UCRL-AR-122089

Environmental Protection Department
Hazardous Waste Management Division

Headspace Gas Sampling for TRU Waste Drums

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1. Purpose

The purpose of this procedure is to provide HWM personnel with the approved method for sampling the gas in the void space between the rigid liner of the transuranic (TRU) waste drum and the drum lid.

2. Scope

2.1 This procedure describes the actions necessary for headspace gas sampling of 55-gal transuranic waste drums. The sampling process is used to determine the presence of hydrogen, methane, and volatile organic compounds as a part of transuranic waste characterization and includes the following:

- Selecting the transuranic waste drums.
- Setting up the sampling the sample area and sampling equipment.
- Sampling a batch of TRU waste drums.
- Installing new composite carbon filter vents for the TRU waste drums.
- Storing and shipping the headspace gas samples.

2.2 The activities in this procedure are performed according to the requirements of the Transuranic Waste Characterization Quality Assurance Program Plan, Waste Isolation Pilot Plant (WIPP) Waste Characterization Program Sampling and Analysis Guidance Manual, and Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846).

2.3 The sampling equipment and canisters are provided by Idaho National Engineering Laboratory (INEL) and their principal contractor, Lockheed Idaho Technologies Company (LITCO). Analyses of the headspace gas samples are performed at LITCO.

2.4 This procedure **does not** involve the opening of the drum lid. No drum seals will be broken. Only the drum lid carbon composite filter vent will be removed and replaced with a new carbon composite filter vent .

3. Definitions

3.1 Headspace – The interior of a drum between the drum's rigid liner and the bottom surface of the lid.

3.2 Low-Level Waste (LLW) – For this procedure, low-level waste (LLW) is waste that meets any or all of the following qualifications:

(1) Contains radioactivity defined by the LLNL document, *Criteria and Procedures for the Certification of Nonradioactive Hazardous Waste*.

(2) Can be classified as; a low-specific-activity (LSA) waste as defined in Title 49, Code of Federal Regulations (CFR), Part 173.403; a limited quantity of radioactive material as defined in 49 CFR 173.403; or a radioactive Type A or B quantity as defined in 49 CFR 173.431.

(3) Is not classified as high-level waste, transuranic waste, uranium mill tailings, mixed waste, or spent nuclear fuel.

Waste with transuranic nuclides in concentrations that are less than 100 nanocuries per gram (nCi/g) will be considered as low-level waste according to DOE order 5820.2A.

3.3 Sampling Batch – Gas samples from no more than 18 TRU waste drums plus one duplicate sample and one field blank (no more than 20 SUMMA® canisters total).

3.4 Radioactive Waste – Solid, liquid, or gaseous material that contains radionuclides regulated under the Atomic Energy Act of 1954, as amended, and of negligible economic value considering the cost of recovery.

3.5 Transuranic (TRU) Waste – Without regard to source or form, waste that is contaminated with alpha-emitting transuranic radionuclides with half-lives greater than 20 years and concentrations greater than 100 nCi/g at the time of assay.

3.6 Waste – A material in any form (gas, liquid, semi-solid or solid) that is recycled, or, discarded, or stored with the intent of disposing by burning, incinerating, burying, or treating.

4. References

4.1 Chemistry and Materials Science Environmental Services (CES). *Analytical Sample Custody*, CES Procedure No. 201, (CES-201), latest revision.

4.2 Chemistry and Materials Science Environmental Services (CES). *Sample Log-In*, CES Procedure No. 202, (CES-202), latest revision.

4.3 Chemistry and Materials Science Environmental Services (CES). *Sample Preparation for Off-Site Shipment*, CES Procedure No. 204, (CES-204), latest revision.

4.4 Lawrence Livermore National Laboratory. *Criteria and Procedures for the Management of Nonradioactive Hazardous Waste*, (UCRL-AR-109662), latest revision.

4.5 Lawrence Livermore National Laboratory. *Nonconformance Reporting*, Waste Certification Procedure No. 3, (WCP-3), Revision 1 dated 5/3/95.

4.6 Lawrence Livermore National Laboratory. *Records Control*, Waste Certification Procedure No. 4, (WCP-4), Revision 1 dated 5/3/95.

4.7 U.S. Department of Energy (DOE). *Radioactive Waste Management,* DOE Order 5820.2A, 9/26/88.

4.8 U.S. Environmental Protection Agency (EPA). *Test Methods for Evaluating Solid Waste Physical/Chemical Methods,* (SW-846), third edition, final update I &II (SW846).

4.9 U.S. Department of Energy (DOE). *Transuranic Waste Characterization Quality Assurance Program Plan,* (CAO-94-1010), Revision 0, 4/30/95.

4.10 U.S. Department of Energy (DOE) Procedure 110.2. *Direct Canister Method to Collect Headspace Gas Samples from a TRU Waste Drum,* (CAO-91-043), Revision 0, 5/95.

4.11 Department of Health and Human Services (NIOSH) Publication No. 94-110. *Applications Manual for the Revised NIOSH Lifting Equation.*

5. Responsibilities

5.1 The **HWM Building 612 Area Supervisor** (referred to as HWM Supervisor):

- Authorizes persons to perform the TRU waste drum sampling.
- Trains or provides training to the HWM Operations Technicians about how to sample the TRU drums and manage the paperwork during the headspace sampling process.
- Maintains a file that identifies the HWM Operations Technicians who are trained and authorized to perform this sampling operation.
- Provides personnel to sample the TRU waste drums who are trained and authorized to perform this operation.
- Assures that the requirements of Facility Safety Procedure (FSP) 612 and this procedure are followed by those individuals performing headspace sampling.
- Reviews and forwards records generated during headspace gas sampling to the Operations Control Office (OCO).

5.2 The **HWM Operations Control Office (OCO)** tracks and stores the records related to the headspace gas sampling of the TRU waste drums.

5.3 The **HWM Operations Technicians** or other trained, qualified, and authorized LLNL Technicians set up and sample the TRU waste drums.

