APPENDIX D

HAZARDS

Particularly Hazardous Substance Use Approval Form

Before using any particularly hazardous substance, please complete this form and have it approved by your supervisor or Chemical Hygiene Officer. See the back of this form for more complete definitions of a particularly hazardous substances and instructions for completing this form. **Do not use the substance until approval is granted.**

Name_____Phone_____Bldg/Rm._____

Substance Information

Chemical name	❍ Carcinogen
Estimated Rate of Use (e.g., grams/month)	❍ Reproductive Toxin
MSDS reviewed and readily available ❍ Yes ❍ No	❍ High Acute Toxicity

Hazards

Physical Hazards				**Health Hazards**		
Flammable ❍ Yes ❍ No	Corrosive	❍ Yes ❍ No		Significant Route(s) of Exposure		
Reactive ❍ Yes ❍ No	Temperature sensitive	❍ Yes ❍ No		Inhalation Hazard	❍ Yes	❍ No
Stability (e.g., decomposes, forms peroxides, polymerizes, shelf-life concerns)		❍ Stable ❍ Unstable		Skin Absorption	❍ Yes	❍ No
				Sensitizer	❍ Yes	❍ No
Known incompatibilities				Medical surveillance	❍ Yes	❍ No

Procedure (Briefly describe how material will be used & precautions for preparation of stock solutions & dilutions)

Vacuum system used ❍ Yes ❍ No. If yes, describe method for trapping effluents _____
Administered to animals ❍ Yes ❍ No. If yes, special precautions for excreta; are metabolites hazardous? (describe)

Exposure Controls

Personal Protective Equipment (PPE) (Check all that apply)	**Ventilation/Isolation**		
❍ Safety glasses ❍ Chemical splash goggles ❍ Face shield	Fume hood required	❍ Yes	❍ No
❍ Gloves (type _____) ❍ Lab coat ❍ Apron	face velocity operates at > 100 feet per minute	❍ Yes	❍ No
❍ Respirator ❍ SCBA *(Respirators / SCBA require Safety approval)*			
❍ Other, please describe	Glove box required	❍ Yes	❍ No
	Vented gas cabinet required	❍ Yes	❍ No

Location/Designated Area

Building: Room:	**Storage Method/Precautions**
Describe the area where substance(s) will be used and the method of posting it as a designated area.	Building: Room:
	❍ refrigerator/freezer ❍ fume hood
	❍ double containment ❍ vented cabinet
	❍ flammable liquid storage cabinet
	❍ other, describe

Spills, Decontamination and Waste Disposal

Spill control materials readily available ❍ Yes ❍ No		In-lab neutralization	❍ Yes ❍ No
Special personal protective equipment needed (e.g., SCBA) ❍ Yes ❍ No	Describe	Deactivation	❍ Yes ❍ No
Decontamination method		Dispose to Safety Dept.	❍ Yes ❍ No

Authorization

This individual has demonstrated an understanding of the hazards of the listed substance and plans to handle the substance in a manner that minimizes risk to health and property. He/she is authorized to use the substance in the manner described.

_____ _____

Principal Investigator / Supervisor Chemical Hygiene Officer

Using this form

For purposes of this form, a particularly hazardous substance (PHS) includes known or suspected human carcinogens, reproductive toxins, and substances with acute toxicity above certain thresholds. A more complete definition is included in your departmental Chemical Hygiene Plan or Appendix D, Chemical Safety and Disposal Guide. Each individual planning to use a PHS must complete this form and have it approved by their Principal Investigator or supervisor and Chemical Hygiene Officer prior to their initial use. Responsibility for determining whether a chemical is a PHS and completing this form rests jointly with the supervisor and the individual seeking use approval.

Substance Information

Carcinogen: if on IARC, OSHA or NTP list. ***Reproductive toxin***: mutagens, teratogens, embryotoxins. ***High Acute Toxicity:*** oral LD_{50} = 50 mg/kg, skin LD_{50} = 200 mg, air LC_{50} = 200 ppm or = 2 mg/l. MSDS may be available in hard copy or via the internet.

