



DEPARTMENT OF THE NAVY
NAVAL POSTGRADUATE SCHOOL
1 UNIVERSITY CIR
MONTEREY, CA 93943-5000

IN REPLY REFER TO:

NPSINST 5100.6

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NPS INSTRUCTION 5100.6

Subj: NAVAL POSTGRADUATE SCHOOL CHEMICAL HYGIENE PLAN

Ref: (a) 29 CFR 1910.1450
(b) OPNAVINST 5100.23
(c) NAVPGSCOLINST 5090.1
(d) NSAMINST HAZCOM PLAN
(e) NSAMINST 5090.3 HAZWASTE PLAN

Encl: (1) Naval Postgraduate School Chemical Hygiene Plan

1. Purpose. To publish the Naval Postgraduate School (NPS) Chemical Hygiene Plan.

2. Discussion. Reference (a) provides policy and outlines responsibilities for the implementation of a Chemical Hygiene Plan. Reference (b) provides policy and outlines responsibilities for the implementation of the total Navy Safety and Occupational Health Program. Reference (c) outlines responsibilities and provides instruction for the NPS HAZMAT Program. Reference (d) outlines responsibilities and provides instruction for Hazard Communication as a NSAM tenant command. Reference (e) outlines responsibilities and provides instruction for the NSAM HAZWASTE Program.

3. Action. All levels of NPS shall implement and manage the Chemical Hygiene Program in compliance with the policies, procedures, actions, and guidance set forth by this plan.


D. L. McLAY
Chief of Staff

Distribution:

<http://intranet.nps.edu/Code00/Instructions/IndexNew.html>

NPS LABORATORY CHEMICAL HYGIENE PROGRAM

Laboratory Name: _____

Department: _____

Building Name: _____

Building #: _____ Room Number(s): _____

PI/Supervisor: _____

HAZMAT Representative: _____

Safety Coordinator: _____

Prepared by: _____ (HM Rep / PI / Lab Manager)

Approved by: _____ (Lab PI)

Acknowledged by: _____ (NPS CHO)

Introduction: Laboratory Chemical Hygiene Program

1. The Naval Postgraduate School (NPS), like many other complex teaching and research institutions, uses a wide variety of chemicals. The NPS Chemical Hygiene Plan (CHP) provides a written program that sets forth procedures, laboratory and personal protective equipment, and work practices capable of protecting employees from the health hazards presented by laboratory use of hazardous chemicals, within various laboratories at NPS. In this context, laboratory use of hazardous chemicals refers to laboratories where relatively small quantities of hazardous chemicals are used on a non-production basis.

2. This document is the overarching NPS Chemical Hygiene Plan. It is written in a format such that it can be reproduced locally, modified slightly as indicated below, to become the lab-specific Chemical Hygiene Plan required by Occupational Safety and Health Administration (OSHA) regulations and other parts of this instruction. As such, this plan contains requirements for laboratory chemical hygiene practices designed to protect faculty, staff, students, volunteers, contractual services employees, visitors, and the environment from the potential physical and health hazards of chemical use that may occur as a result of school-related laboratory activities. This program is also designed to comply with OSHA 29 CFR 1910.1450 regulations and to achieve compliance with the OSHA law which mandates that employers must provide a safe and healthful working environment for their employees.

3. The NPS CHP shall be made readily available to all employees.

4. Scope. This program applies to all laboratories at NPS or any of its satellite facilities or locations including but not limited to research, instructional, analytical, and/or academic laboratories. Requirements contained within are in accordance with 29 CFR 1910.1450 regulations.

5. Responsibilities. This section includes but is not limited to responsibilities outlined in 29 CFR 1910.1450 Appendix A.

a. The NPS Chemical Hygiene Officer (CHO) on behalf of the NPS President will:

- (1) Establish, maintain, and revise the chemical hygiene plan (CHP).
- (2) Create and revise safety rules and regulations.

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(3) Work with the Naval Postgraduate School (NPS) Hazardous Material Control and Management (HMC&M) Program Officer and departmental HM representatives to monitor procurement, use, storage, and disposal of chemicals.

Conduct periodic inspections of the laboratories, preparations rooms, and chemical storage rooms. Submit laboratory inspection reports to applicable lab PIs, departmental safety and HM representatives, department chairs, and the NPS OSHE Directorate. Submit statistical reports of deficiencies for safety committee and council meetings. Report deficiencies in ESAMS.

(4) Maintain inspection, training, and inventory records. Obtain training records and monthly inventories for the PIs and HM representatives.

(5) Assist laboratory supervisors in developing and maintaining adequate facilities.

(6) Seek ways to improve the chemical hygiene program (i.e. develop laboratory self-audit forms).

(7) Provide general chemical hygiene training.

(8) Work with the assigned BUMED Industrial Hygiene Officer for exposure assessments, evaluations of exposure control, and criteria for exposure control measures. Ensure control measures are contained in the SOPs prior to the command acknowledging the SOP.

(9) Maintain employee exposure records.

(10) Coordinate emergency response for chemical spills too large to be controlled by lab or safety personnel.

(11) Investigate laboratory accidents and incidents.

(12) Monitor compliance with the program and perform an annual evaluation of this Laboratory Chemical Hygiene Program.

b. Directors and Department Heads

(1) Assume responsibility for personnel engaged in the laboratory use of hazardous chemicals.

(2) Provide the chemical hygiene officer (CHO) with the support necessary to implement and maintain the CHP.

(3) After receipt of lab inspection reports from the CHO, meet with lab supervisors to discuss cited violations and to ensure timely actions to protect trained lab personnel and facilities and to ensure that the department remains in compliance with all applicable federal, state, university, local and departmental codes and regulations.

