

## HAZARD COMMUNICATION PLAN

The general intent of the hazard communication plan for the USDA-ARS Poisonous Plant Research Laboratory is to inform all employees of the critical elements of the OSHA Hazard Communication Program (29 CFR 1910.1200) and of ARS Manual 230 (safety program manual): using MSDS (material safety data sheets), responsibilities of supervisors and all employees under the program, and maintenance of records such as the chemical inventory. The latest edition of the standard and ARS Manual 230 are located in the Safety Files.

The plan is available to all employees (this includes RSA, contractors, and others) for review and a copy will be located in the following areas: Safety Plans Binder and Safety files (Headhouse), and the Animal Caretaker's Office (Building 25). The plan will be reviewed annually by the PPRL Safety Team and updated as necessary. The associated documentation (standards, MSDS, chemical inventory, hazard analyses, etc.) is located in the Safety Files or the Safety Binders and on the safety computer (Terrie's).

### I. CHEMICAL INVENTORY

The chemical inventory is maintained by the PPRL Chemical Hygiene Officer (CHO; Terrie Wierenga). A computer database of the chemical inventory is updated at least every quarter; the inventory is printed out each December and kept in a binder on the Safety Shelves (next to the MSDS binders). The inventory is also available online via the PPRL server. An inventory for each lab or chemical storage area is printed and this information is kept on a clipboard in that area. Individual researchers are responsible for keeping the inventory up to date by providing the pertinent information on these sheets when chemicals are received or disposed of. The CHO (Terrie Wierenga) enters the information from these individual inventories into the computer. A physical inventory is conducted each year to ensure that the chemical inventory is accurate. Inventory information includes chemical name, synonyms, molecular formula, CAS number, expiration date, quantity, location, MSDS availability, hazard category, and SARA/CERCLA requirements. The inventory is also cross-referenced with a list of users.

The CHO checks in chemical shipments to assure that containers are properly labeled, to obtain the information for the inventory, and to log in the MSDS. Purchase of chemicals that are explosives, poison by inhalation gases, P-list materials, or that have a NFPA health rating of 4 are first reviewed with the CHO. An MSDS is obtained and reviewed before the order is placed to ensure that the correct handling procedure is in place before the chemical is on-site. Secondary containers (such as repipets, flasks, and bottles) are labeled as to their contents (chemical name, caution statements, and user name).

### II. MATERIAL SAFETY DATA SHEETS (MSDS)

All chemicals used at PPRL (this includes cleaners and other solutions used by the janitor and a number of products used by office personnel) are required to have an MSDS if they pose a hazard to the user or if a consumer product (such as Windex<sup>®</sup>) is used differently or in much higher quantities than the typical consumer would. When chemicals are purchased, an MSDS should either be sent with the shipment or be provided in a separate letter before the chemicals arrive at PPRL. If

an MSDS is not received within one week of a chemical shipment, the CHO will request one from the supplier. Documentation of these requests will be kept in the safety files by the CHO.

A complete set of MSDS for hazardous materials at PPRL is kept in print in binders located on the Safety Shelves. MSDS are also available from USU and a number of WWW sites. Researchers are encouraged to keep copies of the MSDS pertinent to their research projects in the areas where the research is occurring for easy access. However, since the print copies and computer files are available at all times, this is not strictly necessary. The CHO will maintain the MSDS reference systems (hard copy and computer file).

Each supervisor is responsible to inform his/her support staff of the hazards presented by a specific chemical or procedure. It is the laboratory worker's responsibility to read, understand, and follow the directions for use and disposal of the chemical in the MSDS and the instructions given by the principal researcher. Training on how to read and use an MSDS is provided initially; several pamphlets are available to help the employee learn to read and understand the information provided in the MSDS, as well as the annual refresher training provided by the Safety Team.

All MSDS will be in English; formats will vary with the different suppliers but will include the following information: material identification; ingredients and hazards; physical data; fire and explosion data; reactivity data; health hazard information; spill, leak, and disposal procedures; special protection information; and special precautions and comments. Other information sources (such as the Merck Index) are also to be used to understand the health and physical hazards presented by a specific chemical. **If the MSDS is incomplete or confusing, or you have other questions about the use or disposal of the chemical**, contact the supervisor or CHO for more information.

