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Los Alamos NATIONAL LABORATORY EST.1943

Environmental Programs Directorate
Corrective Actions Projects

Standard Operating Procedure

for

INSPECTING STORM WATER RUNOFF SAMPLERS AND RETRIEVING SAMPLES

APPROVAL SIGNATURES:

Subject Matter Expert:	**Organization**	**Signature**	**Date**
Alethea Banar	ET-ER	Alethea K Banar	05-03-2011
Responsible Line Manager:	**Organization**	**Signature**	**Date**
Steve Veenis	PMFS-DO	Steve Veenis	5.3.11

1.0 PURPOSE AND SCOPE

This procedure describes the process for inspecting ISCO storm water runoff samplers and retrieving storm water runoff samples from all locations at Los Alamos National Laboratory (LANL) where storm water sampling activities are conducted. This procedure applies to the storm water project technical staff and subcontractor personnel conducting activities at storm water sampler stations.

2.0 BACKGROUND INFORMATION

2.1 Background

ISCO samplers are used in a variety of applications across the Laboratory to collect storm water runoff. Samplers may be used at Individual Permit (IP) Site Management Areas (SMAs), Consent Order-driven storm water monitoring stations, environmental surveillance stations, and other projects. ISCOs are designed to automatically collect water when the water surface is high enough to trigger an actuator to fill sample bottles. Field personnel are required to inspect the sampling station while retrieving water samples and at other intervals determined by the individual project or as directed by work orders issued by project personnel.

A Los Alamos National Security, LLC (LANS) Project Leader is the primary person with responsibility for the steps in this procedure. Several Route Leads may be appointed with responsibility for a subset of sampling stations.

2.2 Precautions

This procedure is used with an approved Integrated Work Document (IWD) if needed and/or other safety documents as required.

If subsequent rain events occur before all sampler locations have been visited after the first rain event, finish the route to collect the first-event samples (safety permitting).

Inspections may be discontinued during periods or conditions that make Sites dangerous for worker safety or prevent personnel from safely accessing Sites (e.g., weather-related events such as flash floods, flooding, lightning, wildfires, hail, icy roads, deep snow, high winds, red flag conditions, and LANS operations).

3.0 EQUIPMENT AND TOOLS

Inspecting Samplers

- Copy of this procedure
- Copy of Integrated Work Document (IWD) or other safety document
- Issued Work Order (see example in Attachment 1, Form EP-DIV-SOP-10013-1 Example ISCO Sampler Inspection and Sample Retrieval Work Order)
- Voltage meter
- Spare batteries
- Leather gloves
- Shovels
- Spare tubing: tygon and Teflon®
- Plastic wire “zip” ties
- Wooden stakes
- Backpacks (if needed)
- Leatherman type tool
- Radio
- Pager
- Cell phone (Government cell phone only in secure areas)
- Necessary access and station keys

Additional Equipment for Retrieving Storm Water Samples

- Coolers with ice or Blue Ice®
- Expanded Site Field Maps
- Nitrile gloves
- Replacement sample bottles (glass and plastic) with lids
- Marker pen (permanent, waterproof)
- Ball point pen
- Zip lock bags
- Safety glasses with side shields
- Rebar
- Rebar caps
- Hose clamps
- 2-3 lbs. sledge hammer

4.0 STEP-BY-STEP PROCESS DESCRIPTION

4.1 Preparing for Fieldwork

Subcontract-or Project Manager	1.	Receipt of a work order indicates that sampler inspections have been approved by the LANS Field Team Lead. Schedule work to be completed by the target date appearing on the work order(s).
	2.	Review the work orders and e-mail confirmation of receipt to the Process Control Coordinator. A sample Work Order form is provided in Attachment EP-DIV-SOP-10013-1, “ISCO Sampler Inspection and Sample Retrieval” form.
	3.	Distribute work order(s) to Route Lead field personnel.
	4.	Inform (e.g., by e-mail) the Field Operations designee of the schedule for sampler inspection work and the associated locations up to a week (preferred) before but no later than the day before (for minor changes) to be added to the appropriate plan of the day.
	5.	Conduct pre-job briefing with field personnel using the current Integrated Work Document (IWD). Obtain worker signatures on new or newly-revised IWDs. Two people are required for field work. Work should only be done during daylight hours. Extended work hours, if needed, must be approved by a supervisor.
	6.	For work at locations operated by Weapons Facility Operations or Nuclear Environmental Sites, notify the appropriate access control before traveling to those locations. The IWD Part II will address specific requirements and training for these locations.
Route Lead	7.	Obtain any necessary additional paperwork before conducting this work, including IWD’s, and excavation permits (if necessary).
	8.	Gather the required equipment (see Section 3.0) for the work to be done.
	9.	Set watch(s) to the precise Mountain standard (not daylight saving) time. This can be done by calling the Laboratory’s time system (667-TIME or 667-8463) or by going to the time page at www.time.gov (or click on the clock icon on the lab’s internal home page). This is so the ISCO clock can be synchronized to the current local time.

