Immediate Procedure Change (IPC) Cover		
Section 1 – Originator Request		
Document No.: EP-DIV-SOP-20217	Revision No.: 1	IPC No.: 1
Title: Processing Surface Water Samples		
Description of need and requested action (Attach document mark-up and numbered additional sheets, if needed): Sample container type (glass or polyethylene) not listed correctly for TAL Metals or PCBs in Attachment 3 were corrected. Using the incorrect container type will invalidate the sample from analysis. In addition, one spelling error was discovered and corrected in the Table Of Contents and Equipment section; and Attachments incorrectly labeled as Appendices were corrected to Attachments. Please see attached document mark-up for corrections.		

Originator Name (print):	Organization:	Z#:	Date:
Alethea Banar	EP-ES	108243	2-11-15

Section 2 –Reviews

Discipline:	Name:	Signature:	Date:
SME	Paul Mark		2/11/2015
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Section 3– Final Approvals

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Responsible Line Manager Signature: Steve Veenis	Print Name and Title: Steven Veenis	Z#: 109949	Date: 2.11.15

PROCESSING SURFACE WATER SAMPLES

Effective Date: September 3, 2014

Procedure Owner: Steve Veenis	Signature: /s/ Signature on File	Date: 9/3/14

This document fully satisfies the requirements of P300, Integrated Work Management, in order to systematically describe the work activity, the associated hazards, and the controls that **MUST** be employed to mitigate the risks.

REVISION HISTORY

Document No./Revision No.	Issue Date	Action	Description
EP-DIV-SOP-20217, R0	05/20/2014	New document	Updated SOP-5215 to new format. Revision of content.
EP-DIV-SOP-20217, R1	09/03/14	Minor revision	Added text for containers and sections for monitoring refrigerators, and packaging and transporting samples.
EP-DIV-SOP-20217, R1, IPC1	2/17/15	IPC	Sample bottle type correction in Attachment 3. Spelling correction in Table Of Contents. Terminology correction on

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1. PURPOSE AND SCOPE

This procedure describes the process for splitting, filtering, preserving and preparing storm water samples for shipment to an analytical laboratory. This procedure applies to all Los Alamos National Laboratory (LANL) personnel and any subcontractors who conduct chemical preservation of water samples either in the field at the time of sample collection or in the Storm Water Processing Facility (SWPF).

2. BACKGROUND

Surface water samples are collected across LANL for a variety of projects. The Environmental Protection Agency (EPA) issued National Pollution Discharge Elimination System (NPDES) Individual Permit (IP) requires LANL to monitor storm water run-on and runoff from Solid Waste Management Units and Areas of Concern, collectively referred to as Sites with regard to potential pollutants. The Environmental Surveillance Program, Los Alamos/Pueblo Watershed Stabilization Project, regional background study locations, and other monitoring programs may also require surface water sampling.

Surface water samples can be collected in the field using automated samplers (e.g. ISCO, Avalanche, and Global), single stage samplers or grab samples. Sample splitting, chemical preservation and filtration may be conducted in the field immediately following sample collection or in the SWPF. Processing samples should be conducted based on project requirements in accordance with the applicable sampling procedure.

3. REFERENCES

EP-DIV-SOP-10013, Inspecting Storm Water Runoff Samplers and Retrieving Samples
EP-DIR-AP-10003, Record Transmittal and Retrieval Process
EPA 833-8-92-001, NPDES Storm Water Sampling Guidance Document
US EPA Specification and Guidance for Contaminant-Free Sample Container, Publication 9240.05A, EPA/540/R-93/051, December 1992
Geotech Filter Holder Installation and Operation Manual, Rev 6/04/12, Part # 23150035

4. TRAINING PREREQUISITES

Orientation to the Processing Facility by an experienced individual is required. Personnel performing this procedure will be familiar with the most current versions of the following procedures:

EP-DIV-SOP-10013, Inspecting Storm Water Runoff Samplers and Retrieving Samples

5. PRECAUTIONS AND LIMITATIONS

This procedure is used with an approved Integrated Work Document (IWD) and/or other safety documents as required. Use of acids and bases requires an IWD. Review IWDs for facility specific requirements, training, precautions and access controls.

