Standard Operating Procedure for Maintaining the Custody and Storage of Environmental Samples in the DEP Laboratory

1. INTRODUCTION AND SCOPE

This standard operating procedure details chain of custody and storage of all samples received at the DEP lab. The DEP Laboratory is required to maintain accurate chain of custody for all samples. Chain of custody (COC) provides a record of location, transfer, and handling of samples from kit preparation to sample discard, and this information may be required for criminal investigations or to evaluate quality assurance issues. The DEP Laboratory uses a Laboratory Information Management System database (LIMS) to document COC within the laboratory; sampling technicians document COC in the field.

Chain of Custody begins in the DEP Laboratory with sample kit preparation. The Lab provides sampling containers and supplies to customers and documents container lot numbers on each Packing List and in LIMS. (DEP SOP LB-015). Upon receipt of samples, Laboratory Support Section (LSS) staff review sample submittal forms, document any discrepancies, and sign the forms to document sample receipt. Samples are entered into the LIMS and assigned a laboratory identification number and a storage location, which is printed on the labels that are attached to the sample containers. Containers are kept for up to 4 weeks after samples have been analyzed and reported before discarding.

2. SAMPLE STORAGE

Each sample container that is received and entered into LIMS by LSS staff (see SOP LB-016), is assigned a Sample ID in both numeric and barcode format, and storage location ID. LIMS generates labels with this information that are adhered to each container during sample log-in. The storage location ID is the refrigerator ID or room ID, the shelf number, and the shelf section number (if applicable). For example: REF-4-3-2 = refrigerator 4, shelf 3, section 2 of shelf 3. Sample are stored in their designated locations when not being used for analysis. Storage areas are listed below:

Table 1: Storage Locations for Environmental Samples

Equipment Name or Description	Room #	Equipment Name or Description	Room #2
Walk-In Refrigerator 4 - Nutrients	C301	Sliding Door refrigerator - Temporary	C201
Walk-In Refrigerator 5 - Organics	C301	Refrigerator - Temporary Biological	C201
Sliding Door Refrigerator 1 - Soil	C301	Refrigerator 9 - Flammables	C301
Sliding Door Refrigerator 6 - Short-holds	C301	Open Shelves - Metals	C301
Refrigerator 8 - Nutrient Soils & Overflow	C301	Organic Waste Room - long term criminal	C217
Refrigerator 7 – PT, VOC, & Nutrients	C301	Inorganic Waste Room - long term criminal	C218
VOC refrigerator - Soil/Waste VOCs	B345	Fifth floor - Criminal water samples	5th floor
Walk-In Refrigerator - Biology	B227	Refrigerator 10 – Shared	C201
Walk-In Freezer - Tissue samples	B227		

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3.0. SAMPLE CUSTODY WITHIN THE LAB

Analysts use the LIMS to check out samples, transfer samples, and check samples back into the designated storage locations. If the LIMS is unavailable, then analysts must use the COC Manual located in room C301 for check-out, transfer, and check-in. If sample custody is not maintained (e.g., analyst mistakenly leaves samples on the bench overnight) then the analyst must enter a comment describing the situation.

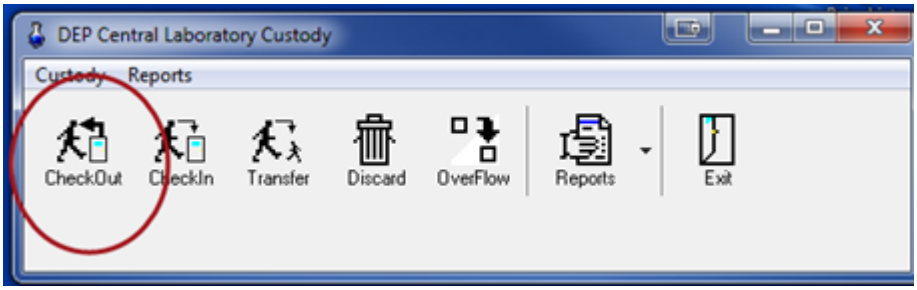
Samples with very short holding times may need to be analyzed before they are logged into the LIMS. In those cases, analysts may check out samples by noting their initials, date, and time of sample pick-up on the chain of custody form.

Custody for biological samples is detailed in SOPs BB-30 (Bench Biology) and TA 08.09-1.10.

