IOWA STATE UNIVERSITY

I. STANDARD OPERATING PROCEDURE

Use this form to document the Health & Safety information associated with the procedure.

Procedure Title: Phenol

Dept: EEOB **Bldg/Rm:** 431 Bessey **Supervisor:** Jonathan F. Wendel

Circumstances of use:

Phenol is commonly used in lab for DNA, RNA and protein extraction.

Health and safety information:

Phenol is very hazardous in case of skin contact – it is corrosive, toxic, and can cause irritation. Initially, it can cause numbness or slight tingling, so employees may not be immediately aware of contact. If absorbed through the skin, it can cause muscle weakness, tremors, loss of coordination, shock, sudden collapse, coma, convulsions, organ damage, and death. It may cause severe eye injury (including blindness) if it contacts the eyes, and is extremely toxic (fatal) by ingestion.

Inhalation exposure is less likely – it does not evaporate easily at room temperature, but can be inhaled if heated and/or misted, or in the case of a large spill. If inhaled, phenol can cause upper respiratory irritation, lung damage, and CNS impairment. The OSHA PEL and ACGIH TLV are both 5 ppm as an 8 hour time-weighted average.

For more safety information, refer to Prudent Practices' Laboratory Chemical Safety Summary for Phenol.

Hazard Control Measures:

(Lab coat, eye and hand protection, and closed toe/heel shoes must be selected as required by Section D of the ISU Laboratory Safety Manual.)

☐ **Latex gloves**	☐ **Insulated gloves**	☐ **Face Shield**	☐ **Respirator**
☒ **Nitrile gloves**	☒ **Safety glasses**	☒ **Lab Coat**	☒ **Fume hood**
☐ **Neoprene gloves**	☐ **Vented goggles**	☐ **Apron**	☐ **Biosafety cabinet**
☐ **Vinyl gloves**	☐ **Splash goggles**	☐ **Dust mask**	☐ **Glove box**
☒ **Closed Toe/Closed Heel Shoes**		☐ **Flame Resistant Lab coat**	

Other Control Measures:

- An eyewash (preferably eyewash/drench hose combination unit) must be located in the immediate area.
- Work with large open containers should be performed only in a chemical fume hood.
- Small amounts can be handled safely on the benchtop at or below room temperature, as long as skin contact is avoided.

Special Handling Procedures and Storage Requirements:

- It is highly recommended that labs using phenol (or reagents containing phenol – e.g., TRIzol) have polyethylene glycol 300 or 400 (PEG-300 or PEG-400, both of which are VISCOUS LIQUIDS) on hand in case of dermal exposure. See first aid procedure if exposure occurs.
- Designate an area for working with phenol, and label it as such.
- Post the Phenol Hazard Alert in the vicinity of the designated phenol work area.
- Purchase in the smallest container that is practical for lab use.
- Purchase in a shatter-resistant container if available (such as PVC-coated glass).
- Keep containers closed as much as possible.
- Use in the smallest quantities and lowest concentration practicable for the experiment being performed.
- Avoid heating if possible as this increases risk of inhalation exposure.
- After work with phenol is complete, wipe down work area with soap and water solution.

Waste Disposal Procedures:

Generated waste should be disposed of as outlined in the Waste and Recycling Guidelines. Chemical wastes shall not be flushed down the sink or put in with the general garbage. Contaminated clothing should not be worn again until washed.

First Aid Procedures:

- Quickly remove contaminated clothing.
- If a small area of skin has been exposed to phenol, swab polyethylene glycol 300 or 400 (PEG-300 or 400) onto the affected area immediately and repeatedly until the smell of phenol is no longer evident, then seek medical attention. If PEG-300 or 400 is not available, flush area with COPIOUS amounts of water (such as from a drench hose or safety shower) for at least 15 minutes, then seek medical attention.
- For larger areas of exposed skin or eye exposure, flush area with COPIOUS amounts of water for at least 15 minutes, then seek immediate medical attention. Please note that using high-density water irrigation will reduce phenol uptake, but if lesser amounts of water are used it will merely dilute the phenol and increase the area of exposure.
- If there is respiratory irritation associated with exposure, remove all persons from the contaminated area and contact EH&S for assistance (515-294-5359).
- Call 911 from a campus phone to request assistance if needed.
- All accidents and injuries occurring at work or in the course of employment must be reported to the employee's supervisor as soon as possible (even if no medical attention is required). http://www.ehs.iastate.edu/occupational/accidents-injuries

Spill/Release Containment, Decontamination, and Clean Up Procedures:

Employees in the area should be prepared to clean up minor spills, including most spills confined to the chemical fume hood. **Wearing Silver Shield laminate gloves (with optional nitrile gloves over top), neoprene/natural rubber gloves, or ChemTek Viton/butyl gloves plus splash goggles, face shield and lab coat (and impermeable apron and sleeves, if available)**, use absorbent pads to absorb spilled material. After spill has been completely absorbed, wipe down contaminated area with soap and water solution. Lab personnel should take great care to avoid skin contact with phenol. If skin contact does occur, follow the instructions outlined for exposures/unintended contact in the section

above. Contaminated PPE and clean-up materials should be placed in a clear plastic bag. Call EH&S to arrange pick-up. Large spills of phenol must be referred to EH&S.

Using Substances Requiring Special Procedures? No ☐ Yes ☐
(If Yes; identify authorized personnel, designate a use area and specify specialized safety precautions here. Refer to Section B in the ISU Laboratory Safety Manual for details.)

Written By: Guanjing Hu **Date:** 11/28/17

Approved By: _____ **Date:** _____
(PI or Lab Supervisor)

II. HAZARD ASSESSMENT

Use the hierarchy of controls to document the hazards and the corresponding control measure(s) involved in each step of the procedure.

Consider *elimination or substitution* of hazards, if possible.
Engineering Control(s): items used to isolate the hazard from the user (i.e. fume hood, biosafety cabinet).
Administrative Control(s): policies/programs to limit the exposure to the hazard (i.e. authorizations, designated areas, time restrictions, training).
Required PPE: indicate PPE including specific material requirements if applicable (i.e. flame resistant lab coat, type of respirator or cartridge).

Hazard	Engineering Control(s)	Administrative Control(s)	Required PPE

III. Training Record

Use the following table to record the training associated with this Standard Operating Procedure.

Print Name	Signature	Date

Note: Attach to or file with written materials and methods