5.4 The **ES&H Team 4 Personnel:**

- Provide safety requirements for headspace sampling.
- Forward information as requested by the Documents and Assessments Group Leader as a part of the review for Unresolved Safety Questions (USQs).

5.5 The **HWM Records Control Office** manages the TRU waste drum sampling data when received from the HWM Supervisor and enters it into the Waste Inventory System (WIS).

5.6 The **Waste Certification Engineer (WCE):**

- Provides a qualified individual(s) for initial headspace sampling training.
- Assures that there are no USQs outstanding prior to the start of the sampling.
- Assures that subsequent training is conducted by the HWM Supervisor or designee.
- Assures that the requirements of the *Transuranic Waste Container Characterization Quality Assurance Program Plan* are completed during the TRU waste drum sampling process.

5.7 The **Documents and Assessments (D&A) Group Leader** assures that the sampling process is reviewed for USQs prior to the start of the physical sampling process.

6. Environmental, Safety, and Health (ES&H) Conditions

6.1 Personal Protective Equipment (PPE)

As a minimum, PPE includes the information listed in Table 1:

	Obtaining the headspace samples	**Handling Of Waste Drums**
Clothing	HWM issued & laundered cloth coveralls	*(same)*
Gloves	exam weight latex or PVC	cloth or leather
Eye Protection	safety glasses or goggles	*(same)*
Footwear	safety shoes	*(same)*
Respiratory Protection	none	none
Hearing Protection	To be determined	not required
Other	none	none

Table 1. List of PPE requirements for sampling and drum handling.

6.2 Moving or handling heavy objects:

- Material handling aids (drum dollies, fork mounted drum grabs, ramps, etc.) are utilized whenever practical. No material handling should exceed the limits established by the revised NIOSH Lifting Equation (see reference 4.11).
- Appropriate PPE is worn by personnel performing these activities.
- Walking and working surfaces are maintained in an orderly and undamaged condition and do not impede material handling activities.
  - Whenever possible, the size or weight of a drum is reduced to mitigate the potential of injury from a materials handling accident.

6.3 In an emergency, such as a spill or a fire, the **HWM Operations Technician** performs the emergency or contamination control procedures according to the *Area 612 Facility Contingency Plan* (URCL-AR-109118), Revision 3, April 1995.

7. Pre-Operational Activity

7.1 The **Waste Certification Engineer (WCE):**

7.1.1 Provides a qualified individual(s) for initial headspace sampling training.

7.1.2 Assures that there are no USQs outstanding prior to the start of the sampling.

- Contacts the D&A Group Leader about changes to the sampling procedure and assures that the information for the USQ development is accurate.

7.2 The **Documents and Assessments Group Leader** assures that the sampling process is reviewed for USQs prior to the start of the physical sampling process.

7.2.1 Receives information from the Waste Certification Engineer, the ES&H Team Representatives and the HWM Supervisor about all aspects of the physical sampling process, the sampling location, the containment requirements and any other information necessary for the completion of the USQ paperwork.

7.2.2 Issues a report to the WCE stating that there are no USQs for the sampling process.

7.2.3 Forwards any USQs to the Department of Energy (DOE) for resolution before the start of sampling activities.

- Informs the WCE of the delay in the sampling process until the USQ is resolved by DOE.

7.3 The **HWM Building 612 Area Supervisor** or designee**:**

7.3.1 Briefs persons participating in their first headspace sampling about the expected hazards and the goals of the process.

– Assures that time to sample each batch of TRU waste drums does not exceed 14 days. The current time estimate for sampling is 5 drums/day.

– Assures the field holding times and the shipping times listed in Table 4 are not exceeded.

7.3.2 Discusses PPE requirements, the need for proper probe insertion and purging of the pump chamber, canister sealing methods that will be used, and documentation for the headspace sampling process.

7.3.3 Directs the HWM Operations Technicians to sample only TRU waste drums containing carbon composite filter vents.

– Provides any other sampling information or drum selection requirements during the daily safety meetings.

7.3.4 Provides guidance for corrective actions as requested by the HWM Operations Technicians to bring the operation into compliance with this procedure.

– Generates a Nonconformance and Corrective Action Report (NCAR), as required in WCP-3, if the HWM Operations Technicians can not immediately correct the nonconforming activity.

7.4 The **HWM Operation Technician**:

7.4.1 Selects which TRU waste containers will be used for the sample batch.

7.4.2 Starts a Container Chain-of-Custody form for the selected TRU waste drums (see Attachment A).

7.4.3 Attends, and documents on a sign-in sheet, the daily briefs for TRU waste drum sampling.

7.4.4 Attends TRU waste drum sampling training provided and documented by the HWM Supervisor or WCE.

7.4.5 Assures that the sampling line is connected to the pass through opening in the containment dome.

7.4.6 Collects the following equipment for the sampling process:

a. New drum lid carbon composite filter vent (referred to as "filter vent")

b. Gas sampling apparatus (see Figure 1)

– The equipment consists of an 1/8" stainless steel needle fitted via a reducer to the 1/4" inlet of a half micron sintered metal filter. This filter is connected to a Swagelok® fitting on the SUMMA® canister valve via a Swagelok® to VCR® adapter. The low internal volume of these components, in comparison to the internal volume of the canister assures that a representative headspace gas sample is collected.

c. Protective clothing as listed in Table 1.

d. Calibrated torque wrench.

e. Calibrated Blue alpha meters.

f. 1 1/2-in crow's foot 3/8 drive.

7.4.6 (continued)

g. Hacksaw.

h. Calibrated continuous air monitoring device (if requested by the Health Physicist).

i. Evacuated 250-ml SUMMA® sample canisters (referred to as canisters).

– These canisters are leak-free welded stainless steel SUMMA® pressure vessel with a Cr-NiO-passivated interior surface, bellows valve, and dial pressure/vacuum gauge. The gauge indicates the status of the canister pressure and provides evidence of canister leaks.