Hazards (Refer to *Physical Properties* section of MSDS)

Flammable liquid: flashpoint = 100° F. ***Flammable solid***: liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or which can be ignited readily and when ignited burns vigorously

Corrosive: Causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.

Reactive: May become unstable or contact with water produces flammable or toxic gas.

Temperature Sensitive: Must be kept within a certain temperature range to ensure stability.

Unstable: substance will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, or high or elevated pressure or temperature. Also includes time-sensitive materials, particularly those that produce peroxides over time.

Incompatibilities: list chemicals or materials that might cause instability or adverse conditions if mixed with the particularly hazardous substance(s).

Inhalation: inhalation of the substance may cause adverse health effects.

Skin exposure: substance is readily absorbed through the skin or can cause significant damage to skin upon contact.

Sensitizer: certain chemicals are known to effect the immune system, causing a person to experience allergic reactions, up to and including anaphylactic shock, upon exposure to the chemical, after the initial sensitization.

Some chemicals can accumulate in body tissues and may require initial or periodic medical surveillance. Contact Safety or for more information.

Procedure

Briefly describe the part of the experimental procedure that involves the substance, with particular attention to how the chemical will be manipulated. Vacuum systems include central vacuum systems and vacuum pumps within the lab. Describe what will be done to ensure that the substance is not accidentally drawn into the vacuum system. Cold traps or filters are some examples of such measures. PHA administered to animals may pose a hazard to animal handlers via contact with excreta and metabolites, note any special precautions.

Exposure Controls

Safety glasses protect from flying particles and minor chemical splashes, for instance, from opening a centrifuge tube.

Chemical splash goggles should be worn when there is a possibility of a significant chemical splash. Most chemical manipulations, particularly where pressure is involved, warrant chemical splash goggles.

Face shield, worn with splash goggles, provides full face protection when working with large volumes of chemicals.

Gloves should be worn when working with any particularly hazardous substance. Since not all gloves offer significant protection from every chemical, it is important to choose the glove that offers the best resistance. See the MSDS, the Safety web page or glove manufacturer compatibility charts for more information.

Lab coats should be worn when working with hazardous substances. The coat should not be worn outside the laboratory and should be laundered separately from other clothing.

Aprons offer chemical resistance and protection from splashes and can be used in conjunction with a lab coat.

Respirators offer protection from inhalation of substances when engineering controls are not sufficient. However, use of respirators must be approved by Safety. Contact Safety at 2-8769 if you believe a respirator is needed.

Self-Contained Breathing Apparatus (SCBA) users must be approved by Safety and must attend training at least annually. Contact Safety at 2-8769 for more information.

A ***fume hood*** should be used for chemicals that may produce vapors, mists, or fumes, or if the procedure may cause generation of aerosols. The hood must have an average face velocity of between 95 and 125 feet per minute. This measurement is noted on the hood survey sticker. If the hood has not been inspected within the past year, contact Safety at 2-8769 for re-inspection before using the hood. A ***glove box*** should be used if protection from atmospheric moisture or oxygen is needed or when a fume hood may not provide adequate protection from exposure to the substance; e.g., a protection factor of 10,000 or more is needed. Highly toxic gases must be used and stored in a ***vented gas cabinet*** connected to a laboratory exhaust system. Gas feed lines operating above atmospheric pressure must use coaxial tubing.

Location/Designated Area

Building and room number where the substance will be used. Describe where in this room the substance will be used. For example, in a hood, on a specific benchtop, in several areas of the laboratory, etc. This room or area must be posted with a *Designated Area* sticker available through Safety or your department Chemical Hygiene Officer. Describe where the substance will be stored. Be specific, e.g., on a shelf, in a refrigerator, in a hood, etc. *Double containment* means that the container will be placed inside another container that is capable of holding the contents in the event of a leak and provides a protective outer covering in the event of contamination of the primary container.

Spills, Decontamination and Waste Disposal

Describe how the work area will be decontaminated after use, in the event of a spill, or upon completion of the work and before removal of the designated area signage. Some corrosive chemicals may be neutralized before disposal via the drain or the hazardous waste program. Some materials, such as ethidium bromide, can be chemically deactivated before disposal via the drain or the hazardous waste program. See the Safety web page for more information about the hazardous waste program. Particularly hazardous substances must not be poured down the drain without consulting Safety.

