ESH100U ARGONNE NATIONAL LABORATORY USER FACILITY ORIENTATION

INTRODUCTION

This course provides the following information:

- Description of Argonne policies and emergency procedures that you will be expected to follow
- Additional information that will enable you to work safely at Argonne National Laboratory

Upon completion of this course, you should be able to:

- Explain how Argonne's safety policy affects you while you are at Argonne.
- Follow Argonne's security policy.
- Explain your responsibilities under Argonne's stop work policies and procedures.
- Properly report emergencies while at Argonne.
- Describe the proper response to site alarms or warning announcements.
- Follow Argonne's vehicle safety and parking requirements.
- Explain your obligations under the Argonne computer protection policy.
- Describe the Argonne hazard communication policy and procedural requirement applicable to your work.
- Describe how you should respond to radiological postings at Argonne.

ARGONNE SAFETY POLICY

As a Department of Energy (DOE) facility, Argonne National Laboratory complies with the DOE worker protection program, which, in brief, stipulates that everyone at Argonne has a right to a safe place to work. While Argonne and your host user facility have the obligation to establish and enforce safe work practices, you share this responsibility. At Argonne, safety is considered to be EVERYONE'S responsibility. As such, it plays an integral role in the planning, review, and execution of all activities, including your work here. Although the primary mission of the Laboratory is scientific/technical research, the Department of Energy, UChicago-Argonne LLC, Argonne and your host management hold safety as the highest priority. The Laboratory Director has stated, "No work we do is so important that it need be done without proper safety measures".

The framework used by Argonne for all of our work is called Integrated Safety Management or ISM. ISM is based on five core functions that call for us to define the work, identify all hazards, develop and implement hazard controls, work within these controls, and provide feedback to improve safety in future work. By working within this framework, your work here should be planned and performed in a safe manner. Each user facility has a specific experiment or work planning and control process based on ISM. You are expected to follow this process.

STOP WORK AUTHORITY

Everyone working at Argonne has the authority to stop work if unsafe conditions arise. In short, Argonne policy states: "Stop Work Authority" enables Argonne employees, visitors, facility users, and contractors to stop any activity that they deem to pose an immediate danger to themselves, other employees, the public, or the environment. Individuals who find themselves or others engaged in an unsafe activity or observe unsafe working conditions are empowered and obligated to stop any activity that they deem to have placed them or others in immediate danger.

It is also an obligation of anyone stopping work to bring such conditions immediately to the attention of the Division Director, Department Head, or line supervisors of the relevant organization.

REPORTING EMERGENCIES

To report an emergency from any Argonne telephone, dial 911 and stay on the line until you are instructed to hang up. If you are using a mobile phone, dial 630-252-1911. If you are calling from a pay phone, you do not need coins.

When asked about your location, if you are using an Argonne phone, look at the 911 sticker (see photo). The building and room number are listed there. Dialing 911 initiates a group alert system that involves the fire, security, and the medical department, among others. As soon as it is safe to do so, inform your host about the emergency.

Emergencies include the following: vehicle accidents, fires, large chemical spills, injuries, acute illnesses, any utility interruptions, suspicious packages, bomb or other terrorist threats, and criminal activity.

Do not delay in calling 911. Seemingly minor accidents or fires can quickly become serious events. Even a few minutes can make a significant difference.

SITE ALARMS AND WARNINGS

Several types of emergency notification systems are used at Argonne: outdoor sirens, the public-address system warning tone and voice announcements, and building alarms. Sirens and the public-address system warning tones are tested on the first Tuesday of each month at 10:00 AM. If you do not hear the warning alarms during the test, contact your host so that Argonne Emergency Management can be informed.

Tornado warnings are announced indoors by voice over the site-wide public address system. Outdoor sirens are also sounded when tornado warnings are issued. When you hear the warning, go immediately to a designated tornado shelter and stay there until an all-clear announcement is made.

Shelters are identified by signs such as those shown. If you are outdoors and hear the siren, seek shelter.

Take shelter in an area indicated by a sign that looks like this:

To find the nearest shelter, follow signs such as this:

FIRES

In the event of a fire, go immediately to a safe place, dial 911 from an Argonne telephone or 630-252-1911 from a mobile telephone, and stay on the line until you are told to hang up.