Products that list proprietary ingredients on the MSDS will be assessed for the hazards they present to the user. The CHO will ensure that information on such ingredients will be readily available if an exposure occurs. Such information will be provided to the physician. Currently, no trade secret materials are in use at PPRL.

MSDS files and the chemical inventory are kept indefinitely by the CHO as records of exposure for employees. These files are kept as both electronic and paper copies.

Some general rules for handling chemicals (this includes pesticides, vaccines, oil, etc.):

1. Know the safety rules and procedures for the work being done; determine the potential hazards and the appropriate precautions to use before starting work.
2. Know where and how to use emergency response equipment.
3. Do not consume food and beverages, chew gum, or smoke in areas where chemicals are being used or stored.
4. Contact Terrie when you have chemical waste to dispose of (also read the Hazardous Materials Handling Plan).
5. Clearly label all chemical containers.
6. Wear the required and appropriate protective clothing at all times.
7. Wash well after using chemicals. Avoid the use of solvents for washing up since they can increase the absorption of certain chemicals.
8. Use protective equipment such as hoods when necessary (weighing plant, etc.).
9. Don't work alone; safety precautions for after-hours work will be at the minimum the same as those required when working during 'normal' hours (7:30 - 4:00).

10. Inform Terrie or Dale of any chemical spills. If you know the correct clean-up procedures, and are comfortable doing so, clean up minor spills and dispose of the waste properly. Otherwise, a trained individual or the USU Emergency Response Team will be utilized.
11. Compressed gas cylinders will be secured to prevent tank or valve rupture due to falls. Use the cylinder cart for transporting cylinders between buildings or rooms.

### III. LABELS

All chemical shipments will be inspected by the CHO or person who ordered them to ensure that all containers are properly labeled (identity, hazard level, label statements). The MSDS (or a copy of it) will be given to the CHO for filing. Chemical containers improperly labeled will be returned to the supplier by the CHO.

Secondary containers will be labeled as to contents, hazard statements, and the supplier or manufacturer. Label containers of solutions, too, such as 1 N HCl or 1% H<sub>2</sub>SO<sub>4</sub>. Use common abbreviations such as IPA for isopropanol or EtOH for ethanol. Always have a key to the abbreviations posted in the lab so that visitors or emergency personnel can identify the compound.

Empty containers will be disposed of according to regulations: some can be rinsed and reused, others will be treated as hazardous waste. The MSDS can give you guidance on this. Labels will be removed or defaced on clean, empty containers.

### IV. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Hazard assessments of various procedures (large scale plant extractions, grinding plant material, pesticide application, large animal handling) are conducted by the supervisor and the PPRL Safety Team. These assessments look at the physical, chemical, and health hazards presented by a specific process, then determine what protective equipment or clothing is required. The PPE is not to be used as the first response to a chemical or physical hazard. Instead, consider experimental design (Can a less hazardous substance be substituted? Or a different procedure used?), then engineering practices (Does performing the procedure in a working chemical hood provide the necessary protection?). After these have been implemented, the choice of what PPE to use should be made. PPRL provides the proper PPE (respirators, coveralls, gloves, eye, foot and hearing protection, etc.).

The hazards present will determine what type and level of protection is necessary. It is important to note that **one type of PPE (glove, respirator, etc.) does not protect you from all hazards**. Latex exam gloves, which are distributed throughout the facility, will not offer protection against commonly used solvents in the labs. They do offer protection against a number of aqueous solutions (such as when the ground plant is mixed with water prior to dosing animals). Safety goggles designed to provide protection against flying debris will not effectively protect against chemical splashes. A risk assessment form should be filled out by each supervisor for each procedure. This form indicates what hazards are present, what the possible routes of exposure to chemicals are or what physical hazards are present, and what type of protective equipment should be used and worn. Anytime a new procedure is used or an old one is substantially modified, a new risk assessment form should be completed. Supervisors are required to review this information with the people involved in the project before work starts in the lab or field. The CDSO (Collateral Duty Safety Officer; Terrie) is responsible for ordering and maintaining supplies of basic PPE (respirator

cartridges, gloves, foot protection, etc.). The supervisor is responsible for ensuring the proper protective equipment is available before the work starts. A copy of the hazard (risk) assessment will be kept in the safety files by the CHO.