3.1. Sample Check-out

Once a sample has been logged into the LIMS, it must be checked-out in LIMS for analysis. If samples have been logged into LIMS but are needed by the analyst before they are placed in the designated storage area, analysts must check out samples at the transfer station in C201 before removing them from the receiving area. An analyst must be assigned custodian status in LIMS to check out samples.

To check out samples, select *Laboratory→Receiving→Custody* from the LIMS main menu and select the *CheckOut* icon.

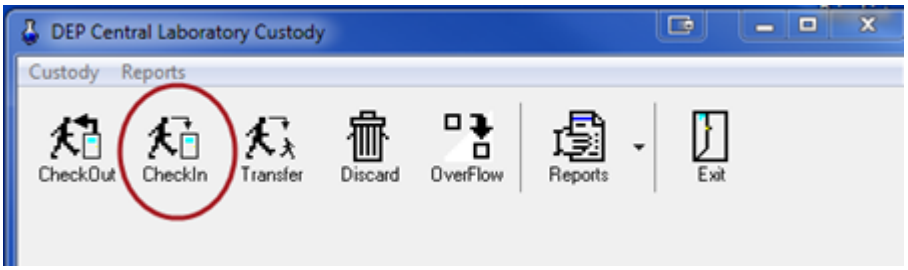


Scan the barcode of each sample. Be sure that the number of samples that are being checked out corresponds with the total number scanned, displayed at the bottom of the screen. After scanning the barcodes the analyst will be prompted to scan his/her ID badge twice, then click **OK**.

3.2. Sample Check-in

When analysts are finished with sample containers they must return samples and check them back in in LIMS. From the LIMS main menu, select *Laboratory→Receiving→Custody,* and select the *CheckIn* icon.

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Scan the barcode of each sample and be sure that the total number checked in corresponds to the original number of samples. Click **OK** after scanning the barcodes. When prompted, the analyst will scan his/her ID badge twice, and then click **OK**.

3.3. Sample Transfers

Samples may be transferred from one analyst to another, to a client or outside party, or to a contract laboratory using LIMS. Several computers throughout the laboratory are designated as transfer stations and may be used to document COC for transfers. Lab staff must obtain client approval before transferring or shipping samples to an outside party.

3.3.1 Transferring samples to the client or an outside party

Confirm the identity of the person, e.g., check a picture ID of the person receiving the samples. Scan the samples in the discard program in the LIMS; before selecting the OK button, add a comment indicating to whom the samples are being given and the date of the transfer. Have the person sign and date the Chain of Custody Form or Field Sheet to show the transfer in writing. Add the updated form to the scanned event file.

3.3.2 Shipping samples to the client or an outside party

When samples are transported to a contract laboratory, the transfer is documented in the LIMS. Custody is also documented on the Task Assignment form.

Scan the samples in the discard program in the LIMS; before clicking the OK button add a comment indicating to whom the samples are being sent and the date of the shipment. Document sample shipment date and the recipient's name on a copy of the Chain of Custody form. Add the updated form to the scanned event file. Package the samples with the appropriate preservation for shipping.

When samples are transported to a contract laboratory, the transfer is documented both in the LIMS and on a Task Assignment form.

3.3.3 Transferring samples within the laboratory

Once custody of a sample has been established by performing the Sample Check-out method described in 3.1, sample custody may be transferred from one analyst to another outside of the sample storage room (C301). There are several PCs designated as transfer stations throughout the lab. Analysts must have the sample in their possession and select the *Transfer* tab of the custody module, scan the barcode of the sample, select *OK*, and scan the identification card of the person receiving the sample to establish the new custody.

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4.0 DISCARDING SAMPLES

The LIMS login program sets a default time span for holding samples after a job is authorized, however, the default times may be edited as needed by supervisors after samples have been logged in. The default hold time for non-criminal samples is 1 week after job authorization. The default hold time for criminal case samples is 5 years. Samples will not appear on the discard list until the job has been authorized and the default time has elapsed.

4.1 Criminal Sample Storage and Discard

Limited storage space in the laboratory may mean that criminal samples cannot be stored for 5 years. If criminal samples must be discarded prior to 5 years due to lack of storage space, contact the customer to obtain their approval in writing or by e-mail. Once written approval is obtained, change the LIMS save duration to 0 days in Data Review Authorise, which will move the samples to the discard list.