The locations of fire extinguishers will be pointed out during your sector or building orientation. (If a small, contained fire occurs, you may use a fire extinguisher to put it out if you have been properly trained and you feel confident to fight the fire. Someone should call 911 at once.) Wall-mounted pull alarms are generally located near exit doors and should be used to alert personnel of a fire if no audible alarm is sounding. These alarms will also be pointed out during your sector or building orientation.

Be sure you know the exit routes from the area where you will be working. When leaving a building in response to an alarm, avoid blocking exit routes and roadways. For information and instruction on when it is safe to return to the building, look for an Area Emergency Supervisor (AES) wearing an orange cap with the letters AES on it.

REPORTING REQUIREMENTS

All users are required to notify Argonne of any changes in their name, employer or home institution, and immigrant status or USCIS documentation. Foreign national users should also report any involvement in civil or criminal issues. Failure to provide appropriate documentation when required or providing fraudulent documentation will result in suspension of access approval, removal from the site, and possible cancellation of future access.

HEALTH CONCERNS

Injuries and Illnesses:

If anyone in your vicinity suffers an injury or acute illness, dial 911 from an Argonne telephone or 630-252-1911 from a mobile telephone (24 hours a day) and stay on the line until you are instructed to hang up. After you hang up, notify someone from your host facility. Argonne paramedics will respond and transport the injured or ill person to the nearest hospital emergency room or to the Argonne medical department, as the situation warrants. Do not attempt to take an injured or ill person to the Medical Department or hospital. Do not let an injured or ill person attempt to get to medical services on his or her own. Be aware that if you are the injured or ill person, emergency health care at an off-site facility is your financial responsibility. It is important for you to be familiar with the terms of your insurance coverage and your employer's coverage for occupational illnesses and injuries. Be sure you have your insurance card, health maintenance organization card, or other proof of insurance with you during your stay at Argonne National Laboratory. If you do not have medical coverage, short- term medical insurance can be arranged.

For non-emergency illnesses or injuries, go to the Argonne Medical Department, Building 201, during sick-call hours (Monday through Friday, from 10:30 AM to 12:00 PM and from 3:00 PM to 4:30 PM). Medical Department staff will either treat you or refer you to an appropriate off-site facility.

Pregnancies:

We would like to call attention to special considerations made available for pregnant women working in laboratory settings. Although declaration of pregnancy is voluntary, we strongly encourage you to inform your host if you are pregnant so these special considerations can be discussed.

SECURITY, EXPORT CONTROL, AND PHOTOGRAPHY

Argonne places a very high priority on health and safety in the workplace. Therefore, you may not bring any of the following items on site: firearms or other weapons, pepper spray, explosives or incendiary devices, open containers of alcohol, illegal drugs, or pets. Specific authorization is required to bring in or take out hazardous material (including radioactive materials). Argonne reserves the right to inspect incoming or outgoing personnel or vehicles for prohibited material and/or government property. Therefore, any equipment or material owned by you or your institution should be clearly tagged. For more specific guidance, contact your host.

Based on U.S. regulations, some sensitive technology and software is export controlled. The release of such sensitive technology can occur by transfer of documents, conversations, phone calls, etc. The Argonne Export Control Department assists in avoiding the release of these sensitive technologies. Argonne is firmly committed to strict adherence to all U.S. export control laws and regulations. Under no circumstances should the export of controlled technical data, software, or commodities take place contrary to U.S. export control laws and regulations. Penalties exist against both the laboratory and individuals for violations of export control laws.

Badge Responsibilities

- Use for official Laboratory business only
- Must be worn at all times while on site
- Do not wear offsite
- Return to Division, Human Resources, or Security upon termination
- Future access may be denied if badge is not turned in
- Report loss or theft
- Get a new badge if you have a change in name or appearance, or if it becomes damaged or discolored

There are no restrictions regarding photography on site, with the exception of photographing emergency responses, whether actual or training. Taking pictures inside of buildings, or of any work being performed, should be approved by a competent authority (Security, building manager, or division management).

Information Security

Unclassified Controlled Information, such as Official Use Only (OUO), is protected through specific marking, access control, physical protection and other requirements for reproduction, transmission, destruction and dissemination. For more information on protecting Unclassified Controlled Information, see DOE M 470.4, *Information Security*, located at www.directives.doe.gov.

