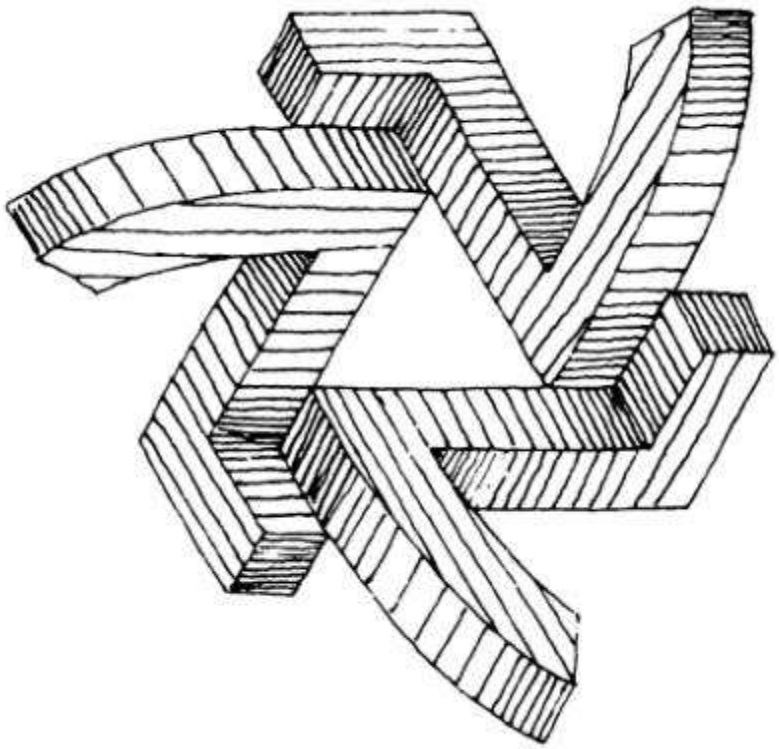
Soudan Underground Laboratory Safety Handbook



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1. Introduction

Safety at the Soudan/Minos Laboratory is a cooperative effort of The University of Minnesota, The Department of Natural Resources and all Collaboration members to the Laboratory. The Primary ES&H Agent in the underground lab is the University of Minnesota. The Department of Natural Resources is the Primary ES&H agent for the Soudan Mine Underground State Park. This handbook is a general overview for safe operations in the Soudan/Minos facility. Please be aware that policies and procedures may change and this handbook may not reflect the most current policies. If you have any questions or concerns, please talk to your supervisor or the Lab Safety Officer.

Careful adherence to these safety rules will help reduce the occurrence of accidents and health hazards in the unique working environment of the Soudan/Minos Lab. All employees, DNR staff, and visitors from other institutions are required to comply with these policies as well as those established by Federal or State statute. The ultimate goal is for a safe work environment for employees, collaborators, students and visitors.

Safety is the top priority

2. Lab Safety Officer

The immediate responsibility for safety in the Soudan Underground Laboratory rests with the Lab Safety Officer (LSO). Jerry Meier is the Lab Safety Officer and is responsible for enforcing this Safety Policy. The LSO shall be responsible for maintaining the ES&H Program and keeping records and policies up to date. The LSO shall also oversee safety training and investigations. Accidents, "near miss" accidents, and safety problems should be reported to the Safety Officer or the shift supervisor immediately.

3. General Information

a. Working 2,341 ft underground

The location of this lab has some unique problems of it's own. The closest local hospital or clinic is 25 miles from the Lab. University personnel have been trained in First Aid, CPR, High Angle Rescue, High Concentration Rescue Oxygen, and Defibrillator use. We also have a trained joint (DNR + U of M) rescue team. University and DNR personnel have also been trained in The Minnesota Incident Management System. Our goal is to provide a safe environment to work in and to train for any emergency that may arise.

b. House keeping

Good housekeeping means simply a place for everything and everything in its place. We must all do our part to keep our work areas clean and neat, not just for appearance but also to prevent accidents associated with slips, trips and falls; the prevention of fires, and for regulatory compliance. Suggestions for good housekeeping:

- Keep your work areas clean and all aisle ways open.
- Replace as needed all grating, toe boards, guardrails, barricades, machine guards, and warning signs.
- Clean up your work area at the end of each shift or immediately after finishing a job.