Criminal case samples are stored in plastic crates in a long term storage area unless they can be disposed of shortly after reporting. There are three areas used for long term storage of criminal case samples. Rooms C217 and C218 are used for contaminated samples. Clean water samples such as blanks or background water samples are stored on 5th Floor. The following procedure is used for placing samples in long term storage.

4.1.1 Scan the sample ID barcode to determine if it is ready for discard. If not, place the sample in the long term storage area.

4.1.2 Open each can containing a sample to make sure the inner container is sealed well and bagged and that there is sufficient absorbent in the can. Close the cans and place them in the crate for storage. If contaminated samples are not already in a can, place them in a bag, then in the can with absorbent. Label the can with the sample ID.

4.1.3 Edit the sample location in LIMS to reflect the correct storage location.

4.1.4 Document the list of job IDs and sample IDs on 4 copies; affix one copy to all 4 sides of the crate. This makes sample retrieval easier.

4.1.5 Place the crate on the designated shelf in the storage area.

4.1.6 Pull samples that are older than 5 years for discard and any that appear on the discard list for the long term storage areas. Follow procedure 4.2 for discarding samples.

4.2 Sample Discard

After the samples pass the default holding time the sample IDs will appear on a discard list that can be generated in the LIMS. Canceled samples also appear on the discard list. If the samples have been flagged with a hazard, the hazard will also appear on the discard list. The samples on the discard list are pulled from their locations and scanned in the LIMS custody program as being discarded. An Employee ID badge is required for discarding samples.

To locate and pull the samples, select *Laboratory→Receiving→Custody*, select the Reports icon, then select Discard List. Select the locations and analysis groups for discard and select "OK" to generate the list. Locate samples and place them on a cart. Many analyses have multiple containers for each sample, (e.g., including mercury and metals, pesticide/semi-volatile water samples, soil/sediment samples, volatiles in water). If a sample has multiple

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containers, **all containers must be located and scanned for discard before disposal. This is especially important if the sample is flagged as hazardous.**

In situations where a discard list is not used, return samples that are not ready for discard to their locations or set them aside for long term storage if they are flagged as criminal.

Count the containers. In the *Custody* module, select the Discard icon. The cursor will appear in the box labeled "Scan Sample ID. Choose a container on the cart and scan the Sample ID barcode, and move the container to another cart. After all containers have been scanned and before clicking OK, re-count the containers to verify that the number matches the initial count. Click OK, and then scan the Employee ID badge.

4.2.1 Discarding Chemistry Samples

After scanning for discard in the LIMS, non-hazardous water samples may be poured down the drain and the containers rinsed and thrown in the trash. Glass bottles must be boxed up for disposal. Non-hazardous soil/sediment samples may be disposed of in the trash (container and sample). Soil samples in glass jars must be boxed up for disposal. Handle hazardous samples as directed in sections 4.2.3.

Trace Level Total and Methyl Mercury Water Samples are delivered to room C301 by Clean Lab Staff when they are ready for discard. Scan the samples for discard. Samples can be poured down the drain.

4.2.2 Discarding Hazardous Waste Samples

If a sample contains hazardous material, a pop up message will appear when the barcode is scanned that indicates the hazard type, along with the option to print a hazard label. The system will automatically enter a comment stating that the sample was disposed of through the hazardous waste disposal contract. Print the hazard label and attach it to the container. Place the sample in the proper location to be packed for hazardous waste disposal.

If a sample appears to be hazardous but has no hazard flag then consider it a hazardous sample (e.g. oily matrices). See the Receiving Room supervisor if there are questions.

5.0 DISCARDING CONTAINERS

The custodian will regularly review discard lists for each section. Containers for the chemistry analyses are disposed of after LIMS discard, unless flagged as a hazardous. Containers for some of the biology analyses are washed and re-used. Containers that are not re-used are disposed of after LIMS discard. Containers that will be re-used are washed and placed back in the system for kit preparation. For most of the biology analyses the sample is depleted during the analysis and the discard procedure is performed on empty containers.

5.1 Biology

Containers are washed and re-used for toxicological (4L amber glass bottles), and macro-invertebrate (2L plastic jars) analyses. The discard procedure for the Biology Section

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containers is varied due to the reuse of the containers and the multiple locations within the Biology Lab. The following procedures are grouped by analysis/bottle type.

