USC UNIVERSITY OF SOUTHERN CALIFORNIA

STANDARD OPEARTING PROCEDURE FOR CARCINOGENS

DPS emergency number 213-740-4321

NATURE OF HAZARD

"Carcinogen means a substance or a mixture of substances which induce cancer or increase its incidence. Substances and mixtures which have induced benign and malignant tumors in well-performed experimental studies on animals are considered also to be presumed or suspected human carcinogens unless there is strong evidence that the mechanism of tumor formation is not relevant for humans." (29 CFR §1910.1200 Appendix A)

Carcinogens directly or indirectly damage DNA in cells, causing an increased probability of cancer. Precancerous cellular damage is generally symptomless, and in the event it progresses to cancer, it usually does so after a long induction period (years to decades). Not all damage can be repaired by the body and the level of residual irreversible damage will increase with each exposure. Thus, carcinogens are principally a chronic health hazard.

Carcinogens act on the body by all routes of exposure (absorption through skin/eyes/mucous membranes, injection under skin, ingestion, inhalation as dust, droplets, or vapor).

HAZARD IDENTIFICATION

- Classification and identification of carcinogens is covered in detail in Section 6 of the CHP. All personnel who agree to abide by this SOP are required to familiarize themselves with the contents of Section 6 of the CHP.
- For purchased chemicals, identification as a carcinogen should be made by assessing hazard information given in the safety data sheet (SDS) against the criteria given in the CHP subsection Particularly Hazardous Substances (towards the end of Section 6). If the SDS does not list the material as carcinogenic, the material may still be a carcinogen according to California Proposition 65; check the official list to confirm (https://oehha.ca.gov/proposition-65/proposition-65-list).
- For synthesized chemicals, please refer to CHP subsection Particularly Hazardous Substances for pointers as to when carcinogenicity may be suspected or assumed.
- Any mixture containing a carcinogen at a concentration of 0.1% or more by mass shall be handled as a carcinogen. For carcinogens known to be highly potent (e.g. the 13 particularly severe carcinogens listed below), mixtures containing any quantity should be assumed carcinogenic.

REGULATED CARCINOGENS

- Min Special regulatory conditions apply to 13 severe carcinogens (8 CCR §5209). Please contact labsafety@usc.edu far in advance of purchasing or using the substances in the following list (or their salts, in the case of amines):
    - 2-Acetylaminofluorene [CAS 53-96-3]
    - 4-Aminodiphenyl* (4-aminobiphenyl) [CAS 92-67-1]
    - Benzidine (and its salts) [CAS 92-87-5]
    - 3,3'-Dichlorobenzidine (and its salts) [CAS 91-94-1]
    - 4-(Dimethylamino)azobenzene* [CAS 60-11-7]
    - alpha-Naphthylamine* (1-naphthylamine) [CAS 134-32-7]
    - beta-Naphthylamine* (2-naphthylamine) [CAS 91-59-8]

4-Nitrobiphenyl [CAS 92-93-3]
N-Nitrosodimethylamine [CAS 62-75-9]
beta-Propiolactone [CAS 57-57-8]
Bis(chloromethyl) ether [CAS 542-88-1]
Methyl chloromethyl ether [CAS 107-30-2]
Aziridine* (ethyleneimine) [CAS 151-56-4].
* Salts of these amines are not specifically mentioned in 8 CCR §5209, but shall be considered equally as hazardous and regulated as the free amines.

PHS DESIGNATION

- Carcinogens are considered *Particularly Hazardous Substances* (PHS) by Cal-OSHA (8 CCR §5191 (e) (H)). PHS need to be handled with special care, please refer to CHP Section 8 for guidance.

PREPARATION

- Do not handle Carcinogens while working alone in the cleanroom area.
- Remove hand and wrist jewelry. Do not wear contact lens (Contact lens are not permitted in the cleanroom).
- Identify the locations of safety equipment (Eyewash and Shower station, Hazardous Waste Container, Emergency buttons and Phones).
- Save DPS emergency line 213-740-4321 into personal phone.
- Read the Safety Guideline and Material Safety Data Sheet for Carcinogens.
- Wear all appropriate PPE (Safety Goggles, Face Shield for operations with splash hazard, Two layers of gloves).
- Ensure an adequate supply of clean-up material is within reach in case of minor spills.
- Ensure an appropriate waste container is accessible to dispose contaminated clean-up material.
- For more hazardous work involving Carcinogens, restrict access to work area with sign labelled “Warning – Carcinogen”.
- Carcinogens must be handled under a fume hood.
- Clearly label all containers with any liquids, including containers with water. Place containers with Carcinogens into secondary polypropylene container while not in use.
- Labels must include User Name, Group (PI) Name, Contact Email or Phone Number, Chemical Name, and Chemical Formula.

WASTE DISPOSAL

- Wash all beakers and cylinders used in handling.
- Wipe down and dry all surfaces.
- Store waste in containers labelled “CHEMICAL/HAZARDOUS WASTE FOR DISPOSAL.”

SKIN AND EYE EXPOSURE

- For skin exposure, immediately flush with cool water for a minimum of 15 minutes. Remove contaminated clothing and footwear while rinsing.
- For eye exposure, forcibly hold eyes open and flush for at least 15 minutes. Continue flushing area with water if pain continues.

- Do not use neutralizing chemicals, creams, abrasives, or lotions.
- Contact DPS and alert cleanroom staff.
- Wash all beakers and cylinders used in handling Carcinogens.
- Wipe down and dry all surfaces following handling.
- Store Carcinogen waste in containers labelled “Hazardous Waste Container.”

INHALATION EXPOSURE

- Move to location with fresh air.
- Obtain medical attention immediately if symptoms develop (coughing, shortness of breath, wheezing, burning in mouth or throat, or chest pain).
- Alert cleanroom staff and call DPS for medical assistance.

INGESTION

- Alert cleanroom staff and call DPS for medical assistance.
- If possible, determine what material was ingested by victim.
- If victim begins to vomit, turn head or entire body to one side to avoid choking.
- Do not induce the victim to vomit or drink any beverage unless instructed to by qualified medical personnel.

ACCIDENTAL SPILLS

- Minor spills can be cleaned with a spill kit or simple items like wipes or absorbent pads.
- For all spill emergencies, contact DPS and alert cleanroom staff.
- Evacuate personnel from spill area and deny entry.

UNATTENDED EXPERIMENTS

- Chemicals may not be left unattended for more than 15 minutes.
- For unattended experiments longer than 15 minutes, notify cleanroom staff to get permission.
- The maximum time for unattended chemicals is one hour.
- Unattended chemicals require displayed signage at fume hood.
- The sign must contain the hazards of the experiment, the experimenter’s name and contact information, responsible PI’s name and contact information, expected date and time of disposal.
- For more information on unattended hazardous experiments, please refer to the Unattended Hazardous Operations Fact Sheet.

EMERGENCY NOTIFICATION

- Notify the Department of Public Safety (DPS) at (213) 740-4321 or (323) 442-1000. For a non-emergency, dial (213) 740-6000.
- State the nature of the emergency (e.g., injury, hazardous materials or biohazards spill, fire) and provide details.

a) Location of injury/incident
b) Name(s) of injured and name(s) of witness(es)
c) Contact information (your name and call-back number)
d) Injury/incident summary

- Notify EH&S immediately at (323) 442-2200 or injuryprevention@usc.edu to report the injury/incident.
- Notify the cleanroom staff and your supervisor.

References

- SOP – Carcinogens | USC Environmental Health & Safety
- Chemical Hygiene Plan

Contributors	Revised Date
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