TECHNICAL

PROCEDURE GUIDANCE

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

NOTES

Quality Assurance/Quality Control Procedures

GUIDANCE SUMMARY-AT-A-GLANCE

Quality assurance (QA) is a process designed to ensure that all data collected are adequate for the purpose for which they are collected, that is, the data are complete, reliable, and representative. Quality control (QC) is the routine application of procedures for controlling the accuracy and precision of data measurements. Practicing QA/QC ensures that all samples collected are of adequate quality to ensure an efficient and effective cleanup and, when necessary, to withstand legal scrutiny in a court case.

This section provides QA/QC protocols for sample collection and handling during spill response activities. These protocols cover the following topics:

- -- Well drilling and development;
- -- Decontamination of equipment;
- -- Sample containers;
- -- Sample preservation requirements;
- -- QA/QC for sample collection;
- -- Splitting samples with responsible parties and others; and
- -- Chain-of-custody recordkeeping.

Any sampling equipment used should preferably be laboratory cleaned, packaged, and dedicated for use at one site and sample location for each day of sampling activity. Cleaning equipment between uses is acceptable provided the recommended field decontamination procedures listed in Exhibit 2.4-1 are followed.

Refer to Exhibit 2.4-2 for container types recommended for sample handling.

Refer to Exhibit 2.4-2 for the various types, concentrations, and amounts of preservatives required for samples.

A trip blank is prepared as a control measure of sample container preparation, blank water quality, and sample handling. Handle the trip blank in the same manner as the other sample containers. One trip blank should be handled for each sampling.

A field blank is used to check on potential sources of contamination resulting from exposure to the ambient air or from improperly cleaned sampling equipment. Handle, store, transport, and analyze field blanks in the same manner as the samples collected that same day.

Duplicate samples are collected to determine the accuracy of a laboratory's analysis by allowing a comparison of analytical results for two samples from the same location. We recommend that one duplicate sample be taken for every 20 samples collected.

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GUIDANCE SUMMARY-AT-A-GLANCE
(continued)

- Spiked samples provide a proficiency check on how much of the added analyte can be detected. Analyte can be lost during transport and storage of the collected samples, and analyte recovery will be a function of the analyte equipment. The analysis requirements for spiked samples are the same as those for the regular field samples.

- Split samples are also collected to determine the accuracy of a laboratory's analysis. Split samples allow a comparison of analytical results for two parts of the same sample from the same sampling location.

- Requests from other state, local, or federal agencies for split samples should be honored. Requests from known or suspected spillers should be discussed with your RSE, regional attorneys, and, as necessary, with the Central Office of the Bureau of Spill Prevention and Response (BSPR) before you agree.

- All collected samples, especially to be used as evidence in cases where penalties are likely to be assessed and/or legal action is contemplated, must be handled in such a manner as to guarantee a chain of custody. Seal each sample after collection and have an identification and custody tag attached showing the sample's serial number, time and date collected, source, and type of preservation. The chain-of-custody record (Exhibit 2.4-4) should accompany each sample shipment sent back to the laboratory, and must show the name or initials of each individual in succession that has handled that shipment.

- Contractor laboratories are required to follow the analytical methods and QA/QC procedures defined by the U.S. Environmental Protection Agency and the N.Y. State Department of Health. No other methods are to be substituted unless these changes have been approved by the BSPR.

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2.4 Quality Assurance/Quality Control Procedures

Whether samples of released product or potentially contaminated air, water, or soil are collected by you or your contractor, **make sure that the data collected are of adequate quality to ensure an efficient and effective cleanup** and, where appropriate, to withstand legal scrutiny in a court case. That is the basic function of the quality assurance/quality control program.

A quality assurance (QA) program ensures that all data collected are complete, reliable, and representative. Data quality needs vary throughout the different stages of a spill response. You begin the QA process, therefore, by considering the purposes for which you collect data and then evaluating the data quality requirements of those purposes.

