Field Safety at NEES@UCSB Facilities

NEES@UCSB
A Collaboration of
Brigham Young University
The University of California at Santa Barbara
The University of Southern California

Revision 1.8
June 23, 2013

Overview

This Safety Handbook was developed for students, faculty, staff and/or visitors at the NEES@UCSB field sites at Garner Valley and Salton Sea, California.

This handbook is a supplement the UCSB Injury and Illness Prevention Program. Please see the section Resources for more information.

Health and Safety Policy Statement

The management of the Earth Research Institute at the University of California, Santa Barbara, is vitally interested in its employees' health and safety. Our objective is to protect our workers from injury and illness.

I, Kathy Scheidemen, of the Earth Research Institute at the University of California, Santa Barbara, am personally committed to taking every reasonable precaution for the protection of all workers. To fulfill this commitment the institute will make every effort to provide and maintain a safe and healthy workplace by adhering to University of California as well as campus standards and complying with occupational health and safety legislation. In keeping with occupational health and safety legislation, a healthy and safe workplace will be accomplished in consultation and cooperation with management and employees, in particular the worker health and safety representative in the Department of Environmental Health and Safety.

Supervisors will be held accountable for the health and safety of workers under their supervision. Responsibility includes ensuring that machinery and equipment are safe and that work practices are in compliance with established legislation, workplace practices and procedures. To protect their health and safety, workers must receive adequate specific work task training.

Every employee must protect his/her health and safety and the health and safety of other workers by working in compliance with legislation and established workplace practices and procedures.

Contractors will be required to operate according to legislative requirements using best practices and following University of California and campus policies and procedures regarding health and safety.

Health and safety is an integral part of this organization's every day business. It is in the best interest of all to join together and put into practice health and safety principles in all work activities.

This policy will be reviewed and revised as necessary.

Kathy Scheidemen
Alternate Departmental Safety Representative

Date: June24th, 2013

TABLE OF CONTENTS

Introduction

The University of California, Santa Barbara requires all university personnel including faculty, staff, students and visitors to follow safe working procedures. The UCSB Office of Environmental, Health and Safety (EH&S) is the department principally responsible for assisting in the implementation of University workplace health and safety principles and policies. EH&S responsibilities include:

- Accident Prevention
- Asbestos Management
- Biological Safety
- Education and Training
- Emergency Preparedness
- Environmental Health
- Fire and Life Safety
- Hazardous Materials Management
- Industrial Hygiene
- Occupational Safety
- Radiation Safety

All NEES@UCSB personnel are required to comply with UCSB EH&S policies and standards. In addition to the policies and regulations set forth by UCSB EH&S, this Field Safety manual has been developed to ensure a safe and healthful work environment for each employee (including student and contract employees) while performing field experimental activities and to establish a framework for identifying and mitigating workplace hazards, while addressing legal requirements for a formal, written Injury and Illness Prevention Program.

Responsibilities

All Students, Faculty, Staff, Visitors and Guests

Every employee, student, or other person authorized to conduct NEES@UCSB activities is responsible for complying with all applicable health and safety regulations, UC policies, and established work practices. This includes but is not limited to:

- Use common sense and good judgment at all times.
- Read and comply with all safety procedures.
- Inform your supervisor of workplace hazards.
- Attend established education and training sessions and comply with health and safety directions.
- Ask your supervisor whenever you have a concern about an unknown or hazardous situation.
- Conduct only those activities that your supervisor has approved; use UCSB facilities, equipment and tools only for the purpose for which they were designed.
- Follow safe operating procedures associated with your job tasks.
- Use proper personal protective equipment
- Know emergency plans and procedures for your work area.

- Analyze work procedures to identify hazards; ensure measures are implemented to eliminate or control those hazards.
- Use appropriate personal protective equipment as determined by your supervisor.
- Report unsafe conditions and potential hazards to your supervisor without fear of reprisal. These include malfunctioning equipment and work-related fires, accidents, incidents, injuries, illnesses, and property damage.
- Warn co-workers about defective equipment and other hazards.
- Ensure that environmental, health and safety obligations are carried out by everyone working in their operations.
- Participate in required inspection and monitoring programs.
- Consult Material Safety Sheets for the chemicals that you use.
- Ensure that proper hazardous waste disposal procedures are followed.