VEHICLE SAFETY AND PARKING

The Illinois Motor Vehicle Code applies at the Argonne site. Vehicle operators must have a valid driver's license or instruction permit, wear seat belts, obey traffic signs and signals, have liability insurance, be alert for road hazards, and yield the right of way to pedestrians who are crossing at marked crosswalks.

On-site speed limits are as follows:

- Near entrances: 15 mph (24 km/h)
- All other locations: 30 mph (48 km/h)
- Residential area (600 area): 20 mph (32 km/h)

These limits are strictly enforced by the Argonne Protective Force. Violations are reported to your host.

Deer can pose a traffic hazard at Argonne and in the surrounding area. These animals roam the site, sometimes in herds, crossing roads without warning. Be alert at all times and SLOW DOWN when you see deer near the edge of the road.

Park only in marked parking spaces. Parking is prohibited at building loading/receiving docks, in spaces designated for the handicapped (unless the vehicle has properly displayed authorization), within 15 ft (4.6 m) of a fire hydrant, in fire lanes, and in reserved spaces.

Motorcycle riders are required to wear Department of Transportation (DOT) approved helmets on site, even though helmets are not required under Illinois law. In addition, bicycle riders, moped riders, inline skates, and even users of wheeled cross-country ski trainers must wear Consumer Product Safety Commission (CPSC) approved helmets while on site. The Protective Force will issue tickets to enforce these rules.

Individuals operating motor vehicles on the Argonne campus are prohibited from using cell phones or other mobile communication devices while driving. The Protective Force will issue tickets to users who violate this rule.

The Argonne Bike Share Program is designed to provide an alternative to automobile use for travel around the Laboratory site and to promote wellness in the workplace. Bikes will be available from the last week of March until the first week of November, weather permitting. Before using the bikes, you must complete a required training course, ESH561 - Bicycle Safety. Upon completion of the training, you will receive an Argonne-issued Bike Share helmet. Non-employee students, subcontractor employees, and long- term visitors (such as scientific users) are also eligible provided they complete the training course and sign the required liability waiver, form ANL-877.

COMPUTER PROTECTION

Argonne employee and visitors are expected to comply with Argonne's computer protection policies and practices. Briefly, these policies specify that you must identify and protect sensitive information and computer applications, follow appropriate back-up procedures, and prevent any unauthorized use of Argonne computing and network resources. Any suspected compromise of computer security should be immediately reported to your host.

In order to use any of Argonne's user facilities, you must also take the Argonne course ESH223 - Cybersecurity Education and Awareness. This course has a one-year retraining interval. While you are on the Argonne site, your ESH223 training must be current.

SMOKING

It is the policy of Argonne to establish a smoke-free environment for its workers and visitors. The smoking of tobacco products is thus prohibited in all interior space at Argonne, except for those rooms/areas of the Argonne Guest House and lodging facilities specifically designated for smoking. In addition, smoking is prohibited in any outdoor areas within 15 ft of a building entrance, windows that can be opened, or ventilation intakes. If you smoke, make sure your smoking materials are extinguished before you leave the area. Use the designated receptacles for cigarette butts.

WORKING ALONE

When activities anywhere at Argonne National Laboratory involve significant hazards, you are not permitted to work alone; you must remain within sight and hearing of a second person who understands the work being performed and knows all pertinent emergency procedures. If you will be working alone conducting non-hazardous activities, make sure that someone from your host group is aware that you will be doing so.

HAZARD COMMUNICATION

Hazard communication is a critical part of Integrated Safety Management. While every work activity may expose people to many hazards, the hazards from chemicals need special attention.

Chemical Safety

Argonne National Laboratory has worked to implement a system for controlling risks arising from the storage, use, transport and disposal of hazardous chemicals. A hazardous chemical is any chemical that is a health or physical hazard. This includes chemicals that have acute or chronic health effects including carcinogens, toxic or highly toxic agents, reproduction toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic system, and agents that damage the lungs, skin, eyes, or mucous membranes. This also includes chemicals that are combustible liquids, compressed gases, explosives, flammables, organic peroxides, oxidizers, pyrophorics, reactives, or water-reactive chemicals.