(4) Provide budgetary arrangements to ensure the health and safety of the departmental personnel, visitors, and students.

(5) Ensure departmental compliance with all the procedures outlined in this program.

c. NPS Safety Coordinator and Representative Committee.
Review accident reports and make appropriate recommendations to the department chairperson regarding proposed changes in laboratory procedures.

d. Principal Investigator/Supervisor of the laboratory (PI)

(1) Implement a CHP and maintain safe lab practices.

(2) Comply with the CHP and ensure lab personnel do not operate equipment or handle hazardous chemicals without proper training, equipment, and authorization.

(3) Develop and implement a laboratory-specific CHP using this template.

(4) Develop Standard Operating Procedures (SOP) that address the specific safety procedures used in the lab to protect employees.

(5) Inform students and personnel working in the laboratory of any medical examinations and exposure monitoring required per the Industrial Hygiene Survey or OSHE Office.

(6) Inform those same personnel to coordinate medical surveillance with the NPS OSHE Office, and inform the OSHE Office of lab personnel who should be enrolled in a medical surveillance program.

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(7) Ensure personnel in the laboratory know the emergency response procedures for chemical spills, injuries and overexposures.

(8) Keep records of percentages and chemicals (name, manufacturer, CAS#s) mixed and Safety Data Sheets (SDSs) for chemicals produced in the laboratory for inter- and/or intra-laboratory use.

(9) Maintain an inventory of chemicals used in the lab and in Lab Fume Hoods.

(10) Provide area-specific chemical safety training to students and lab staff and work with the HM representative to input training documentation into ESAMS. For students, a training roster with the subject date name and signature is adequate. Forward a copy of the student training roster to the CHO and Training Officer.

(11) Ensure lab personnel wear personal protective equipment (PPE) that is compatible to the degree of hazard of the chemical.

(12) Follow all pertinent safety rules when working in the lab to set an example.

(13) Review lab procedures for potential safety problems before assigning to other lab personnel.

(14) Ensure visitors follow lab rules and assume responsibility for lab visitors.

(15) Ensure PPE is available and properly used by each lab employee and visitor.

(16) Perform regular, formal chemical hygiene and housekeeping inspections, including routine inspections of emergency equipment. Forward documentation of these inspections to the CHO.

(17) Follow all conditions of the permit when an air permit is required for the laboratory fume hood. Monitor the facilities and the chemical fume hoods to ensure that they are maintained and function properly. Contact the safety and HM

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coordinators, designated by the department chair, to report problems with the facilities or the chemical fume hoods.

e. The HM representative

(1) Work with administrators and employees to help develop, review, and implement appropriate chemical hygiene plans, policies, and practices within the school and department.

(2) Monitor procurement, use and disposal of chemicals used in the labs assigned.

(3) Coordinate an annual evaluation of the laboratory CHPs within the department and provide guidance on updating the plans as necessary.

(4) Inform all newly-hired lab employees of specific chemical hazards present in the laboratory.

(5) Update the department's chemical inventory on a monthly basis and providing a copy to the OSHE office. Update SDSs as necessary.

(6) Ensure laboratory self-audits are conducted.

(7) Act as a liaison between the laboratory and NPS OSHE Directorate.

(8) Provide area-specific chemical safety training when needed and document training in ESAMS. For students, a training roster with the subject date name and signature is adequate. Forward a copy of the student training roster to the CHO and Training Officer.

f. Laboratory personnel

(1) Read, understand, and follow all safety rules and regulations that apply to the work area. Know and follow the lab's SOPs and Chemical Hygiene Plan.

(2) Plan and conduct each operation in accordance with the institutional chemical hygiene procedures.

(3) Promote good housekeeping practices in the lab during work.

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(4) Report accidents, possible overexposures or unsafe conditions or practices in the work area to the lab supervisor / PI.

(5) Use appropriate personal protective equipment and required controls for each procedure that involves hazardous chemicals or when required by an SOP, instruction, other guidance, CHO, HM rep, or PI.

6. Laboratory Facilities

a. Persons responsible for laboratories within all departments shall ensure planning designs for new facilities or modifications to existing facilities are reviewed by area experts, the NPS OSHE Directorate, Public Works, and FEAD before modifications are made to ensure compliance with OSHA, NAVOSH, and other applicable standards.

b. General Laboratory Design Considerations. Wet chemical spaces and those with a higher degree of hazard should be separated from other spaces by a wall or protective barrier wherever possible. If the areas cannot be separated, then workers in lower hazard spaces may require additional protection from the hazards in connected spaces.

(1) Laboratory Layout and Furnishing:

(a) Work surfaces should be chemically resistant, smooth, and easy to clean.

(b) Hand washing sinks for hazardous materials may require elbow, foot, or electronic controls for safe operation.

(c) Wet laboratory areas should have chemically resistant, impermeable, slip resistant flooring.

(d) Walls should be finished with a material that is easy to clean and maintain.

(e) Doors should have view panels to prevent accidents and should open in the direction of egress when lab operations are being conducted.

(f) Windows should not be opened in laboratories for ventilation. Exhaust ventilation should be provided by chemical hoods or other local ventilation systems (i.e. flexible hosing,

glove boxes, standard room ducting that provides an adequate exchange rate).

(2) Safety Equipment and Utilities:

(a) Laboratories must have an adequate number and placement of safety showers, eyewash units, and fire extinguishers.

(b) Departmental safety coordinators and representatives will work with departmental HM representatives to maintain an accurate list of shower, eyewash unit, and fire extinguisher locations. Inspection and inventories of showers, eyewash units, and fire extinguishers shall be conducted in accordance with NPSINST 5100 and OPNAVINST 5100.23 (series).