5.1.1 Chlorophyll Bottles (1L brown plastic):

5.1.1.1 Biology staff will place empty containers on a cart and notify the Receiving floor supervisor when the cart is full.

5.1.1.2 A custodian from Receiving place the bottles on the shelves in room B424.

5.1.1.3 The custodian will attach a paper to the shelf giving the date range on the containers (job date).

5.1.1.4 The custodian will bring the bottles to the Receiving area and scan them for discard.

5.1.2 BOD Bottles (1L clear plastic)

5.1.2.1 Biology staff will place the empty bottles in a large plastic bag and notify Receiving staff of a full bag.

5.1.2.2 Receiving staff will place the bag in room 3 (tank room).

5.1.2.3 The custodian will scan the samples for discard and throw away the containers.

5.1.3 Macro-Invertebrate Containers (2L opaque jugs)

5.1.3.1 The custodian will bring the containers to the receiving area and scan the samples for discard.

5.1.3.2 Receiving staff will peel the labels from the jugs and then return the jugs to a designated shelf in the Biology lab (hallway by micro lab) or a location designated in the receiving areas. The bottles are ready to re-use at this point.

5.1.4 Phytoplankton/Periphyton Containers (1L brown plastic with red tape and some small tubes).

5.1.4.1 The custodian will get the containers from the designated shelf (between bio-freezer and bio-fridge) and bring the containers to the receiving area to scan for discard.

5.1.4.2 The custodian will return the containers (tubes and bottles) to the shelf designated for returns or throw them away, as appropriate.

5.1.5 Microbiology Containers

5.1.5.1 The custodian will scan the samples for discard in LIMS and dispose of the containers.

5.1.6 Toxicology Bottles (4L glass bottles)

5.1.6.1 The custodian will retrieve the emptied/washed containers from the designated shelves in the culture lab.

5.1.6.2 The custodian will scan the samples for discard.

5.1.6.3 The custodian will peel the labels off the containers and return the scanned bottles back to the same shelves in the culture lab.

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5.1.6.4 The bottles are ready to re-use at this point.

5.1.7 AGP Bottles (250 ml square plastic bottles)

5.1.7.1 The custodian will get the samples from the biology walk-in refrigerator and take them to the receiving room (or the culture lab) and scan them for discard.

5.1.7.2 The custodian will place the samples on a cart or in a tray and put a placard on top indicating that the samples are ready for disposal, label peeling and washing.

5.1.7.3 The custodian will place the placarded tray/cart in the culture lab.

5.1.8 Particle Size and Sediment Tests (250 ml plastic jars)

5.1.8.1 The custodian will get the samples from the biology walk-in refrigerator and take them to the receiving room.

5.1.8.2 The custodian will scan the samples for discard and dispose of them.

6.0 CUSTODIAN RETRIEVING WATER SAMPLES (Metals and Nutrients Group Analysts)

Due to the large number of analysts in the Nutrients and Metals Groups the Receiving custodian retrieves the samples for the analysts and places them in a designated refrigerator/storage area. Analysts request samples through the LIMS Sample Reservation module. The custodian uses the LIMS Custody module to retrieve the samples and document the status of the requests. Samples that are stored in refrigerated locations must be placed in refrigerators after they have been pulled for the analysts.

Some samples may be hazardous and many are preserved with acids or bases. Wear gloves, safety or prescription glasses, and lab coat when handling sample containers. When retrieving samples from shelves keep the containers upright and check for loose caps to prevent spillage.

6.1 Select *Laboratory → /Receiving → Sample Retrievals*

There are four categories of request statuses:

New: The request has not been printed or viewed yet.

Waiting: The request has been printed but the samples have not been pulled yet.

Partial: The request has been printed and some of the samples have been pulled.

Completed: All samples have been pulled for the request

6.2. Check the box for "New" to display the list of new requests. The analyst's name, and the date, and time that the samples are needed are displayed.

6.3. To print a request, select the request and click the print icon. Once a request has been displayed for printing, it will change from status New to status Waiting.

6.4. The following information is displayed on each request:

Reservation Made: Date/time the analyst made the reservation

Date Range: Date/time range that the analyst needs the samples

Reserved By: The name of the analyst generating the reservation

Reserved For: The name of the analyst needing the samples

Reservation ID: Contains the analyst name and the date/time samples are needed

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Reservation Status: Indicates either New, Waiting, Partial or Completed.