4.2 Inspecting the Sampler

Route Lead	1.	Before performing work, conduct a tailgate safety meeting and obtain all worker signatures on tailgate meeting form.
	2.	If conditions prevent a sampler inspection, document the conditions on the work order and notify the STR or designee within 24 hours. Multiple attempts can be documented on the original inspection work order up to the target date. After the target date, return work order to the Tracking and Reporting (TR) Team for reissuance (if necessary).
	3.	**Item 1 on work order (see example in attachment 1)**: Enter the date and time inspection is initiated and the names and Z numbers of the field personnel performing the work in the upper right corner of the work order. List the route lead first. If more than two personnel conduct the work, enter the additional names in the "Addition Notes" section (**Item 14**).
	4.	Remove the lid from the sampler.
	5.	**Item 2:** Verify and document the sampler is ON and its condition upon arrival by checking the "Yes" or "No" box. Explain any non-functional status in third column.
	6.	**Item 3**: Verify and document the ISCO programming displays the following by checking the "Yes" or "No" box in second column. • For samplers at gage stations (Sutron activated) mark "Yes" if the display indicates "Bottle 1 after 1", or "Bottle 1 of X after 1" OR • For stand-alone samplers (actuator activated) mark "Yes" if the display indicates "Sampler Inhibited" If No, describe the messages (e.g., "Done X samples", or "sampler off", etc). If more space is needed, continue notes in the "Additional Notes" section. If there is no indication of flow and the sampler triggered due to a non-flow event (e.g., animal, tumbleweed), indicate this in the third column. Document any messages from the ISCO display in the third column. Record sample collection messages in the "Comments" section on page 2 next to the corresponding sample bottle.
	7.	**Item 4**: If sample bottles are empty, check "Yes". If sample bottles were filled, retrieve the water according to the steps in Section 4.3. Follow the steps in Section 4.3 and return to next step below. If no water was collected by the sampler, draw a line through page 2 of the work order, and initial and date the strike-through.
	8.	**Item 5**: Verify and document the sampler is set to the correct Mountain Standard Time +/- no more than 1 minute by checking the "Yes" or "No" box in second. If the sampler is set incorrectly, reprogram for the correct Mountain Standard Time. Describe the work performed and correction applied (e.g., "ISCO clock was X minutes slow") in third column. If two samplers are deployed at a location, ensure each is set to within one minute of the other.

Route Lead (cont.)

9. **Item 6**: Verify and document that equipment, manufacturer, model, serial number, specification and configuration match the work order header on page 1 by checking the "Yes" or "No". If the equipment deployed does not match the equipment listed on the work order, ensure you are at the correct location. If the location is verified, check "No" and update inaccurate information in the third column. If more space is needed, continue notes in the "Additional Notes" section.

10. **Item 7**: Verify and document power supply function. Use the voltage tester to check the voltage of the battery and record the voltage. Check "Yes" or "No" to indicate if battery voltage is acceptable upon departure from the station (generally ≥11.7 V but may vary by configuration). Perform the necessary maintenance and describe in the third column. If more space is needed, continue notes in the "Additional Notes" section, and follow up at Item 11.

    If maintenance cannot be completed at the time of inspection, then describe the condition and work needed in third column, and follow up at item 12.

11. **Item 8**: Verify and document the sample tubing passed a suction test upon departure from the station by checking the "Yes" or "No" box.

    Check the condition of sample tubing and pump tubing. If maintenance (e.g., clearing the tube, replacing the tube) is necessary and can be performed at the time of inspection, perform the work and describe in third column. If more space is needed, continue notes in the "Additional Notes" section, and follow up at Item 11.

    If maintenance cannot be completed at the time of inspection, then describe the condition and work needed in third column, and follow up at item 12.