Work with hazardous chemicals in laboratories requires the use of chemical fume hoods. Details of proper work practices for chemical fume hoods are available at:

https://www.aps.anl.gov/files/APS-Uploads/Safety-and-Training/Safety/Reference-Material/Fumehood_Work_Practices.pdf

This system recognizes your right to know the identity of chemicals to which you might be exposed, the hazards associated with them, and the results of any associated monitoring. It also requires you to provide, through your facility contact, information needed for your own safety and the safety of others.

As a user, you must:

- Understand and know how to manage hazards posed by the substances you use
- Ensure that relevant hazard information is immediately available
- Follow the safety plan developed for the laboratory at which you'll be working

If you have further questions, contact the safety officer for your host facility.

Chemical Inventory

Each facility maintains a record of the chemicals used in its laboratories. You have the right to view this record and the obligation to fully describe any chemicals (and their hazards) that you bring with you or have shipped to Argonne.

Safety Data Sheets

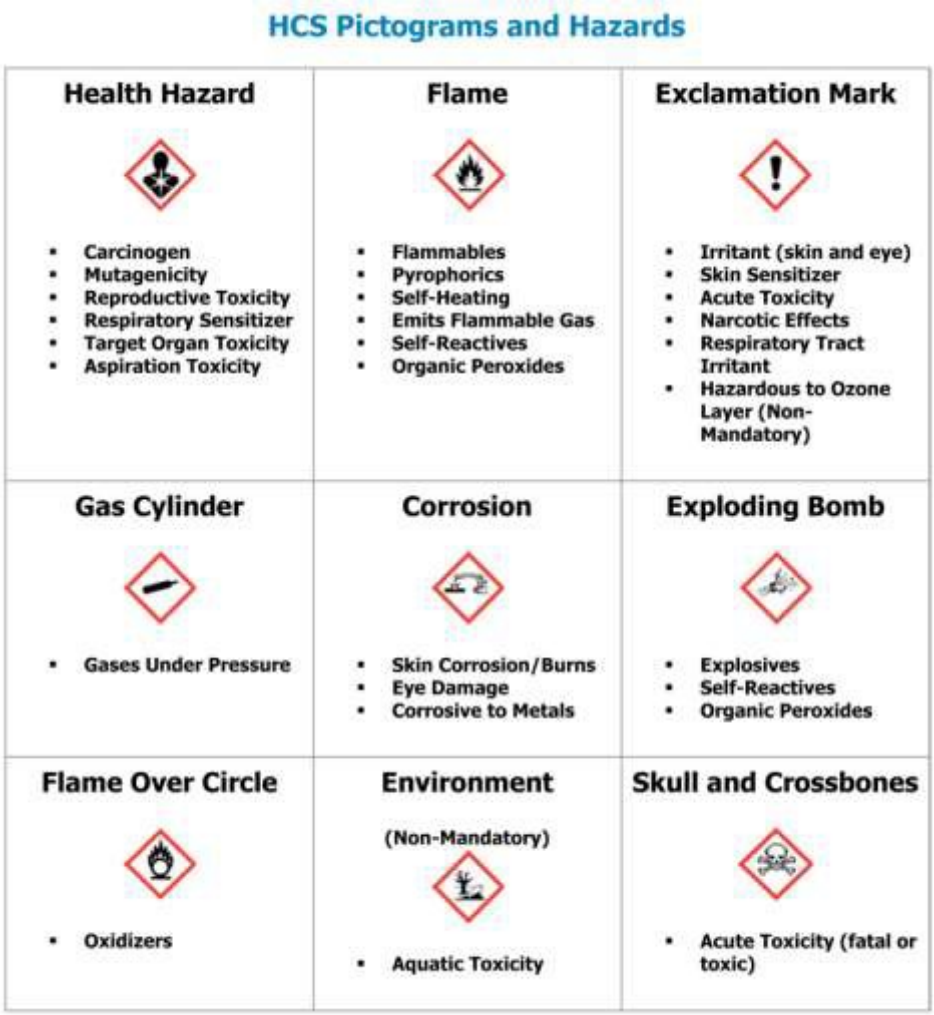
Each laboratory is required to maintain safety data sheets (SDSs) for all industrial and reagent chemicals stored or used at the facility. Under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) that Argonne follows, SDSs feature 16 standardized sections.