– All sampling equipment components that come into contact with headspace sampling gases must be constructed of relatively inert materials such as stainless steel or Teflon®. A passivated interior surface on the stainless steel components is recommended.

j. Containers to transport the filled SUMMA® canisters to CES. These containers may be the containers that the canisters were received in.

k. Small and large plastic bags and tape to wrap and dispose of waste items.

l. The SAMPLE CANISTER TAG form (one per canister, see Attachment B), the FIELD GAS SAMPLE RECORD form (one per batch, see Attachment C), and the SAMPLE CHAIN-OF-CUSTODY form (each form has room for 5 samples, see Attachment D).

m. Tape for sealing the waste bags.

n. Needle guide caps.

o. Lifting strap or equivalent to use with the crane or forklift for placing the TRU waste drums into the 85-gal drums.

p. Calibrated thermometer and barometer.

– The design of the barometer is specified in the Methods Manual Procedure No. 110.2, *Direct Canister Method to Collect Headspace Gas Samples from a TRU Waste Drum,* and includes the following:

1. The ambient pressure gauge is a full range Fortin barometer or equivalent with a range of approximately 500-800 mm Hg with a resolution of 1 mm Hg and the calibration is traceable to National Institute of Standards and Technology (NIST). The barometer is also kept in the sample area while the sampling is in progress.

2. The thermometer is a NIST-traceable laboratory grade mercury thermometer, total immersion type with nitrogen above the mercury. It has permanent stain markings in the approximate range of -30° to 50°C with a resolution of one degree.

7.4.7 Assures that the sampling apparatus batteries are charged or is left to charge overnight.

7.4.8 Sets up the sampling area by doing the following:

a. Tapes down a plastic sheet over the area designated by the HWM Building 612 Area Supervisor for sampling.

b. Ropes or tapes off the plastic covered area to restrict entry while the sampling operations are in progress.

c. Sets up a step-off pad for the sampling area.

d. Contacts the ES&H Health Physicist for proper signage.

e. Assures that the overhead crane is operational and available for use.

8. Sampling Operations

*The following activities are conducted by the **HWM Operations Technician** unless otherwise stated.*

NOTE

If any radioactive contamination is found during this process, stop work and contact the ES&H Team 4 Health Physicist and the HWM Supervisor.

NOTE

The QAPP-required sampling equipment blank (see reference 4.9) was collected and analyzed by INEL prior to the first use of each SUMMA® canister. The required field reference standard sample was collected and analyzed at INEL prior to the first use of the sampling apparatus.

8.1 Selects no more than 18 TRU waste drums, with filter vents, for a sample batch. A batch of samples consists of 18 TRU waste drum samples, a duplicate sample, and a field blank.

8.1.1 Assures that the movement of the TRU waste drums does not cause the drum to raise farther than 4 feet above another drum or farther than 4 feet from the floor when moving the drum in the staging area.

8.1.2 From the batch, stages drums that will be processed in one day (about 5 drums) in an area designated by the HWM Supervisor for sampling the TRU waste drums.

8.1.3 Determines which drum in the batch will have a duplicate sample prior to the start of the batch.

8.1.4 Visually inspects the drums to assure that the drum exterior has not been damaged before or during movement of the drum.

8.2 Inspects the canisters to be used for the day for the following:

8.2.1 Pressure gauge reads a vacuum of no less than 25 inches of mercury (lower number values, e.g., 20 inches of mercury, may indicate a leak).

8.2.2 Each canister has a "canister tag".

8.3 Assembles the sampling apparatus by:

8.3.1 Placing a canister into the canister holder on the sampling apparatus and verifing the sample canister number matches the canister tag.

8.3.2 Connecting the canister tubing (the shorter length) to the outlet port of the pump using the quick connects (see Figure 1).

8.3.3 Connecting the other end of the canister tubing to the canister using a VCR® metal gasket with an integral filter (see Figure 1).