6. PREREQUISITE ACTIONS

6.1 Equipment and Tools

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- Copy of this procedure
- Copy of Integrated Work Document (IWD)
- Refrigerators cooled to ≤ 6°C
- Calibrated ~~fridge~~ refrigerator thermometers
- SWPF Sample Refrigerator Temperature Logbook
- Safety glasses
- Nitrile gloves
- Lab Coat
- Certified clean glass and poly sample containers
- Chemical preservatives
- pH Paper and disposable droppers
- pH Meter
- SWPF pH Meter Calibration Logbook
- Geopump
- Cartridge Filters (0.2µm, 0.45µm, 1µm, 5µm, 10µm)
- Pump Tubing (silicone)
- Geofilter stand
- Cellulose Acetate Flatstock Filter Membranes (0.2 µm, 0.45µm, 1µm, 5µm, 10µm)
- Custody Seals

6.1. Equipment and Tools (continued)

- Coolers with blue ice and plastic bubble wrap for glass
- Decontamination Supplies; paper towels, Fantastic, Alconox, deionized water
- Waste supplies; bags in various sizes, drum liners, liquid waste storage container

7. STEP-BY-STEP PROCESS DESCRIPTION

7.1 Accepting Samples from the Field

Field Personnel

[1] Deliver samples and completed Form 10013-1, ISCO Sampler Inspection and Sample Retrieval form to the Storm Water Processing Facility per EP-DIV-SOP-10013.

[2] Relinquish samples to the Sample Processor.

Sample Processor

[3] Verify volumes, review, and accept samples by signing "Received by" on Form 10013-1. Maintain original with water samples.

[4] Place samples and the original work order in the sample refrigerators.

[5] Notify the Sample Data Steward where samples have been collected and volumes.

7.2 Monitoring Sample Refrigerator Temperatures

Sample Processor

[1] Read the temperature inside each refrigerator daily when samples are present in the refrigerators.

[2] Record the date, time, temperature, any comments, and initial the entry in the SWPF Sample Refrigerator Temperature Logbook.

7.3 Determine Analyses Needed

Sample Data Steward

[1] Use the project specific guidance to determine which analytical suites will be submitted for analyses.

[2] Generate Form 20217-1, Storm Water Sample Processing Form with labels (Attachment 1) using the appropriate LANL Sample Management Office application.

[3] Submit the forms and labels to Sample Processor.

Sample Processor

[4] Generate Form 20217-2, Surface Water Sample Processing Form (Attachment 2) and append it with the above forms to the original Form 10013-1 and keep with water sample.

7.4 Processing Samples

Sample collection bottles are the bottles the sample was collected in in the field. Sample containers are containers/bottles that the sample is shipped in to the analytical laboratory. Use only Certified 300 series sample containers that have been processed and meet or exceed "US EPA Specification and Guidance for Contaminant-Free Sample Container" (Publication 9240.05A, EPA/540/R-93/051, December 1992). Never clean or re-use sample containers. Keep containers in a clean, dry place until the sample is ready to be processed and is ready to be transferred to the appropriate container.

Sample Processor

[1] Don fresh gloves, lab coat, and protective eyewear. Long pants are required. No open toed shoes are allowed. Confirm eyewash is operational prior to processing samples.

[2] Collect the Certificates of Analysis from each box of sample bottles and sample containers as the box is opened and set aside. Submit to records (see Section 8.0).

[3] Determine the priority sample in holding based on sample collection date and sample hold time listed on Form 10013-1 and/or the direction of the Sample Data Steward.

[4] Sign the SWPF Refrigerator Access Logbook. Remove sample to be processed.

CAUTION

Process only one sample (i.e., samples listed on one Work Order) at a time to ensure surface water from different sites is not comingled.

[5] On the work bench arrange the sample collection bottles in order according to the number on the lid.

7.4 Preparation for Processing Samples (continued)

[6] Record the date and time processing activities started and the personnel conducting the processing.

[7] Add field work order identification number and location (e.g. SMA Number or Station Number) from Form 20217-1 to Form 20217-2.