- Do NOT leave equipment, tools, etc., in stairwells or on stairways as a trip hazard.
- Place waste materials in containers provided for such purposes.
- Immediately clean up any spills which may cause a slip hazard or an environmental impact.
- All extension cords and welding leads shall be coiled up and put away when you are done using them

c. Emergency Procedures

FIRE ALARM: Visitors must proceed to the North West end of the cavity, to receive instructions and possibly evacuate. All Lab users shall know the location of self-rescuers and be prepared to use them if necessary. Further instructions are in section 3-d.

EVACUATION PROCEDURE: Exit through the West Soudan drift. Close the fire doors and leave the West drift through the wooden doors. Turn West (left) and follow the tracks for approximately one half mile. Stay to the left at the place where the tracks fork. Proceed to the Rescue Room and remain there until you receive instructions from the surface.

POWER OUTAGE: Most power outages at the lab will only last a few minuets. All users should carry a small flashlight on them while underground. Remain where you are and wait for the lights to come on. If the outage seems long, proceed to the north West end of the cavity and await further instructions. The DNR maintains a Backup Diesel in the engine house so they can operate the Cage in the event of prolonged power outage.

SEVERE WEATHER: In case of severe weather, The DNR will require all persons underground to leave the mine.

d. Accidents and Illnesses

You are responsible for the safety of your activities and for following all safety procedures applicable to your work. If you become aware of conditions or behaviors, which may be a safety hazard, it is your responsibility to report such conditions to your supervisor or the Lab Safety Officer.

All accidents or near miss incidents shall be reported so the matter can be reviewed and possibly prevented in the future.

In the event you become ill, notify your supervisor so arrangements can be made to get you to the surface.

e. Fire Safety

1. Locate the fire extinguisher near your work area and know how to use it.

2. Locate the "Self Rescuers." Two bright yellow boxes containing 6 units each are kept (1) mounted on the First Aid Cabinet near the counting house stairway, and (2) on the railing along the North end of the dance floor. These respirator units remove carbon monoxide from the air you breathe through a mouthpiece. Use a self rescuer when evacuating the Laboratory in the event of a fire. The mouthpiece will get hot when carbon monoxide is present -- it is essential to continue using the unit if this should occur!

3. The fire sprinkler system is automatic (sprinkler heads are heat sensitive); it will interrupt the electrical power in the Laboratory if activated.

4. Smoke detector alarms, fire alarm pull switches, and sprinkler activation will each turn off all electrical power in the Laboratory after a 5 minute time delay. This delay may be reset manually as many times as needed until the cause of the alarm is found. Transient false alarms will not turn off the electrical power. A backup battery operates the fire alarm system when the electrical power is off and all alarms are relayed to the surface. (engine house)

5. The delay time should be changed from 5 minutes to zero minutes during periods when the Laboratory is unoccupied. The delay time should be changed back to 5 minutes when the Laboratory is reoccupied.

6. If you discover a fire before it sets off an alarm, notify everyone in the Laboratory immediately, and take steps to extinguish it only if you are sure you can do it safely.

f. Enforcement of Safety Rules

Enforcement of Safety rules in the Lab is the responsibility of the LSO and Lab Supervisors. Violations will be reviewed and appropriate action taken. Visiting users privileges may be revoked for severe or repeated violations. U of M personnel will be reprimanded according to University procedures.

4. Industrial Safety

a. Radiation Safety

There are areas in the Lab where exposure to man-made radiation can occur. These areas, designated as RADIATION AREA, are posted with black (or magenta) and yellow signs indicating their boundaries. The Mapping table is one of these areas. ONLY Authorized persons that are named on the University of Minnesota radiation permit will be allowed to use the sources. When not in use, they must be locked in an appropriate protective container. For further information, see the University of Minnesota Radiation Safety Manual.

b. Chemical Hazards

The U of M and the DNR must approve of chemicals or hazardous materials in the Lab before they are allowed underground. Copies of the Material Safety Data Sheet must be available to all persons who may come in contact with them and be on file with the Lab Safety Officer and the DNR. For further information, refer to the University of Minnesota Chemical Hazard Plan.

c. Electrical Safety

Electrical and electronic installations at the Laboratory must conform to the intent of the current edition of the National Electric Code. The standards of nationally recognized testing agencies, such as Underwriters Laboratory, must be observed in the selection of electric wiring, electrical/electronic devices and equipment. When no existing code or standard applies, the design of electrical and electronic installations must give prime consideration to the safety of personnel.