Safety Officer

The *Safety Officer* has the primary authority and responsibility to develop and ensure implementation of a safety plan to ensure the health and safety of the faculty, staff, students, and other visitors to the *NEES@UCSB* Site. This is accomplished by performing the following tasks:

- Analyze work procedures to identify potential hazards and then implement measures to eliminate or control those hazards by:

    1. First identifying each step required to complete a job or task at a given site.
    2. Identify all hazards associated with the job considering all potential types of hazards including physical, environmental, and chemical concerns.
    3. Determine controls to minimize each identified potential hazard.

    Site specific Job Safety Analysis forms are available to help complete a safety analysis (See Resources below).

- Communicate work place hazards and safety policies to employees and visitors.
- Establish and enforce safe operating procedures for job tasks.
- Perform periodic documented audits of the established safety plans considering both the effectiveness of the plan and compliance with the plan and revise any regulations that need improvement.
- Ensure that Material Safety Data Sheets (MSDS) are present for chemicals used in the department.
- Provide proper safety equipment and personal protective equipment to employees.
- Report work-related fires, accidents, injuries, near accidents, illnesses, property damage, and unusual occurrences to both EH&S and the Office of Insurance & Risk Management.
- Encourage prompt reporting of health and safety problems without fear of reprisal.
- Ensure that employees are trained in proper waste disposal procedures.
- Serve as a liaison with EH&S and other campus safety resources on issues the department cannot resolve.

- Maintain safety equipment and conduct inspections as required in the Remote Field Site and Laboratory Safety Plan Guidelines of the Injury and Illness Prevention Program (IIPP).

Safety Committee

The NEES@*UCSB* Safety Committee has the ongoing responsibility to maintain and update an Injury and Illness Prevention Program (IIPP), to assess compliance with applicable regulations and campus policies, to evaluate reports of unsafe conditions, and to coordinate any necessary corrective actions. The Safety Committee will meet periodically and will consist of the Safety Officer and the Principal Investigators. In order to insure staff and student participation, a representative of the support technical staff and a student employee (if any are currently employed at the time) will attend as a (rotating) member of the committee.

Unsafe conditions that cannot be immediately corrected by an employee or their supervisor should be reported to the Operations Manager or any Safety Committee member by filling out a "Hazard Reporting Form" (See Resources below).

Timely correction of workplace hazards will be tracked by the Safety Committee which will receive and review reports of unsafe conditions, workplace inspection reports, and injury reports. Specifically, the Safety Committee will:

- Review the results of periodic, scheduled workplace inspections to identify any needed safety procedures or programs and to track specific corrective actions
- Review supervisors' investigations of accidents and injuries to ensure that all causes have been identified and corrected
- Where appropriate, submit suggestions for avoiding future incidents
- Review alleged hazardous conditions to determine necessary corrective actions, and assign responsible parties and correction deadlines
- When necessary, conduct its own investigation of accidents and/or alleged hazards to assist in establishing corrective actions, or seek the advice of University staff (EH&S).

As an employee, you are entitled to employment in as safe a workplace as is reasonably achievable. As an employee who is covered by Cal/OSHA, you also have the right to:

- Receive general training in safe work practices and specific training with regard to hazards unique to the job assignment.
- Be given training in potential health hazards of materials and chemicals to which you may be exposed.
- Refuse to perform work that would violate the Labor Code, or any occupational safety and health standard or order whereby such violation would create a real and apparent hazard to your health or safety.
- Observe any monitoring or measuring of harmful substances in the workplace.
- Know the potential hazards associated with your work and work area as well as the control measures being used to protect you from those hazards.
- Report potential hazards without fear of reprisal or punishment.

The Committee will audit the effectiveness of this plan every two years. The audit will consist of a review of this plan, of all Accident Report Forms, any un-remedied Hazard Report Forms,

and any changes in the law or in the University's IIPP. Audit recommendations will be promptly acted upon. Reductions in the number of accidents and reported hazards will be considered a measure of the effectiveness of the this plan.

