FILTERING AND CHEMICAL PRESERVATION OF WATER SAMPLES

Purpose

This Water Quality Group (ENV-WQH) procedure describes the process for the chemical preservation of storm water and groundwater samples.

Scope

This procedure applies to ENV-WQH personnel, contract personnel, and students conducting chemical preservation of water samples either in the field at time of sample collection or in the ENV-WQH Storm Water Lab.

In this procedure

This procedure addresses the following major topics:

Integrated Work Management

The work specified in this procedure shall be conducted in accordance with applicable Integrated Work Documents, in accordance with LANL IMP 300-00-00, Integrated Work Management for Work Activities

Signatures

First authorization review date is one year from group leader signature below; subsequent authorizations are on file in group office.

Prepared by: Signature on file B. Turney, ENV-WQH	Date: 1/31/06
Approved by: Signature on file M. Alexander, ENV-WQH Team Leader	Date: 2/3/06
Approved by: Signature on file S. Rae, ENV-WQH Safety Committee Chair	Date: 2/7/06
Approved by: Signature on file S. Rae, ENV-WQH Group Leader	Date: 2/7/06

General information about this procedure

Attachments

Attachments to this procedure are:

Number	Title	Pages
1	Storm Water Sample Runoff Processing Form	2

History of revisions

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	1/06	New document

Who requires training to this procedure

The following personnel require training before implementing this procedure:

- ENV-WQH personnel, contractors, and students conducting chemical preservation of water samples.

Training method

The training method for this procedure is read-training (self-study) to this procedure. In addition, on-the-job training by a previously trained individual is required. All training is documented in accordance with ENV-WQH-QP-024, *Personnel Training***.**

Prerequistes

In addition to training to this procedure, the following training is also required prior to performing this procedure:

- Training as specified in ENV-ES-Field, *General Field Safety*
- EDS Training Plan 7211, ENV WQH Qualified Chemical Worker
- EDS Training Plan 7558, ENV-WQH Sample Management

Note

Actions specified within this procedure, unless preceded with “should” or “may,” are to be considered mandatory guidance (i.e., “shall”).

Conduct chemical preservation

Description of process

Storm water runoff samples and groundwater samples are collected in the field. Chemical preservation is conducted in the field immediately following groundwater sample collection or, if storm water sample, in the ENV-WQH Storm Water Lab (in the basement of TA-59-01). If chemical preservation is conducted in the Storm Water Lab, samples shall be delivered from the field in accordance with the applicable sampling procedure and placed, along with the chain of custody documentation, in field sample receiving refrigerators.

Prior to chemical preservation, storm water samples are transferred, or aliquoted, to sample containers as specified in the Analytical Request Forms.

Determine analyses needed

The personnel processing the water shall refer to Analytical Request/Chain of Custody Form for sample container and preservation requirements for the collected samples.

For storm water samples, the Analytical Request Form provides the priorities of required analyses and the sample prep team shall adjust the priorities when there is insufficient storm water collected to perform all desired analyses.

Conduct chemical preservation, continued

Process only one sample at a time; this will help avoid possible sample mix up.

Process storm water samples

To process storm water samples prior to preservation, perform the following steps:

Step	Action
1	Obtain clean sample bottles from storage cages next to the processing room and Storm Water Runoff Sample Processing Forms (Attachment 1).
2	Affix the prepared bar code labels to appropriate sample bottles. (Labels indicate type of bottle.)
3	Arrange sample collection bottles on the counter, without shaking, in order of priority (reference the Analytical Request Form) and group them by filtered and unfiltered chemical analysis.
4	A second member of the sample prep team must check all labels and the priority arrangement. Document this check by initialing the Analytical Request Form.
5	Place sample bottles for unfiltered analyses, in order of priority, near the splitter and Geopump.
6	Fill sample bottles by any convenient means that keeps the sample well mixed (homogenized) in the sample collection bottle; using the Geopump has been found to work better than using the spigot on the splitter. Pouring through a funnel may also be used.
7	Record the analytical sample requested for each sample bottle on the Storm Water Runoff Sample Processing Form (Attachment 1, page 2).

Conduct chemical preservation, continued

Filter sample

Filtering of collected samples may be required as requested on the Analytical Request Form.

Note: **Sample collection bottles** are the bottles the sample was collected in in the field. **Sample containers** are containers/bottles that the original sample is transferred to after processing. These containers are transferred to ECR-SMO for shipment to the analytical laboratory. To filter a water sample, perform the following steps:

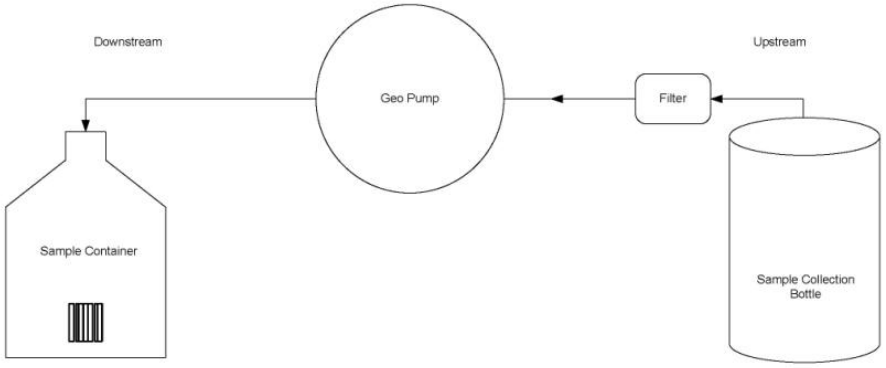
Step	Action
1	Don fresh gloves, lab coat, and protective eyewear. Using a suitable length of tubing, run a tube from the churn splitter, or sample collection bottle, to a filter and then additional tubing through the Geopump and into a sample container. (This places the filter upstream of the Geopump, preventing the tubing from over-pressuring and blowing the filter off the tubing. This will make a mess.) 
2	Turn on the Geopump.