Following good professional data sampling and analysis procedures is a good start for providing adequate QA. Consequently, this Spill Response Guidance Manual is itself a major element of our QA program. Guidance is provided regarding good technical and institutional procedures for data collection, analysis, and reporting, and for case documentation.

Quality control (QC) is the routine application of procedures for controlling the accuracy and precision of data measurements. Quality control is a direct function of quality assurance. Your adherence to the site investigation and environmental sampling procedures discussed in this manual will help to minimize problems with QC. Following these standard procedures, however, does not ensure that your data are either precise or accurate. Problems can arise if systematic errors, such as using improperly calibrated sampling/monitoring devices or contaminated drilling or sampling equipment, occur during data collection and go undetected. QC procedures such as collecting and analyzing duplicate, split, trip, and field blank samples are used to detect such problems.

We recognize that for each spill incident you must use your professional judgment regarding where and how to collect samples, to install monitoring wells, and the like. Physical limitations, such as buildings, roads, or property boundaries, and the urgency of the situation will also influence your ability to follow good QA/QC procedures. Strict adherence to data quality requirements under emergency conditions may be much less important than responding to the emergency. While we encourage you to use professional judgment in responding to each spill, keep in mind that collecting, analyzing, and recording data and information in accordance with good QA/QC practices is an important goal of the BSPR.

One aspect of QA/QC not covered in this manual is the QA/QC responsibility of the analytical laboratories that you or a PRP/RP may use. The contractor laboratories we retain are required contractually to follow the analytical methods and QA/QC procedures defined by the U.S. Environmental Protection Agency (EPA) and the N.Y. State Department of Health (DOH). No other methods are to be substituted unless these changes have been approved by BSPR. To be approved to conduct QA/QC analysis for BSPR, laboratories must acceptably perform in proficiency tests, which will result in a Certificate of Approval for Laboratory Service issued

by the DOH. You should also require PRP/RPs to demonstrate and document that the spill response contractors and the laboratories they hire also practice adequate QA/QC.[1]

The remainder of this section provides QA/QC protocols for sample collection and handling during spill response activities. These protocols include the following:

- Well drilling and development;
- Decontamination of equipment;
- Sample containers;
- Sample preservation requirements;
- QA/QC for sample collection;
- Splitting samples with responsible parties and others; and
- Chain-of-custody recordkeeping.

Our objectives in developing these protocols and in seeing that they are followed are to: (1) maintain the physical form and chemical composition of the sample as collected, (2) prevent cross-contamination from other sources, and (3) establish a measure of control over the handling of samples beginning with proper cleaning of sample containers and ending with analysis of the sample in the laboratory.

1. Well Drilling and Development

The process of drilling and developing ground-water monitoring wells will disturb the soil and ground-water properties at or near the wells, and can directly affect the quality of collected soil and/or ground-water samples. In the context of QA/QC, it is important to minimize the potential impact on soil and ground water during and after the installation of monitoring wells.

Drilling fluids and additives may introduce contamination into the subsurface, which could persist even after well development is complete and affect the chemical and biological quality of any samples collected subsequently. Using the mud rotary drilling method is not recommended, particularly for investigation of organic contaminants. Wherever possible, hollow stem auger, cable tool, or air rotary methods should be used to install soil borings and monitoring wells. Where fluid rotary methods are employed, use clean water and control the fluids carefully to minimize impact on site hydrogeology.

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[1] *All data generated by contractor laboratories need to be validated before use for determining the level and extent of contamination at a spill site. A contractor laboratory should submit analytical results of collected samples with documentation that specifies the standard operating procedures (SOP) for performing the analyses, detection limits of chemicals, and precision of measurements.*

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Grouts and sealants are used to close the annular space in the borehole to prevent the infiltration of water and fluid-borne contamination. Grouts and sealants may invade the oil and filter pack and elevate pH, or if improperly installed, provide a route whereby samples may become contaminated from contaminants traveling down the well casing from overlying units or from the surface. When selecting a grout and sealant material, consider the compatibility between the material and the soil and ground water. Calcium bentonite can be used in metal-rich calcic soils. However, sodium bentonite is generally used because of its ability to swell with water and thus seal the annulus, but it may shrink and crack from dewatering when exposed to brines. Increasing the solids content of the bentonite slurry can minimize this problem. Any additives used (e.g., polymer-based thickeners) may contribute contaminants to the ground water and should be selected carefully.

