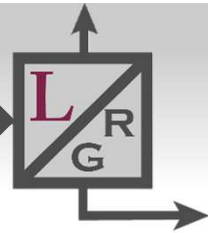
McMaster University

Latulippe Research Group

Chemical Waste Handling & Disposal

Group Meeting, June 6, 2019

Overview



Policy for handling and disposing of chemical waste. Much of this policy is covered in University Health & Safety training modules, but it bears repeating. The handling of biological substances is not covered, here.

Chemical Waste Disposal

Store Laboratory Waste in Suitable Containers

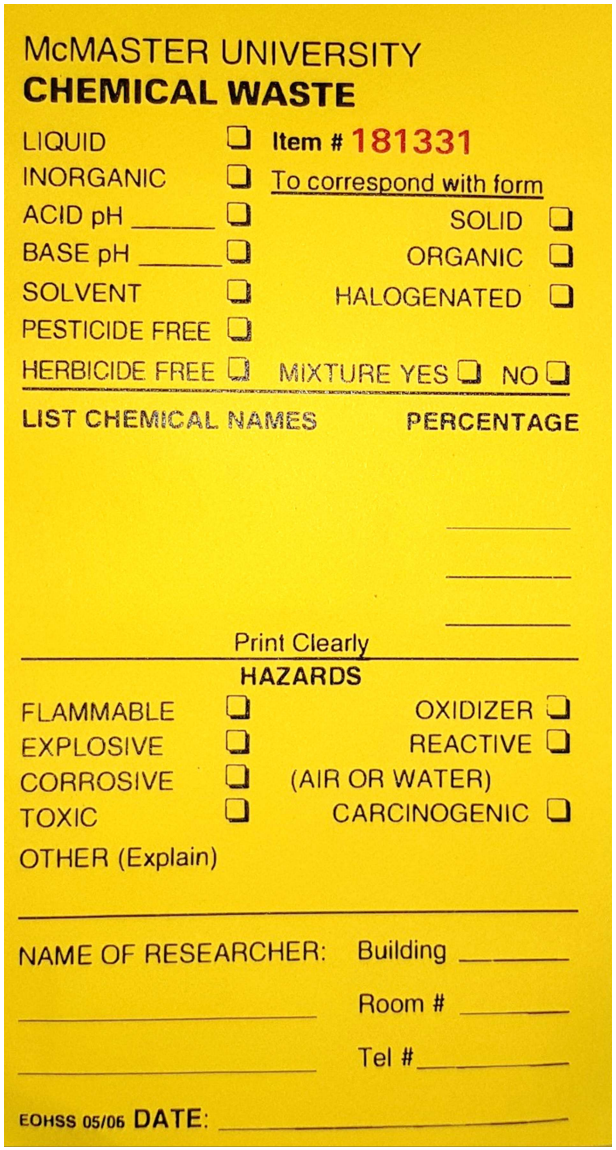
- Keep and use old chemical containers to store chemical waste
  - **Glass**: useful for organic solvents and strong acids/bases
  - **Plastic**: non-corrosive aqueous solutions
  - **Metal**: Aqueous solutions not containing reactive components (*e.g.* iron, aluminum salts, strong acids/bases, oxidizers)
  - Do not use valuable labware (screw-lid bottles) as waste containers!
- Certain wastes (*e.g.* halogenated organics) require different treatment procedures and are more expensive to dispose—segregate!
  - Do not mix incompatible wastes (*e.g.* flammable solvents + strong oxidizers; organic acids + alcohols). Unsure? Ask someone!
- Immediately apply **yellow waste label** to containers storing chemical waste
  - **You** are responsible for your waste containers: labelling, disposal, etc.
- Empty/used chemical bottles and containers:
  - Prior to disposal, these must be triple-rinsed with water
  - Dispose of first rinse as chemical waste
  - Add green sticker assuring that this procedure has been followed, and dispose of bottles in hallway (JHE), preferably in a box

