TOXIC ORGANIC MANAGEMENT PLAN (TOMP)

USDA-ARS
POISONOUS PLANT RESEARCH LABORATORY

Description of Facilities and Solvent Use

Only a few operations generate wastewater. The general laboratory processes and the animal care and handling facilities are described.

The Poisonous Plant Research Laboratory (PPRL) is a research facility studying the effects of poisonous plants on livestock. As such, we maintain a small number of animals ranging from goats to cattle at the main facility in Logan with most of our animals housed at the Richmond Farm. Animals are kept in pens that are a combination of dirt/straw base (with a clay layer about 12 inches deep) and concrete. We have one animal treatment facility inside a building where chutes and pens allow us to humanely and safely confine the animal for various treatments. There are floor drains in this building that lead to the 2500 gallon clarifer. This is pumped out twice a year (spring and fall) and the sludge waste is used as a fertilizer on various croplands around Cache Valley. Grab samples are taken at various times by Logan City for analysis; test results have always been within regulatory limits. All solid waste is scraped from the pens once a week and either taken to the USU compost area or out to our Richmond Farm for use as fertilizer.

Most of our wastewater is sanitation water: approximately 400 gallons per day (18 full-time staff members). Water used for our landscaping is from the USU irrigation system. All of our laboratory sinks are plumbed such that all lab wastewater goes through a 250 gal tank filled with limestone chips then transfers to another 250 gal tank where pH is constantly monitored. If the waste in the second tank is below pH 6 or above pH 8.5, it is adjusted with acid or base to bring the pH within the set limits. Only then will the waste be pumped into the sewer system. The pH of the effluent is recorded automatically; printouts are kept by the maintenance engineer.

Primary solvents used in the laboratory consist of ethanol, methanol, isopropanol, carbon disulfide, chloroform, methylene chloride, acetone, and hexanes. Amounts range from 5 mL to 1 gallon per week depending on the season and the research program. Waste solvents are put in identified waste containers and accumulated up to the 5 gal amount, then picked up by USU EH&S personnel for inclusion in their hazardous waste stream. Every 3-5 years a large scale plant extraction is done. This consists of extracting large amounts of ground plant material (300 to 500 pounds) with solvents (methylene chloride or methanol is usually used). The solvent used in these extractions is reclaimed for use in future extractions. These large scale extractions will be carried out in the Plant Extraction building (to be built this winter; it replaces a building that was demolished during construction of the new laboratory). This building has its own containment system and is not connected to the city sewer. Any hazardous waste will be collected in 55 gal drums and disposed of through the USU waste stream.

Other organics that may appear in the wastewater include ammonium hydroxide, sodium hydroxide, hydrochloric acid, and sulfuric acid. All are in dilute amounts (approximately 1-8% solutions). This waste is collected in containers, the pH adjusted to

7 – 7.5 (if necessary), then poured down the lab sinks. This amounts to less than 100 mL per day for each. Concentrated nitric acid is used in one procedure that is done twice a year for about 2 weeks each time. The waste nitric acid is collected in an identified hazardous waste container, then disposed of through the USU hazardous waste stream.

Some research is performed using radiolabelled compounds. The isotope used is Iodine-125; amounts are those found in commercially available assay kits (no more than 150 µCi will be present at any time). This work is done in a restricted entry lab; all waste is collected in specially identified containers and picked up by USU. Iodine-125 is a short half-life isotope, decaying to background levels within 20 months. This research is done on a sporadic basis, perhaps 2-3 weeks over a 2-3 year period. The permit to do such research is through USU; their radiation safety officer and technician perform monthly and quarterly audits and inspections of this research area.

One lab performs histopathological research. This involves the use of tissues preserved in neutral buffered formalin (NBF; 4% formaldehyde and 96% phosphate buffer). Amounts vary with the research project. Nearly all are in 200 mL or less NBF per container. All used NBF is collected in 5 gal carboys and disposed of through the USU hazardous waste stream.

None of the labs have floor drains therefore no spills of chemicals will enter the sewer system. Emergency showers and eyewashes are located in each laboratory space and in the basement mechanical room. The mechanical room does have some larger quantities of chemicals. The 30 gal tanks for the waste neutralization system will hold up to 25 gal of either acid or base when full. The levels in these tanks are monitored and additional acid or base solutions are added in 5 gal quantities when needed. A closed glycol system is used to provide conditioned air to the building; this is in a separate diked room that could contain all of the glycol in case of a tank rupture.

We have no major quantities of toxic chemicals; most are in milligram amounts. Some solvents are in 55 gal drums; these are stored in a different building with no drains. Our current inventory of drums consists of acetone, methanol, and hexanes. All other solvents are in 1 or 5 gal containers and are stored in flammable cabinets.

Toxic Organic Management Plan

Solvent Storage Procedures: Solvents are stored in flammable cabinets or in diked areas. The storage area for large quantities will be diked to hold 100 gal (largest container is 55 gal). The majority of the solvents are reclaimed for use in laboratory procedures. Spent (waste) solvents are collected in 5 gal carboys and added to the USU hazardous waste stream.

Training: All employees receive instruction in the proper handling and disposal of solvents, toxic chemicals, and clean-up materials in order to keep regulated toxic organics out of the wastewater. New employees are trained in these and other procedures before being allowed to work in the lab. All personnel receive annual refresher training and will follow the established procedures to eliminate regulated organics from entering the wastewater.

Training consists of classroom and online instruction (with tests) on the following: a) hazard communication/chemical hygiene plans; b) hazardous materials plan; and c) spill response training.

Inspections: The PPRL Safety Committee performs semi-annual inspections; the Location Safety Committee performs annual inspections.

Implementation: This plan (in various forms) has been implemented since May 1991. It is reviewed and updated annually to reflect changes in research, procedures, and facilities.

Certification

"Based on my inquiry of the person or persons directly responsible for managing compliance with the TTO limitations, I certify that, to the best of my knowledge and belief, no dumping of concentrated toxic organics into the wastewater has occurred since filing of the last report. I further certify that this facility is implementing this organic pollutant management plan submitted to the Control Authority on June 10, 2005."

__/s/ Lynn F. James_____
Lynn F. James
Research Leader