

Radioactive Liquid Waste Disposal Procedures

What radioactive liquid wastes will need to be collected for proper disposal?

In the spring of 2013 we are rolling out a change in policy on the disposal of liquid radioactive wastes to the sanitary sewer. All liquids that have significant levels of radioactivity above background (bkg) need to be collected as radioactive waste. Please sample 1 milliliter of your wastes and rinses and count the samples in a Liquid Scintillation Counter. Any sample whose count rate is more than three standard deviations above background, e.g., a good approximation is: $bkg + (3\sqrt{bkg})$, is considered a statistically significant amount of radioactivity above background and must be collected for disposal through EH&S as radioactive waste. Any aqueous sample with a count rate below this threshold can be disposed of to the sanitary sewer, assuming that it is chemically safe to do so. See the “*Drain Disposal Restrictions for Chemicals*” on the web at <http://ehs.berkeley.edu/images/ehs/pubs/draindisposal.pdf> for further information. Further assistance on how to radiologically characterize your waste stream is available by contacting the EH&S Radiation Safety Team at radsafety@berkeley.edu.

Once you have characterized the waste stream for each of your experimental processes, you may apply the results to all future wastes generated by those same processes. Please retain documentation of your waste characterization analysis.

How do I get radioactive liquid waste picked up?

Collect your radioactive liquids in poly carboys that are provided free of charge from EH&S. When you are not actively adding waste to your carboy, it should be kept tightly capped. Please do not overfill the carboys - leave approximately three inches of space at the top. Use a funnel for filling the carboy and place it in secondary containment (e.g., buckets or Nalgene wash tubs, etc.) that is large enough to contain all of the waste.

Maintain the pH between 5 and 10 for your radioactive liquid wastes. The liquid waste carboys **must always** be labeled with a trefoil and the words “Caution Radioactive Materials”, as well as the radioisotope(s) present in the waste. Avoid combining short-lived isotopes (e.g., separate S-35 waste from P-32.)

If you have never collected radioactive liquid waste before, then you will need to create waste container entries in the Radiation Safety Information System (RSIS) <http://ehs.berkeley.edu/rs.html> for each container you plan on managing in the lab. There should be a separate container for each radioisotope that has a half-life less than 90 days (i.e., P-32, S-35, Cr-51, Fe-59, I-125). Liquid H-3 and C-14 wastes can be combined in one container. Other long-lived liquid wastes with a half-life > 90 days should be combined into a different container.



When your carboy is full, log into RSIS to initiate its disposal. After completing the waste information page, print out your waste label (there should be only be one carboy per waste label). Place the carboy in a strong, clear plastic bag to provide a contamination-free surface for handling. Place the waste label inside the bag so that it is clearly visible and seal the bag shut with tape.

If your waste is being picked up from your lab, keep your carboy stored in secondary containment until the waste is picked up by EH&S (this process typically takes up to five business days). If you will be transferring this waste to your building's Central Pick-up Unit (CPU), place the carboy(s) inside the liquid waste collection tubs in your CPU. If there is no room in the collection tub, **DO NOT** leave the carboy on the CPU floor—place it in the “pre-approved drum”. If both of these containers are full, return the waste to your lab and call EH&S-Radiation Safety for a pick-up.

Quick Reference Guide

- Characterize your waste stream
- Collect all liquids that contain radioactivity greater than three standard deviations above background (e.g., $bkg + (3\sqrt{bkg})$) and retain documentation of your analysis. Below this value, aqueous wastes may be disposed of down the sewer unless they contain chemical contaminants.

For example:

Threshold for when liquid waste is considered radioactive = $bkg + (3\sqrt{bkg})$

Background control (1ml aliquot) = 16 cpm

$$16 \text{ cpm} + (3 \times \sqrt{16 \text{ cpm}}) = 16 + 12 = 28 \text{ cpm}$$

For this example, liquid wastes that have >28 cpm must be collected as radioactive liquid waste. Below 28 cpm can be disposed of down the sewer.



Call 510-642-3073 or email radsafety@berkeley.edu for further assistance.