8.3.4 Connecting the sample needle tubing (the longer length) to the inlet of the pump using the quick connects.

8.3.5 Stages the sampling apparatus on the stand for the containment dome.

8.4 Attaches the grounding device to the sampling apparatus and a suitable attachment to the 85-gal containment drum.

8.5 Draws one field blank prior to sampling this batch of drums. This field blank process is covered in Attachment F.

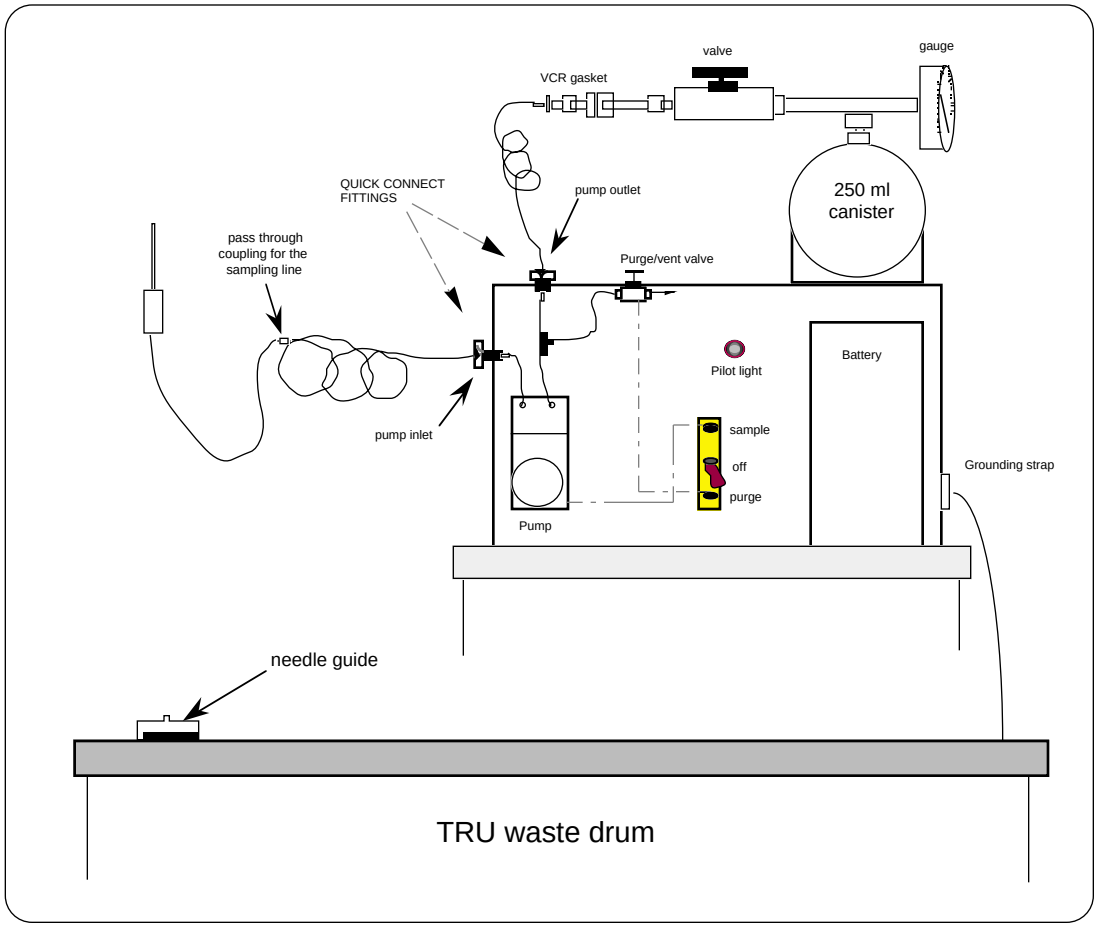


Figure 1. Conceptual design of the sample collection apparatus.

8.6 Records the header and sample information for the field blank on the forms listed in Table 2.

8.7 Dons the PPE listed in Table 1 and starts the environmental monitoring equipment as required in the Health Physicist.

WIPP SAMPLE CANISTER TAG (one canister per tag, see Attachment B)	**FIELD GAS SAMPLE RECORD (one record per batch, see Attachment C)**	**SAMPLE CHAIN-OF-CUSTODY form (five canisters per form, see Attachment D)**
HEADER INFO: • sample site ID is "LL" • The date (MMDDYY) is recorded in two places, the time of sampling is recorded once. • Enter the canister ID (format=AA###) • Enter the sampling organization name as "LLNL". • Enter the sample description as "SUMMA canister".	HEADER INFO: • The name of the Technician generating the sample. • Write in the date in the "batch number" column. • Write the canister number (the same number that was put on the canister tag)	HEADER INFO: • Enter the sampling site as "LLNL" and the chain-of-custody number as "LL-HGS-YY-nn" where "YY" are the last two digits of the year, e.g., "95", and "nn" is a serial number beginning with 00 (zero zero). • Enter the name of the Technician generating the sample and sign below the name on the next line.
SAMPLE INFO: • Enter the canister pressure after sampling. • Enter the ambient temperature and the barometric pressure as measured by calibrated instruments. • Enter the initials of the Technician taking the sample in the column labeled "initials". • Add any comments or remarks in the remarks section.	SAMPLE INFO: • Write the drum ID number in the column marked "container #". Enter the numbers between the "LL85" and "TRU" in the column cell. • Enter the sample date. • Enter the sampling time.	SAMPLE INFO: • Enter the drum ID number in the space between "LL85" and "TRU" on the form. • Enter the date and time the sample was taken • Enter Kem Hainebach's name on the line marked "Project contact". • Enter the sample ID number which is the combination of the "batch #", and the "canister #" on the FIELD GAS SAMPLE RECORD form. • Enter the date and time of the sample. • Place a check mark or "x" in the columns "Hydrogen/methane" and "Gas VOCs". • Enter "gas" in the column labeled "matrix". Enter 1 in the column marked "number of drums" and enter "none" in the column marked "preservative".

Table 2. List of forms and information the Technician completes at the time the sample is collected.

8.8 Replaces the used canister with another evacuated canister.

- Assures that the new canister number matches its canister tag and records the sample information (except for final canister pressure and ambient temperature and pressure) on the forms listed in Table 2.

8.9 Starts the drum processing by using a hacksaw to cut off the filter cap of one of the staged TRU waste drums (there are four tack welds).

NOTE

The cut welds will be sharp. Care must be used when sampling to avoid cutting or puncturing hands.

8.10 Surveys the removed cap to determine the waste management of the cap.

8.10.1 If surveyed cap has levels of radioactivity above background, tapes the edges of the cap and place the cap in a plastic bag. Seals the plastic bag with tape and places this sealed bag into another plastic bag for management as LLW, stops work and contacts the Health Physicist.

8.10.2 If the surveyed cap has less than background levels of radioactivity, tapes the edges of the cap and places the cap in a plastic bag for management as California Hazardous Waste.

8.11 Places a needle guide over the open filter.

8.12 Uses the overhead crane or another suitable lifting device approved by the HWM Supervisor to lift and place the TRU waste drum into the 85-gal containment drum (see Attachment F).

8.12.1 Slides the 85-gal containment drum under the containment dome.

8.12.2 Attaches the grounding device to the TRU waste drum.

– Assure that the sampling apparatus, the 85-gal containment assembly and the TRU waste drum are all connected to the same grounding device.

8.12.3 Lowers and attaches the containment dome over the 85-gal containment drum using a winch or another suitable device, and secures the containment dome to the containment drum (see Attachment F).

– Allow only persons performing the sampling operations into the staging area after the environmental monitoring and control equipment has started.

8.13 Backflushes the line before sampling the first TRU waste drum for the day using the steps in Table 3 as illustrated in Figure 3. If the field blank was just taken, skip this step and proceed to step 8.14.

	Backflushing the sampling apparatus with ambient air
a.	Opens the VCR coupling to the canister and switches the input and output lines on the sampling apparatus by swapping lines at the quick connects. The needle line should now be on the pump outlet and the VCR coupler line should be on the pump inlet (see Figure 3).
b.	Inserts the needle into the backflush bubbler.
c.	Places the switch on the sampling apparatus to the PURGE position.
d.	Presses the "purge/vent" button for approximately 15 seconds. – Observes that the bubbler in the filter train shows good flow.
e.	Turns off the pump by flipping the switch to the OFF position.
f.	Switches the input and output lines back to the normal position. – Replaces the used VCR® gasket with a new gasket. – The normal position has the VCR coupling attached to the pump outlet of the sampling apparatus and the needle probe line attached the pump inlet (see Figure 2).