Many of the well casing and screen materials (e.g., PVC, Teflon, stainless steel, galvanized steel) can have an effect on the quality of ground-water samples and may not have the long-term structural characteristics to withstand site-specific conditions. For example, steel casing deteriorates in corrosive environments, and PVC deteriorates when in contact with ketones, esters, and aromatic hydrocarbons. Well casing and screen materials, therefore, should be selected based upon a consideration of the geochemistry, the anticipated lifetime of the monitoring program, well depth, chemical parameters to be monitored, and other site-specific factors.

After installation, wells need to be developed in order to repair damage done to the soil by the drilling operation and to alter the basic physical characteristics of the aquifer near the borehole so that water or free product will flow more freely to the well. A well must be developed to allow for the influx of water reasonably free of suspended solids, because samples containing suspended sediments may bias the chemical analysis of the collected samples. The first step in well development involves alternately moving water into and out of the well-screened gravel pack at high and low velocities to break down the mud pack on the well bore and loosen fines in the aquifer being monitored. This step is followed by pumping the well to remove suspended solids from the well and the immediate area outside the well screen. This procedure should be continued until the water pumped from the well is visually free of suspended materials.

A period of time should elapse between developing the well and sampling the ground water to allow the aquifer to recover from the stresses created by drilling and developing the well. This waiting period can range from a few days for permeable soils to weeks for clayey formations. Obtain technical advice from a hydrogeologist and/or the drilling contractor to determine the time required for the ground water to equilibrate.

2. Decontamination of Equipment

a. Sampling Equipment

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Decontamination of field sampling equipment is a critical element of the QA/QC process. Improperly cleaned and prepared sampling equipment can lead to cross-contamination of environmental samples.

Whenever feasible, any sampling equipment should be laboratory-cleaned, packaged, and dedicated for use at one site and sample location for each day of sampling activity. For instance, if you need to sample six wells at one site in one day, ask the laboratory to prepare at least six sets of the necessary sampling equipment (although having a supply of extra, pre-prepared sampling devices is advisable). Clean sampling equipment from the laboratory should remain in the wrapping material until it is used in the field. If you follow this procedure, you will avoid having to decontaminate your equipment in the field, which is not always possible or convenient.

When it is not feasible to have sampling equipment cleaned in the laboratory, cleaning the equipment in the field between sampling locations is an acceptable alternative. Refer to Exhibit 2.4-1 for the recommended procedures for field equipment decontamination. Decide on a case-by-case basis whether the available procedures for decontamination of the equipment in the field are sufficient for the conditions and situation. Some of the issues to consider include:

- Sampling logistics. It may be impractical to laboratory-clean and dedicate sampling equipment in an emergency situation because of time and administrative constraints.

- Sample matrix. Dedicated sampling equipment is always preferred for all sample matrices; however, soil sampling equipment such as split-spoon samplers and hand augers may be more amenable to field decontamination. It is always preferable to laboratory-clean ground-water sampling equipment and dedicate this equipment to a single-sampling point for each day of sampling.

- Sampling volume and frequency. If you have a large number of sample locations to cover and/or only a short time to conduct sampling, it may be more efficient to use laboratory-cleaned equipment rather than lose the time consumed in field decontamination procedures.

- Cost. It can be expensive to procure and prepare laboratory-cleaned sampling equipment for one sampling episode.

If you have determined where you will collect your samples, we recommend that you start in the area of the site suspected to have the lowest contaminant concentrations and then proceed to areas of successively higher suspected contaminant concentrations.