(c) Sprinkler systems are resisted by some laboratories because of the presence of electrical equipment or water reactive materials, but it is still required and safer to have sprinkler systems installed. A fire large enough to trigger the sprinkler system would have the potential to cause far more destruction than the local water damage.

(3) Chemical laboratories in particular shall ensure:

(a) Appropriate general ventilation is designed with air intakes and exhausts located so as to avoid intake of contaminated air.

(b) Storage facilities are properly constructed and ventilated.

(c) Storage facilities do not have open drains to the sanitary sewer.

(d) Chemical handling facilities have laboratory hood and sinks available.

(e) Available safety-equipment such as eyewashes and drench showers are prescribed by competent authority.

(f) Hazardous chemical wastes are collected and labeled in containers provided by the respective Departments, and turned into the NPS Environmental Coordinator for disposal.

(g) Laboratories have posted applicable hazardous communications to include: industrial hygiene surveys, Material Safety Data Sheets, Chemical Hygiene SOPs, emergency egress maps,

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spill clean-up SOPs, and Fume Hoods Air Permit (if required).

(h) A log book is maintained to record the chemical used and the quantity each time a fume hood is used. Report these log entries monthly to NSAM Environmental.

7. Laboratory Chemical Hygiene Plan

a. Each PI or responsible lab supervisor will complete the tables in this instruction and use this instruction as a template and guide for creating individual laboratory Chemical Hygiene Plans (CHPs) and SOPs. Individual CHPs will be reviewed by the departmental HM representatives and CHO to help address specific chemical hazards in the work area. This section should contain provisions at a minimum for the following:

(1) Basic lab safety rules and standard lab practices to include work practices that are oriented toward minimizing exposure to all chemicals. This should include, but not be limited to:

(a) Planning laboratory sequences to require the least number of chemical handling and mixing operations.

(b) Whenever possible, mixing and handling chemicals in a fume hood, otherwise, in a well-ventilated, non-confined space with open windows.

(c) Never performing chemical operations in a confined space.

(d) Avoiding direct skin contact with all chemicals. Utilization of appropriate personal protective equipment (PPE) to include, as a minimum, gloves and eye goggles.

(e) Mixing and handling the smallest amount of chemicals necessary for the operation to be performed. Keeping containers covered and properly stored when not in use.

(f) Covering containers of mixed chemicals, but not so tightly as to seal them.

(g) Requiring storage of mixtures that evolve a gas in containers that are not tightly sealed to avoid pressure build up and possible rupture.

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(h) Requiring that all personnel, prior to working with laboratory chemicals, review the SOP for working with chemicals.

(2) Location and use of all lab emergency and safety equipment such as eyewash stations, lab coats, PPE, fire extinguishers, alarms, emergency responder phone numbers, etc.

(3) Specific safety procedures for handling, labeling, transporting, using, and storing chemicals used in the lab. The location of safety data sheets (SDSs) for each chemical, training on how to read them, and any special precautions contained therein.

(4) Procedures for emergencies, including evacuation routes spill cleanup and waste disposal from spill cleanup.

(5) Instructions on personal hygiene.

(6) Lab housekeeping standards.

(7) Use of the SDS to include details on how to read the SDS for each chemical to be used, paying particular attention to:

(a) Health hazard data and fire and explosion hazard data.

(b) Reactivity data.

(c) Spill or leak procedures.

(d) Precautions to be taken in handling and storage.

(e) In circumstances where the laboratory user creates a unique chemical mixture, the user shall be responsible for logging the contents and percentages of the mixture and having the SDS available for each content item.

(8) Location of the HAZCOM plan.

(9) Hazardous waste disposal procedures.

(10) Location and proper use instructions for fume or vent hoods if installed.

(11) Gas cylinder storage requirements and use if in use in the specific lab.

(12) Use of required PPE.

(13) Use of required engineering and administrative control measures.

(14) Use of storage closets, containers, and cabinets.

(15) Other items unique to the individual lab based on manufacturer's suggested practices or PI experience.

Note that experiments involving use of hazardous chemicals should not be done in unattended labs. If absolutely necessary, appropriate signs must be clearly posted outside of an area or room where an unattended procedure that involves hazardous chemicals is in progress. Additionally, access must be restricted in a way that prevents entry of untrained or unqualified personnel into the area(s) involving use of hazardous chemicals.

8. Hazmat Representative. A HM representative is designated for each department by their department chair. This person must be qualified through training or sufficient experience in hazmat and chemical hygiene to provide assistance in developing and implementing provisions of this CHP for the laboratory.

9. Laboratory Audits. The laboratory manager or PI is required to conduct an annual self-audit of the laboratory and submit this assessment to the OSHE Directorate to ensure that the laboratory is in compliance with this program. Audit forms are available through the NPS OSHE Directorate. The CHO will conduct audits of laboratories periodically, and audit the records of the laboratory manager or PI.