Table 3. List of steps to backflush the sampling apparatus.

8.14 Inserts the needle through the needle guide on the filter vent cap (see Figure 2).

8.15 Purges the tubing and the pump with the sample gas before opening the canister by placing the power switch to the PURGE position, depressing and holding the "purge/vent" bypass button (see Figure 2) for approximately 15 seconds.The flow meter should read approximately 200 ml/min.

8.15.1 Stops and contacts the HWM Supervisor if the flowrate needs adjustment.

8.16 Starts collecting the sample by releasing the "purge/vent" button and moving the power switch to the SAMPLE position ***and at the same time*** opening the canister valve.

8.16.1 Collects the gas sample until the pressure on the canister gauge reads no more than 20 psig. This takes approximately 15-20 minutes.

8.16.2 While the sample is being collected, records the ambient temperature and barometric pressure on the Sample Canister Tag.

a. If there is less than 15 psig of pressure after 30 minutes, stops collecting the sample and contacts the HWM Supervisor.

b. Removes the partially filled canister and write "DO NOT USE" on the canister tag. Records the sampling information on the tag as listed in Table 2.

8.17 After reaching the required pressure in the canister, shuts the canister valve and turns off the pump.

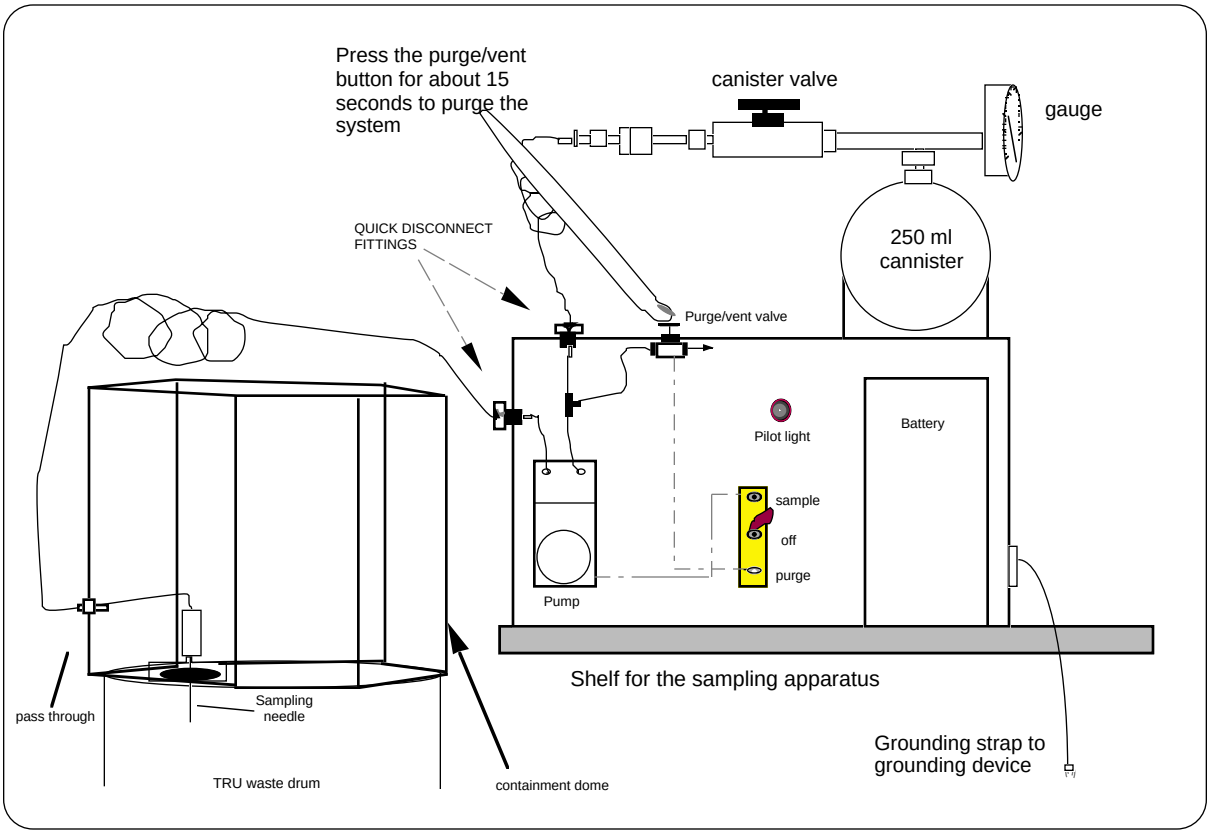


Figure 2. Diagram of the sampling apparatus during sampling.

