Wastewater: BMP Factsheet

Stanford University
Utilities Services

About the Palo Alto, Regional Water Quality Control Plant, Sewer Use Ordinance, General Discharge Permit

The purpose of the General Discharge Permit is to regulate wastewater discharges from lab buildings at Stanford University (Stanford) which ultimately end up in the City of Palo Alto's sanitary sewer system. Specific buildings which have similar types of operations, wastes, and requirements for effluent limits and monitoring are regulated under this General Discharge Permit. Wastewater discharges shall comply with Chapter 16.09 of the Palo Alto Municipal Code (Sewer Use Ordinance), any applicable provisions of Federal or State laws and regulations, and all provisions of the permit itself.

Best Management Practices

As part of a comprehensive program to reduce the amount of pollutants that reach the sanitary sewer system and the South San Francisco Bay, the Palo Alto Regional Water Quality Control Plant (RWQCP) has prepared these Best Management Practices (BMPs) for laboratories and industrial facilities.

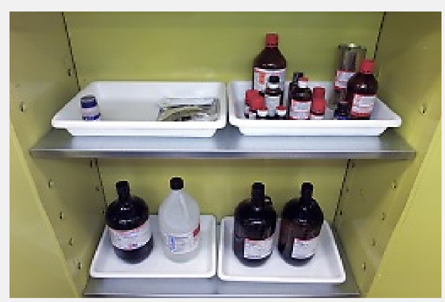
I. Requirements

A. Wastewater Discharge

- Contact Stanford Utilities (http://lbre.stanford.edu/sem/Contact_Resources) to determine what substances are appropriate for discharge to the sanitary sewer under the Sewer Use Ordinance. Hazardous wastes, as defined by either State or Federal regulations, including California Code of Regulations Title 22 and Code of Federal Regulations Title 40 Part 261, shall not be disposed of via the sanitary sewer. See attached table for local discharge limits and detection levels.
- Initial rinses from chemical bottles and containers that have been in contact with hazardous or prohibited materials shall not be discharged to the sanitary sewer unless authorized in advance by Stanford Utilities and the RWQCP. This includes initial rinses from hand washed glassware using acids, bases, solvents, or alcohols. Initial rinses should be containerized and disposed by EHS.
- Chemical reagents or additives containing metals such as thimerasol or copper containing algaecides shall not be discharged to the sanitary sewer unless authorized in advance by Stanford Utilities and the RWQCP.
- The use of water aspirators is prohibited.

B. Chemical Storage and Secondary Containment

- Use a secondary containment vessel or area (e.g. a tray, canister, or bermed area) that is impervious to liquid(s) being contained and large enough to hold at least 110% of the capacity of the primary container, or for multiple primary containers 150% of the largest primary container.
- Secondary containment vessels or areas should not drain into any sink or sewer drain and chemicals should not be stored in or above sinks.



C. Personnel Orientation and Training

Personnel, including workers and supervisors whose duties pertain in any manner to the production or removal of waste discharges, shall be informed of the provisions of the Sewer Use Ordinance. Steps to inform such personnel include:

Personnel Orientation and Training (continued)

- Orientation of newly employed or assigned personnel.
- Annual orientation of all appropriate personnel.
- Posting signs or diagrams at all workstations that indicate approved waste disposal methods and accidental leak or spill reporting requirements.

II. Additional Measures

A. Replace Mercury Containing Devices with Non-Mercury Alternatives

Devices containing mercury, including mercury thermometers, should be replaced with non-mercury alternatives.

B. Container Security

To reduce the chances of chemicals being released to the sanitary sewer or the laboratory in the event of a spill or earthquake:

- Purchase smaller quantities of chemicals. Smaller containers allow for easier storage and more efficient consumption of chemicals.
- Use plastic coated chemical bottles to help reduce bottle breakage. Use plastic or insulated holders for solvent bottles. Store glassware and containers on rubber mats.
- Secure chemicals stored on chemical safety shelves or in cabinets behind barriers (at least 1/5 the height of tallest container) if secondary containment is not feasible.
- Make sure all chemical containers are properly labeled and segregate incompatible chemicals to prevent mixing in case of a spill.
- Have copies of Safety Data Sheets (SDS), formally called MSDS, on file for all chemicals stored or used at the facility.

C. Chlorinated Solvent Compliance

All chlorinated solvents must be kept completely out of the effluent water lines (drains, sinks, water recirculative pumps, aspirators, etc.)