Table continued on next page.

Conduct chemical preservation, continued

Filter sample

Step	Action
3	If flow diminishes to less than about one mL per second during the filtering of a sample, replace the filter as follows: **Step** / **Action** 1 — Hold the filter up and remove the tube from the churn-splitter or sample collection bottle. Continue pumping until flow stops. 2 — Turn off Geopump. 3 — Wash hands with gloves on, or don new gloves before replacing filter (to prevent cross-contamination of tubing). 4 — Remove the spent filter from tubing. Place fresh filter into tubing. 5 — Continue filtering process.
4	After the last sample bottle is filled, clean up the area.
5	Don new gloves before filtering a new sample (to prevent cross-contamination). A sample is defined as a "sample location."

Chemical preservation

IMPORTANT: Preservation entails the addition of acid or base to a sample. Acids used include hydrochloric acid (HCl), nitric acid (HNO_3), and sulfuric acid (H_2SO_4). Bases used in preservation include sodium hydroxide (NaOH). These are all strong acids and bases that can cause severe burns. Extreme care should be taken when using these acids and bases.

To preserve samples (either filtered or un-filtered) in the field, or in the WQH Storm Water Lab, perform the following steps:

Step	Action
1	Don gloves, protective eyewear, lab coat. No open toed shoes are allowed during preservation. Check eyewash prior to preservation process.
2	Preserve (add acid or base) to samples according to the requirements on the sample container label. Reference ENV-DO-206, *Sample Containers and Preservation*, for additional guidance.

Table continued on next page.

Conduct chemical preservation, continued

Chemical preservation, continued

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>3</td><td>After a minimum of 15 minutes, agitate preserved sample and then check pH. (pH for samples preserved with acid are expected to be less than 2. pH for samples preserved with base are expected to be greater than 12.)

Decant off a small volume of sample and observe the pH.
<table>
<tr><th>If</th><th>Then</th></tr>
<tr><td>pH is less than 2</td><td>enter “pH<2” on the Analytical Request Form/Chain of Custody form</td></tr>
<tr><td>pH is greater than 12</td><td>enter “pH>12” on the Analytical Request Form/Chain of Custody form</td></tr>
<tr><td>pH is between 2 and 12</td><td>enter the pH value on the Analytical Request Form/Chain of Custody form (example: “pH=5”)</td></tr>
</table></td></tr>
<tr><td>4</td><td>Securely affix lid to sample container. Clean and dry the exterior of sample container, ensure lid is on securely, and check sample container for leakage and breakage.</td></tr>
<tr><td>5</td><td>Apply chain-of-custody tape to the lid/bottle.</td></tr>
<tr><td>6</td><td>Carefully place sample containers in the cooler and package sample containers with blue ice.</td></tr>
<tr><td>7</td><td>Complete the sampling field sheet and the Analytical Request Form/Chain of Custody form.</td></tr>
<tr><td>8</td><td>Submit samples to the ECR-SMO for shipping to the analytical laboratory in accordance with ENV-DO-207, Handling, Package and Packaging, and Transporting Field Samples.</td></tr>
</table>

Conduct chemical preservation, continued

Conduct Storm Water Lab clean up	For ISCO bottles, rinse them and place in a bag to be collected for cleaning. After each sample in the Storm Water Lab is processed, clean the area. For non-ISCO sample "wedge" bottles, rinse the used sample collection bottles and dispose in the trash.
Disposal of wastes	There are only non-hazardous wastes association with this operation. Place used glass bottles in cardboard box, close the box with tape, and dispose of box in the dumpster. Carefully place any broken glass in the Broken Glass Box in the Storm Water Lab. Reference the Waste Profile Report for specifics.
Documen-tation	Retain a copy of the Analytical Request form when relinquishing custody of samples to the the ECR SMO. Provide the copy to the WQH IM Team for database entry.

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be submitted as records to the storm water sampling team leader:

- Copy of Analytical Request form(s)
- Sampling field sheets
- Storm Water Runoff Sample Processing Form

Click here to record self-study training to this document.

Storm Water Runoff Sample Processing Form

Section 1 (to be completed by person receiving sample call in)	
Sample Location Synonym (e.g. E200)	Sample Location Name (e.g. Mortandad below Effluent Canyon)
Field person calling in:	
Type and number of field samples delivered from processing: Type: □ Single Stage □ ISCO Number of bottles: _____ plastic _____ clear glass _____ amber glass	Approximate total volume deliver (liters) _____ L plastic _____ L clear glass _____ L amber glass

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Storm Water Runoff Sample Processing Form

Section 2 (to be completed by processing personnel)
Note:
ISCO samples: Samples collected in ISCO samplers are collected sequentially in order (1-21 or 1-24). Aliquots transferred to other containers for shipment to the analytical laboratory will be transferred in this sequential order only. Preferably, a single sample bottle will be used to for a single analytical bottle.
Note:
"Topping off" of sample bottles to be shipped to the analytical laboratory with any remaining field sample is NOT allowed.
Processing personnel Date/Time Sample processing started
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Sample ID label

Place sample ID label here (e.g. GF04080E20003)

Field sample container number(s) used for aliquot sent to analytical laboratory (e.g. 1, 2)

ISCO Bottle #	Analytical Sample	ISCO Bottle #	Analytical Sample
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Single Stage Bottle Type:	Analytical Sample: