SAMPLING OF GROUNDWATER, SOILS AND WASTES

PETER VAN ZANDT, *C: 512-364-7049, PETER.VANZANDT@SAGEENVIRONMENTAL.COM*
ROBERT SHERRILL, *C: 512-470-8710, ROBERT.SHERRILL@SAGEENVIRONMENTAL.COM*
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BACKGROUND:

THE DATA QUALITY OBJECTIVE PROCESS

ALL GROUNDWATER, SOIL, AND WASTE SAMPLING PROGRAMS SHOULD ADHERE TO A DATA QUALITY OBJECTIVE (DQO) PROCESS THAT IS USED TO PREPARE FOR SAMPLING ACTIVITIES. THE DQO PROCESS ESTABLISHES SPECIFIC OBJECTIVES FOR AN ENVIRONMENTAL STUDY OR SAMPLING PROGRAM AND FOCUSES DATA COLLECTION AND ANALYSIS TO MEET THOSE OBJECTIVES. APPROPRIATE USE OF THE DQO PROCESS ACHIEVES TWO MAJOR OBJECTIVES: IT ENSURES THAT THE TYPE, QUANTITY, AND QUALITY OF DATA COLLECTED ARE APPROPRIATE FOR THE DECISION AT HAND; AND IT ELIMINATES THE COLLECTION OF UNNECESSARY, REDUNDANT, AND OVERLY PRECISE DATA.

OUR SERVICES AND APPROACH:

A PLAN FOR SAMPLING

SAMPLE AND ANALYSIS PLAN

For any given sampling event, Sage presents a Sampling and Analysis Plan (SAP) that describes the methods and procedures used to accomplish the sampling goals. Sage determines the level of detail required, as the SAP may vary with the scope and purpose of the sampling activity. Within a SAP, Sage specifies procedures that ensure sample, handling, and analysis result in data of sufficient quality to plan and evaluate remedial actions at the site. Additionally, information necessary to ensure proper planning and implementation of sampling activities is included.

Sage conducts all sampling and analytical methods in accordance with EPA-SW-846: Test Methods for Evaluating Solid Waste Physical and Chemical Methods. Personnel involved in sampling must wear clean, disposable gloves of the appropriate type. Generally, Sage provides a copy of our Sampling SOP along with the SAP, but site-specific and/or sample specific procedures are addressed as needed. Depending on the media to be sampled, a step-by-step list of procedures is addressed to ensure that all sampling standards are achieved and any confusion regarding sampling procedure is eliminated.

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GROUNDWATER SAMPLING

Currently the most common groundwater purging and sampling methodology is to purge a well using bailers or high-speed pumps to remove three to five casing volumes followed by sample collection. This method can cause adverse impacts on sample quality through collection of samples with high levels of turbidity. Sampling-induced turbidity problems are often mitigated by using low-flow purging and sampling techniques.

It is generally accepted that water in the well casing is non-representative of the formation water and needs to be purged prior to collection of groundwater samples. However, the water in the screened interval may indeed be representative of the formation, depending upon well construction and site hydrogeology.

Low-flow purging should be done using pump-intake located in the middle or slightly above the middle of the screened interval. Placement of the pump too close to the bottom of the well causes entrainment of solids that have collected in the well. Placement of the pump at the top of the water column is only recommended in unconfined aquifers screened across the water table. Low-flow purging has the advantage of minimizing mixing between the overlying stagnant casing water and the water within the screened interval.

In-line water quality indicator parameters should be continuously monitored during purging. The water quality parameters monitored can include pH, redox potential, conductivity, dissolved oxygen and turbidity. Measurements should be taken every three to five minutes and stabilization is achieved after all the parameters have stabilized for three successive readings.

Upon parameter stabilization, sampling can be initiated. Sampling should occur in a progression from least to most contaminated wells, if this is known. Samples must be preserved as specified in the site Quality Assurance Project Plan (QAPP).

SOIL SAMPLING

Analysis of soil may determine whether concentrations of specific contaminants exceed established threshold action levels, or if the concentrations present a risk to public health, welfare, or the environment.