Exhibit 2.4-1

Suggested Equipment Decontamination Procedure

A. The following procedure is recommended for cleaning and decontaminating field sampling equipment:

1. Wash with non-phosphate detergent plus tap water

2. Rinse with tap water

3. Rinse with distilled/deionized water

4. Rinse with a solution of 10% nitric acid[a] (trace metal or higher grade nitric acid) diluted with distilled/deionized water

5. Rinse with distilled/deionized water[b]

6. Rinse with acetone (pesticide grade[c])

7. Subject to total air dry or pure nitrogen blow out[b]

8. Rinse with distilled/deionized water[b]

9. Wrap in clean aluminum foil with dull side towards equipment

B. Equipment should be custody sealed and information concerning decontamination methodology, date, time, and personnel should be recorded in the field log book.

C. The use of distilled/deionized water commonly available from commercial vendors may be acceptable for sampling equipment decontamination provided that it has been verified by laboratory analysis that the water has been distilled and deionized.

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[a] A one percent nitric acid rinse should be used on carbon-steel split-spoon samplers.

[b] Only if sample is to be analyzed for metals.

[c] Only if sample is to be analyzed for organics.

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b. Submersible Pumps

Submersible pumps should be cleaned between wells when used to evacuate stagnant ground water. Cleaning a submersible pump consists of an external detergent wash and tap water rinse, or a steam cleaning of the pump casing, hose, and cables, followed by a 20-gallon flushing of the pump housing and hose using potable water. Exercise caution to avoid touching the pump when it is running in order to avoid an electric shock. Always disconnect the pump from the power source before handling.

Surface pumps (centrifugal and diaphragm) used for well evacuation need not be cleaned between uses at different well locations. However, we do recommend using a new length of polyethylene tubing for each well. Dispose of the used tubing properly.

c. Heavy Equipment

Other equipment and materials such as drill rigs, well casings, auger flights, and backhoes can represent potential sources of interference and cross-contamination for environmental samples and should be cleaned prior to and between uses. There are basically two options for cleaning the heavier or bulkier equipment: steam cleaning and manual scrubbing.

Steam cleaning removes visible debris from the equipment and is very effective for removing residuals. The cleaning equipment is easy to handle and generates a small volume of wash solution. Potential disadvantages for this cleaning method include the need for a fixed or portable power source, and it may not be cost-effective for use on small pieces of equipment or for one-day sampling events.

Manual scrubbing involves the hand application of a non-phosphate soap solution followed by a thorough water rinse. This method can be as effective as steam cleaning and may work better in some situations. Its disadvantages are that it is labor intensive and generates large volumes of wash and rinse solutions requiring disposal.

3. Sample Containers

Prior to collecting a sample, consider the type of container that you will use to store and transport that sample. The analytical laboratory you choose will usually help you make this decision and provide you with the proper sample containers. Key parameters in choosing sample containers are the sample matrix (i.e., soil or water), the potential contaminants to be encountered, the analytical methods requested, and the laboratory's internal QA requirements. Other key evaluation criteria include: (1) potential reactivity of container material with the sample; (2) volume of the container; (3) color of the container; and (4) container closures. Exhibit 2.4-2 provides a

Exhibit 2.4-2

Recommended Sample Handling

Measurement for:	Sample Matrix	Type and Size of Container	Number of Containers and Sample Volume	Preservation	Maximum Holding Time
Purgeable (volatile) organics	Water	40 ml capped Teflon septum glass vial	Two; vials filled completely, no air space; two field blanks (one filled with analyte free water, another filled with rinse water) turned into the lab with every 20th sample.	Cool to 4°C in an ice chest	14 days
Acid/Base/Neutral Extractable Organics	Water	2,000 ml (2-liter) amber glass bottles with Teflon-lined caps	Two; total volume approximately 1 gallon; fill bottles 5/6 full	Cool to 4°C in an ice chest	Must be extracted within 7 days
Metals (total)	Water	1 liter polyethylene or glass bottle with polyethylene-lined caps	Number of containers varies depending on the metals analyzed;[a] each bottle is filled 7/8 full	Acidify with nitric acid to a pH of 2 or below (approximately 1.5 ml conc. HNO_3 per liter)	6 months (except mercury)
Metals (dissolved)	Water	Same as above for measuring total metals	Same as above for measuring total metals; a 0.45 micron membrane filter is needed to filter dissolved metal samples before adding the preservative	Same as above for measuring total metal	6 months
Cyanides	Water	1 liter polyethylene or glass bottle with polyethylene-lined caps	One; bottle is filled 7/8 full	Preserve with 10N NaOH to a pH of 12 and cool to 4°C in an ice chest	Must be extracted within 24 hours
PCB/Pesticides	Water	2,000 ml (2 liter) amber glass bottles with Teflon-lined caps	Two; total volume approximately 1 gallon; fill bottles 5/6 full	Cool to 4°C in an ice chest	Must be extracted within 7 days