A representative of your host facility will show you the location of the SDS sheets. Also, SDSs for chemicals used at Argonne can be obtained through the Argonne intranet.

Container Labeling

All reagent chemical containers must be labeled with the name of the reagent as it appears on the SDS, appropriate hazard warnings, and the name of the person who is responsible for the container. The labels should also include pictograms (in compliance with the GHS requirements).

In addition, if a chemical is peroxidizable or otherwise becomes more dangerous with age, a "discard by" date must appear on the container.



Particularly Hazardous Substance (PHS)

You may encounter PHS during your work at ANL. PHS are chemicals posing a high degree of potential health hazard. They meet one or more of the criteria below:

- High degree of acute toxicity
  - Can cause death or damage to target organs from a single exposure or an exposure of short duration, or
  - SDS hazard statement of acutely toxic by inhalation, oral or dermal with Globally Harmonized System (GHS) Hazard Codes H300, H310 and H330
- ANL chemical carcinogen (a chemical agent which increases the incidence of cancer)

- Your host has the ANL Carcinogen list and carcinogen inventory report (building, room, etc.), or
- SDS hazard statement of carcinogenic with GHS Hazard Codes H350, H350i and H351
- Reproductive toxin, including a germ cell mutagen
- Can cause adverse effects on reproductive function, fertility, or offspring development (teratogens), including chromosomal damage to germ cells (mutagens), or
- SDS hazard statement of Reproductive Toxicity with GHS Hazard Code H360 and H361, or
- SDS hazard statement as Germ Cell Mutagen with GHS Hazard Code H340 and H341

You can identify PHS by

- Determining if the chemical has the above PHS health hazard attributes using SDS or other reliable reference
- Consulting your host
- Reviewing manufacturer SDS and lab placards

You may see these chemical container labels and warning signs in your work area to identify PHS:

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Proper attire for work in a laboratory setting includes closed toe, covered heel shoes and long pants. Sandals are not acceptable. Skirts may be worn if exposed skin is covered by a lab coat or other protective equipment. For low risk laboratory scale work with potential for protected (i.e. gloved hands) incidental/accidental contact exposure to chemicals, in most cases it would be appropriate to use the general PPE includes safety glasses with side shields (in case of flying particles), lab coat, and disposable nitrile gloves, unless Standard Operating Procedure (SOP) requires other PPE. For potential splash hazards, a face shield over either safety goggles (for chemical) or safety glasses (acceptable for cryogen), and chemical resistant apron (lab coat is not chemical proof) and gloves with improved protection (increased thickness, length, etc.) may be required. You must also know eyewash and emergency shower locations and their respective use procedures. Wash hands with soap and water after work.

Before using PPE, you must inspect it:

- Is this the right PPE?
- Is it the right size?
- Is the PPE damaged?
- Check gloves for pinholes
- Check for degradation
- Is it clean?

When PPE is being worn, inspect:

- To assure proper fit
- Condition – check for holes
- During use – replace if snagged, punctured, or damaged.

Notes: While disposal nitrile gloves are acceptable for laboratory (small) scale use of many chemicals, they may not be good for quite a few chemicals even if the chemical contacts the glove material only briefly (ask your host about a list of 75 chemicals one manufacturer tested). Therefore, always consult your host or SOP for the proper gloves for the work before choosing the nitrile gloves. Change out gloves immediately if they become contaminated (decontamination with disinfectants is not allowed). Be mindful of other conditions that may stress the integrity and protection of the PPE. For example, heat and abrasion will accelerate glove degradation and chemical permeation.

CONSTRUCTION AREAS

To enter a construction area, you must receive permission from the project manager, adhere to any construction area requirements, and complete required training. Always contact your Argonne host before attempting to enter any construction area.

TRANSPORTATION OF HAZARDOUS MATERIALS

The transportation of any hazardous material on the Argonne site must be in accordance with Argonne requirements. Do not transport hazardous materials in your own vehicle. Contact your host for guidance. Transport of hazardous materials to/from the Argonne site must be done in compliance with U.S. Department of Transportation (DOT) regulations.