1. Respirators are provided to people working with substances that might provide a hazard due to inhalation. Each person is issued their own respirator and is fit tested for that respirator only. Each is responsible for the maintenance of their respirator. Cartridges are available for a number of respirable hazards: plant or chemical dust, organic acids, formaldehyde, and a number of solvents. The PPRL Respirator Management Plan is found in the Safety Plans Binder. Dust masks are to be used **only** when there is no hazard present. They are more properly called nuisance dust masks. They will only filter out large dust particles. There is no way to fit test the dust masks so there is no way to ensure that the proper protection from inhaled dusts, mists, or fumes is obtained. They are for personal comfort only (such as when grinding certain plant material that presents no respirable hazard). Even if you use just dust masks, you still must be certified by a physician that there are no adverse health conditions to prevent you from wearing a respirator. See the PPRL Respirator Management Plan for more information. Air monitoring for a number of processes has been conducted. The results are available for your inspection; contact the CDSO.
2. Eye injuries from flying debris or chemical splashes account for three of the five injuries experienced by PPRL employees in the last eight years. Safety goggles and glasses with side shields are available and should be used whenever there is a possibility for injuries to the eye due to splashes or particles embedding in the eye or scratching the eye. The safety glasses with side shields are only for protection from physical hazards: flying particles or lab equipment that is under pressure and may explode (such as when drawing a vacuum on a desiccator). Whenever you grind, cut, or drill things, you should be wearing some type of protective eyewear. Full face shields, for protection from either chemical or physical (impact) hazards, are available. Safety glasses or goggles should still be worn under the shield. There are three types of safety goggles currently used by PPRL employees. One type protects against impact hazards, another against splashes of liquids to the eyes, and a third against mists or vapors. Use the type for the hazard present.
3. Hearing protection is also necessary. Hearing loss is not always immediately apparent. OSHA has established the amount of time a person may be exposed to certain noise levels and types (see the Hearing Conservation Plan in the Safety Plans Binder). As a general rule of thumb, if you drive the tractors or use large equipment on a regular basis, wear hearing protection. Ear muffs are provided to the animal caretakers since those employees experience the most noise exposure. Ear plugs that can be worn alone or in addition to the muffs are also provided. Hearing tests for those employees are also part of the annual physical offered under the medical surveillance program by PPRL. Noise

levels for several situations (driving a tractor, grinding plant, working with pigs) have been measured and the results used in developing the PPE recommendations.

4. A variety of protective clothing is also provided to all workers at PPRL. Coveralls, lab coats, rubber boots, gloves, etc. are available. More specialized protective clothing will be ordered on an as-needed basis. Contact your supervisor or the CDSO for the items you need.

## V. MACHINES AND EQUIPMENT

Research at PPRL requires the use of a wide variety of machines and equipment in addition to the use of vehicles (pickups and cars). Danny Hansen is the Vehicle/Equipment Officer. Before being allowed to operate any tractor, front end loader, bobcat, pickup and trailer, etc., you must be certified as able to do such. Training will be provided by PPRL for learning new and needed skills in this area.

Some general rules of thumb: Do not operate any equipment or machine unless you have received training on its proper use from your supervisor or the employee responsible for the equipment. All safety guards must be in place before operating machines. Check to be sure the guards have been replaced especially after repairs to the equipment have been made. Report any broken or ungrounded equipment to your supervisor or the Safety Team so the problem may be corrected. Lock out and tag out machines or equipment with moving parts prior to repair (see the PPRL LockOut/TagOut Plan).