[a] Metal analysis requires an additional amount of sample for quality control analysis. To correct for this additional volume, determine the volume of sample needed (200 ml for each metal analyzed) using the guidelines provided below:

- If the sample volume is less than one liter, multiply by two and submit this volume as the correct sample volume;
- If the sample volume is equal to or greater than one liter, add one liter to the sample volume and submit this as the correct sample volume.

Exhibit 2.4-2

Recommended Sample Handling (continued)

Measurement for:	Sample Matrix	Type and Size of Container	Number of Containers and Sample Volume	Preservation	Maximum Holding Time
Petroleum hydrocarbons	Water	1 liter glass bottle with Teflon-lined caps	One; do not overflow the bottle and leave some air space inside	Preserve with conc. H_2SO_4 or HCl to a pH of 2 or less and cool to 4°C in an ice chest	7 days
Oil and Grease	Water	1 liter glass bottle with Teflon-lined caps	One; do not overflow the bottle and leave some air space inside	Preserve with conc. H_2SO_4 or HCl to a pH of 2 or less	28 days
Volatile Organics	Soil/Sediment	40 ml capped Teflon septum glass vials	Two; vials filled completely	Cool to 4°C in an ice chest	14 days
Acid/Base/Neutral Extractable Organics	Soil/Sediment	8 oz. wide-mouth glass bottle with Teflon liner	One; fill bottle 5/6 full	Cool to 4°C in an ice chest	Must be extracted within 7 days
Metals	Soil/Sediment	8 oz. wide-mouth glass bottle with Teflon liner	One; fill bottle 5/6 full	(N/A)	(N/A)
Cyanides	Soil/Sediment	8 oz. wide-mouth glass bottle with Teflon liner	One; fill bottle 5/6 full	(N/A)	(N/A)
Otterberg Limits	Soil	8 oz. glass bottle	One; fill bottle 5/6 full	(N/A)	(N/A)
Moisture Content	Soil	8 oz. glass bottle	One; fill bottle 5/6 full	(N/A)	(N/A)
Grain Size	Soil	8 oz. glass bottle	One; fill bottle 5/6 full	(N/A)	(N/A)
Permeability	Soil	8 oz. glass bottle	One; fill bottle 5/6 full	(N/A)	(N/A)

N/A = Not Applicable.

Source: NYSDEC, Division of Water, Sample Correction Manual, March, 1989.

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list of parameters and containers recommended for the handling of different samples.

We recommend that sample containers be cleaned by the same laboratory performing the sample analysis. The cleaning procedure is dictated by the specific analysis to be performed on the sample. After a sample is collected (unless otherwise specified) it should be properly sealed before it is sent back to the laboratory. Care should be taken at all stages of handling sample containers to avoid cross-contaminating the containers and their contents.

4. Sample Preservation Requirements

Certain analytical methods for specific analytes require chemical additives to stabilize and maintain the integrity of the sample during transport and storage (i.e., until the sample is analyzed). Sample preservation occurs either by adding the preservatives to the containers at the laboratory prior to shipment into the field, or adding preservatives in the field immediately before or after the samples are collected.