[8] Review and crosscheck Sampler Inspection and Sample Retrieval form 10013-1 against Sample Processing Log 20217-1. Record the analytical sample requested for each sample collection bottle on Surface Water Sample Processing Form 20217-2. ***Ensure that sample container type and preservation type is correct for the analysis requested per Sample Processing Log.***

[9] Verify sample location and cross reference with the Waste Characterization Strategy Form to determine the disposal path for any generated waste.

NOTE: For IP Program samples the Sample Data Steward or Sample Processor may assign the analysis to each individual bottle. For Los Alamos and Pueblo Canyons Sediment Transport Mitigation Project the Sample Data Steward or Sample Processor will reference Attachment 3 to assign analysis to each individual bottle. For all other monitoring programs the Sample Data Steward will assign the analysis to the appropriate bottle.

[10] Determine which bottles will require filtration per the Sample Prep field on each Storm Water Sample Processing Log (Form 20217-1) and refer to Section 6.7.

NOTE: Unless otherwise noted on the Sample Processing Log, a 0.45 µm filter is to be used. If the 0.2µm filter is indicated refer to Section 6.8.

[11] Determine which samples need to be split into smaller aliquots and refer to Section 6.6.

[12] Apply labels to correct sample collection bottles and sample containers.

7.5 Taking pH Data

Sample Processor

[1] Complete a three point pH calibration before processing samples in accordance with the manufacturers operating instructions for the specific instrument being used. Record all calibration results in the SWPF pH Meter Calibration Logbook.

7.5 Taking pH Data (continued)

[2] Containerize and label used buffer solution in accordance with the current Waste Characterization Strategy Form.

[3] If requested by the Sample Data Steward, take sample pH and record results in the notes section on Form 20217-2.

7.6 Storm Water Sample Splitting

CAUTION

All NPDES Individual Permit Samples must be split using the Geopump method.

Per EPA 833-8-92-001, NPDES Storm Water Sampling Guidance Document Section 3.5.1 Decontamination of Sample Equipment Containers requires an acid rinse of equipment for metals analysis. Current process restrictions do not allow the use of an acid rinse as part of equipment decontamination in the Storm Water Processing Facility.

Use of the Dekaport Sample Splitter is restricted to **NON-NPDES Individual Permit Samples**. Refer to EP-DIV-SOP-20218 to use the Dekaport Splitter if requested.

7.6.1 Storm Water Sample Splitting Using the Geopump

Sample Processor

[1] Turn the sample collection bottle upside down multiple times to ensure all sediment is loose from the bottom of the bottle and distributed evenly as much as possible in the bottle. Move the Geopump intake tube up and down through the sample to create a representative aliquot.

7.7 Sampler Filtration

7.7.1 Sampler Filtration Using Cartridge Filters

Sample Processor

[1] Filter samples IF REQUESTED under Sample Prep on Form 20217-1, Storm Water Sample Processing Log.

[2] Select the appropriate sized cartridge filter (0.2µm, 0.45µm, 1µm, 5µm, or 10µm).

[3] Attach an appropriate amount of silicone tubing to both ends of the cartridge filter. Place the filter upstream of the Geopump to prevent over-pressurization. If the sample contains a significant amount of sediment a pre-filter can be used.

7.7.1 Sampler Filtration Using Cartridge Filters (continued)

[4] For split samples(filtered and unfiltered), turn the sample collection bottle upside down multiple times to ensure all sediment is loose from the bottom of the bottle and move the intake tube up and down through the sample during filtration. A sample collected solely for filtration can be filtered without being homogenized by shaking.

[5] If flow diminishes or the pump begins to make a grinding sound replace the cartridge filter.

NOTE: An individual sample is delineated by the Sample Data Steward by the generation of a unique Sample Id. A new filter is to be used with each new sample ID. Therefore multiple bottles retrieved from an individual ISCO Sampler that require filtration listed under the same Sample ID on Form 20217-1 do not necessitate the use of a new filter.

[6] Complete the Filtration By section of Form 10013-1.

7.7.2 Sampler Filtration Using the Geofilter with Flatstock Filter Membranes

Sample Processor

[1] Filter samples using the Geofilter with flatstock filter membranes, IF REQUESTED under Sample Prep on Form 20217-1, Storm Water Sample Processing Log.