10. Chemical Procurement, Distribution and Storage

a. Procurement. All chemicals must be ordered through NPS Purchasing Department and require the review and approval of the NPS HAZMAT coordinator. Data on the name of the chemical/mixture, building and room number, size and number of containers, etc., must be entered into the NPS inventory management system in use at the time of purchase. When purchasing chemicals, consideration should be given to purchasing the least hazardous chemical for the process and the smallest quantity necessary. Prior to initiating an order, local inventories will be checked to ensure that the chemical is not already on hand. Procurement will only be accomplished in

accordance with procedures established by NAVPGSCOLINST 5090.1. No container should be accepted which is not in good condition and properly marked with chemical name and manufacturer's name. An SDS for each chemical will be on hand prior to receiving the chemical.

b. Distribution. When chemicals are hand-carried, the chemical container should be placed in a secondary container. Elevators should be used for transport, if available. Special care should be taken when transporting compressed gas cylinders or dewars filled with cryogenic liquids (> 10 liters) on elevators. Breakage of and/or leaks in these containers can lead to extremely hazardous situations if the elevator were to stall.

c. Storage. All chemicals must be stored by hazard class, in accordance with the NPS HAZMAT instruction. The amounts of chemicals stored in a laboratory should be as small as practicable. Disposal costs far outweigh the savings of buying in quantity, and a six-month supply should be the maximum. Hazardous material should not be stockpiled. Avoid exposure to heat and sunlight, and avoid storage on open bench tops and other areas subject to bumping. Inventories of on-hand inventories will be maintained current at all times. Storage areas will have sufficient ventilation to prevent accumulation of fumes. Storage of HAZMAT will be in secure facilities. Incompatible materials shall be segregated, as violent reactions may occur when the following hazard classes are mixed together:

- (1) Corrosives + Flammables = Explosion/Fire
- (2) Corrosives + Poisons = Poison Gas
- (3) Flammables + Oxidizers = Explosion/Fire
- (4) Acids + Bases = Corrosive Fumes/Heat

11. Chemical Safety Information

a. Labels

(1) The PI and the HM representative are responsible for ensuring that all chemical containers are labeled in accordance with this section.

(2) Every container of hazardous chemical delivered to, used at, or shipped from the laboratory must be labeled with the name of the chemical as it appears on the SDS, the name and

address of the manufacturer, and the appropriate hazard warnings. The NPS Chemical Labeling Guidelines are found in the NPS HAZMAT instruction, NSAM HAZCOM Plan, and 29CFR1910.1200. Labels will be provided by the NPS HAZMAT Coordinator upon request.

(3) The labels must be maintained in a legible condition. Manufacturers' labels must not be defaced or removed unless the container is immediately labeled with the required information. Any container without a label or with an illegible label should be reported to the supervisor immediately.

(4) If chemicals are transferred out of the original container, the secondary container must be labeled immediately with the information listed above.

(5) All Hazardous Waste must be labeled accordance with the NSA Monterey Hazardous Waste Plan in NSAMINST 5090.3. When the first drop of HAZWASTE is placed into a container, the container must be labeled with the following required 7 items:

- (a) Words "HAZARDOUS WASTE"
- (b) Name of Generator
- (c) Generator Address
- (d) Composition (Content/Chemical)
- (e) Physical State (Solid/Liquid/Gas).
- (f) Hazardous Properties (Flammable/Corrosive/Reactive/Toxic).
- (g) Accumulation Date (When first drop was placed into the container).

b. Safety Data Sheets (SDSs)

(1) A SDS should accompany each shipment of any chemical purchased. If no SDS is received in the shipping container and the current ring binder of laboratory SDSs does not contain an SDS for that specific chemical, the HM representative should contact the manufacturer for a copy (which must be provided under OSHA regulations within 30 working days).

(2) Each department is required to maintain current SDSs for each chemical and pharmaceutical used or stored in its work

area. SDSs must be in a manageable format readily accessible to employees and students at all times. It is the responsibility of PIs to ensure that employees and students review the SDS prior to initially working with the chemical.

(3) Laboratory Posting Requirements. SDSs are available for each hazardous chemical used in the laboratory. They are located and are readily available to all employees and students.

c. Chemical Inventory List. All departments must maintain a current inventory list of all chemicals used in each of their laboratories. This list will be updated by the departmental or lab HM representative whenever a new chemical is ordered or chemical use is discontinued. PIs are responsible for marking quantities used on the inventory to aid the HM representative in maintaining the master departmental inventory. Chemicals are to be identified in this chemical inventory by the name that appears on the label and by the HAZMAT control number. A hard copy of this written inventory must be maintained in the laboratory, and be readily available for inspection/review by employees, students and OSHA inspectors.

Suggested Posting

A chemical inventory list of hazardous chemicals used in the laboratory is available and is located _____

d. Standard Operating Procedures

(1) Standard Operating Procedures (SOPs) will be developed by the PI for procedures in which hazardous chemicals are used, or for each hazard class used in the laboratory. These SOPs will address the safety and health practices to be followed by personnel while using these chemicals.

(2) The PI, with the assistance of NPS Safety, will determine action levels and what engineering and administrative controls and PPE are necessary for each procedure conducted in the laboratory. Under no circumstances will action levels (ALs) or permissible exposure limits (PELs) established by OSHA or threshold limit values (TLV) established by American Conference of Governmental Industrial Hygienist (ACGIH) be exceeded. If there is any suspicion that the AL, PEL or TLV are being approached or exceeded, a request for exposure monitoring will be submitted to the NPS CHO. Results of initial exposure monitoring may dictate the need for periodic exposure monitoring. This information will be incorporated into the

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laboratory's SOP.

(3) The SOP will be included as part of the laboratory-specific chemical hygiene plan. A chemical use SOP template is located on the NPS OSHE intranet under programs under SOPs. This template is meant to be a starting place only, as each procedure and chemical is unique, so the SOP must be uniquely developed to safely handle the required chemicals in each specific process/procedure.