Many laboratories provide pre-preserved bottles as part of their services. Be aware that there are potential problems with this method, among them: (1) if enough of a sample cannot be collected, the result may be that there is too much preservative in the sample; and (2) there may be an insufficient amount of preservative provided to achieve a desired pH level (as a consequence of chemical reactions with the sample, which consume some of the preservatives). Be prepared to add additional preservatives to samples if this situation occurs. The recommended sample preservation requirements are listed in Exhibit 2.4-2.

5. QA/QC for Sample Collection

QA/QC as applied to sample collection is intended to provide a context for the subsequent review, interpretation, and validation of the resulting analytical data. The BSPR QA/QC guidelines for the collection of trip and field blanks, duplicate and spiked samples, and background samples are contained in Exhibit 2.4-3. While the number of QA/QC samples varies on a case-by-case basis, a good rule-of-thumb is that 10 percent of the total number of samples collected should be QA/QC samples to assure the control of sample quality.

6. Splitting Samples with Responsible Parties and Others

You may encounter situations where various parties, including suspected or known spillers, desire to split samples collected for analysis at a particular spill site. Requests from other state, local, or federal agencies for split samples should be honored. Requests from known or suspected spillers should be discussed with your RSE, regional attorneys, and, as necessary, with the BSPR Central Office before you agree. In most cases, a request to share samples with spillers will be granted. In either instance, however, you should

Exhibit 2.4-3

Field QA/QC Control Samples

Type	Function	Preparation/Handling/Analysis
Trip Blank (Travel Blank)	Prepared as a measure of control of sample container preparation, blank water quality, and sample handling. Contaminated trip blanks indicate that the sample containers were cleaned inadequately, the blank water itself was of questionable quality, or contamination occurred during transport and/or storage.	One trip blank should be handled for each sampling event. The laboratory is responsible for preparing the trip blank sample container with deionized water. Take the trip blank to the site along with the empty, pre-cleaned sample bottles and send it back to the laboratory along with the collected samples. Do not open the trip blank container during the trip. Trip blanks are analyzed for volatile organics.
Field Blank (Field Rinse Blank)	Used to check on potential sources of contamination resulting from exposure to the ambient air or from improperly cleaned sampling equipment.	A field blank is collected using two identical sets of laboratory-cleaned sample containers. One set of containers is filled at the laboratory with deionized water and the other set is taken to the site empty. At the most contaminated area of the site, pour the deionized water through what is believed to be clean sampling equipment and collect the water in the empty set of sample containers. For samples collected directly into sample containers provided by the laboratory (e.g., potable wells and surface-water samples), the full set of field blank water containers should be poured directly into their identical set of empty containers. Field blanks are to be analyzed in the same way as collected samples.
Split Samples and Duplicate Samples	Used to determine the precision of a laboratory analysis by allowing a comparison of analytical results for two parts of the same sample from the same location. Used to demonstrate the reproducibility of the sampling techniques, and to test the precision of the overall analytical system (field and laboratory).	Split and duplicate samples must be prepared and analyzed for the same parameters by the same methods to demonstrate the reproducibility of the sampling and analytical techniques. It is recommended that at least one duplicate sample and one split sample be taken for every 20 samples collected. # Aqueous Sample Matrix Alternately fill sample containers from the same sampling device for duplicates of water samples. Volatile organic samples collected using bailers should be filled from the same bailer whenever possible, and should be the first set of sample containers filled to minimize the loss of volatile organics from sample. When other sampling devices are used (e.g., bladder pumps), alternate between the two sample containers during filling.

Exhibit 2.4-3

Field QA/QC Control Samples (continued)