Injury and Illness Prevention Program (IIPP)

UCSB is obligated to follow safety standards promulgated under the California Occupational Safety and Health Act (Cal/OSHA) to protect the health and safety of workers. Accordingly, rules, rights and responsibilities presented in this handbook are based on Cal/OSHA standards, other federal, state and local regulations, and sound safety practices.

General Safety and Action Plan

Housekeeping and general caution are key factors in avoiding accidents such as slips, trips and falls. To prevent injury, several general rules should be followed:

- Two person rule. Never work on a project site alone. The *NEES@UCSB* Site strictly requires a minimum of two personnel during the installation, maintenance or operation of any equipment.
- Unless special written authorization is obtained from the Facilities Manager, the *NEES@UCSB* equipment and facilities cannot be used after regular hours. Such authorization is valid only if the Principal Investigator of the particular project is present with his/her research assistants at all times during the period of authorization.
- When possible, keep floors clear of debris and spilled liquids.
- Keep designated walkways and doorways clear, unobstructed and free of electrical cords, boxes, and other equipment.
- Use proper step stools or ladders, not chairs, when climbing to reach high items.
- Use proper harnesses when working in an area with risk of falling a large distance (e.g. roofs, balconies).
- Properly store and handle any potentially hazardous chemicals.

Protective Equipment

The use of appropriate protective equipment is required in all situations. All such equipment must conform to EH&S standards. Training in the use of the equipment should be given prior to the assignment.

Hardhats. Hardhats must be worn at all times in the laboratory and in the field when hazards due to falling objects are present.

Eye and face protection. Protective equipment such as safety glasses, goggles or masks is required for anyone working in areas where an operation could cause injury to the face or eyes. Eye protection is mandatory when operating any of the NEES@UCSB shakers or drilling equipment.

Respiratory protection. Respiratory equipment may be applicable in certain conditions. In such situations, the UCSB Respiratory Protection Program should be consulted, and all users must receive specialized training and medical approval prior to use.

Hearing protection. High noise areas should be evaluated to determine the typical noise levels. If the average noise exposure is above 90 decibels, the personnel must be included in the Hearing

Conservation Program. Employees included in this program must wear hearing protection, undergo periodic hearing evaluations, and receive training on avoidance of hearing damage.

Safety shoes. Steel-toe shoes may be required for certain designated areas or job tasks.

Lifting. Observe proper techniques when lifting heavy objects.

- When lifting, get as close to the object as possible to prevent excess back strain.
- Twisting when reaching or lifting an object is the main cause of back injuries.
- Use a ladder or step-stool to bring high objects down below shoulder height.
- For object in front of you, support your upper body weight by leaning on desk or able
- Lift with your leg muscles, not your back.

Ladders. When it is necessary to work above ground level, a self-supporting portable ladder that meets OSHA requirements can be used. Portable ladders must be tied or blocked to prevent displacement. Always face the ladder when climbing, and grasp the latter with at least one hand. Don't carry anything up a ladder that could cause you to loose balance. Only use a ladder on a stable surface that is not slippery, with weight evenly distributed between posts. If working around electrical wires, use a ladder that has non-conductive handrails. If there is traffic in the area, such as a doorway, use barricades to stop or avert traffic.

If using the ladder to access the top of a structure, the ladder must extend three feet above the level of the top surface to make it easier to get on and off. If a ladder does not extend three feet above the top level, it must be secured at the top so that it cannot be deflected.

Safety Harness. Harness must be worn in situations where elevations hazards exist.

SFSI Structure. The top of the SFSI structure is not a work area. Do not walk or work on the top of the structure. If, due to modifications or the requirements of an experiment, the top of the SFSI will be accessed, retrofitted or have equipment installed there, then either the Experiment Project Plan or a permanent change to this safety plan is required to address all elevated work area rules and safety requirements, including access, hand rails or a safety harness.