Chemical Waste Disposal

Store Laboratory Waste in Suitable Containers

- Hard plastic waste: pipette tips, Falcon tubes, well plates, etc.
  - Cannot be disposed of in the regular garbage
  - Dispose of in cardboard boxes, but do not overfill
  - Do not dispose of chemical waste (*e.g.* full Falcon tubes) in these boxes, but chemical contamination is fine
  - When full, **anyone** can seal the boxes with tape, mark as "plastic waste", and leave out in the hall for carestaff (JHE)
- Glass and broken glass:
  - Dispose of in glass waste container, ensuring that bottles are unsealed
  - Do not dispose of chemical waste (*e.g.* filled vials) in the glass waste container, but chemical contamination is fine
  - Dispose of glass box before it is too fully and heavy! Follow instructions on box, seal with tape, and leave in the hallway for pickup (JHE)
- Sharps (*e.g.* needles, razor blades)*:*
  - Dispose of in red sharps box

Waste Disposal Labels


McMASTER UNIVERSITY
CHEMICAL WASTE

LIQUID ❑ Item # 181331
INORGANIC ❑ To correspond with form
ACID pH _____ ❑ SOLID ❑
BASE pH _____ ❑ ORGANIC ❑
SOLVENT ❑ HALOGENATED ❑
PESTICIDE FREE ❑
HERBICIDE FREE ❑ MIXTURE YES ❑ NO ❑

LIST CHEMICAL NAMES PERCENTAGE

_____
_____
_____

Print Clearly

HAZARDS

FLAMMABLE ❑ OXIDIZER ❑
EXPLOSIVE ❑ REACTIVE ❑
CORROSIVE ❑ (AIR OR WATER)
TOXIC ❑ CARCINOGENIC ❑
OTHER (Explain)

