

RADIOACTIVE MATERIAL SEWER DISPOSAL

This document provides the procedures to be followed in the laboratory when disposing radioactive liquids via the sanitary sewer. Disposal via this method is restricted to sanitary sewers that are connected to a Public Owned Treatment Works (POTW). Any disposal to on-site septic systems is prohibited. This document supplements the EHS Safe Operating Procedure (SOP), **Sewer Disposal List**, where all conditions of that SOP apply to the disposal of radioactive liquids. The procedure outlined below should be followed by radiation workers when disposing of radioactive liquids via the sanitary sewer.

Step 1: Determine if the liquid is acceptable for sewer disposal.

- The chemical matrix of the radioactive liquid must be readily soluble, or is readily dispersible biological material, in water. Any chemical matrix that does not meet this requirement must be tagged for collection by EHS.
- The chemical matrix of the radioactive liquid must be listed on the UNL **Sewer Disposal List**, which indicates that the POTW has determined that the discharge is acceptable. All liquids that are not on the **Sewer Disposal List** or do not conform to the conditions of the **Sewer Disposal List** must be tagged for collection by EHS.
- Determine the activity of the solution through process knowledge or direct testing (Appendix A). Verify that the activity to be disposed combined with the activity previously disposed in the current month will not exceed monthly allowable limits. Monthly allowable limits are: $^3\text{H} = 4.0 \text{ mCi}$, $^{14}\text{C} = 0.8 \text{ mCi}$, and all other radionuclides combined = 0.8 mCi.

Step 2: Prepare for disposal.

- Stage a survey meter near the sink (for all radionuclides except H-3) to monitor for contamination during the disposal process.
- Use absorbent padding on surfaces where containers are staged to prevent contamination.
- Don appropriate PPE (e.g., laboratory coat, gloves and eye protection).

Step 3: Perform the disposal.

- Dispose of liquids from least to greatest activity to minimize the potential of spreading contamination.
- Pour liquids directly into the drain to minimize contact with the sink interior and splashes.

Step 4: Cleanup.

- Water must be run down the drain for a minimum of 5 minutes after each disposal event.
- Conduct a survey that includes sink surfaces and adjacent counter spaces.
- If contamination is identified, clean and re-survey the area. Continue this process until contamination is less than 200 dpm based on a swipe survey area of at least 100 cm².
- Document the sink survey with the monthly survey records. ***Sewer disposal of radioactive liquids is considered use of radioactive material and a monthly survey is required regardless of whether any other use of radioactive material occurred in the laboratory!***

Step 5: Complete and file records.

- Record sewer disposal information (e.g., date of disposal, radionuclide, radioactivity) on the Sanitary Sewer Disposal Log (Appendix B). For convenience and quick reference, post the log near the sink. A separate log should be maintained for each sink used for disposal of radioactive materials.
- Document survey results with monthly survey records.
- Send a copy of the completed Sanitary Sewer Disposal Log to Environmental Health & Safety (EHS): **Radiation Safety, EC – 0824**. File the original in the radioactive material use logbook.

Appendix A

Procedure for Determining Radioactivity in Liquid Waste

1. Pipet 1 mL of the liquid waste into an empty scintillation vial.
2. Add 10 mL of scintillation cocktail.
3. Run vial through the Liquid Scintillation Counter.
4. Acquire DPM from the LSC results.
5. Convert DPM to $\mu\text{Ci/mL}$.
 $(\text{DPM}) \times (4.545 \times 10^{-7}) = \mu\text{Ci/mL}$
6. Convert $\mu\text{Ci/mL}$ to μCi .
 $(\mu\text{Ci/mL}) \times (\text{total mL in waste bottle}) = \mu\text{Ci}$
7. Convert μCi to mCi.
 $(\mu\text{Ci}) \times (1.0 \times 10^{-3}) = \text{mCi}$

Appendix B

LIQUID RADIOACTIVE WASTE SANITARY SEWER DISPOSAL LOG

Instructions: Radioactive material (RAM) may be disposed via the sanitary sewer as long as the allowable limits per month are not exceeded. Record the date, radionuclide, and activity in mCi on this form each time that you conduct a sanitary sewer disposal. When this form is full, send a copy to **Radiation Safety, EC - 0824** and file the original in your radioactive logbook. ***Sewer disposal of radioactive liquids is considered use of radioactive material and a monthly survey is required regardless of whether any other use of radioactive material occurred in the laboratory!***

Precautions: Be careful when pouring into the sink.
Avoid splashing.
Immediately clean and survey splashed areas.
Flush sink thoroughly to reduce contamination.
Use standard contamination control techniques and include sinks in monthly use surveys.

Allowable monthly limits (mCi)

$^3\text{H} = 4.0$ $^{14}\text{C} = 0.8$ All other radionuclides combined = 0.8

Date of Disposal	Radionuclide	Activity (mCi)	Date of Disposal	Radionuclide	Activity (mCi)

Contact the RSO at 402-472-2157 or 402-472-4925 with questions on limits or requests for limit increases.

(Created 2/08)