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Reproductive Toxins

STANDARD OPERATING PROCEDURE (SOP)

Type of SOP: ☐ Process ☐ Hazardous Chemical ☒ Hazardous Class

All personnel who are subject to these SOP requirements must review a completed SOP and sign the associated training record. Completed SOPs must be kept with the UC Davis Laboratory Safety Manual or be otherwise readily accessible to laboratory personnel. Electronic access is acceptable. SOPs must be reviewed, and revised where needed, as described in the UC Davis Laboratory Safety Manual. Note that not all hazardous chemicals are appropriately addressed in a single control-banded SOP, and some chemicals are subject to several control-banded SOPs. The unique properties of each chemical must be considered before including it into a control band.

Date SOP Written: **1/1/18** Approval Date: **1/2/18**

SOP Prepared by: **Diane Hoffmann**, **CLSC SOP Task Force**

SOP Reviewed and Approved by (name/signature): _____

Department: **Biomedical Engineering**

Principal Investigator/ Laboratory Supervisor: **Marc Facciotti** **530-752-3781**; **Andrew Yao** Phone: **530-752-4164**

Lab Manager/ Safety Coordinator: **Diane Hoffmann** Phone: **530-752-9996**

Emergency Contact(s): **EH&S-Safety Services** Phone: **530-752-1493**

Location(s) covered by SOP: Building: **GBSF & Academic Surge** Lab Phone: **530-752-4164**; Room #(s): **5212A GBSF/2240 AS**

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1. HAZARD OVERVIEW

There is a broad spectrum of chemicals that pose the potential to be Reproductive Toxins (*e.g.,* mutagenicity, teratogenicity, etc.). Recognition of the hazards associated with the transportation, handling, storage, and disposal of these materials is essential.

2. HAZARDOUS CHEMICAL(S)/CLASS OF HAZARDOUS CHEMICAL(S)

Reproductive Toxins are substances or agents that may have adverse effects on various aspects of reproduction in both women and men, including fertility, gestation/pregnancy, birth defects, lactation, genetic effects, and general reproductive performance. Many chemicals used in laboratory study and research, industrial processes, and daily activities pose reproductive hazards.

Materials that meet this criteria can be identified using the following Globally Harmonized System Hazard Codes, which should be included on current Safety Data Sheets:

1. H340 - May cause genetic effects;
2. H341 - Suspected of causing genetic effects;
3. H360 - May damage fertility or the unborn child;
4. H361 - Suspected of damaging fertility or the unborn child; and
5. H362 - May cause harm to breast-fed children.

A few examples of common Reproductive Toxins used at the UC Davis campus include, but are not limited to, the following:

1. Chloroform
2. Toluene
3. Benzene
4. Lead
5. Anesthetic gases (*e.g.,* halothane, isoflurane, etc.)

BORIC ACID, CHLOROFORM, IMIDAZOLE, KANAMYCIN SULFATE, PHENOL, SODIUM TETRABORATE, WARFARIN.

All SDS sheets are available and reviewed to describe important properties and signs/symptoms of exposure.

3. ENGINEERING/VENTILATION CONTROLS

The following is a general plan for all Reproductive Toxins:

A. Use containment devices (*e.g.,* chemical fume hoods, glove boxes, etc.) when:
   i. Using volatile and/or semi-volatile substances;
   ii. Manipulating substances that may generate aerosols; and
   iii. Performing laboratory procedures that may result in an uncontrolled release.

B. Use high-efficiency particulate air (HEPA) filters, carbon filters, or scrubber systems with containment devices to protect effluent and vacuum lines, pumps, and the environment whenever feasible.

C. Ventilated containment should be used to weigh out solid chemicals (*e.g.,* certified laboratory chemical fume hood). Alternatively, the tare method can be used to prevent inhalation of the chemical. While working in a fume hood, the chemical is added to a pre-weighed container. The container is then sealed and can be re-weighed outside of the fume hood. If a chemical needs to be added or removed, this manipulation is carried out in the fume hood. In this manner, all open chemical handling is conducted in the fume hood.