1. Shop (Building 31): be alert when entering the shop. Don't distract the attention of any machine operators until the equipment has stopped running. Get qualified (by AI or your supervisor) before operating any equipment such as the drill press, grinder, etc. Protective equipment is located in the box labeled PPE. Always wear eye protection when working in the shop (and other protective equipment as required). Again, make sure the safety guards are in place.
2. Tractors are used every day at PPRL. You must be qualified to operate any of the large equipment (John Deere front end loader, the bobcat, Big Bertha); Danny or Rex will check that you either have the necessary level of skill to operate the equipment safely or training will be provided. Each employee will have a training/skills documentation sheet kept in the animal care office with copies kept in the safety files.

Before starting the equipment, make sure it is in safe operating condition (inspect hydraulic lines, lifting chains, etc. for any leaks, cracks, or other dangerous conditions). Check oil, water, and brake fluid levels, look for puddles under the tractor, check the tires. After the vehicle is started, check the steering, brakes, lights, and horn and make sure the transmission and gear box operate properly before driving. No riders are allowed on the tractor.

Face the direction of travel at all times. Do not exceed a safe speed. Use extra caution when operating near potential hazards (overhead lines, buildings, tight spaces) or when handling hazardous or toxic substances. Know the capacity of the vehicle and load

within the limits. Properly secure the load. When lifting, lowering, or carrying loads, keep the mast or the bucket slightly tilted back. Lift loads slowly; avoid sudden jerks. Start and stop gradually and slowly; carry the load as close to the ground as possible. Never stand or pass under an elevated bucket or platform.

Park the tractor with forks or bucket flat on the floor or ground. Shut off the power and set the parking brake. Chock the wheels if parking on an incline.

All tractors are inspected and maintained on a regular basis. Inform Danny of any repairs needed, etc.

3. Large grinders or mixers are used to prepare large quantities of plants for extractions or other research use. Refer to the SOP (standard operating procedure) Grinding Poisonous Plants for more information.
4. Use ladders or safety step stools for climbing; use of chairs, boxes, or other make-do items invites injury. Never use a ladder with cracked rungs or rails or one that has splinters on the rail. Always climb and descend the ladder facing the rungs and rails. Straight ladders must be equipped with safety feet unless the ladder is securely fastened in place. Do not paint a ladder or use one that has been painted; paint can cover up flaws in the ladder. Anchor extension ladders at the top to prevent sideways slippage if the climbing height exceeds 12 feet.

## VI. VEHICLES

Every employee of PPRL will, at some time, probably be required to operate a government vehicle (car, truck, pickup, trailer or sheep camp being towed). Adherence to all road and traffic rules shall be observed at all times.

When operating a government-owned vehicle, the individual is responsible for its care. All employees operating government-owned vehicles must have a valid drivers license and be qualified to operate the vehicle. Except in emergency situations, no unauthorized or non-government employee shall be permitted to operate or ride in the vehicle. No smoking is permitted in government vehicles. Drug or alcohol use will not be tolerated. Drunken driving is the leading cause of automobile fatalities in the country. Any employee who uses drugs or alcohol while operating a vehicle on official business will be terminated.

Seatbelts are installed in all vehicles. Use them any time you are operating the vehicle, even for short trips up to campus or down to the motor pool. Never carry more passengers than seatbelts unless it is an emergency situation. It is the driver's responsibility to insure that all passengers are using seatbelts.

Gooseneck trailers and sheep camps are often used in the field research of PPRL. The supervisor or Vehicle Officer will check that employees using such equipment are familiar with and qualified in its operation.

Before taking any vehicles, each employee should perform a basic check of that vehicle's worthiness. At a minimum, visually check the condition of the tires and make sure you have enough fuel in the vehicle. When taking vehicles and other equipment out in the field or on extended trips, make sure all necessary tools, repair supplies, first aid/emergency kits, etc. are present. Clean out the

vehicle, trailer, etc. when you return from your trip. Make arrangements with the Vehicle Officer for refueling and any necessary servicing on the vehicle or refuel it yourself at the USU Motor Pool. A vehicle report form is located on the door of the key cabinet in Building 25. Use this as a checklist for tools, tow ropes, etc. to be present in the vehicle plus as a reminder to check that the vehicle is safe to operate.