12. **Item 9**: Verify all cable and electrical connections are attached and secure upon departure from the site by checking the "Yes" or "No" box.

    If maintenance (e.g., tightening connection, replacing cables) is necessary and can be performed at the time of inspection, describe the work performed in third column. If more space is needed, continue notes in the "Additional Notes" section, and follow up at Item 11.

    If maintenance cannot be completed at the time of inspection, then describe the condition and work needed in third column, and follow up at item 12.

13. **Item 10**: Verify and document the ISCO programming displays the following by checking the "Yes" or "No" box in column 2, page 1.

    - Samplers at gage stations (Sutron activated) mark "Yes" if the display indicates "Bottle 1 after 1", or Bottle 1 of X after 1"

    OR

    - Stand-alone samplers (actuator activated) mark "Yes" if the display indicates "Sampler Inhibited"

    OR

    - Stand-alone samplers (actuator activated with "Start Time Delay") mark "Yes" if the display indicates "Start Storm Program at *time…*".

Route Lead (cont.)

14. If No, document the reason. Continue any notes in the "Additional Notes" section.

    Follow instructions on sample collection work order regarding whether the sampler should be disabled or enabled with a "Start Time Delay": in some cases, sampler should be disabled immediately after collecting a sample so a subsequent sample is not collected before the allowed time period (e.g. no sooner than 15 days from prior sample).

    If sampler is to be deactivated, ensure sampler is turned off upon departure.

    If sampler is to be left activated, press "Start sampling" and "Enter" twice:

    - For samplers at a gaging station and thus connected to a Sutron data logger, ensure the sampler indicates "Bottle 1 of X After 1" or "Bottle 1 after 1".
    - For samplers activated with an actuator and without a "Start Time Delay", ensure the sampler indicates "Sampler Inhibited".
    - If a sampler is to be activated with a "Start Time Delay" enter the appropriate number of minutes into the configuration sequence (see EP-DEV-SOP-10008 for settings). Ensure the sampler indicates "Start Storm Program at *time current time*". Record the "Start Time Delay" entered.
    - Where applicable, reset the actuator switch to "latch" or "toggle/reset" (see EP-DIV-SOP-10008 for settings).

    If an error occurs, reconfigure the sampler (see EP-DIV-SOP-10008 for settings).

15. **Item 11**: Verify and document any maintenance completed while on site. Describe the work performed or indicate "none completed" in third column.

    Maintenance items may include (but are not limited to) battery replacement, tubing clearing or replacement, site clearing, securing electrical connections, or sampler diagnostics or repair.

    Check the physical condition of the sampler including the actuator and intake line for correct location and height in the channel. If maintenance (e.g., clearing debris, resetting line position, etc…) is necessary and can be performed at the time of inspection, perform the work and describe in the third column. If more space is needed, continue notes in the "Additional Notes" section.

16. **Item 12**: Verify and document any maintenance needed that could not be completed while on site. Describe the needed maintenance in third column. If more space is needed, continue notes in the "Additional Notes" section. A separate work order for the station maintenance will be issued by the TR team.

    If no follow-on maintenance is required, indicate "none required" in third column.

    Maintenance items may include (but are not limited to) battery replacement, tubing clearing or replacement, site clearing, securing electrical connections, or sampler diagnostics or repair.

17. **Item 13**: Document that water was retrieved by checking the "Yes" or "No" box. If water was collected but not retrieved document the reason in the third column.

18. **Item 14**: Document any additional notes or site information in the "Additional Notes" section.

Route Lead (cont.)	19.	Replace and secure the sampler lid and secure the sampler shelter (if sampler is in a shelter).
	20.	**Item 21**: Have another field crew member review the completed work order(s) for accuracy and completeness and sign and date "Review by Signature" line on page 2 of work order.
	21.	**Item 22**: The lead field crew member will review the work order(s) for accuracy and certify that the information submitted is "true, accurate, and complete" by signing and dating "Lead Signature" line on page 1.
Subcontract-or Project Manager	22.	Return completed original work orders to the TR Team by noon the day following completion of field work. If original work orders must remain with collected samples (Section 4.4), return photocopies of incomplete work orders to the TR Team by noon the day following completion of field work. Stamp or write "Copy" on the work order returned.