Written standard operating procedures have been developed for the following procedures and/or chemicals:

_____	_____
_____	_____
_____	_____
_____	_____

e. Employee Information and Training

(1) Every laboratory employee and student receives a basic orientation to laboratory chemical hygiene. This training will be provided by the HM representative, PI, or ESAMS. All training must be documented by the individual presenting the training session. Training must be documented in ESAMS for staff and by a training plan and roster for students. Training documentation of students must be submitted to the NPS CHO and NPS Training Officer for external inspections and record keeping. A copy of the training records will be submitted to NPS Safety. Training must include the following:

(a) Requirements of the chemical hygiene program.

(b) An explanation of NPS's laboratory chemical hygiene program, NPS's HAZMAT and HAZWASTE labeling systems, SDSs, and how employees can obtain hazard information.

(c) A description of the various methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area.

(d) General guidance on the selection of protective measures to reduce chemical exposure.

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(e) Information on safety resources. Emergency procedures to be used in the event of accidental exposure to hazardous chemicals, including emergency phone numbers. It is the responsibility of the supervisor (PI), HM representative (when needed) or lab manager (when needed) to provide laboratory specific on-the-job training, which will inform personnel of:

1. The details and location of the laboratory chemical hygiene plan.

2. The chemical inventory list and MSDSs for their work area.

3. The specific physical and health hazards present in the laboratory.

4. The OSHA permissible exposure limits of the chemicals used in the laboratory.

5. The signs and symptoms of excessive exposure associated with these chemicals.

6. The specific protective measures required when using the chemicals in the laboratory, including the SOPs that have been developed by the PI to protect them from exposure to hazardous chemicals.

7. The specific methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area.

8. The location of eye washes and safety showers, and a demonstration of how these safety devices are to be used in the event of a spilled or splashed chemical.

(f) Laboratory-specific training will be conducted whenever a new hazard is introduced to the work area, when the employee transfers to a new job within the lab, and whenever the employee demonstrates behavior that indicates a lack of understanding of the safe handling of chemicals.

(g) Supervisors (PIs) are responsible for ensuring that personnel with potential exposure to hazardous chemicals receive the appropriate training before working with those chemicals. To ensure that supervisors and HM representatives are knowledgeable of their training responsibilities, the NPS

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CHO and NPS HAZMAT Coordinator conduct periodic train-the-trainer courses for all HM representatives and any interested PIs.

f. Chemicals Produced in the Laboratory

(1) To ensure that the hazards of chemicals produced in the laboratory are communicated to personnel, the following requirements must be met:

(2) If chemicals of known composition, produced for use in the laboratory, are determined to be hazardous by the PI, the PI must ensure that personnel are trained on these hazards and any related safety issues.

(3) If chemicals of unknown composition are produced for use in the laboratory, personnel will assume that the chemical is hazardous and take all appropriate precautions. The PI has the responsibility of performing a hazard assessment as soon as possible to determine whether the chemical is hazardous or not.

(4) If chemicals are produced for use by employees outside of the laboratory, the requirements of the Hazard Communication Program must be met. This includes hazard assessment and preparation of labels and SDSs.

12. Control Measures

a. Laboratory Ventilation

(1) Laboratory ventilation is designed to provide protection from toxic gases, vapors, aerosols, fumes and dusts. All work with chemicals should be performed so that skin contact and the potential for vapor or dust exposure is minimized. For all practical purposes, this means that the many manipulations involving hazardous chemicals will need to be performed inside a laboratory ventilation hood.

(a) Chemical fume hoods should be used during hazardous chemical use.

1. PIs must ensure that chemical fume hoods are tested annually. This service is provided by the BUMED Industrial Hygienist (IH) servicing NPS.

2. Chemical fume hoods must not be used if they do not pass inspection. They must be repaired and recertified prior to use. Chemical fume hood repair or replacement is

accomplished through a public works work order.

3. Chemical fume hoods should have a continuous monitoring device or alarm to indicate improper functioning.

4. Chemicals normally used in a fume hood should not be used unless the fume hood is fully operational.

(b) Biological safety cabinets shall be used for primary containment devices when working with infectious agents.

1. PIs are responsible for ensuring that these are tested and certified annually. Biological safety cabinets must not be used if they are not certified and must be taken out of service until they have been certified.

2. This testing is also provided by the BUMED IH servicing NPS. The NPS CHO or BUMED IH can provide a list of sources for new or replacement Biosafe cabinets when required.

Mark the types of ventilation controls used in the laboratory and describe what they are used for.

√	Type	Use	Date of Last Certification	Tested By
	Chemical Fume			
	Canopy Hood			
	Slot-Type			
	Biological Safety			
	Glove Box			
	Other			

b. Personal Protective Equipment

(1) Personal protective equipment (PPE) must be provided to all laboratory personnel by the PI to minimize chemical exposures. The PPE must provide protection from the specific hazards in the laboratory. The following personal protective equipment will be readily available in or near laboratory areas where chemical operations are performed:

- (a) Gloves
- (b) Eye Protection
- (c) Respirators (if applicable)
- (d) Eyewash and body wash stations (report

unavailability to the OSHE Directorate and NSAM Public Works)

(e) Chemical aprons

(f) Lab coats

(g) Fire extinguisher (report unavailability to the OSHE Directorate and NSAM Fire Marshal)

(h) Fire alarm (report unavailability to the OSHE Directorate and NSAM Fire Marshal)

(i) Telephone with an emergency contact phone list posted near it (provided by the department)

(2) Additional detail on a few of these items is provided below.

(a) Gloves. Employees are required to wear gloves when the potential for direct skin contact with hazardous chemicals, blood and other infectious materials exists. Gloves must be suitable for the materials being used. The NPS CHO or BUMED IH can provide guidance on selection of appropriate glove types.

Note: Gloves must be removed prior to leaving the immediate work area. Gloves must be removed prior to entering public areas such as hallways, elevators, etc., and hands washed to avoid inadvertently contaminating such public facilities. If you are carrying specimens, biohazards or chemicals in public areas, they should be placed in secondary containment to avoid the need for gloves.

The types of gloves available in the laboratory include:

√	Type	Use

(b) Eye Protection. This includes safety glasses, goggles and face shields. These are used to prevent contact of hazardous chemicals, blood and other infectious agents with the eyes, nose or mouth.

The types of eye protection available in the laboratory include:

√	Type	Use
	Safety Glasses With Side Shields	
	Safety Goggles	
	Contact Lenses With Goggles	
	Full Face Shield	

(c) Respirators. Respirators are used as a last resort to control exposure to inhalation hazards. Respirator use and type will be determined by the Respiratory Program Manager and BUMED IH and specified in the SOP, based on air monitoring results. If respirator use is required (i.e., exposure exceeds OSHA Permissible Exposure Limits), employees must be medically cleared to wear a respirator and be fit-tested and trained by the Respiratory Program Manager before using a respirator.

Note: Personnel using dust masks must contact the Respiratory Program Manager. Dust masks do not require medical clearance or fit-testing; however, training is required.

The types of respiratory protection available in the laboratory include:

√	Type	Model	Use
	dust/mist respirator		
	half-face respirator		
	full-face respirator		
	powered air-purifying resp.		
	SCBA or supplied air resp.		

The following employees have been medically cleared, fit-tested and trained for respirator use:

Employee Name	Date of Last Medical Clearance	Date of Last Fit-Testing and Training

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(d) Other. This includes chemical resistant suits, aprons, gowns, lab coats, head protection and foot protection (sandals, perforated shoes and sneakers are forbidden).

√	Type	Use
	Lab Coat	
	Gown/Apron	
	Hearing	

All Personal Protective Equipment must be inspected by employees prior to each use. Supervisors (PIs) are responsible for ensuring proper use, storage, and cleanliness of respirators.

c. Work Practices

(1) Do not smell or taste chemicals.

(2) Ensure that appropriate eye protection and other appropriate personal protection are worn by all individuals entering the laboratory, including visitors when necessary.

(3) Vent apparatus which may exhaust toxic chemicals (vacuum pumps, distillation columns) into local exhaust devices or hoods.

(4) Inspect gloves and test glove boxes prior to each use.

(5) Use only chemicals that can be handled safely with the available ventilation system.

(6) Do not use mouth suction for pipetting or starting a siphon.

(7) Eating, drinking, gum chewing, smoking or application of cosmetics in areas where chemicals are present are all prohibited.

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(8) Do not store food or beverages in storage areas, refrigerators, glassware or utensils which are also used for laboratory operations.

(9) Wash hands before and after using chemicals.

(10) Confine long hair and loose clothing.

(11) Avoid practical jokes or other behavior which might confuse, startle or distract another worker.

(12) Wear shoes in the laboratory that cover the entire foot. Sandals are not permitted.

(13) Use of a lab coat is required when chemicals are out of storage and in active use.

d. Housekeeping

(1) Work areas should be kept clean and free from obstructions.

(2) Chemical wastes must be placed in appropriate waste containers that are kept closed and are labeled properly.

(3) Spilled chemicals must be immediately managed in accordance with the Chemical Spill Response Plan (see NSAM HAZWASTE Plan).

(4) Unlabeled chemicals and chemicals that are no longer needed should be disposed of in accordance with the NPS HAZMAT Control Program.

(5) Floors, shelves and countertops should be cleaned regularly.

(6) Lips should be installed on shelves where chemicals will be routinely used.

(7) Equipment and chemicals should be stored properly, in accordance with the NPS HAZMAT Control Program

e. Maintenance. All laboratory equipment should be inspected and maintained as recommended by the manufacturer. Broken equipment should be repaired immediately or

tagged as out of service.

13. Employee Exposure Assessments

a. The assigned BUMED IH will conduct air monitoring to determine if there is a reason to believe that exposure levels for a chemical may exceed regulatory limits. The decision to conduct air monitoring will be based on the:

- (1) hazard potential of the chemical;
- (2) amount of the chemical used;
- (3) type and effectiveness of control measures used;

and/or

(4) presence of overexposure indicators such as odors, observations, visual appearances or symptoms of exposure.

b. Chemical monitoring has been conducted in this laboratory for the following chemicals:

_____	_____
_____	_____
_____	_____

c. Records/results of any air monitoring conducted in the laboratory must be maintained by the PI as part of the laboratory Chemical Hygiene Plan.

Suggested Posting

Results of the air monitoring are located:

_____.

14. Medical Surveillance

a. All employees who work with the below list of hazardous chemicals will have the assigned BUMED IH determine if medical surveillance enrollment is necessary through exposure assessment or monitoring. If medical surveillance is necessary, a pre-employment or an initial medical history and/or physical is completed through Presidio of Monterey Occupational Health Services. The NPS OSHE Directorate can help schedule this examination. OSHA's expanded standards mandate medical surveillance for employees with potential occupational

exposure to: asbestos, alpha-naphthylamine, methyl chloromethyl ether, 3,3'-dichlorobenzidine, bis-chloromethyl ether, beta-naphthylamine, benzidine, 4-aminodiphenyl, ethyleneimine, beta-propiolactone, 2-acetylaminofluorene, 4-dimethylaminoazobenzene, N-nitrosodimethylamine, vinyl chloride, arsenic, lead, cadmium, benzene, coke oven emissions, cotton dust, 1,2-dibromo-3-chloropropane, acrylonitrile, ethylene oxide, formaldehyde, methylenedianiline, 1,3-butadiene, and methylene chloride under the following circumstances:

(1) When a student or an employee has developed signs or symptoms associated with exposure.

