Nebraska Department of Environmental Quality

ENVIRONMENTAL GUIDANCE DOCUMENT

08-018 July 2008

SCHOOL CHEMICALS AND DISPOSAL

Each year schools, colleges and universities find themselves needing to take care of surplus, unnecessary, unknown, or outdated chemicals. These chemicals often originate in chemistry labs, but can also originate from swimming pool operations, vocational education classes, and maintenance activities. The following are guidelines for the disposal of such chemicals and helpful hints to avoid the need for disposal in the future. This document replaces the document with the same title dated June 2003.

DISPOSAL

- The school must prepare an inventory of all chemicals to be disposed before disposal options can be determined. The inventory need not be detailed but must include chemical names and the approximate weight of each chemical. It is sometimes helpful to convert the weight to pounds. One pound ≈454 grams. Volumes of liquids can be estimated at one gallon = 8.34 pounds. The quantity and type of waste will determine which requirements in Title 128 – Nebraska Hazardous Waste Regulations are applicable to the school.

    - For safety, someone familiar with handling chemicals should perform the inventory. Because Title 128 and disposal companies use Chemical Abstract Service (CAS) numbers, you may want to add CAS numbers to your inventory. Use appropriate personal protective equipment such as goggles, gloves, face shield, etc. when doing the inventory. Do not allow high school students to do the physical inventory.
    - Unknown chemicals need to be identified. Contact former employees if necessary to identify the unknown items. These items may need to be tested if you cannot make a determination any other way.
    - If explosive or highly reactive chemicals are encountered, do not handle or move these chemicals. Under no circumstances attempt to remove the cap on containers of these chemicals. The Nebraska State Patrol can be contacted at (402) 471-4545 for assistance. Explosive chemicals that are often encountered at schools include picric acid (crystallized) and peroxides from ethers.
    - The NDEQ, your local landfill, your local wastewater treatment facility, or a hazardous waste disposal company can use the inventory you develop when assisting with disposal options.

Produced by: Nebraska Department of Environmental Quality, P.O. Box 98922, Lincoln, NE 68509-8922; phone (402)471-4210. This Material is intended for guidance purposes only. It is not meant to substitute for the regulations found in Title 128 – Nebraska Hazardous Waste Regulations or other applicable Nebraska environmental regulations.

ACUTE HAZARDOUS WASTE

- Consult the list of acute (P-List) hazardous wastes in Title 128, Chapter 3, §015. If your inventory contains *more than 2.2 pounds* of chemicals on this list, full large quantity generator hazardous waste regulation applies to this waste. Contact the Waste Management Section at (402) 471-4210 or 8308 for assistance. The remainder of this fact sheet applies to wastes that are not on the list of acute hazardous waste chemicals. Note: In order for a material to be an acute (P-List) hazardous waste, it must be the sole active ingredient and be unused. The material remaining in an opened container would normally be considered to be "unused." For example: a ¼ full bottle of carbon disulfide is a P022 acute hazardous waste.

ALL OTHER HAZARDOUS WASTE

- The school must determine which wastes are hazardous wastes according to the hazardous waste regulation. On the inventory, mark all items that meet any of the following criteria. These items are hazardous wastes:

    - Listed as toxic chemicals in Title 128, Chapter 3, §016 (U-listed hazardous waste).
    - Listed as hazardous waste from a nonspecific source in Title 128, Chapter 3, §013. An example is spent toluene from cleaning equipment (F005).
    - Contains a toxicity characteristic as described in Title 128, Chapter 3, §010 (D004 through D043).
    - Exhibits a characteristic of ignitability, corrosivity or reactivity as described in Title 128, Chapter 3, §007 through §009. Material safety data sheets (MSDS) and other reference materials can be used to help determine the physical characteristics of the waste. Many of these sources may be available on the internet (search for the desired chemical name). Many school chemical wastes are hazardous waste due to ignitability (D001); that is, they have a flash point below 140° F.
    - The MSDS can often be used to determine the constituents of your chemical products. This may allow you to avoid expensive analytical testing.

- If more than 220 pounds of hazardous waste is present on the inventory for that month, or if the school generates other hazardous waste (for example, vocational classes such as auto repair) and the total hazardous waste generated in that month is greater than 220 pounds, more stringent hazardous waste regulations apply. Contact the NDEQ Waste Management Section for assistance.

- If the total amount of hazardous waste generated *is less than* 220 pounds in the calendar month, the school is subject to reduced regulation for the hazardous waste present on your inventory. These "reduced" regulations for *conditionally exempt small quantity generators* (CESQGs) can be found in Title 128, Chapter 8.