4.3 Retrieving Storm Water Runoff Samples

Route Lead	1.	Don nitrile gloves and safety glasses.
	2.	**Item 15:** Record the date and time the ISCO collected water in each glass and poly bottle by the position number in the carousel. Record the specific ISCO displayed message for each bottle, if present, in the "Comments" column.
	3.	See flow chart in Section 6.0, and refer to the "Earliest Sample Collect Date" on work order. If the "Earliest Sample Collect Date" field is empty OR the ISCO sample collection date is ON or AFTER that date, samples may be retrieved per the volume requirements given on work order. Continue with step 3 below. If the ISCO sample collection date is BEFORE the "Earliest Sample Collect Date": • Indicate "not a measurable storm event" in "Additional Notes" **Item 14**. • Discard the collected storm water on the ground at the station. • Draw a line through page 2 of the work order, initial and date the strike-through, and indicate "not a measurable storm event" as the reason for the strike-through. • Skip to Step 13 below.
	4.	Remove filled and partially-filled bottles from carousel.

Route Lead (cont.)	5.	**Items 16 and 17**: Add up total volume of water collected and check that the collected volume of water in glass and poly matches the required volume in the header of the work order page 2. The volume of water required to complete a sample set varies by station. For samplers with minimum volume requirements: If sample volume collected was greater than or equal to the minimum volume required, continue with next step 6 below. If sample volume was less than the minimum volume required: • Record total volume retrieved as "0" in **Item 17**. • Pour out all water on the ground at the station. • Skip to step 13 below. For samplers without minimum volume requirements continue with step 6 below.
	6.	For samples retrieved, place lids onto the sample bottles.
	7.	Write the date and time collected, station number, and the corresponding carousel number on each retrieved sample bottle. Obtain the sample collection date and time from the ISCO sampler.
	8.	Return any excess water that exceeded the maximum amount required to the ground at the station. Note "not retrieved" in the "Comments" column next to the bottle(s) affected.
	9.	**Item 17:** Record the total volume (estimate to the tenth of a liter) of sample retrieved in glass containers and the total volume of sample retrieved in polyethylene containers.
	10.	**Item 18:** Place retrieved sample bottles in a cooler with blue ice (or equivalent). Record the date and time sample cooling was initiated. Provide initials of the person initiating cooling.
	11.	**Item 19:** Record the date and time sample filtration was initiated (see SOP-5215 for guidance). Provide initials of the person initiating filtration.
	12.	**Item 20:** Record the date and time sample chemical preservation was initiated (see SOP-5215 for guidance). Provide initials of the person initiating chemical preservation.
	13.	Install new sample bottles in the carousel for the next sampling event. The number and type of bottles may vary by program/project. Ensure bottles match the configuration specified on page 1 of the work order.
	14.	**Item 14**: Document any additional notes or site information in the "Additional Notes" section.
	15.	Return to step 8 to complete Item 5 in Section 4.2.

4.4 Delivering Samples

Route Lead	1.	If samples were retrieved, deliver the samples, contact waste, and completed, reviewed, and signed work order to the Pueblo Storm Water Processing Facility.

Route Lead (cont.)	2.	**Item 23**: Relinquish samples to a sample processor by signing “Relinquished By”.
	3.	Place samples and the original work order in field sample receiving refrigerators. See SOP-5215, Processing Storm Water Samples.