(2) When occupational exposure monitoring indicates exposures above the OSHA action levels.

b. Whenever an employee is involved in a spill, leak, explosion or other occurrence resulting in a possible overexposure to hazardous chemicals, laboratory employees and/or students will be provided with the opportunity to receive medical attention at POM medical facilities.

c. Employees participating in the NPS Medical Surveillance Program based on chemical exposures above the OSHA action levels include:

Employee Name	Reason

d. Employees may obtain free medical consultation regarding concerns about chemical or other occupational exposures by contacting the NPS OSHE Directorate. Students with concerns about chemical or other occupational exposures should inform their PI and if unable to get their concern resolved, they should also contact the NPS OSHE Directorate. Counseling on reproductive health matters may be obtained by contacting NPS OSHE Directorate.

15. Spills and Accidents

a. Spills

(1) Small Spills

(a) Laboratory personnel can clean up the vast

majority of chemical spills that occur in the lab. The individual(s) who caused the spill and/or is most knowledgeable about the spill is(are) responsible for prompt notification and proper clean-up, if safe to do so. It is the responsibility of the PI and/or HM representative to have spill control clean-up materials and personal protective equipment, which are appropriate for the chemicals being handled, readily available and accessible for emergency use. The PI and HM rep are also responsible for ensuring that spills are cleaned up as soon as possible. The PI and HM representative must refer to specific spill procedures in the lab SOP, which should state the types and safe quantities of chemicals that may be cleaned-up.

(b) Spill kits with instructions, absorbents, reactants and Personal Protective Equipment should be made available for the clean-up of minor spills. A minor chemical spill is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel. Consult paragraphs 16 and 17, and appendix M of the NSA Monterey Hazardous Waste Plan in NSAMINST 5090.3 for information on spill cleanup.

The location of the Spill Kit for this laboratory is:

_____.

(2) Large Spill

(a) If an area contains large quantities of any chemical, emergency procedures for spill clean-up must be included as part of the Standard Operating Procedures for that chemical in the NPS workplace. Employees should only attempt to clean up large or major spills after special training has been received, and when appropriate spill clean-up materials and personal protective equipment are readily available and are properly utilized. Otherwise, in the event of a major spill for which personnel are not properly prepared, and particularly if any person has been significantly exposed, contaminated or injured to such an extent that medical or other outside assistance is required, follow the E.A.R steps:

1. Evacuate affected area and close doors.
2. Alert the NPS OSHE Directorate, NSAM Safety, NSAM Environmental, and if necessary NSAM police.
3. Remain close to the phone, if requested to do so, until contacted by responders.

Enclosure (1)

(b) Be prepared to provide more information about the spill, and prepare to provide MSDS copies. Assist responders upon arrival.

(3) Major Life / Environmental Threatening Spill. In the event of a major life threatening chemical spill, secure the area to the extent possible and use the Naval Support Activity Monterey Oil and Hazardous Substance (OHS) Spill Emergency sheet located on the next page and Appendix M (the RED Plan) in the NSA Monterey Hazardous Waste Management Plan. Additionally, notify the NPS CDO, NPS OSHE Directorate, NSAM Safety, and NSAM Environmental as soon as possible. The spill response order of precedence follows:

(a) Assess the nature and extent of the chemical spill with assistance from appropriate personnel from the spill location.

(b) Evacuate and secure the affected area of the chemical spill with assistance from appropriate personnel from the spill location.

(c) Remove injured personnel and ensure transport to the appropriate medical facility.

(d) Contain the chemical spill.

(e) Maintain perimeter control while responsible personnel clean up the spill.

(f) Notify the City of Monterey and State of California, if appropriate (will be done by OSHE or CDO personnel).

**NAVAL SUPPORT ACTIVITY MONTEREY
OIL & HAZARDOUS SUBSTANCE (OHS)
SPILL EMERGENCY**

BUSINESS HOURS

1. FOR LARGE AND/OR UNCONTROLLED OHS SPILLS OR IF THERE IS A POTENTIAL THREAT TO PEOPLE, ENVIRONMENT, AND/OR PROPERTY IMMEDIATELY NOTIFY:

- **911**

2. FOR ANY OHS SPILL IMMEDIATELY NOTIFY BOTH:

- **BASE SECURITY - 831-656-2555**
- **ENVIRONMENTAL PROGRAM DIRECTOR - 831-656-7746**

NON-BUSINESS HOURS

1. FOR LARGE AND/OR UNCONTROLLED OHS SPILLS OR IF THERE IS A POTENTIAL THREAT TO PEOPLE, ENVIRONMENT, AND/OR PROPERTY IMMEDIATELY NOTIFY:

- **911**

2. FOR ANY OHS SPILL IMMEDIATELY NOTIFY BOTH:

- **BASE SECURITY - 831-656-2555**
- **STAFF DUTY OFFICER - 831-392-5651**

If any chemical spill occurs outside a building, with potential for adversely impacting storm water quality, contact the NPS OSHE Directorate and NSAM Environmental. After hours inform the NSAM and NPS Command Duty Officers who have access to after-hours contact information.

b. Accidents

(1) Emergency showers must be located such that they are accessible, require no more than ten (10) seconds to reach and are within 100 feet of the potential hazard. Eyewash (including

eye/face wash and hand-held drench hoses) units must be located such that they are accessible, require no more than ten (10) seconds to reach and are within 50 feet of the potential hazard (10 feet where strong corrosives are the hazard).

NOTE: Remember the injured worker may have to locate the unit while blinded by a contaminant.