- Use a special rotary evaporator to remove chlorinated solvents. The evaporator must either operate off an air cooled vacuum pump or use the house vacuum system.
- All liquid waste shall be collected and no effluent shall be disposed to sinks.
- Tubing that might contain solvents must not terminate in sinks.
- Water fractions from CH_2Cl_2 (Methylene Chloride) extractions contain 20,000 times the sewer limit (0.75 mg/L) and should be collected.
- Glassware from solvent use must be rinsed with acetone or methanol and rinsate waste collected as hazardous waste.

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D. Solder Disposal

The California Department of Toxic Substances Control (DTSC) has determined that processed solder residues from soldering operations contain metal oxides which exclude them from the scrap metal exemption found in 22 CCR §66260.10. Therefore, all solder residues must be managed as hazardous waste, including lead-free solder.

- Use re-closeable storage bags (such as Ziploc bags) for containing solder waste by taping them on or near soldering workstations. These bags must be kept closed except when adding solder waste. Attach a label to the bag once it is used to hold solder waste.
- Submit a pick-up request at no later than 8 months past the accumulation date. Use the Stanford on-line system for creating waste labels and requesting pickup, see http://wastetag.stanford.edu.
- Dispose of all solder/flux contaminated wipes, sponges and debris as hazardous waste.
- Use solder made from less hazardous materials (i.e. silver and nickel) whenever possible.

E. Waste Minimization

Basic waste minimization techniques include micro-scale experiments, product substitution, reduced product usage and storage, recycling/reuse of chemicals, modified operations, and water conservation.

• Substitute chemicals with less toxic alternatives.

• Use the minimum amounts of chemicals required by each experiment or process to minimize disposal volume at end of procedure.

• Order minimum amounts of chemicals to reduce waste and leftover materials in case procedures are changed or expiration dates pass.

F. Experiments and Equipment

Many types of equipment used routinely in conducting experiments may generate wastes that should not be discharged to the sanitary sewer.

• Use a rotary evaporator with a contained vacuum system and a dry ice condenser to intercept solvents.

• Drains from analytical equipment and automated chemistry should drain to waste containers.

G. Water Conservation

Structural measures such as those listed below can reduce water use significantly. Minimize water use where practical. For example:

• Install water-saving devices (such as flow restrictors) on sinks and rinse tanks (see photo on right).

• Reduce rinse times if possible (without affecting product quality).

• Eliminate the use of potable water as a single pass coolant. For restrictions on the use of single pass cooling, refer to Section 16.09.055 of the Sewer Use Ordinance.

If you would like more information on your building's general discharge permit, contact the building or lab manager.

Contact Stanford Utilities if you have any questions or concerns regarding these laboratory BMPs or other wastewater compliance items:

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Local Discharge Limits and Analytical Detection Levels

Pollutants	Local Maximum Limits[1] (mg/L)	Maximum Allowable Analytical Detection Levels (mg/L)
Arsenic	0.1	0.01
Barium	5	0.5
Beryllium	0.75	0.075
Boron	1	0.1
Cadmium	0.1	0.01
Chromium, Hexavalent	1	0.1
Chromium, total	2	0.2
Cobalt	1	0.1
Copper	0.25[2]	0.025
Cyanide	0.5	0.05
Dissolved Sulfides	0.1	0.01
Fluoride	65	6.5
Formaldehyde	5	0.5
Lead	0.5	0.05
Manganese	1	0.1
Mercaptans	0.1	0.01
Mercury	0.01	0.001
Methyl Tertiary Butyl Ether (MTBE)	0.75	0.075
Nickel	0.5	0.05
Phenols	1	0.1
Selenium	1	0.1
Silver	0.25	0.025
Single Toxic Organic	0.75	0.075
Total Toxic Organics	1	0.1
Zinc	2.0[3]	0.2
pH	5.0 pH units	11.0 pH units

[1] For discharges with annual average flows greater than fifty thousand gallons per day through any single sampling location, the maximum allowable limits shall be one-half the values listed in the table, with the exception of copper, mercury, MTBE, nickel, and silver, for which the limits shall remain 0.25 mg/L, 0.010 mg/L, 0.75 mg/L, 0.50 mg/L, and 0.25 mg/L, respectively, regardless of flow.

[2] The local maximum copper limit for cooling system discharges less than 2,000 gpd, Vehicle Services, Photoprocessing, Machine Shops shall be 2.0 mg/L. See Section 16.09.045 of the Sewer Use Ordinance for details and for metal finisher requirements.

[3] The local maximum zinc limit for vehicle service facilities shall be 4.0 mg/L