    - Hazardous waste from CESQGs may be placed in the landfill at a maximum rate of 43 pounds per day. No approval is required by NDEQ prior to disposal to a landfill. However, local governments or landfills may restrict such waste. Contact your county and municipal waste agency for confirmation and always obtain the landfill's prior approval. Bulk liquid wastes are not allowed in Nebraska landfills.

- Many chemicals might not be a regulated hazardous waste but could still be a dangerous hazardous material such as poisons, caustics, etc. Use a commercial publication such as the Merck Index to determine your chemical's properties.
- Some CESQG or non-regulated waste should not be sent to a landfill even though the waste regulations might allow it. Some chemicals are so dangerous, that they should not be placed into the environment except under controlled conditions. Examples of chemicals that fall into this category are strong oxidizers or flammable solids (yellow phosphorous, camphor, nickel nitrate, stannic chloride) and very toxic or reactive substances (aluminum chloride, antimony trichloride, arsenic trioxide, lead carbonate, nickel sulfate, pyrogallol).
- Even though a CESQG might be allowed to send its hazardous waste to a landfill or chooses to send its non-hazardous waste, but dangerous, wastes to a landfill, care must be exercised to keep hazardous waste and other hazardous materials from children. Waste in a dumpster is easily accessible to any number of persons. Consider hauling the waste materials to the landfill yourself or arrange to dispose of the waste in the trash receptacle at the same time the trash hauler arrives for pick up.

- Some liquid wastes and some dissolved solid wastes can be safely disposed down a sanitary sewer. *Do not allow incompatible chemicals to be co-mingled!* *Do not allow any ignitable wastes to be disposed down the drain*. *Do not allow any chemicals that form shock sensitive compounds with metals to be disposed down the drain*. Obtain the local wastewater treatment facility's prior permission for disposing chemicals in question to the sanitary sewer. If you have a septic system or some other sewer system that does not flow to a public wastewater treatment facility, do not dispose of any chemicals down the drain.

- Some chemicals, such as acids and bases, can be neutralized by qualified personnel and then disposed down a sanitary sewer. *Do not allow incompatible chemicals to be co-mingled!* This procedure should be accomplished under a chemical fume hood. Use proper personal protective equipment.

- Elemental mercury, including mercury thermometers, is hazardous waste. The department recommends that elemental mercury never be disposed to a landfill. If the school is a CESQG, it is allowed to bring its hazardous waste, such as elemental mercury, to a local household hazardous waste (HHW) collection facility or one-day event. *Note well that HHW facilities or events have the option to refuse any or all CESQG waste at their discretion.* Coordinate with the HHW organizers or management prior to using that avenue of disposal. If elemental mercury can't be disposed to a HHW facility or event, then the school will need to dispose of the material commercially.

- You may need to dispose of your wastes at a permitted hazardous waste treatment, storage, or disposal facility. Contact the NDEQ Waste Management Section for assistance. See our web site for a copy of the Hazardous Waste Service Providers Directory. Actual hazardous waste transportation and disposal services will involve costs that you should plan for. Assistance might also be available through extant grant programs. Contact Keep Nebraska Beautiful or your Educational Service Unit (ESU) for information regarding the School Chemical Cleanout Program (SC3P).

    - Note that liquid hazardous and non-hazardous wastes are not allowed to be disposed at landfills. As a result, those wastes that cannot be disposed to the sanitary sewer will normally be required to be disposed of at a commercial facility. An example of a waste that could not be disposed to a sanitary sewer is acetone. It is ignitable.

    - No hazardous waste generator, even a CESQG, is allowed to let his or her *hazardous waste* evaporate as a means of disposal. *Non-hazardous*, aqueous, inorganic mixtures may be

evaporated. The department discourages the deliberate evaporation of ***non*-*hazardous*** organic mixtures. Note the distinction made between regulated hazardous waste and non-hazardous waste.

WASTE REDUCTION AND MANAGEMENT

- Purchase the minimum quantity of lab and other chemicals needed. Avoid high volume purchases of toxic chemicals; the money you may save by bulk buying will probably be lost in disposal costs. (Not to mention the disposal hassle!)

- Incorporate micro scale experiments into your courses to reduce waste generation.

- Use less toxic chemicals for cleaning and maintenance activities. Let your school's daily operations be an example of positive environmental stewardship to your students. "Do as I do as well as what I say."

- Attempt to use your excess, *usable* chemicals as intended in lieu of disposal. If that option is not realistic, attempt to find another user for your excess, *usable* chemicals. For example, there may be another school district that needs the chemical you no longer need. Both districts can save money. Your ESU might be able to identify needs across school districts. The Keep Nebraska Beautiful, Materials Exchange Program can be a useful resource. Attempt to pool disposal efforts among several schools or across school districts to help reduce disposal costs.