If you work on or around equipment with the potential of electrical shock, you should attend training about the hazards involved and actions that you should follow to prevent injury. Whenever possible, electrical equipment must not be worked on until it has been reliably deenergized.

d. Machine Tools and Powered equipment

Machinery and machine tools are by definition power driven equipment used to shape material by cutting or impact. Included in this category are lathes, mills, punches, presses, radial saws, planers, sanders, drills, and grinders. The operation, adjustment, or repair of any machinery or machine tool is restricted to experienced and trained personnel. All areas where machine tools are used should be placarded to indicate that eye protection is mandatory for all persons in the area whether operating the equipment or not.

Never leave machinery running if you are not there to operate it. Materials such as metal stock or lumber must be removed from the machine and the power-down procedure carried out before leaving the area. Proper grounding and machine guards are required where applicable. Removing or circumventing machine guards which have been installed is strictly prohibited without approval of your supervisor.

e. Material Handling Equipment

Powered Material Handling Equipment such as lift trucks (forklifts) and cranes may be operated only by persons who have been formally qualified through training and by supervisor approval.

Lifting and moving of heavy objects should be done by mechanical devices whenever this is practical. The equipment used must be appropriate in size and design for the lifting and moving task. Heavy objects that require special handling or rigging must be moved by U of M employees specifically trained to move such objects. The rated load capacity of the equipment must be displayed and must not be exceeded. In addition, each lifting device must be inspected before lifting.

Lift trucks, cranes and hoists are designed to move material not passengers. The operator is the only person permitted on the equipment. When loads are moved, they must never be moved over any personnel. Walking under a suspended load is strictly prohibited.

f. Ladders, Scaffolding and Personnel Lifts

All ladders used at The Lab must meet the requirements set forth by the Occupation Safety & Health Administration (OSHA). Ladders must be appropriate for the job - proper length and type; e.g., metal ladders must never be used for electrical work or in areas where there is any probable contact with live electrical parts. Arrangements must be made for transporting tools and materials up and down ladders (i.e., use canvas bag or tie into bundles, etc.) so that you will have both hands free for climbing. Misuse of ladders and the use of improvised ladders are responsible for a large percentage of the injuries resulting from falls.

All scaffolds must conform to OSHA requirements. They are to be inspected and approved by a competent person prior to use. See your Senior Safety Officer for more information. Climbing on handrails, midrails, or brace members as a means of access to the scaffold is forbidden. Use a secure ladder for entry. Fall protection is required if you are unable to erect proper guardrails or need to work from the rails. Check with your Senior Safety Officer to insure your work plan is appropriate.

The Powered Personnel Lift shall only be operated by authorized persons. Prior to using this equipment you must be trained. Fall protection gear must be worn while in the man lift bucket.

g. Welding and cutting operations

Only experienced personnel will be allowed to perform welding and cutting operations. Welding goggles and hoods, gloves, and aprons must be worn while welding and cutting. Shields and screens constructed of approved materials must be used to contain sparks, hot slag that could start a fire, and to avoid exposing others to harmful light rays. When welding and cutting equipment is not in use, the valves must be shut off at the cylinders and the torch. Arc welding leads must be stored properly after each use. Ventilation in the area must be adequate to exhaust any toxic fumes produced in the operation

h. Subcontractor Safety

Subcontractors conducting work on site are required to take all precautions necessary to protect the environment, health and safety of their employees, as well as that of other persons on and around the site. In part, this requires compliance with the Soudan / MINOS ES&H Manual and this Safety Handbook and all DOE mandatory safety standards, especially OSHA, NEC and NFPA standards prescribed by DOE.