DOT Awareness and Inner Container Preparation

You may be asked to prepare or coordinate shipping of research samples, materials or equipment as part of your job. These activities may be subject to the U.S. Department of Transportation, International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) rules. This includes filling of receptacles that contain samples, providing the correct Safety Data Sheet for a material, or placing batteries correctly into equipment.

While the shipping department handles the vast majority of compliance with these regulations, your part in the process is just as important. For materials or equipment that can't be repackaged, your work is the first part of the overall compliance process.

Sample Material Identification

In order to select the appropriate packaging for your chemical, you must know the characteristics of the materials you are preparing. This information can be found in a Safety Data Sheet (SDS). The correct SDS must accompany each material being shipped off site.

In order for the shipping department to correctly package any material, you must be sure to mark containers or equipment so they can be identified and matched to the correct SDS.

Selecting a Container

Before filling a receptacle you want to ship with a sample or material, you must be sure that you are choosing one that will withstand the conditions in an aircraft cargo hold. This includes withstanding the extreme variation of pressure from altitude (95 kPa) and temperature ranges (regardless of season). Temperature from -40 F to 140 F are encountered by air and ground transport in the United States and internationally.

For new inner containers, you must choose a receptacle and a cap or closure that is provided by the container's manufacturer. Securely tighten, tape, or seal the cap or closure to prevent it from loosening. The receptacle and cap or closure must also be compatible with the material to ensure that no chemical or galvanic reaction will occur. Materials in their original receptacle, with their original cap and closure, may be shipped in that original container. Keep in mind that the fill requirements below have to be met, and the cap or closure has to be securely tightened, taped, or sealed to prevent loosening.

Inner containers must be obtained through AMOS or PARIS, and documentation must be provided by the supplier to ensure it meets these requirements. If the receptacle you use can't be verified as complying with the regulations, your shipment will be delayed. Prior to filling, the inner container must be inspected to ensure that the container and its closures are in proper condition to contain the materials inside.

Please Note: If a product needs to meet certain specifications (i.e., container can only be made of 304L stainless steel, product comes with material or testing certification) or has to meet Argonne Quality Assurance requirements, then AMOS is not the appropriate procurement method.

Contact the shipping department for specific help in determining inner container specifications.

Filling and Closing your Container

When filling inner containers, sufficient ullage (headspace) must be left to ensure no leakage or permanent distortion of the container will occur during transportation from expansion resulting from pressure or temperature changes. To comply with these requirements, the Argonne policy is that containers are not filled greater than 80% of their volume capacity. Prior to transfer to Building 46 for shipment, you must securely close the container and tape the cap or closure.

Note: Once closed, the inner container will not be reopened by shipping personnel during inspection to ensure that the inner container is properly closed and secured with no leakage or loss of your material. After a thorough review of the material and the inner container has been completed by shipping personnel, the inner container will be packaged in outer packaging meeting DOT requirements or best practices.

Getting your Materials to Building 46

Make sure that all shipment documentation (including a SDS) accompanies the movement of the material to Building 46. Examine all filled containers to identify and mitigate any leaks and remove any residue from the outside of each container. Any inner containers found to be leaking at Building 46 will be returned to you, which may delay your shipment. Contact the shipping department if you have any questions prior to movement.

NON-CHEMICAL HAZARDS

At Argonne, hazard communication does not stop with chemical hazards. Since Integrated Safety Management requires that all hazards be identified, you must know about hazards posed by all facets of the work you do. In addition to chemical hazards, consider the following as potential hazards:

- Physical hazards
- Impact / penetration / compression
- Electrical
- Slips, trips and falls
- Pinch points
- Physical agents
- Heat and cold
- Non-ionizing radiation
- Microwaves
- Magnetic fields
- Ultraviolet and infrared radiation
- Lasers (Note: The use of class 3 and 4 lasers requires that several medical, training and procedural requirements be met.)
- Noise and vibration
- Ionizing radiation

ELECTRICAL SAFETY

Personal Safety:

Electrical safety awareness and compliance with Argonne safety policy is for your protection. It is the most important part of your work activity at Argonne. Safe work practices require knowledge of all potential hazards, and the application of safeguards and precautions that effectively minimize the risks these hazards create. If you do not know or understand the hazards associated with your work or the equipment you are using, stop the work and ask your facility host for guidance in developing safe work practices that control the hazards and minimize the risks involved.