If you must use Reproductive Toxins without engineering or ventilation controls, you must contact chem-safety@ucdavis.edu for an exposure assessment.

Engineering and ventilation controls will be followed in accordance to UC Davis Guidelines and product SDS.

4. ADMINISTRATIVE CONTROLS

The following elements are required:

1. Complete the UC Laboratory Safety Fundamentals (or approved equivalent) training prior to working in the laboratory;
2. Complete laboratory-specific safety orientation and training on laboratory-specific safety equipment, procedures, and techniques to be used, including any applicable laboratory-specific Laboratory Safety Plan(s), prior to receiving unescorted access to the laboratory;
3. Demonstrate competency to perform the procedures to the Principal Investigator (PI), Laboratory Supervisor, laboratory-specific Safety Officer, and/or trainer;
4. Be familiar with the location and content of any applicable Safety Data Sheets (SDSs) for the chemicals to be used (online SDSs can be accessed from UC SDS);
5. Implement good laboratory practices, including good workspace hygiene;
6. Inspect all equipment and experimental setups prior to use;
7. Follow best practices for the movement, handling, and storage of hazardous chemicals (see Chapters 5 and 6 of Prudent Practices in the Laboratory for more detail). An appropriate spill cleanup kit must be located in the laboratory. Chemical and hazardous waste storage must follow an appropriate segregation scheme and include appropriate labeling. Hazardous chemical waste must be properly labelled, stored in closed containers, in secondary containment, and in a designated location;
8. Do not deviate from the instructions described in this SOP without prior discussion and approval from the PI and/or Laboratory Supervisor;
9. Notify the PI and/or Laboratory Supervisor of any accidents, incidents, near-misses, or upset condition (*e.g.,* unexpected rise or drop in temperature, color or phase change, evolution of gas) involving the Reproductive Toxins described in this SOP; and
10. Abide by the laboratory-specific working alone SOP, if applicable.

For Reproductive Toxins, the following are also required:

11. Work surfaces should be protected (*e.g.,* disposable absorbent bench paper, aluminum foil, etc.) and must be decontaminated after each use.

Laboratory personnel considering pregnancy or who become pregnant may want to consult the additional information on the Reproductive Health webpage.

Quantities will be used and stored within UC Davis Guidelines and product SDS.

5. PERSONAL PROTECTIVE EQUIPMENT (PPE)

At a minimum, long pants (covered legs) and closed toe/closed heel shoes (covered feet) are required to enter a laboratory or technical area where hazardous chemicals are used or stored.

In addition to the minimum attire required upon entering a laboratory, the following PPE is required for work with Reproductive Toxins:

A. Eye Protection: Eye protection is required for all work with Reproductive Toxins.
   i. At a minimum ANSI Z87.1-compliant safety glasses are necessary.

ii. Splash goggles may be substituted for safety glasses, and are required for processes where splashes are foreseeable or when generating aerosols.
iii. Ordinary prescription glasses will NOT provide adequate protection unless they also meet the Z87.1 standard and have compliant side shields.

B. Body Protection: At a minimum a chemically-compatible laboratory coat that fully extends to the wrist is necessary.
   i. If a risk of fire exists, a flame-resistant laboratory coat that is NFPA 2112-compliant should be worn.
   ii. For chemicals that are corrosive and/or toxic by skin contact/absorption additional protective clothing (*e.g.,* face shield, chemically-resistant apron, disposable sleeves, etc.) are required where splashes or skin contact is foreseeable.

C. Hand Protection: When hand protection is needed for the activities described in this SOP define the type of glove to be used based on: A) the chemical(s) being used, B) the anticipated chemical contact (*e.g.,* incidental, immersion, etc.), C) the manufacturers' permeation/compatibility data, and D) whether a combination of different gloves is needed for any specific procedural step or task.

PPE and hygiene practices will be followed in accordance with UC Davis Guidelines and product SDS.

6. SPILL AND EMERGENCY PROCEDURES

Follow the guidance for chemical spill cleanup from SafetyNet #13 and/or the UC Davis Laboratory Safety Manual, unless specialized cleanup procedures are described below. Emergency procedure instructions for the UC Davis campus and UCD Medical Center are contained in the UC Davis Laboratory Safety Manual, campus Emergency Response Guide (ERG), and UCD Health System ERG. The applicable ERG must be posted in the laboratory. All other locations must describe detailed emergency procedure instructions below.