For help in determining whether a substance meets the PHS criteria, call Safety at x2-8769.

Particularly Hazardous Substances

IARC Carcinogenic Chemicals
Acetaldehyde
Acetamide
Acrylonitrile
Arsenic and compounds Arsenite, arsenate, arsenic trichloride
Asbestos
Benzene
1,3-butadiene
Cadmium compounds Cadmium oxide, acetate, chloride, sulfate, sulfide, nitrate
Carbon tetrachloride
alpha-chlorinated toluenes Benzyl chloride, benzal chloride
Chloroform
Chromium(VI) compounds Chromium trioxide, chromate, dichromate, chromic acid
p-dichlorobenzene
1,2-dichloroethane
Dichloromethane methylene chloride
Diepoxybutane butadiene dioxide, 2,2'-bisoxirane
Dimethyl sulfate
1,4-dioxane
Epichlorohydrin 2-chloromethyloxirane, 3-chloropropylene oxide
Ethyl acrylate
Ethylene dibromide 1,2-dibromoethane
Ethylene oxide oxirane
Ethyl methanesulfonate EMS, methanesulfonic acid ethyl ester
Formaldehyde Formalin solution, paraformaldehyde, s-trioxane

OSHA and EPA toxic chemicals
Acetophenetidin
Allyl alcohol
Afflatoxins
4-aminopyridine
Ammonium vanadate
Brucine
Cacodylic acid
Chlorambucil
Chromyl chloride
Cyanide salts, soluble in water as free CN(-)
Cyclosporin A
Diethyl stilbesterol
Diisopropyl fluorophosphate
2,4-dinitrophenol
Epinephrine
Nickel carbonyl
Nicotine and salts
Nitric oxide
Nitrogen dioxide
Osmium tetroxide
Phenacetin
Phenylmercuric acetate
Phosgene
Propargyl alcohol
Propionitrile
Sodium azide
Sodium cacodylate
Strychnine
Tetranitromethane
Thallium(I) sulfate
Thallic oxide
Thiophenol
Thiosemicarbazide
Vanadium pentoxide
Warfarin

Particularly Hazardous Substances

IARC Carcinogenic Chemicals
Hexamethylphosphoramide HMPA
Hydrazine
Lead compounds Lead oxide, acetate, chloride, sulfate, nitrate, sulfide
N-methyl-N'-nitro-N-nitrosoguanidine MNNG
N-methyl-N-nitrosourea
Mitomycin C
1-naphthylamine 1-aminonaphthalene
2-naphthylamine
Nickel compounds Nickel carbonyl, oxide, chloride, sulfate, nitrate
Phenobarbital 5-ethyl-5-phenylbarbituric acid
Phenytoin 5,5-diphenylhydantoin
Potassium bromate
1,3-propanesultone 3-hydroxy-1-propanesulfonic acid gamma-sultone
beta-propiolactone 2-oxooxetane
Propylene oxide 2-methyloxirane
Saccharin o-sulfobenzimide, sodium and ammonium salts
Silica, crystaline (quartz) powder NOT silica gel or amorphous-precipitated or flour
Styrene
Tetrachloroethylene perchloroethylene
Thiourea
Toluene diisocyanates, 2,4- , 2,6-
o-toluidine 2-methylaniline, 2-aminotoluene
Vinyl chloride

EPA U-List Toxins
Acrylamide
Aniline
p-benzoquinone Quinone
Chloroformate esters methyl, ethyl, propyl, butyl
o-chlorophenol
Crotonaldehyde
Cyanogen bromide
Ethyl carbamate Urethane
Iodomethane methyl iodide
Pyridine
Vinylidine chloride 1,1-dichloroethylene

Reproductive Toxins
Aminopterin
Benzene
Carbaryl
Carbon disulfide
Carbon tetrachloride
Chloroform
Chloroprene
Cycloheximide
Dimethylformamide
2-ethoxyethanol
Mercury
Methotrexate
Methoxychlor
2-methoxyethanol
Methylene chloride
Selenium
Trichloroethylene
Tetrachloroethylene
Toluene
Xylenes