Any defective equipment on the vehicle (low tires, burned out lights, old wiper blades, leaks, chipped windshields, etc.) must be reported and repaired immediately. Report such things to the Vehicle Officer for PPRL. Any accidents must be reported promptly to the appropriate law enforcement personnel and to the Research Leader. In addition to reports filed with the highway patrol or city police officers, an accident report form (see Appendix B, Safety Plan) must be filed. These forms are located in the vehicles or can be obtained from the secretary.

## VII. ANIMAL HANDLING

All research at PPRL involving the use of animals requires approval from the IACUC (Institutional Animal Care and Use Committee) in addition to allocation of funds from the PPRL budget. A research protocol is submitted for review to the IACUC; this includes an outline of the procedures that will be performed on the animals, a list of the personnel involved in the project and their training, why the research is needed, and who the attending veterinarian and animal housing people are. The principal investigator for the project should review the procedures, schedule, etc. with all people involved. The PPRL Safety Team reviews the protocol to identify the physical and chemical hazards that may occur and determines whether additional training is required.

Both large and small animals are used. Large animals, such as horses, cattle, sheep, and goats, are quarantined for 2 weeks when first brought onto the facility. There is a vaccination and treatment protocol in place to maintain the health of animals on the facility. Small animals, such as mice, rats, and hamsters, are generally bought from disease-free suppliers. They, too, are held for at least a week before being used on a project. The PPRL Biosafety Plan and the SOP for Large Animals have more information.

Safe handling of the animals is necessary to prevent injury to both animals and people and to perform the research in an acceptable manner. Properly restrain the animal to reduce the likelihood of injury to itself or the people working with it. Avoid unduly exciting the animals. Don't get hands caught between the animal and the chute or tangled up in the halter rope. Release the animal only when it has a clear path back to its pen. Working with the small animals (rats, mice, hamsters) requires much the same guidelines.

Report animal bites or scratches immediately to your supervisor and/or the Safety Team and obtain medical care (disinfection, tetanus, etc.). See the Biosafety Plan for more information.

## VIII. MEDICAL PROGRAM

1. Injuries and Illnesses If an employee is injured or develops signs and symptoms associated with exposure to a chemical or work condition, PPRL will provide to affected employees medical attention including follow up examinations which the physician determines are necessary. Exposure monitoring has been completed for OSHA-regulated substances that are being used in current research at PPRL (all were below action levels when using the stated protocol). Whenever a new chemical or procedure is introduced, or a current process is

substantially modified, exposure monitoring for the appropriate substance will be done. Results of the monitoring are kept in the Safety Files.

If you suffer a work-related illness or injury, notify your supervisor and seek medical attention (Logan Regional Hospital or a clinic). Also notify the research leader and the Safety Team. Forms for reporting an illness or injury are available from the secretary. She can also provide you with the appropriate Worker's Comp forms, if necessary.

RSA employees, if injured on the job, are to report to their USDA advisor and seek medical attention at either the USU Student Health Clinic or Logan Regional Hospital. The supervisor will contact the USU Personnel & Benefits Office for the appropriate forms and reports.

## 2. Occupational Health Maintenance Program

Participation in the OHMP (Occupational Health Maintenance Program) is offered to all PPRL employees. This program is used more as a medical surveillance tool. It helps assure that employees are medically able to do the physical work required in their position. It also documents health effects resulting from chronic exposures to various substances or conditions. For most, it is a voluntary program. However, if you work with certain substances or are required to wear a respirator, you are **required** to participate in the program (OSHA regulations; see Terrie for more information). The PPRL picks up all expenses for the physical examination and associated testing (audiometry, pulmonary function, etc.).

When you participate in the program, you are given a form to record all exposures to chemicals or conditions (welding, noise, plant dust) that you have encountered in the past year. You will also be required to fill out a medical history form to share with the consulting physician. The examinations are held in late winter. The test results are sent directly to you; a letter reporting any findings related to the work environment is sent to the research leader. The USDA occupational health physician also reviews the exam results.

## VIII. EMERGENCY RESPONSE

The first consideration in an emergency is for the safety of personnel; second is protection of research, equipment, and the environment. Emergency phone numbers have been posted beside every phone in the facility. Emergency contact numbers are also found on cards in the glove box of every vehicle at PPRL. Fires, earthquakes, chemical spills, explosions, hazardous weather, and other lab accidents are considered emergencies.