Spill and emergency procedures will be followed in accordance with UC Davis Guidelines and product SDS.

7. WASTE MANAGEMENT AND DECONTAMINATION

Hazardous waste must be managed according to Safety Net #8, and must be properly labeled. In general, hazardous waste must be removed from your laboratory within 9 months of the accumulation start date; refer to the accumulation time for waste disposal. Hazardous waste pick up requests must be completed using WASTe.

Note: See the WASTe Factsheet for instructions on how to complete a label.

Waste management will be followed in accordance with UC Davis Guidelines and product SDS.

Decontamination procedures vary depending on the material being handled. The toxicity of some materials can be neutralized with other reagents. All surfaces and equipment should be wiped with the appropriate cleaning agent following the dispensing or handling of reproductive hazards to prevent accumulation. Decontaminate vacuum pumps or other contaminated equipment before removing them from the designated area or before resuming normal laboratory work in the area.

Carefully inspect work areas to make sure no hazardous materials remain. Clean contaminated work areas with an appropriate cleaning agent, and dispose of cleaning materials properly. Be sure all ignition sources are secured before beginning clean-up with flammable liquids.

Decontamination procedures will be followed in accordance with UC Davis Guidelines and product SDS.

Upon completion of work with Reproductive Toxins and/or decontamination of equipment, remove gloves and/or PPE to wash hands and arms with soap and water. Additionally, upon leaving a designated Reproductive Toxin work area remove all PPE and wash hands, forearms, face and neck as needed. Contaminated clothing or PPE should not be worn outside the lab. Soiled lab coats should be sent for professional laundering. Grossly contaminated clothing/PPE and disposable gloves must not be reused.

8. DESIGNATED AREA

Designated area(s) are required for use and storage of Reproductive Toxins. Such areas must be clearly marked with signs that identify the chemical hazard and include an appropriate warning; for example: DANGER! REPRODUCTIVE TOXIN WORK AREA!

Reproductive Toxins will be designated to use in a certified fume hood or safe work place in accordance with UC Davis Guidelines and the product SDS.

9. DETAILED PROTOCOL

All SDS sheets are available and reviewed to detail hazardous chemicals or hazard class.

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TEMPLATE REVISION HISTORY

Version	Date Approved	Author	Revision Notes:
1.0	12/1/2014	CLSC Task Force	New template
1.1	4/16/2015	Chris Jakober	Changed SDS link, language relating to soiled PPE
1.2	3/10/2016	Chris Jakober	Updated URLs following website redesign, added URL to UCDHS ERG, corrected error in common examples list
1.3	11/30/2016	Lindy Gervin	Unlocked editable fields
1.4	3/13/2017	Lindy Gervin	Updated links in section 7 to WASTe system
1.5	5/10/2017	Lindy Gervin	Updated email address in section 3

LAB-SPECIFIC REVISION HISTORY

Version	Date Approved	Author	Revision Notes:

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Documentation of Standard Operating Procedure Training

(Signature of all users is required)

- ✓ Prior to using **Reproductive Toxins**, laboratory personnel must be trained on the hazards involved in working with this SOP, how to protect themselves from the hazards, and emergency procedures.
- ✓ Ready access to this SOP and to a Safety Data Sheet for each hazardous material described in the SOP must be made available.
- ✓ The Principal Investigator (PI), or the Laboratory Supervisor if the activity does not involve a PI, must ensure that their laboratory personnel have attended appropriate laboratory safety training or refresher training within the last three years.
- ✓ Training must be repeated following **any** revision to the content of this SOP. Training must be documented. This training sheet is provided as one option; other forms of training documentation (including electronic) are acceptable but records must be accessible and immediately available upon request.

Designated Trainer: *(signature is required)*

I have read and acknowledge the contents, requirements, and responsibilities outlined in this SOP:

Name	Signature	Trainer Initials	Date