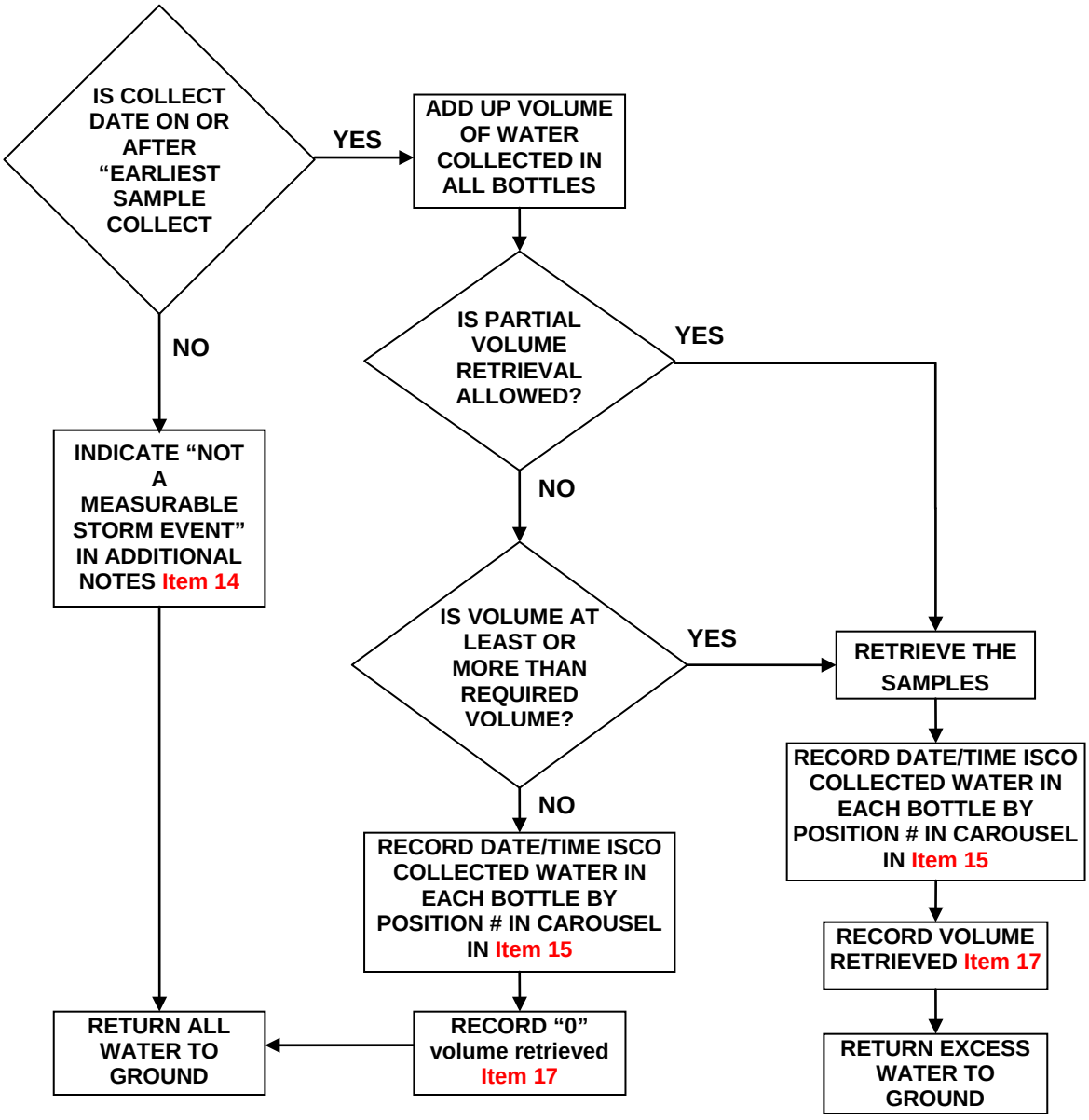
4.5	**Submitting Records Resulting From This Procedure**	
TR Team	1.	Submit the following completed records to the Storm Water Records point of contact. • Completed work order for Storm Water Sampler Inspection and Sample Retrieval (example in Attachment 1)

5.0 RESULTING RECORDS

The following records are generated as a result of this procedure and are to be maintained in accordance with the applicable records management procedure:

- EP-DIV-SOP-10013-1 Completed work order for Storm Water Sampler Inspection and Sample Retrieval (example in Attachment 1)
- Photos (as applicable)
- Derivative Classifier review documentation of photos (as applicable)
- Email and memos of all decisions and actions related to the control measure program (as applicable).

6.0 FLOW CHART FOR SAMPLE RETRIEVAL



7.0 DEFINITIONS

None.

8.0 ATTACHMENTS

Attachment EP-DIV-SOP-10013-1: Example of ISCO Sampler Inspection and Sample Retrieval Work Order

9.0 REVISION HISTORY

Revision No. *[Enter current revision number, beginning with Rev.0]*	Effective Date *[DCC inserts effective date for revision]*	Description of Changes *[List specific changes made since the previous revision]*	Type of Change *[Technical (T) or Editorial (E)]*
0	10/01	New document	T
1	8/03	Annual review	T
2	5/05	Added safety precautions and excavation permit requirements.	T
3	1/06	New procedure; supersedes sample collection steps in ENV-WQH-SOP-009.2	T
0	10/08	New document created from ENV-SOP-011.0, “Collecting Storm Water Runoff Samples,” issued as SOP-5213.	T
1	10/19/10	Complete re-write with new form for new EPA-issued NPDES Individual Permit.	T
0	5/5/11	New Document Control number assigned; Supersedes SOP-5213, R1; Revision to reflect the current order of questions in Form EP-DIV-SOP-10013-1 and allows for the recording of dates and times for initiation of sample cooling, filtration, and chemical preservation.	E

If you do not have a crypto card, contact creichelt@lanl.gov for instructions on getting credit.