Type	Function	Preparation/Handling/Analysis
Split Samples (continued)		# Non-Aqueous Sample Matrix (nonvolatiles) Homogenize (mix) the sample by filling a properly decontaminated stainless steel tray or bowl with the collected sample and mixing with a decontaminated stainless steel or teflon instrument. Once mixed, the sample should be divided in half and the sample containers should be filled by scooping sample material alternately from each half. # Non-Aqueous Sample Matrix (volatiles) When sampling non-aqueous media for volatile organic analyses (VOA), duplicate VOA samples must be taken before mixing the sample and before collecting any samples for non-volatile organic analyses. For VOA samples of soil taken with either a split-spoon sampling or hand auger, isolate the depth stratum from which the sample is taken, fill the VOA sample containers, and seal the containers as quickly as possible. Because the soil samples are not homogenized for a VOA analysis, the amount of variation between duplicate samples may be slightly greater than for the non-volatile organic analyses.
Spiked Sample	Used to provide a proficiency check on analyte recovery as a function of analyte loss during transport and storage of the collected samples, and as a function of the analytical procedures and equipment.	Known amounts of a particular constituent should be added to an actual sample or blanks of deionized water at concentrations where the accuracy of the analytical test method is satisfactory. Spiking the samples should be performed at the time of sample collection. The analysis requirements for spiked samples are the same as for the regular field samples.
Background Sample	Used to compare site conditions to the surrounding environment.	Collect and handle background samples in the same manner as all other samples. Determining the need to collect background samples is made on a case-by-case basis.

Source: Sample Collection Manual, New York State Department of Environmental Conservation, Division of Water, 1989.

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follow the procedures outlined above for collecting duplicate samples. Although DEC-authorized personnel and sampling equipment shall be used to obtain all samples, each interested party must provide their own sample containers, blank samples, preservatives, sample shuttles, chain-of-custody forms, and the like.

7. Chain-of-Custody Recordkeeping

All collected samples, especially those used as evidence in cases where penalties are to be assessed and/or legal action is contemplated, must be handled in such a manner as to guarantee an unbroken chain of custody. A sample is under custody if:

- # It is in your actual possession;
- # It is in your view after being in your physical possession;
- # It was in your possession and then you locked or sealed it up to prevent tampering; or
- # It is in a secure area.

Implementation of chain-of-custody procedures provides the assurance that collected samples have been handled in such a manner as to prevent deliberate or unintentional alteration of the samples.

Each sample should be sealed after collection and have an identification and custody tag attached displaying the sample's serial number, the time and date collected, source, and the type of preservation. The chain-of-custody record (see Exhibit 2.4-4) should accompany each sample shipment sent back to the laboratory, and must show the name or initials of each individual in succession that has handled that shipment.

Upon receiving the samples in custody, the laboratory shall inspect the shipping container and sample bottles and shall contact the Bureau of Technical Services and Research if documents are absent, if the information on the receiving documents do not agree, if the custody seals are not intact, or if the sample is not in good condition. The laboratory shall document resolution of any discrepancies, and this documentation shall become a part of the permanent case file.

Exhibit 2.4-4

Sample Chain-of-Custody Record*

Must be completed for samples that might be used for enforcement proceedings or litigation.				
Sample ID (Lab Use Only)	Field Reference No.	Date/Time Collected	Sample Collection Point	Type: Water, Air Soil, Etc.

Specify Method of Preservation	**Transporting Samples**
___ NaOH ___ Cool, 4°C ___ Acidification (specify) ___ Other (specify)	During transport of the sample from sampling site to laboratory, the chain of custody must be unbroken. Generally, this will require that the sample be delivered by the sample collector or a designated representative, who will sign for the receipt, integrity, and transfer of the sample during shipment. If integrity of sample is questioned, describe problem on reverse side of this form.

CUSTODY OF SAMPLES

	Name	**Affiliation**	**Date**	**Time**
1. Sample Container Prepared by	_____	_____	_____	_____
2. Received by	_____	_____	_____	_____
3. Received by	_____	_____	_____	_____
4. Sample Collected by	_____	_____	_____	_____
5. Sample Received by	_____	_____	_____	_____
6. Sample Received by	_____	_____	_____	_____
7. Sample Received by	_____	_____	_____	_____
8. Sample Received by	_____	_____	_____	_____
9. Sample Received by	_____	_____	_____	_____
10. Sample Rec'd for Lab by	_____	_____	_____	_____
11. Sample Accessioned by	_____	_____	_____	_____

* This form was developed based on the chain-of-custody report used by Center for Laboratories and Research, New York State Department of Health.