(2) Emergency eyewash and showers must be kept accessible. Material shall not be stored or placed in such a manner that would block access to an emergency eyewash or shower.

(3) The eyewash stations and emergency showers must be inspected and maintained to be functional. A periodic functional check is required. All personnel potentially adversely affected in any way during an incident or accident should seek medical attention and inform the NPS OSHE Directorate to conduct a follow-up investigation.

(4) The following guidelines should be followed by laboratory personnel if an accident involving a chemical occurs:

(a) Eye contact. Promptly flush eyes at emergency eyewash station for at least 15 minutes and seek immediate medical attention.

(b) Skin contact. Promptly flush skin with water and remove any contaminated clothing. Use an emergency safety shower when affected area is extensive.

The location of the safety equipment in the laboratory is listed below.

√	Equipment	Location
	Eyewash Station(s)	
	Drench Hose(s)	
	Emergency Shower(s)	
	First Aid Kits(s)	
	Other	

An accident report must be filled out in ESAMS when an employee is injured in any way.

16. Hazardous Waste Disposal

a. All chemical waste will be disposed in accordance with the NSAM Hazardous Waste Management Plan in NSAMINST 5090.3.

When in doubt, contact William J. Baier at with NSAM Environmental at 656-2841 or email William.baier@navy.mil for clarification.

b. The following items do not require supporting SDS documents for disposal:

- (1) Oils (Vehicles, Equipment, Cutting, Hydraulics, Transmission), no PCB's
- (2) Brake Fluids
- (3) Aerosols Cans (< 25 oz)
- (4) Batteries - including lead acid, NiCad, NiMH, lithium, alkaline, and carbon zinc; the exception is for water reactive and other special types of batteries.
- (5) Fluorescent bulbs, all types.
- (6) High pressure sodium/mercury bulbs
- (7) Latex paint
- (8) Oil base paint
- (9) Mercury products and waste
- (10) PCB ballast
- (11) PCB capacitors
- (12) Lead debris/chips
- (13) Asbestos (friable)

c. All other hazardous waste turn in will need supporting documents for proper disposal no matter the amount of waste.

17. Definitions

a. Action level. The concentration designated by OSHA 29 CFR 1910.1000 et seq for any specific chemical, calculated as an 8-hour time-weighted average, which initiates certain limited OSHA- required compliance activities such as exposure monitoring and medical surveillance.

b. Chemicals. Any element, chemical compound or mixture of elements and/or compounds.

c. Chemical Hygiene Officer (CHO). An NPS employee, normally assigned within the NPS Safety Department designated in writing by the NPS Safety Director who is qualified, either by education, training, or through extensive experience, to provide technical guidance in the development and implementation of the provisions of the chemical hygiene plan.

d. Chemical hygiene plan. A written program developed and implemented by the laboratory management which sets forth procedures, equipment, personal protective equipment (PPE) and work practices that are capable of protecting employees from adverse health hazards associated with excessive exposures to those chemicals used in the laboratory.

e. Laboratory Chemical Safety Officer (CSO). A laboratory employee designated by his/her PI or department who is qualified, either by education, training or through extensive experience, to provide technical guidance in the development and implementation of the provisions of the chemical hygiene plan for the laboratory. At NPS the designated departmental HAZMAT representative functions as the laboratory Chemical Safety Officer.

f. Hazardous chemical. All chemicals present some type of physical or health hazard at sufficiently high concentrations or levels. "All substances are poisons; there is none which is not a poison. The right dose differentiates a poison from a remedy." (from Paracelsus in Von der Besucht 1567)."

g. Laboratory. A workplace where relatively small quantities of hazardous chemicals are used on a non-production basis, chemical manipulations are carried out on a "laboratory scale", and multiple chemical procedures or chemicals are used, most often by single individuals.

h. Laboratory scale. Work with substances in which the containers used for reactions, transfers and other handling of substances are designed to be easily and safely manipulated by one person, and excludes those workplaces whose function is to produce commercial quantities of materials.

i. Particularly Hazardous Substance (i.e. capable of posing

a significant health hazard). Any chemical or chemical substance that can lead to adverse acute or chronic health effects that may be caused by excessive exposure to any specific chemical or combination of chemicals, such that they may be classified as carcinogens, reproductive toxins, or have a high degree of acute toxicity such as sensitizers, hepatotoxins, mutagens, teratogens, nephrotoxins, and neurotoxins, etc.

j. Permissible Exposure Limit (PEL). A limit defined as a concentration of a specific chemical, calculated as an 8-hour time-weighted average or as a short-term exposure limit, which when exceeded, triggers various OSHA-mandated requirements such as respirator usage, use of PPE, medical exams, use of engineering and administrative controls, and many other requirements.

k. Physical hazard. A chemical that has been shown with scientifically valid evidence that it is combustible, explosive, flammable, reactive, a compressed gas, water-reactive, pyrophoric, an organic peroxide or an oxidizer.

l. Principal Investigator (PI). That researcher, member of the faculty, staff, or person who is responsible for initiating and subsequently directing the research, teaching, or demonstration that requires the use of controlled or hazardous chemicals. This person is hereafter referred to as the PI and is overall responsible for all aspects of laboratory, classroom, or use area safety including Chemical Safety.

m. Threshold Limit Value (TLV). The greatest concentration, designated by the American Conference of Governmental Industrial Hygienists (ACGIH) for a specific chemical, to which a healthy adult male in the occupational environment may be repeatedly exposed during their 8-hour work-shift and 40-hour workweek over a working lifetime without any known adverse effects. This value may be used as a guideline when it is lower than the OSHA PEL.