NAME OF RESEARCHER: Building _____
_____ Room # _____
_____ Tel # _____

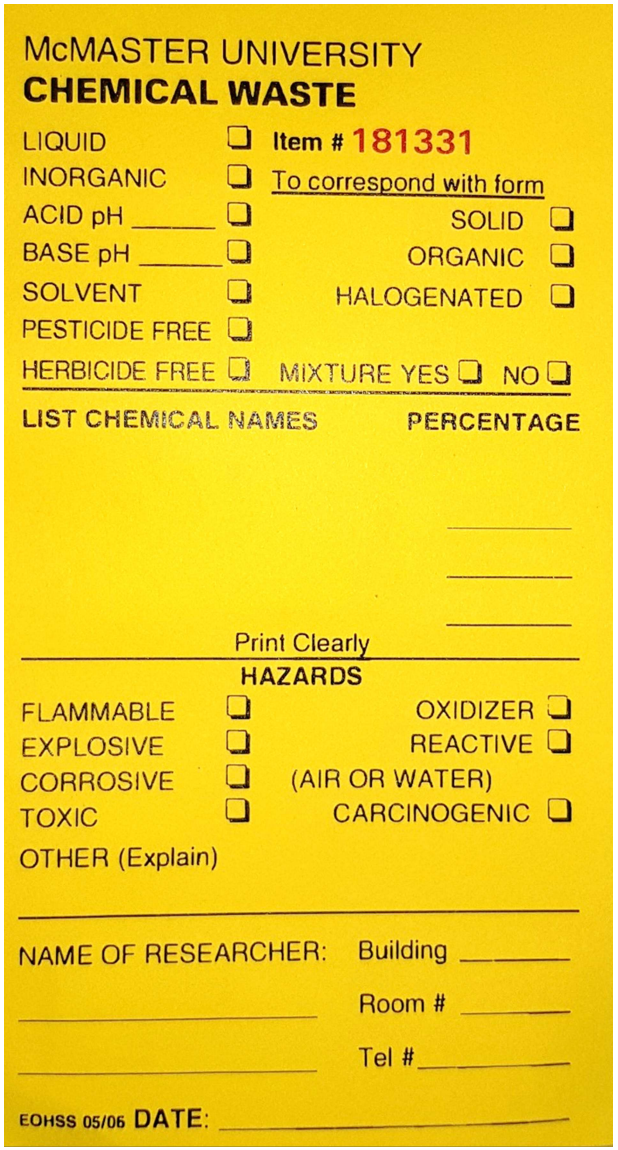
EOHSS 05/06 **DATE**: _____

Fill out prior to disposal or as needed

Fill out on an ongoing basis

Fill out immediately

Waste Disposal Labels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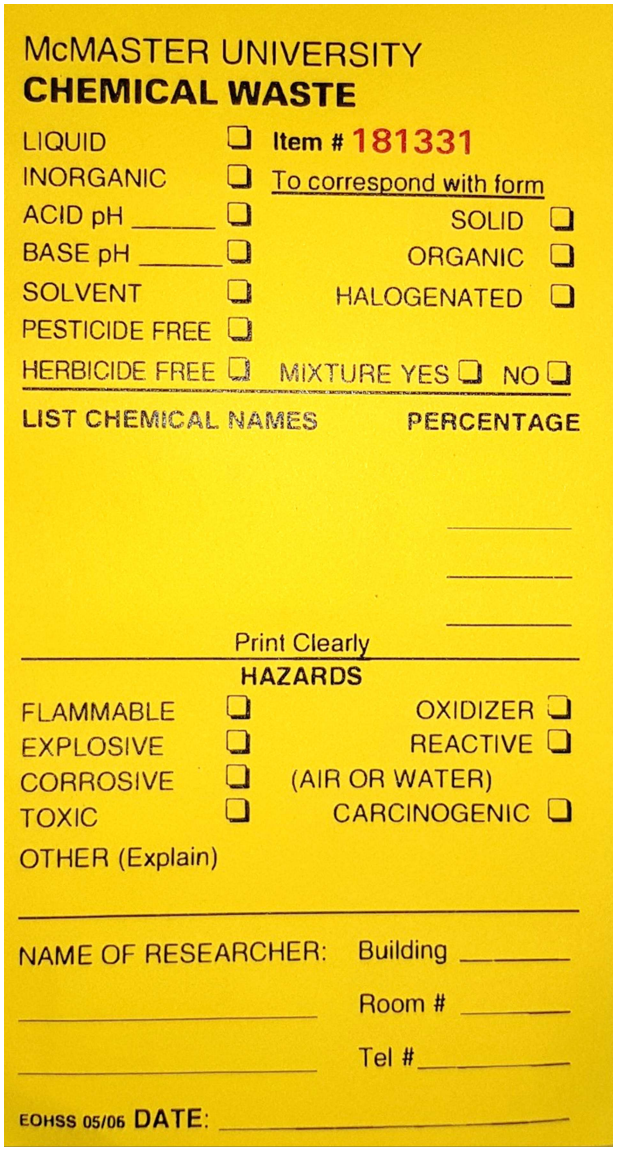
OTHER (Explain)

NAME OF RESEARCHER: Building _____
Room # _____
Tel # _____
EOHSS 05/06 DATE: _____

- **Item #**: reference this unique number on the label when submitting waste disposal forms
- **Liquid**: the waste is in liquid form (*i.e.* there is significant amounts of liquid sloshing around in the waste container)
- **Inorganic**: the waste contains inorganic compounds (*i.e.* metal salts like iron (III) sulfate, sodium hydroxide, etc.)
- **Acid pH**: pH of aqueous liquid waste, if acidic Fill in pH value.
- **Base pH**: pH of aqueous liquid waste, if basic. Fill in pH value.
- **Solvent:** waste contains organic solvent (*e.g.* acetone, dichloromethane)
- **Pesticide/Herbicide Free**: the waste does not contain any explicit pesticides or herbicides
- **Solid**: the waste is in solid form (*i.e.* there's significant solid particles in the waste container)
- **Organic**: the waste contains organic chemicals (*e.g.* methanol, carbon nanotubes, etc.)
- **Halogenated**: the waste contains halogenated organic molecules (*e.g.* dichloromethane, trifluoroethyl methacrylate)
- **Mixture (yes/no)**: is there more than one chemical in the waste?
- **List Chemical Names & Percentage**: the full unabbreviated names of the chemicals in the waste along with a reasonable final estimate of the fraction of each chemical in the waste (*e.g.* 99% water, 1% sodium sulfate)

Waste Disposal Labels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CORROSIVE ❑ (AIR OR WATER)
TOXIC ❑ CARCINOGENIC ❑
OTHER (Explain)

NAME OF RESEARCHER: Building _____
Room # _____
Tel # _____
EOHSS 05/06 DATE: _____