[2] If pre-filtering is needed, attach an appropriate amount of silicone tubing to both ends of a 10µm cartridge filter. Place the pre-filter upstream of the Geopump to prevent over-pressurization.

[3] Assemble the Geofilter stand and insert one flatstock filter membrane per the Geotech Filter Holder Installation and Operation Manual.

[4] Connect the outflow tubing from the Geopump to the top of the Geofilter and proceed with filtration at a **slow speed**.

NOTE: If the filter leaks around the edges tighten the filter holder and adjust the pressure valve.

[5] Use wet decontamination to clean the Geofilter (Alconox wash, tap water rinse, followed by a final de-ionized water rinse).

7.8 Preserve Samples (filtered and unfiltered samples)

IMPORTANT: Preservation entails the addition of acid or base to a sample. Acids used include hydrochloric acid (HCl), nitric acid (HNO3), and sulfuric acid (H2SO4). Bases used in preservation include sodium hydroxide (NaOH). These are all strong acids and bases that can cause severe burns. **Review the appropriate Material Safety Data Sheet or Safety Data Sheet for specific guidelines prior to preserving samples.**

Sample Processor

[1] Preserve (add acid or base) samples according to the requirements on the sample container label and Form 20217-1 Storm Water Sample Processing Log.

[2] After a minimum of 5 minutes, agitate preserved sample and then check pH. Using a dropper, decant off a small volume of sample and apply it to the pH strip. ***Never insert the pH paper directly into the sample container***.

[3] Record the pH according to the table below under Processing Comments on the Storm Water Sample Processing Log, Form 20217-1.

If	**Then**
pH is less than 2	enter "pH<2" on the *Analytical Request Form/Chain of Custody* form
pH is greater than 12	enter "pH>12" on the *Analytical Request Form/Chain of Custody* form
pH is between 2 and 12	enter the pH value on the *Analytical Request Form/Chain of Custody* form (*example*: "pH=5")

[4] 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.

[5] Apply chain-of-custody tape to the lid/bottle.

[6] Complete the Preservation by section of Form 10013-1.

[7] Complete Form 20217-1 Storm Water Sample Processing Log and Form 20217-2 Surface Water Processing Form. Request another sample processor to complete the review of samples processed and all associated forms.

7.9 Storm Water Processing Facility Clean Up

Sample Processor

[1] After each sample in the Storm Water Processing Facility is processed, clean the area.

[2] Liquid waste and contact waste is to be containerized, labeled, and disposed of in accordance with the current Waste Characterization Strategy Form.

[3] All containerized waste in the Storm Water Processing Facility shall be listed on the Storm Water Monitoring Program Waste Accumulation Log.

7.10 Submit Samples for Shipping

Sample Processor

[1] Ensure sample containers are labeled, securely sealed, and wiped dry.

[2] Seal and secure the drainage hole at the bottom of the cooler in case of sample container leakage.

[3] If the sample requestor deems it necessary, place sufficient absorbent material in the cooler or other transport container to absorb all liquid in the event sample containers break.

[4] Place samples in the cooler with sufficient blue ice to maintain the required preservation temperature. Cushioning material (e.g. bubble wrap) may be used to separate containers to avoid breakage during transport.

[5] Completely close and secure cooler lids, using tape if necessary, and place a chain of custody seal over the lid so that tampering can be easily detected.

[6] Transport samples to the Sample Management Office by using a government vehicle or approved subcontractor vehicle only. Transportation of samples is not permitted using a personal or other nongovernment vehicle except for approved subcontractor vehicles.

[7] Deliver samples to the SMO during business hours. As necessary, coordinate with the SMO for delivery during other times or for delivery of samples that have limited holding times.

[8] Relinquish samples with original 20217-1 Storm Water Sample Processing Log to the Sample Management Office.

[9] Retain a copy of Form 20217-1.

8. RECORDS

Sample Processor

[1] Submit the copy of Form 20017-1 with the original Forms 20017-2 and 10013-1 and any other pertinent documentation to the Data Management Team.