Electrical equipment:

Non-commercial equipment, including modified commercially manufactured equipment, must have appropriate engineered safeguards and must also be reported (e.g., as part of your experiment safety assessment) to your host in advance and made available for inspection, testing, and certification by Argonne prior to use.

YOU ARE RESPONSIBLE FOR YOUR ELECTRICAL SAFETY!!

- Be observant.
- Report any electrical work that needs to be done.
- Do NOT attempt electrical work if you are not QUALIFIED and AUTHORIZED.
- Recognize electrical hazards and exercise safe work practices.
- Prevent trip hazards—DO NOT run extension cords on the floor unless properly covered. It is suggested that cords be run overhead, 7 foot
- minimum where practicable. Extension cords are TEMPORARY (90 days or less).
- Prevent overloading—DO NOT overload multi-plugs. DO NOT plug extension cords into extension cords.
- Prevent shock—DO NOT use damaged or frayed cords. DO insure that cords have a grounding pin. DO use Ground Fault Circuit Interrupters (GFCI) when using electric hand tools. DO NOT use metal ladders.
- DO NOT touch exposed wiring—report this to your management.
- Recognize your hazards—as part of your facility-specific orientation, you will be briefed on potential hazards and precautions of the equipment you will be working with.

Information for Users:

As a user, the only electrical activities you are permitted to perform at Argonne are the following:

- Plug into and unplug from an outlet any piece of electrical equipment

with a plug that easily fits the receptacle and requires no modifications, provided the equipment has been approved by a certifying agency or by Argonne and has an approval marking or sticker. This means that any equipment you have built and brought into the user facility must be certified/approved before you can plug it in.

- Operate/use such a piece of equipment in accordance with its instructions
- Operate common light switches
- Replace batteries in common consumer type products such as tools, pagers, cell phones, and laptop computers

You are not permitted to perform any other type of electrical activity or task. Instead contact your primary user facility contact if any other electrical work, task, or activity is required.

CONTROL OF HAZARDOUS ENERGY SOURCES

Types of energy sources:

- Electricity
- Gas, steam and pressurized liquids
- Compressed gases
- Rotating parts
- Springs
- Raised loads

Lockout/Tagout (LOTO): **Do NOT** work on any energized systems! If work must be performed and LOTO is required, contact your host to arrange for LOTO.

RADIATION SAFETY

At Argonne, our goal is that there be no radiation exposures above background levels unless they are planned for and every reasonable effort has been made to reduce the exposure to as low as reasonably achievable. Before you perform work where you may be exposed to ionizing radiation, you will receive one of Argonne's radiation safety courses. You may also be asked to demonstrate your radiation safety awareness via a practical examination.

Dosimeters are specifically required for:

- Personnel working with radioactive material samples, non-exempt sealed sources, and x-ray generators
- Anyone working in a controlled radiation area
- Women who have declared themselves to be pregnant and expect to work in an area of potential radiation

Additionally, dosimeters will be assigned to anyone who specifically requests one for his or her own comfort. Dosimetry results can be obtained by contacting your host, who can arrange for these results to be sent to you.

Personnel working with radioactive samples, x-ray generators, etc. may require additional training.

Posted Requirements:

- Some areas may be posted with additional restrictions for entry because of potential radiation hazards. You are required to obey all such postings. An example of a posting is shown here.
- Magenta and yellow colors, and the familiar radiation trefoil are signals that a radiation hazard may be present. Do not enter a controlled area unless you are properly trained, qualified and authorized to do so.

Radiation Alarms:

- Personnel should be familiar with the radiation alarms and the response to an alarm in the facility
- The response to a radiation alarm is:
- Stop work activities
- Exit the area immediately
- Notify the main control room and your host
- If you have any questions concerning radiation safety, contact your host or the local Argonne Health Physics representative.

BASIC BIOSAFETY INFORMATION

Entrances to areas containing biohazardous materials are posted with the universal biohazard symbol.

This means that the following may be present:

- Human blood
- Human blood products
- Any biological material which can pose a treatable human health risk

Do not enter these areas without authorization.