Click here for “Required Read” credit.

ATTACHMENT 1

EP-DIV-SOP-10013-1

ISCO SAMPLER INSPECTION AND SAMPLE RETRIEVAL WORK ORDER

Los Alamos NATIONAL LABORATORY EST.1943

Form 10013-1 — ISCO Sampler Inspection and Sample Retrieval — Form 10013-1 (5/2011)

Work Order ID: SMPLR-1355

Project ID: P-SMPLR-42

S-SMA-3.6 : SS12255

Project: 2009 Sampler Inspection

Route: XYZ

Reason: IP Sampler Rain Event inspection

Target Date: 4/15/2011

Earliest Sample Collect Date: 11/1/2010

1 Date:_____ Time:_____

Name/Z#:_____

Name/Z#:_____

22 Lead Signature:_____

"I confirm the information as recorded is true, accurate and complete."

Equipment	MFG	Model	Serial No.	Specification	Configuration
Actuator	ISCO	1640	210F00425	Trip level	0.17 ft
ISCO Sampler 12c	Teledyne	3700	210E01715	Bottle Set Configuration	12c- 6 glass / 6 poly
ISCO Sampler 12c	Teledyne	3700	210E01715	Program	Time w/Multiplex & Toggle/Reset

ISCO Sampler Inspection Tasks

ON ARRIVAL		
Is sampler ON and functioning properly upon arrival?	❒Yes ❒No	2
Does ISCO display either "Bottle 1 of X after 1" or "Sampler Inhibited"? If No, record specific message(s) in bottle's Comment field (on Page 2).	❒Yes ❒No	3
Are all sample bottles empty?	❒Yes ❒No	4
Is ISCO time delta < 1 min (MST)? If No, record adjustment.	❒Yes ❒No	5
ON DEPARTURE		
Is equipment configuration correct? (Refer to equipment list above).	❒Yes ❒No	6
Record battery voltage. Is voltage acceptable?	❒Yes ❒No	7
Does sample tubing pass suction test?	❒Yes ❒No	8
Are electrical connections secure?	❒Yes ❒No	9
Does ISCO display either "Bottle 1 of X after 1", "Sampler Inhibited", or "Start Storm Program at..."?	❒Yes ❒No	10
If any maintenance completed, check Yes: Describe.	❒Yes ❒No	11
If any follow-on maintenance is required, check Yes: Describe.	❒Yes ❒No	12
Was sample volume retrieved?	❒Yes ❒No	13

Additional Notes: 14

Example

ATTACHMENT 1 (cont.)

EP-DIV-SOP-10013-2

ISCO SAMPLER INSPECTION AND SAMPLE RETRIEVAL WORK ORDER

Los Alamos NATIONAL LABORATORY EST.1943

Form 10013-1 — ISCO Sampler Inspection and Sample Retrieval — Form 10013-1 (5/2011)

Work Order ID: SMPLR-1355 **Project ID:** P-SMPLR-42

Complete if sample bottles contain water OR to record ISCO message

Glass Bottles: 1.75 L-Min 5.5 L-Max 16				Poly Bottles: 4 L-Min 6 L-Max			
Bottle #	Date:	Time:	Comments	Bottle #	Date:	Time:	Comments
1			15	1			
2				2			
3				3			
4				4			
5				5			
6				6			
7				7			
8				8			
9				9			
10				10			
11				11			
12				12			
13				13			
14				14			
15				15			
16				16			
17				17			
18				18			
19				19			
20				20			
21				21			
22		18	Cooling by:	22			
23		19	Filtration by:	23			
24		20	Preservation by:	24			
Total Volume Retrieved (liters): 17				Total Volume Retrieved (liters):			

Reviewed By Signature: 21			Date:		
Relinquished by Signature	Date:	Time:	Received by Signature	Date:	Time:
23					

LANL PERSONNEL USE ONLY (Initials and dates)

Accepted	Tech QC	FTL