Soil samples may be recovered using a variety of methods and equipment, depending on the portion of the soil profile required (surface versus subsurface), the type of sample required (disturbed versus undisturbed), and the soil type.

Soil is collected directly, using a hand-held device, such as a hand scoop, auger or a post hole digger, or indirectly using a power-activated device, such as power augers, back hoes, or drill rigs. Following collection, the soil is homogenized in a container constructed of inert material and transferred to the appropriate sample containers. Chemical preservation of solids is generally not recommended. Cooling is usually the best approach, supplemented by the appropriate holding time. Wide mouth glass

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containers with Teflon-lined caps are used for soil samples. The sample volume is a function of the analytical requirements and is specified in the work plan. Soil should be transferred from the sample collection device to an appropriate sample container using a stainless steel or plastic scoop or equivalent. If composite samples are collected, place the soil sample in a stainless steel, plastic or other appropriate composition bucket, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Samples for volatile organic analysis must be collected directly from the bucket, before mixing the sample to minimize loss due to volatilization of contaminants.

All sampling devices should be decontaminated, and then wrapped in aluminum foil. The sampler should remain in this wrapping until it is needed. Each sampler should be used for only one sample. Dedicated samplers for soil samples may be impractical due to the large number of soil samples that may be required and the cost of the sampler.

WASTE SAMPLING

Media types or waste matrices commonly sampled under RCRA may include liquids, sludges or slurries, various unconsolidated solids, consolidated solids and debris, soil, groundwater, sediment, soil gas, and air. The physical characteristics of the waste or medium affect many aspects of sampling, including the volume of material required, selection of the appropriate sampling device, how the device is deployed, and the containers used for the samples.

All samples should be placed in containers of a size and construction appropriate for the volume of material specified in the sampling plan and as appropriate for the requested analyses. Factors to consider when choosing containers are compatibility with the waste components, cost, resistance to breakage, and volume.

Samples are preserved to minimize any chemical or physical changes that might occur between the time of sample collection and analysis. Preservation can be by physical means (e.g., kept at a certain temperature) or chemical means (e.g., with the addition of chemical preservatives).

Proper documentation of field activities, collection of field quality control samples and decontamination of equipment and personal should all be specified within the site Quality Assurance Project Plan (QAPP).

REPRESENTATIVE SAMPLING

Within an SAP, Sage carefully identifies the sampling objectives. To achieve the sampling objectives, the samples must be representative of the geologic/hydrologic landscape and of contaminated areas being investigated. Representative sampling ensures that a sample or group of samples accurately reflects the concentration of the contaminant(s) of concern at a given time and location. Analytical results from representative samples reflect the variation in pollutant presence and concentration throughout a site.

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In general, representative sampling objectives for groundwater, soil and waste include the following:

- Identify the presence of contamination, including the source, composition, and characteristics. Determine if it is hazardous.
- Establish the existence of an imminent or substantial threat to public health or welfare or to the environment.
- Establish the existence of potential threat requiring long-term actions.
- Develop containment and control strategies.
- Evaluate treatment options.

FIELD DOCUMENTATION

Field notes are collected by the individual sampler and maintained within project files to document daily records, observations, and measurements. The field notes document the following:

- Date of sampling event
- Name of sampler
- Sample location
- Time of sample collection
- Sampling method
- Air temperature and other climate conditions
- Sample observations
- Sample number
- Field observations
- Groundwater quality parameters
- Approximate flow rate
- Instrument calibration
- Tailgate safety documents
- Daily activities logs
- Flow rates
- Purge volumes
- Problems with sampling
- Presence of PSH
- Summary of equipment

SUMMARY:

SAGE'S APPROACH TO GROUNDWATER, SOIL & WASTE SAMPLING

Sage's approach to groundwater, soil and waste sampling begins with an SAP that addresses all of the project goals, state and federal reporting requirements, stringent QA/QC standards for documentation, reporting and sampling, and most importantly, health and safety. Sage maintains the highest quality assurance standards and utilizes TCEQ/EPA approved sampling and test methods during a sampling event to ensure that all reporting requirements and project objectives are met.