1. In general, render assistance (first aid, CPR, etc) to injured people only if you will not place yourself in danger; do not move them if they are not in immediate danger. Call 911 to summon trained medical help and notify the supervisor or RL. In the case of accidents involving chemicals, be prepared to tell the medical personnel what the chemical is and/or provide them with a copy of the MSDS. The Safety Team schedules first aid and CPR classes every few years; all employees are encouraged to attend.
2. Fires may create toxic smoke or chemical fumes that require the lab or building to be evacuated. Be aware of this possibility before starting the procedure; do a job hazard analysis (forms are available from Terrie). Determine in advance how you will respond

- to a fire. Portable fire extinguishers are distributed throughout the facility and are inspected on a regular basis. Classes are offered on a yearly basis on how to properly use an extinguisher. Only fight the fire if you feel comfortable doing so. Regardless of the size of the fire, always make sure that the Fire Department is notified (911) before you start fighting it so that trained personnel are on the way.
3. Emergencies also occur due to loss of utility service (electricity, water), severe weather, and other natural conditions (floods, earthquakes). Any hazardous work should be stopped until service is restored. In the case of severe weather (or other emergency), contact the RL or your supervisor if you are unable to travel to the lab. Listen to the local radio stations for the announcement of any closures. Evacuation drills are held periodically. Exit routes are posted throughout the facility. Don't wait until an emergency occurs before finding out how to escape.
  4. An emergency response notebook has been prepared that includes maps of each room and building, showing utility cutoffs, chemical and physical hazards, electrical equipment, and response equipment. Familiarize yourself with these for the areas you work in. The notebook is reviewed and updated at least annually; copies are distributed to various university and community emergency response groups (fire and police departments, emergency councils). It is located with the other safety notebooks on the safety shelves.

## X. TRAINING

Initial and refresher training on this plan will be incorporated with the annual training for the PPRL Safety Program. A training outline has been developed and is located in the Safety Plans notebook. Primary training will be done by the CDSO with help from the supervisor.

All employees will receive hazard communications training before beginning work with a hazardous chemical or procedure (see the *New Employee Checklist*). Additional training will be provided when new physical or health hazards are introduced into the workplace or when the job assignment changes. Annual refresher training is also provided to all employees. All training documentation is located in the Safety Files and on the Safety Computer; files are maintained by the CDSO.

RSA employees will meet with the CDSO and are given the appropriate training at that times (hazardous communication, animal handling, biosafety, MSDS, emergency response, etc.). A test is given at the end of training to help evaluate the effectiveness of the training. In addition, workers are observed for safe work habits by both their supervisor and the Safety Team. A written test will be given to determine training effectiveness. All training will be documented; records will be kept by the CDSO.

Contractors and their employees meet with the CDSO before starting work to be made aware of the hazards they may be exposed to while working at the facility. At this time, the CDSO is given a list of any hazardous materials that will be stored or used at the facility during the construction period.

## XI. EVALUATION OF PLAN EFFECTIVENESS

Several approaches will be used by the CDSO to evaluate the effectiveness of this plan. Written tests will be given to students after training and the results analyzed. The written plan will

be reviewed annually as will the injury/illness and OWCP records. The most current standards and directives will be incorporated. The CDSO, with the Safety Team, Location Safety Committee, or other qualified people, will conduct at least an annual inspection of the workplace. Results of these evaluations will be incorporated in the Safety Team meeting minutes. Reports will be forwarded to the ASHM and to the RL for incorporation in the ARMPS.

## XII. RECORD STORAGE

Nearly all records must be kept for the length of employment plus 30 years (basically forever). Chemical and biological agent inventory and hazardous waste disposal records must be kept indefinitely. MSDS, training, and test results must be kept for the length of employment plus 30 years. MSDS must be able to be cross-referenced to employees who used the chemicals. The CDSO will store the records in the safety files. Summary reports will be kept in archived computer files; the CDSO will ensure these files can be accessed by current technology by periodically upgrading them with new software.