Data Management Team

[1] Ensure that documents generated by the performance of this procedure are processed as follows:

Record Identification	Record Type Determination	Protection/Storage Methods	Processing Instructions
Form 10013-1 ISCO Sampler Inspection and Sample Retrieval Form Attachment 1, Storm Water Sample Processing Log Attachment 2, Surface Water Sample Processing Form Sample Refrigerator Temperature Logbook pH Meter Calibration Logbook Sample Container Certificate of Analysis	Record	N/A	When the records are ready for final disposition, the record is transferred to Records Management in accordance with EP-DIR-AP-10003, Record Transmittal and Retrieval Process.

9. ATTACHMENTS

Attachment 1, Form 20217-1 Example of Storm Water Sample Processing Log (Unfiltered and Filtered)

Attachment 2, Form 20217-2 Surface Water Sample Processing Form

Attachment 3, Analytical Suite Prioritization for Los Alamos and Pueblo Canyons Sediment Transport Mitigation Project

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~~APPENDIX~~ ATTACHMENT 1

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EXAMPLE OF STORM WATER SAMPLE PROCESSING LOG (UNFILTERED AND FILTERED)

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STORM WATER SAMPLE PROCESSING LOG

EVENT ID:	4227	**EVENT NAME:**	IP 2013 BLM
SAMPLE ID:	WT_IPC-13-32047	**WORK ORDER:**	SMPLR-34093
COLLECTION DATE/TIME:	07/25/2013 22:27	**RETRIEVAL DATE/TIME:**	07/29/2013 15:15
LOCATION ID:	CHQ-SMA-6	**SAMPLER TYPE:**	APS
LOCATION TYPE:		**SAMPLE PREP.:**	UF
LOCATION SYNONYM(S):		**FIELD QC TYPE:**	REG
FIELD MATRIX:	WT	**SAMPLE USAGE:**	COMP

SAMPLE PROCESSING REQUEST

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	SPECIAL INSTRUCTIONS	PROCESSING COMMENTS
	SW-ALK+pH	0.5 LITER POLY	1	ICE		
	SW-IP-Cyanide	1 LITER POLY	1	NaOH ICE		
	SW-IP-Gross Alpha	1 LITER POLY	1	HNO3		
	SW-IP-HEXP	1 LITER GLASS	3	ICE		
	SW-Metals-Total	0.5 LITER POLY	1	HNO3		
	SW-Ra226/Ra228	1 L POLY from glass	3	HNO3		

SPECIAL INSTRUCTIONS:

PROCESSED BY (Printed Name) (Signature)	**Date/Time**	**REVIEWED BY (Printed Name) (Signature)**	**Date/Time**
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY (Printed Name) (Signature)**	**Date/Time**
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY (Printed Name) (Signature)**	**Date/Time**

Report Date 07/30/2013

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~~APPENDIX~~ ATTACHMENT 1

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EXAMPLE OF STORM WATER SAMPLE PROCESSING LOG (UNFILTERED AND FILTERED)

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STORM WATER SAMPLE PROCESSING LOG

EVENT ID:	4227	**EVENT NAME:**	IP 2013 BLM
SAMPLE ID:	WT_IPC-13-32538	**WORK ORDER:**	SMPLR-34093
COLLECTION DATE/TIME:	07/25/2013 22:27	**RETRIEVAL DATE/TIME:**	07/29/2013 15:15
LOCATION ID:	CHQ-SMA-6	**SAMPLER TYPE:**	APS
LOCATION TYPE:		**SAMPLE PREP.:**	F
LOCATION SYNONYM(S):		**FIELD QC TYPE:**	REG
FIELD MATRIX:	WT	**SAMPLE USAGE:**	COMP

SAMPLE PROCESSING REQUEST

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	SPECIAL INSTRUCTIONS	PROCESSING COMMENTS
	SW-DOC	0.5 LITER POLY	1	H2SO4		
	SW-Metals-Dissolved	0.5 LITER POLY	1	HNO3		
	SW-SO4+Cl	1 LITER POLY	1	ICE		

SPECIAL INSTRUCTIONS:

PROCESSED BY (Printed Name) (Signature)	**Date/Time**	**REVIEWED BY (Printed Name) (Signature)**	**Date/Time**
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY (Printed Name) (Signature)**	**Date/Time**
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY (Printed Name) (Signature)**	**Date/Time**

