type="checkbox"/> (Groundwater) WPC0603Z <input type="checkbox"/> (Drillers Program) 1300BACO <input type="checkbox"/> (Pesticides MOA) PC0400Z-A948
Time: _____	
Prepared by: _____	
Trip Blank Id.: _____	
AI #: _____ Incident #: _____	

Site Identification

TRIP BLANK FOR :

Field Sampler ID: _____

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Division for Environmental Services Samples			
Analysis Requested	Container Size, Type	Preservation Method	Parameters
	40 ml Glass	50 % HCl Cool to 4°C	VOCs
Signatures:			
Relinquished by: _____ Date: _____ Time: _____			
Received by: _____			
Relinquished by: _____ Date: _____ Time: _____			
Received by: _____			
Relinquished by: _____ Date: _____ Time: _____			
Received by: _____			
Sample #: _____ Report #: _____			
DISCARD SAMPLES UPON COMPLETION			