- **Flammable**: the waste can be easily set on fire (*e.g.* mixtures of organic solvents)
- **Explosive**: the waste may be liable to detonate or decompose violently (*e.g.* organic peroxides, uninhibited ethers, some nitrates, dry azides)
- **Corrosive**: significantly acidic or basic (*e.g.* containing strong acids/bases)
- **Toxic**: a chemical in the waste is significantly harmful to human/environmental health (*e.g.* sodium azide, phenol, concentrated sulfuric acid, etc.)
- **Oxidizer**: a component of the waste can readily and violently oxidize other chemicals like organics (*e.g.* nitrates, perchlorates, periodates, concentrated sulfuric acid)
- **Reactive (Air or Water)**: chemical in waste reacts violently or hazardously when in contact with air or water (*e.g.* alkali metals, sodium borohydride, *t*-butyllithium); indicate air/water reactivity
- **Carcinogenic**: chemical in waste is known to cause cancer (*e.g.* lead/hexavalent chromium salts, some DNA stains)
- **Other (Explain)**: any other notable hazards associated with the waste (*e.g.* spontaneous polymerization, peroxide formation, etc.)
- **Name of Researcher**: the person generating the waste and not the PI
- **Building/Room #**: where the waste is located (*e.g.* JHE 364)
- **Tel #**: phone extension where you can be reached (*e.g.* 24011)
- **Date**: when the waste container was first used

Much of this information can be readily found on chemical SDS sheets!

Chemical Waste Pickup

General Procedure

- Waste pickup by RPR Environmental occurs weekly on Tuesdays
  - You must indicate that you need a waste pickup on or before the preceding Friday
- Fill out a chemical waste disposal record form
  - Downloadable PDF:

https://hr.mcmaster.ca/app/uploads/2019/01/Chemical-Waste-Disposal-Record.pdf

  - Submit to waste@mcmaster.ca
- Leave the waste in the fumehood or beside the door and make sure it is clearly marked for pickup; put a sign on the door clearly indicating where the waste is
- General tips:
  - Do not leave waste in the lab for long periods of time—schedule regular pickups
  - Consolidate waste if reasonably possible
  - Provide as much information to RPR Environmental as possible about the nature of the waste

Chemical Waste Pickup

Chemical Waste Disposal Form

McMaster University

CHEMICAL WASTE DISPOSAL RECORD (Campus Locations)

Environmental & Occupational Health Support Services

Tel: 905.525.9140 x 24352 Fax: 905.540.9085 http://www.workingatmcmaster.ca/eohss

PART A GENERAL INFORMATION

Researcher Your Name Here	**Date** Today's Date
Technician/Contact Person n/a	
Department & Extension Chemical Engineering, x##### (e.g. 24011)	**Building** JHE/ABB/MDCL etc.
Lab Clean Out n/a	**Room #** ###
Mosaic Chartfield String Get Chartfield from David	◉ Research ○ Undergrad
Email Address Your McMaster Email Here	○ Other

Chemical Waste Pickup

Chemical Waste Disposal Form

Do not use abbreviations or short forms

Item #	Acid or Base pH	% and Chemical Name Include Water	Physical Form	Volume of Container
######	Aqueous pH	Unabbreviated chemical names and reasonable estimates of their fraction of the waste	Solid/Liquid/Gas	# mL/L
141511	5	99% water, 1% sodium chloride, <1% polyethylene glycol	Liquid	1 L
142612	n/a	45% isopropanol, 30% acetone, 20% ethanol, 5% dimethyl sulfoxide	Liquid	4 L
143314	8	80% industrial wastewater, 20% iron (II) hydroxide sludge	Liquid + solid precipitate	4 L

Please email to waste@mcmaster.ca or fax to 905.540.9085

Please complete all areas on this form and send by email or fax by 4:00pm Friday for pick up the following Tuesday.

To send this record as an email, please save the document to your computer, enter your information and then email the record as an attachment.

Chemical Waste Pickup

Chemical Waste Disposal Form

Any Additional Information

Any other hazardous information needed for waste pickup.
Location of waste bottles is also helpful here.

Submit by Email Print Form

HR/Rev 2.0/2014/06/04

Chemical Waste Disposal

Questions?

- For health and safety questions, consult:
  - The relevant SDS sheet
  - Your graduate student
  - Your colleagues
  - Dr. Latulippe
  - Tim Stephens and/or Doug Keller
  - EOHSS

- Everyone is responsible for proper waste management, from undergraduates, to Masters students to PhD students! This includes the proper disposal of all types of waste mentioned in this presentation.

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