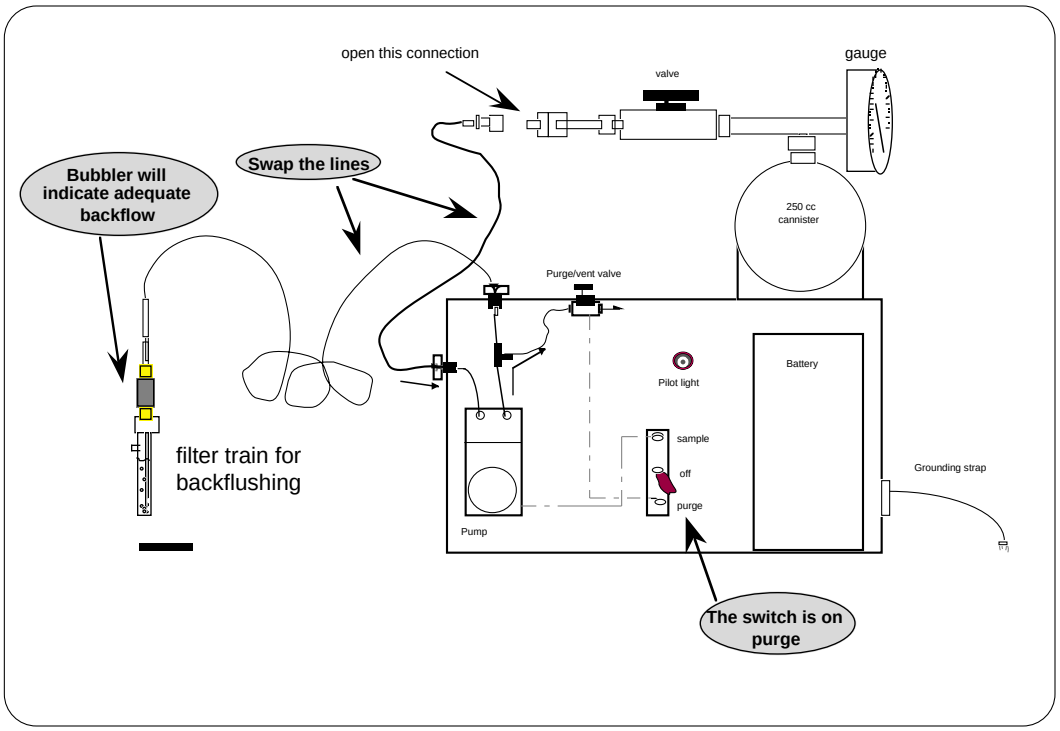


Figure 3. View of the sampling apparatus during the backflush cycle.

8.18 Performs the backflush according to Table 3.

NOTE

Backflushing with ambient air assumes VOC concentrations in ambient air, as measured by field blanks, meet Transuranic Waste Characterization Quality Assurance Program Plan cleanliness criteria of less than three times the minimum detection limit. Otherwise a clean air supply is needed for backflushing.

8.19 Removes the rest of the filter vent:

8.19.1 If surveyed filter vent has levels of radioactivity above background, tapes the edges of the cap and place the cap in a plastic bag. Seals the plastic bag with tape and places this sealed bag into another plastic bag for management as LLW, stops work and contacts the Health Physicist.

8.19.2 If the surveyed filter vent has less than background levels of radioactivity, tapes the edges of the cap and places the cap in a plastic bag for management as California Hazardous Waste.

8.20 Installs the new filter vent.

8.21 The **ES&H Technologist** or the **HWM Operations Technician** surveys the lid of the TRU waste drum around the filter vent area.

8.21.1 If contamination is found, stops the sampling process for that drum and contacts the ES&H Team 4 Health Physicist for decontamination instructions.

8.21.2 If no contamination was found, continues with step 8.22.

8.22 Lifts the containment dome and removes the TRU waste drum from the 85-gal containment.

8.23 Secures the filter vent by torquing it to 180 in-lb (15ft-lb).

8.24 For the duplicate sample, follows the sampling process outlined in Attachment H.

8.25 Records the final canister pressure on the canister tag.

8.26 Places the next TRU drum into the 85-gal containment.

8.27 Repeats steps 8.8 through 8.26 for the remaining drums or drums as directed by the HWM Supervisor.

9. Storing and Shipping the Samples

9.1 The **HWM Operations Technician**:

- Reviews the Sample Canister Tags and Sample Chain-of-Custody form(s) to assure that the information in the form(s) is complete and accurate.
- Signs (signature release) and dates the Field Gas Sample Record.
- Makes copies of the Sample Canister Tags and the Field Gas Sample Records and forwards them to the OCO.
- Assures that the Sample Canister Tags are attached to the correct canisters.
- Forwards the original Sample Canister Tags and the Field Gas Sample Records to CES and transfers custody of the canisters to CES using the Sample Chain-of-Custody form(s).
- Receives copies of the Sample Chain-of-Custody form(s) from CES and forwards them to the OCO.

9.2 The **HWM Operations Control Office** receives and tracks the headspace sampling information forwarded by the HWM Operations Technicians and controls them according to WCP-4.

9.3 The **CES Laboratory Personnel**:

- Sign for receipt of the Sample Canisters and makes a copy of the Sample Chain-of-Custody for the HWM Operations Technician.
- Assure that the sampling holding times and storage conditions conform to the requirements specified in Table 4.
- Receive and process the samples according to CES 204, *Sample Preparation for Off-site Shipment*.
- Seal the sample shipping containers using the Sample Custody Seal (see an example in Figure 4).

Sample ID No.: _____ Seal Broken by: _____

Signature: _____

Print Name: _____ Date: _____

Figure 4. Example of a Custody Seal

9.3 (continued)

Analyte	Container	Minimum Drum Headspace Sample Volume[a]	Holding Temperatures	Field Holding Times[b]	Maximum Time in Transit	Laboratory Holding Time[c]
hydrogen, methane and VOCs	SUMMA® Canister	250ml	0-40°C	4 days	2 days	28 days

[a]Alternatively, if available headspace is limited, a single 100ml sample may be collected for determination of VOCs, Hydrogen and methane.
[b]From time of headspace sampling collection time to shipment.
[c]Programmatic-based maximum holding time. Holding time begins at Validated Time of Sample Receipt.

Table 4. Gas sample container holding times

- Forward the Sample canisters and canister tags under sample chain-of-custody to the address below. Ship by express service or other means that meet the transit time requirements listed in Table 4.

LITCO
CFA 601 Warehouse
Scoville, ID 83415-4107
Attention: Trent Riggs

- Forward the Field Gas Sample Records to:

Glen Hayes
LITCO
P.O. Box 1625 Technical Support Building
Idaho Falls, ID 83415-2424

9.4 The **HWM Building 612 Area Supervisor** receives copies of the completed forms for TRU waste drums from the HWM Operations Technicians and checks the information for completeness before forwarding them to the OCO.