Report Date 07/30/2013

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~~APPENDIX~~ ATTACHMENT 2

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SURFACE WATER SAMPLE PROCESSING FORM

Form 20217-2 **Surface Water Sample Processing Form** Form 20217-2 (4/2014)

Date/ Start Time: _____ **Processing Personnel:** _____

Work Order Id: _____ _____

Location: _____ _____

Sampler Type:
- ❒ ISCO 3700 (24 Bottle)(1L Poly Wedges)
- ❒ ISCO 3700 (12 Bottle)(1L Glass & Poly)
- ❒ Avalanche (2L Glass)
- ❒ Global Water/Single Stage/Grab Sample (4L Glass & 4L Poly)

Dekaport Splitter ❒ Yes ❒ No *
* Not to be used with NPDES IP Samples
Sample pH Checked ❒ Yes pH _____ ❒ No **
**Per Sample Data Managers request.

Field sample container number(s) used for aliquot sent to analytical laboratory.

Bottle #	Bottle Type	Analysis
1	❒P ❒G	
2	❒P ❒G	
3	❒P ❒G	
4	❒P ❒G	
5	❒P ❒G	
6	❒P ❒G	
7	❒P ❒G	
8	❒P ❒G	
9	❒P ❒G	
10	❒P ❒G	
11	❒P ❒G	
12	❒P ❒G	
13	❒P ❒G	
14	❒P ❒G	
15	❒P ❒G	
16	❒P ❒G	
17	❒P ❒G	
18	❒P ❒G	
19	❒P ❒G	
20	❒P ❒G	
21	❒P ❒G	
22	❒P ❒G	
23	❒P ❒G	
24	❒P ❒G	

Sample Process Notes:

Note: "Topping off" of sample bottles to be shipped to analytical laboratory(s) with any remaining field sample is NOT allowed.

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~~APPENDIX~~ ATTACHMENT 3

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ANALYTICAL SUITE PRIORITIZATION FOR LOS ALAMOS AND PUEBLO CANYONS SEDIMENT TRANSPORT MITIGATION PROJECT

Upper Los Alamos Canyon Gages	Priority	Analytical Suite	Glass Bottle	Polyethylene Bottle	Minimum Volume Required (L)
E026, E030, E038, E039.1, E040	1	PCBs	Yes	No	1
	2	Gamma, Iso Pu, Iso U*	Yes	Yes	1
	3	Dioxins/Furans	Yes	Yes	1
	4	Strontium-90	Yes	No	1
	5	TAL Metals (F/UF)	~~Yes~~No	Yes	0.25/0.25

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Upper Pueblo Canyon Gages	Priority	Analytical Suite	Glass Bottle	Polyethylene Bottle	Minimum Volume Required (L)
E055, E055.5, E056	1	PCBs	Yes	No	1
	2	Iso Pu	Yes	Yes	1
	3	TAL Metals (F/UF)	~~Yes~~No	Yes	0.25/0.25

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Lower Watershed Gages	Priority	Analytical Suite	Glass Bottle	Polyethylene Bottle	Minimum Volume Required (L)
E042.1, E050.1, E059.5, E060.1	1	PCBs	Yes	No	1
	2	Gamma, Iso Pu, Iso U, Am-241	Yes	Yes	1
	3	Dioxins/Furans*	Yes	Yes	1
	4	Strontium-90	Yes	No	1
	5	TAL Metals (F/UF)	~~Yes~~No	Yes	0.25/0.25
	6	Gross Alpha/Gross Beta*	Yes	Yes	0.25
	7	Radium-226/Radium-228	Yes	Yes	1

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Retention Basin and wetland below the SWMU 01-001(f) drainage	Priority	Analytical Suite	Glass Bottle	Polyethylene Bottle	Minimum Volume Required (L)
CO111041, CO101038	1	PCBs	Yes	~~Yes~~No	1
	2	TAL Metals (F/UF)	~~Yes~~No	~~No~~Yes	0.25/0.25
	3	Iso U	Yes	Yes	1
	4	Total organic carbon	Yes	Yes	0.04

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* Priority if required