There are 6 columns of information on the request.

Sample ID:	LIMS sample ID
Location ID:	Location in the refrigerators or storage rooms
Test ID:	Indicates the tests requested for the sample (aids in determining bottle size when looking for a sample).
In/Out:	Indicates whether the sample is checked in or checked out. Status is current for the time the reservation is displayed/printed.
Pulled:	Indicates whether the sample has been pulled for the analyst. The custodian changes the status after pulling the samples.
Prior Requests:	Multiple analysts sometimes request the same samples for the same time slot or overlapping time slots. The comment in this column indicates the name of the person who entered their request first. If there is a comment on a request then the sample does not get pulled for the request. Pull only the samples without the comments for the request.

6.5 Place the samples with a copy of the request in refrigerator 6 for Nutrients requests, on a cart in refrigerator 5 if refrigerator 6 is full, or on a cart in the metals room for Metals requests. Document any missing samples on the request sheet so the analyst knows they could not be found.

6.6 After samples have been pulled for a request, change the status of the samples from “not pulled” to “pulled” in LIMS. When a partial number of samples are listed as “pulled” the request will automatically move to the Partial category. When all samples are labeled as “pulled” the request will automatically move to the Completed category.

6.6.1 To change a status to pulled, double click on the request, select the “pulled” status and highlight the samples that have been pulled. Click the Set button, then the Save button.

6.6.2 If a missing sample is found, change the status from “Not Found” to “Pulled” or “Not Pulled.” Open the request that is identified on the Not Found List. Highlight the sample and change the status.

7.0. LOCATING MISPLACED SAMPLES

If a sample can’t be found in time for the analyst to use the day it is requested, change the status of the sample to “Not found.” To view a listing of samples that have not yet been found, click on the Reservation menu item and select “List Samples Not Yet Found.”

If a sample is reported as missing or lost, the Custodian will use the following step within 1 week of reporting to locate the sample. If the sample is located at any point, the Custodian will notify the affected analysts and supervisors.

7.1. First Steps

7.1.1 Check the Custody History in LIMS. If the Custody History report is blank, verify with the receiving room supervisor if the sample should be cancelled but has not yet been cancelled.

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7.1.2 If the status is “Checked Out”, ask the analyst who last had the sample to check their cart, top and bottom. If the status is “Checked In”, print the reservation for the analyst who last held the sample.

7.1.3 Determine the analyses and bottle type to help narrow down the search. Check shelves on the reservation form. If the sample is not found, check all shelves from reservations from that day. Sometimes returned samples get mis-shelved.

7.1.4 Use the Can’t Find Sample module in LIMS to see if there are multiple sample labels on the sample bottle.

7.1.5 Check the Return Cart (C301).

7.1.6 Check the Pending Pick-Up cart.

7.1.7 Check all sample containers on the shelf where the lost sample is supposed to be. It may be in an unusual container.

7.1.8 Check shelves directly above, below, and to either side of the missing sample shelf. Often a tray will be moved to reach samples in the back and not replaced on the correct shelf.

7.1.9 Check shelves with similar numbers or invert shelf numbers. E.g., if sample should be on 4-2-5, check shelf 4-5-2.

The majority of missing samples are located using the procedures described above. Contact supervisors if a sample is missing for more than 2 days from the first day reported.

7.2 Second Steps

7.2.1 Update the Discard list. Samples may be discarded or mis-shelved.

7.2.2 Use the LIMS browser to determine the date/time of sample login and who logged it in.

7.2.3 Talk with the log-in staff person to see if they recall anything unusual. Review the custody sheets and paperwork in the event folder for clues. The sample may have been shelved with other samples in that event.

7.2.4 Pull up the old email shelf space list through MS Outlook to see what shelves were assigned on the day the missing sample was logged in. Check the assigned shelf spaces to see if the sample was accidentally placed in the wrong location.

7.2.5 Check the refrigerator in room 201, including underneath.

7.2.6 Look under shelves on the floor of refrigerators. Samples can fall of carts, shelves, etc.

7.2.7 Last resort: Two staff should check every shelf location available bottle by bottle.

If the sample is located at any point during the search, email affected analysts and supervisors with a status update.

If the sample is not located within one week from the date it was first reported missing, email the analysts and supervisors to let them know. Contact the customer to inform them of the missing sample and create an NCR.

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