All workers going underground will receive this hand book and must sign a statement of training that declares they have read and understand the lab rules. They will also be trained in self-rescuer use and procedures in case of emergency. Subcontractors must provide any necessary safety training, medical surveillance, PPE, and other safety equipment required to perform their work.

i. Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) is designed to protect you from obvious hazards within the working environment. There is no way of knowing just when and where an accident will occur; therefore, you should take the necessary precaution of protecting yourself at all times. Hard hats, safety glasses, safety shoes, gloves, face shields, etc. are passive protective devices which are designed to be worn at all times while in the presence of a hazard. This equipment will do you no good taking up space in your desk drawer or your locker when you should be wearing it. The Lab will provide PPE where needed and its usage will be strictly enforced.

5. Soudan Mine State Park Rules

a. Cage safety

1. Report any shaft safety problems to the Safety Officer or to Paul Wannarka immediately.

2. An official Cage Rider, approved by Paul Wannarka, must accompany all personnel in the Cage. If both decks are occupied, each must have a Cage Rider. The Cage Rider must stand near the Cage door.

3. All persons going underground **MUST** be tagged in at the headframe. All visitors entering the Cage to go underground must be tagged in and signed in on the list at the headframe. This is the Cage Rider's responsibility for persons arriving and leaving at the beginning and end of each working day. If you arrive or leave at other times, it is YOUR responsibility to tag yourself in or out.

4. All visitors to the Laboratory should be instructed to go to the Park Office when they arrive, to arrange for a Cage escort, unless they come down with the regular shift at the start of the day.

5. Everyone entering the Cage must wear a hard hat.

6. At least one person in every Cage must have a flashlight.

7. The Cage doors must be kept closed while the Cage is in motion.

8. Do not ride in the same Cage with heavy or dangerous equipment. Anything that cannot be easily picked up and carried should travel in a Cage without passengers.

9. If the hoist should stop unexpectedly for any reason, stay in the Cage unless instructed to leave by the hoistman.

10. After exiting the Cage underground, proceed directly to the Laboratory by the shortest route.

b. Mine tours

Mine tours must be arranged by the DNR. Absolutely no unauthorized sight-seeing will be tolerated. Only areas used by the park are regularly maintained for safety.

c. Bats

There is a large population of (Small Brown) Bats at the mine. Do not attempt to catch or disturb them. If one lands on you, brush it off with something other than your hand. These bats are docile but will bit or scratch if provoked. In the rare case you are bitten, capture or kill the bat that did it. It will then be analyzed for disease and appropriate action taken

6. Safety Inspections

Periodic inspections for hazards in the lab shall be performed on a monthly basis. This will assure that equipment and the work environment is maintained in a safe condition. All personnel should perform daily inspections for hazards. These item change from day to day and it is the responsibility of anyone finding a hazardous condition to either alleviate the problem, or notify someone who can. If you are unsure, contact the Lab Safety Officer, or Supervisor. Some items to watch for include,

- Housekeeping
- Hazardous materials and storage
- Ladders
- Floors
- Machine tools and guards
- Electrical Hazards
- Fire hazards
- Safe and unsafe practices

Hazards that concern DNR personnel and areas should also be noted and brought up at the monthly cooperative safety meetings

7. Safety Training and Employee Right To Know

All visitors and users coming to the Lab that will be here more than one day will be required to read this handbook and sign a statement that they have read and understand the guidelines set forth in this handbook. They will also be required to go through an orientation to the Lab and shown the locations of safety equipment. The orientation will also include instructions in the use of MSHA approved Self Rescuers. They will also be instructed on evacuation procedures.

Everyone who will work with or is potentially exposed to chemical hazards and hazardous work situations shall receive training about them prior to being exposed or assigned to use them. This training shall include

- Chemical and physical properties of the hazard and methods to detect the presence of these hazards
- Health hazards of materials
- Procedures to protect against hazard (e.g., PPE required, work practices, etc.)
- Spill cleanup (if applicable)
- Where MSDS's are located and how to read the information on them.

Material Safety Data Sheets (MSDS) shall be maintained in the lab, with copies to go to the DNR.

University of Minnesota
Soudan Underground Laboratory
Lab Safety Training Record

Name
_____

Title
_____

Institution
_____

I hereby certify that I have read and will comply with the Safety rules for this facility.
I have received specific training in the following areas

1. Lab safety rules
2. Evacuation procedures
3. Self rescuer operation
4. DNR rules pertaining to the Soudan Underground Mine State Park

Signature _____ Date _____

Safety Supervisor_____ Date _____