

GUIDE TO LABORATORY SAFETY PRACTICES MANAGING PARTICULARLY HAZARDOUS SUBSTANCES

INTRODUCTION

Before beginning laboratory research with a particular substance, the hazard properties of that substance should be known, in order to determine appropriate personal protection and safe handling procedures. Certain substances are defined as "Particularly Hazardous Substances" (PHS) by the Occupational Safety and Health Administration (OSHA) because of their potential to cause severe adverse health effects. PHS items should be identified, evaluated, and managed in accordance with this guidance document to ensure that adequate protection from hazards for laboratory staff is provided.

IDENTIFICATION OF PARTICULARLY HAZARDOUS SUBSTANCES (PHS)

The *OSHA Laboratory Standard* ([29 CFR 1910.1450](#)) defines a Particularly Hazardous Substance as a select carcinogen, reproductive toxin, substance with a high degree of acute toxicity, or possessing some other high hazard physical property. The Globally Harmonized System of Classification and Labelling of Chemicals ([GHS](#)) has been adopted by OSHA as a means for identifying PHS items. Vanderbilt provides resources such as GHS-compliant Safety Data Sheets (SDS), EHS Assist, and other chemical hazard information databases to determine if substances meet the definition of PHS under one or more classifications as defined below. GHS information is found in the Hazard Identification Section (Section 2) of the SDS:

- **Select carcinogens:** Those that are listed by OSHA ([GHS](#)), the International Agency for Research on Cancer (IARC), and the National Toxicology Program (NTP) as known or suspected human carcinogens:
 - [GHS](#) Carcinogenicity Category 1A or 1B or
 - [IARC](#) Group 1, or [NTP](#) Known to be Human Carcinogens or [OSHA-listed carcinogens](#), or
 - [GHS](#) Category 2 AND [IARC](#) Group 2 (A or B), AND [NTP](#) Reasonably Anticipated to be Human Carcinogens.
- **Reproductive toxins:** Chemicals that may adversely affect male and female reproductive health and the developing fetus include:
 - [GHS](#) Category 1A or 1B for reproductive toxicity.
- **Chemicals having high acute toxicity** include the following GHS classifications:
 - [GHS](#) Category 1 or 2 Acute Toxicity by Inhalation, Dermal, or Oral exposure
 - [GHS](#) Category 1 Specific Target Organ Toxicity - Single Exposure
 - [GHS](#) Category 1A Skin or Respiratory Sensitizer
- **Reactive & Explosive Chemicals** considered Particularly Hazardous include the following [GHS/UN](#) classifications:
 - In contact with water emits flammable gas - Category 1
 - In contact with water liberates toxic gas
 - In contact with acids liberates toxic gas
 - Pyrophoric liquid or solid - Category 1
 - Self-heating - Category 1
 - Self-Reactive or Organic peroxides - Type A or B
 - Explosives - Divisions 1.1 - 1.3

MANAGEMENT OF PARTICULARLY HAZARDOUS SUBSTANCES (PHS)

If your laboratory is handling particularly hazardous substances, the following management practices are required:

- Maintain an accurate and clearly identified inventory of your PHS items.
- Prepare and implement written, lab-customized Chemical Safety Protocols / Standard Operating Procedures for PHS items as defined under *Vanderbilt University's Chemical Hygiene Plan*
- Provide documented training covering Chemical Safety Protocols for appropriate laboratory staff

QUESTIONS OR GUIDANCE

If you have questions or require guidance on the full implementation of this guide, please contact Vanderbilt University EHSS via email at ehs@vanderbilt.edu