Biological wastes are stored in red, labeled disposal bags. Biological waste must only be handled by qualified and authorized personnel as they may present a low-level health risk.

Bloodborne Pathogens

Regulated Medical Wastes (RMW) are any wastes contaminated with human blood or blood products.

RMWs are potentially contaminated with human pathogens and must be disposed of properly. This includes:

- Blood from a cut
- Sharps such as a needle used by a diabetic for routine injection Estimates from the Centers for Disease Control and Prevention (CDC) are that one million accidental needle sticks occur every year in the United States.

It is illegal to dump this type of waste into the regular trash. Used needles cannot be put in a regular waste basket. Call 911 if an accident generates a blood spill. Staff trained in blood spill clean-up are available.

RISK ASSESSMENT

Once hazards are identified, ask your host

- Potential routes of exposure, such as skin contact or absorption, inhalation, ingestion, injection, etc., to understand the Consequence
- Likelihood of each route of exposure, considering frequency, duration, process (pipetting vs. pouring a chemical), etc.
- Overall Risk, which is the product of Consequence and Likelihood
- The Hierarchy of Hazard Controls considered and appropriate control measures selected to mitigate the risk

The scope of your user work approval document allows low risk laboratory scale work. Although a broad range of hazardous chemicals (including high hazard PHS) may be used, the controls in place should not allow exposure other than protected (i.e. gloved hands) incidental/accidental contact exposure to chemicals. If your work still presents risk of unprotected skin (such as an unforeseen splash on bare skin not protected by engineering control or PPE), inhalation (such as off-gassing from a solvent to personal breathing zone), ingestion, or injection (such as working with syringe/needle without sufficient prior experience) exposure, consult your host.

"Laboratory scale" means the work only involves containers (used for reactions, transfers, and other handling of substances) that are designed to be manipulated easily and safely by one person. The ‘Low risk’ determination is supported by four levels of control consideration: process changes (e.g. using a squeeze bulb instead of mouth pipetting), engineering controls (e.g. radiation shielding, machinery guarding), administrative controls (e.g. permits), and personal protective equipment. Used together, these controls are referred to as Hierarchy of Hazard Controls and provide protection in depth.

HIERARCHY OF HAZARD CONTROLS

To demonstrate, we use the low risk laboratory scale work with PHS as an example.

Process changes are accomplished by altering the way the work is done or the equipment used to eliminate or significantly reduce the hazard, such as replacing a PHS with a less hazardous chemical or purchasing working concentration to eliminate dilution.

Engineering controls utilize tools and equipment to prevent the hazard from reaching you. For example, work with PHS must be performed in a ventilated enclosure, such as a lab hood with sash lowered, or the process and hazards can be isolated by enclosing them in a glovebox. General room ventilation is not adequate.

Administrative controls alone cannot prevent you from being exposed to a hazard, but they provide information on action you must take to avoid the hazard. For example, you will take different training before you are authorized to work, chemical containers must be labeled, establishment of a designated area must be considered to identify boundaries of the PHS area, warn of the presence of PHS, and limit entry to authorized personnel.

Personal protective equipment (PPE) must be used when all of the above methods have been implemented and the hazard is still not completely controlled. PPE is also used as extra protection from unexpected or accidental exposure.

Post work, at a minimum, precautionary wet wiping of containers, equipment, and potentially contaminated work surfaces is required. If a spill occurs, contact your host for decontamination plan.

HAZARDOUS WASTE

If your work here will generate hazardous chemical or radioactive waste, you must work with Argonne and your host to ensure that these wastes are stored and disposed of properly. Argonne will provide for hazardous waste disposal; your host will make sure you know the proper procedures. NOTE: except in certain cases, waste chemicals may not be disposed of down laboratory, restroom, or storm drains.

ENVIRONMENTAL PROTECTION AND RECYCLING

Not only must Argonne protect its employees, visitors, users and contractors, we have a commitment to protect the environment. You may be asked to provide information on the potential environmental impact of your work here.

In addition, Argonne has an active recycling program. Much of the waste paper and cardboard that is generated can be placed in the blue bins that are provided for collecting recyclables.

THIS CONCLUDES THE COURSE.