- Review your chemical inventories at least yearly.

    - Include maintenance areas and custodial closets.
    - Be on the lookout for deteriorating containers, labels, and cabinets.
    - Ensure labels are secure and legible.
    - Store chemicals strictly in accordance with label directions.
    - Stock your chemicals to ensure chemical compatibility. The Flynn Guide is very useful in this regard. Don't store flammables with acids.
    - Never store pesticides with other chemicals.
    - Arrange for the disposal of chemicals that are no longer being used. Chemicals past their expiration dates should be disposed of promptly. Some chemicals deteriorate into dangerous compounds.
    - Arrange for the prompt disposal of chemicals whose containers are starting to deteriorate.
    - Establish some type of monitoring system that school officials can use to confirm that the above guidelines are being accomplished.
    - Avoid chemicals that are excessively dangerous and/or that have limited usefulness. See Attachment 1 for some examples.

HELPFUL WEB SITES:

- Title 128 - *http://www.deq.state.ne.us/* and click on "Rules and Regulations"
- Hazardous Waste Service Providers Directory - *http://www.deq.state.ne.us/* and click on "Publication Forms"
- MSDS information - *http://msds.pdc.cornell.edu/issearch/msdssrch.htm*
- MSDS information - *http://www.msdssearch.com/*
- Specific chemical information - *http://www.chemfinder.com*

CONTACTS:

● NDEQ Waste Management Section	(402) 471-4210
● NDEQ Hazardous Waste Compliance Assistance	(402) 471-8308
● NDEQ Toll Free Number	(877) 253-2603
● Keep Nebraska Beautiful, Materials Exchange Program	(800) 486-4562 or in Lincoln: 486-4622

ATTACHMENT: Hazardous Chemicals

Attachment

HAZARDOUS CHEMICALS

Chemicals that usually have a greater hazard than usefulness.
(Not all-inclusive)

Acrylonitrile	Dichlorobenzene	Nickel, metal, nitrate, & oxide	Sodium, metal
Aluminum Chloride Ammonium chromate	Dichloroethane	Nicotine	Sodium ferrocyanide
Aniline	Dimethylaniline	Osmium tetroxide	Sodium nitrate
Aniline hydrochloride	p-Dioxane	Oxygen, tank	Sodium sulfide
Anthracene	Ethers	Paris green	Sodium thiocyanate
Antimony trichloride	Ethylene dichloride	Phenol	Stannic chloride
Arsenic	Ethylene oxide	Phosphorus, red, white, yellow	Stearic acid
Arsenic chloride	Gunpowder	Phosphorus pentoxide	Strontium
Arsenic pentoxide	Hexachlorophene	Phthalic anhydride	Strontium nitrate
Arsenic trioxide	Hydrobromic acid	Picric acid	Sudan IV
Asbestos	Hydrofluoric acid	Potassium, metal	Sulfuric acid, fuming
Ascarite	Hydrogen	Potassium oxalate	Talc*
Benzene	Hydriodic acid	Potassium sulfide	Tannic acid
Benzoyl peroxide	Indigo carmine	Pyridene	Tetrabromoethane
Calcium cyanide	Lead arsenate	Pyrogallic acid	Thermite & compounds
Calcium fluoride	Lead carbonate	Saccharin	Thioacetamide
Carbon tetrachloride	Lead (IV) chromate	Selenium	Thiourea
Chlorine	Lithium (metal)	Silver cyanide	Titanium trichloride
Camphor			
Chloral hydrate	Lithium nitrate	Silver oxide	o-Toluidine
Chloretone	Magnesium powder	Silver nitrate	Uranium
Chloroform	Mercury	Sodium arsenate	Uranyl acetate
Chloropromazine	Mercuric chloride	Sodium arsenite	Uranyl nitrate
Chromium	Mesitylene	Sodium azide	Urethane
Chromium oxide	Methyl iodine	Sodium chromate	Vinylite
Chromium potassium sulfate	Methyl methacrylate	Sodium cyanide	Wood's metal
Chromium trioxide	Methyl orange*	Sodium dichloroindophenol	
Colchicine	Methyl red*	Sodium dichromate	

*Suggested alternatives: Methyl orange & Methyl red >>> Bromophenol blue & Bromothymol blue

Talc >>> Starch talc

Reference: Dr. John Moody, Indiana University Southeast, derived from http://www.cs.ius.indiana.edu