10 Records

10.1 The following information is collected and maintained electronically or in paper form, and archived according to division or program policies and procedures:

Document Names	Division or Program and their actions
Copies of: Field Gas Sample Record Sample Canister Tag Waste Container Chain-of-Custody Sample Chain-of-Custody	HWM Operations Control Office maintains electronic and paper versions (as determined by the OCO) of the information according to WCP-4.
Copies of: Field Gas Sample Record Sample Canister Tag Waste Container Chain-of-Custody Sample Chain-of-Custody	Waste Certification Program maintains electronic and paper versions (as determined by the WCO) of the information according to WCP-4.
Copies of: Sample Canister Tag Sample Chain-of-Custody	CES maintains the records according to CES procedures.

Table 5. QA records.

11 Attachments

11.3 Attachment A – TRU Waste Container Chain-of-Custody Form

11.4 Attachment B – Example of a SAMPLE CANISTER TAG .

11.5 Attachment C – Example of FIELD GAS SAMPLE RECORD form.

11.1 Attachment D – Example of SAMPLE CHAIN-OF-CUSTODY form.

11.1 Attachment E – Process For Acquiring The Field Blank..

11.2 Attachment F – Diagram showing the placement of the TRU waste drum in the 85-gallon containment drum and the placement of the containment dome.

11.6 Attachment G – Checklist for duplicate sampling of the TRU waste drum.

Attachment A

TRU Waste Container Chain-of-Custody Form

WASTE CONTAINER CHAIN-OF-CUSTODY

Waste Generator Number: LL85 __ __ __ __ __ __ TRU Date:__ Time:_____

Person Attaching Form: _____

Location	Relinquished by	Date	Time	Received by

*Locations: Storage, Radiography, Gas Sampling, Visual Exam, Solid Sampling, Waste Generator

Comments (note any discrepancies):

Disposition:

Completed by:_____ Date:_____ Time:_____

Attachment B

Example of a SAMPLE CANISTER TAG .

SAMPLE CANISTER TAG

Sampling Site		Date					Canister ID				
L	L										
		M	M	D	D	Y	Y	X	X	#	#	#

Sampling Organization: _____

Sample Description: _____

Location	C/M (a)	Ambient P&T (b)	Date (c)	Time (d)	Initials
Certifying Lab					
Field-Prior to sample collection					
Field-After sample collection					
Lab-Prior to sample analysis					

(a) Canister pressure gauge reading (psig) M=manifold pressure gauge reading (mm Hg)
(b) P = Pressure (mm Hg) T = temperature (celsius)
(c) Date = MMDDYY
(d) Time = 24 hour (e.g. 0900, 1450)

Blank Sample (Y / N)

Remarks:

Example Only
Use Current Revision

Analysis*	
Hydrogen and methane	
VOCs	
Other	

*Report detected but unquantifiable results.

Attachment C

Example of FIELD GAS SAMPLE RECORD form.

FIELD GAS SAMPLE RECORD

TECHNICIAN(S): _____

Therm. Cal. Due Date: _____ **Bar. Cal. Due Date:** _____

Sampling Method: ❑ **Direct Canister / Pump** ❑ **FTIR Spectrometer**

Signature Release: _____ **Date:** _____

SAMPLE #		❑ **SEE THE REVERSE SIDE FOR COMMENTS**		
BATCH # LLmmddyy	**CANISTER # and SIZE** AAnnn ❑ 100ml ❑ 250ml	**CONTAINER #** leave blank / "liner bag" / parcel # LL85n nnnnnTRU	**DATE** mm/dd/yy	**TIME** hh:mm (24 hr)
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	Field Duplicate of: LL85__ __ __ __ __ __TRU		
LL	❑ 100ml ❑ 250ml	Field Blank		

WCP 0084 (7/28/95)

Example Only
Use Current Revision

Attachment D

Example of SAMPLE CHAIN-OF-CUSTODY form.

Sample Chain-of-Custody

Sampling Site: LLNL

Waste Container No.: LL85 __ __ __ __ __ __ TRU

Date: _____

Disposition: _____

Sampler: _____

Sampler Signature: _____

Project Contact: _____

COC No.: _____

Comments (note any discrepancies):

_____

Analytical Laboratory: Carrier Waybill No.:		Phone/Address of sample collection:			Total VOCs	Total SVOCs	Total Metals	Gas VOCs	Hydrogen/methane	PCBs	Analyze	Archive
Sample ID #	Date/Time	Sample Matrix	Type/No. of Containers	Preservatives								

Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Send analytical results to:

Attachment E

Process For Acquiring The Field Blank.

*The following steps are performed by the **HWM Operations Technician** unless otherwise specified:*

1. Sets the sampling apparatus on top of a platform close to the drum.

2. Purges the line by moving the switch on the sampling apparatus to the PURGE position and press the switch on top of the sampler (see Figure 1) for approximately 10-15 seconds.

3. Assures that the sample needle is unobstructed and pointing to an open area away from engine exhausts.

4. Samples the air by doing the following:

   a. Moves the switch on the sampling apparatus to the SAMPLE position and opens the canister valve.

   b. Allows the canister to pressurize to no more than 20 psig.

   c. After the canister has reached the target pressure:

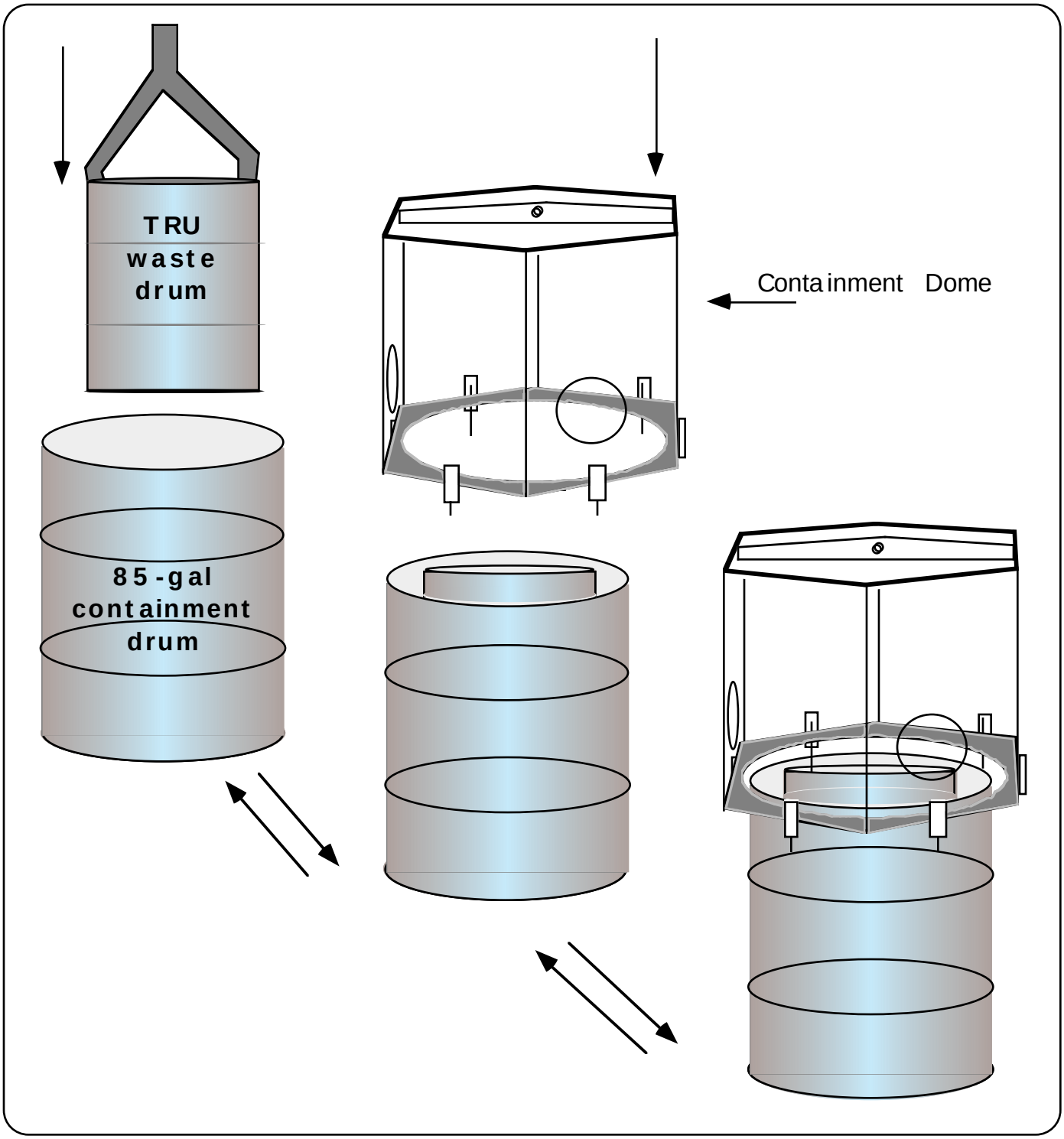
      1. Closes the canister valve

      2. Turns the pump off.

5. Backflushes the sampling apparatus as listed in Table 3.

Attachment F

Diagram showing the placement of the TRU waste drum in the 85-gallon containment drum and the placement of the containment dome.



Attachment G

Checklist for duplicate sampling of the TRU waste drum.

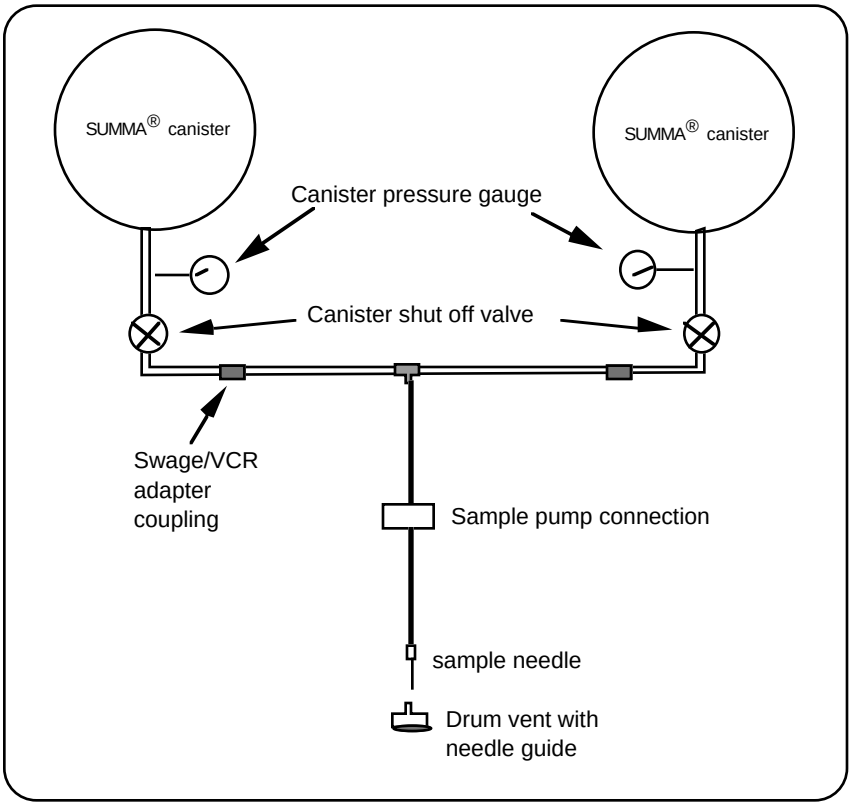


Figure 5. Diagram of the canister set up for duplicate sampling

1. Assembles two canisters according to the diagram above.

2. Attaches the quick connect from the tee to the outlet of the pump.

3. Starts collecting the sample as described in sections 8.9 through 8.17.

   - Open only one canister valve when starting the sampling.

4. When the first canister is full, shuts the valve to the first canister and immediately open the second (duplicate) canister while the pump is still running.

5. After filling the second (duplicate) canister, shuts the valve to the duplicate canister and turns the pump off.

6. Performs a backflush of the sampling lines as described in Table 3.

7. Disassembles the tee and assembles the sampling apparatus as described in section 8.3.

8. Repeats steps 8.8 through 8.26 for the remaining drums as directed by the HWM Supervisor.

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