Required Safety Training

All faculty, staff and students who work at laboratories or fields sites must complete the online course, General Safety Responsibilities and Resources. Registration is online: http://ehs.ucsb.edu/4DAction/WebCourseSessionList

Identifying Workplace Hazards

Regular, periodic workplace safety inspections should be conducted throughout the duration of the project. The inspections should be noted, and the NEES@UCSB Facilities Manager should maintain copies of this documentation for at least one year. Generally, the NEES@UCSB Facilities Manager will be responsible for identification and correction of hazards that staff and/or students face and should ensure that work areas they exercise control over are inspected at least annually. Supervisors should check for safe work practices with each visit to the workplace and should provide immediate verbal feedback where hazards are observed.

A "Hazard Reporting Form" to report unsafe conditions is available on the web: http://ehs.ucsb.edu/units/iipp/iipprsc/IIPPforms/hazrptform.pdf

and is the first attachment to this document. It should be filled out when a referral is made to the Safety Committee as a result of a condition discovered during an inspection for which the responsible supervisor could not determine an immediate remedy.

Communicating Workplace Hazards

Supervisors are responsible for communicating with all workers about safety and health issues in a form readily understandable by all workers. All personnel are encouraged to communicate safety concerns to their supervisor without fear of reprisal.

The Safety Committee is another resource for communication regarding health and safety issues for employees. Any member of the NEES@UCSB Safety Committee can be contacted directly to discuss safety concerns.

Chemicals

In the course of normal operations and experiments, NEES@UCSB does not utilize hazardous chemicals as part of its experimentation process. Should this practice change, this section must be rewritten to specifically address the new situation.

Should any experiment hosted at NEES@UCSB field sites or offices require the use of hazardous chemicals the Experiment Project Plan must address the situation with a Chemical Hazard Communication Plan that specifies the existence, handling procedures, precautions and Material Data Safety Sheets (See below) for chemicals introduced to the sites.

Although not integral to experiments, the following potentially hazardous materials are known to exist at field sites and laboratories:

- Gasoline
- Lead/Acid Batteries
- Propane
- PVC Glue

See below for the Material Safety Data Sheet for these. Please follow the precautions for handling or transporting these materials.

The section should be considered an adjunct and subset to the UCSB Chemical Hygiene Plan: http://www.ehs.ucsb.edu/units/labsfty/labrsc/chemistry/lschemContentsCHP.htm

Per the above mentioned plan, the following steps will be taken by the Safety Officer or worksite supervisor in order to communicate the potential hazards posed by the presence and handling of these materials.

- An inventory of potentially hazardous chemicals will be kept with the laboratory or field site safety log.
- Periodically, during regular safety inspections, inventory lists will be updated.
- All employees will be informed what a Material Safety Data Sheets (MSDS) are, where they are located at the field site or laboratory and how to read them to understand the risks of exposure, precautions and first aid.

- If any potentially hazardous chemicals exist in unmarked containers or pipes (or the markings are obscured), they will be labeled by name along with any designation (toxic, corrosive, flammable, etc.,) given in the MSDS.
- Contractors will be briefed on the locations of chemicals and their MSDS's before they begin working.

Exposure to hazardous chemicals is a safety incident and must be reported just as any other incident or accident.

Material Safety Data Sheets

Material Safety Data Sheets (MSDS's) provide information on the potential hazards of products or chemicals. Hard copies of the MSDS's for chemicals known to exist at a site will be stored at the site along with the safety log. If an MSDS is found to be missing, a new one can be obtained by faxing a written request to the manufacturer. A copy of this request should be kept until the MSDS arrives.

MSDS's are also available over the Internet from a variety of sources. They can be obtained by accessing the EH&S web page (http://www.ehs.ucsb.edu) and clicking on "MSDS."

All employees are required to understand how to read and utilize an MSDS. Videos and training on how to read and understand the information presented on an MSDS is also available from EH&S through online and live courses: http://ehs.ucsb.edu/4DAction/WebCourseSessionList

MSDS's are important to employee safety as they help identify potentially hazardous materials in the workplace and list the controls for each compound. All hazardous materials must be labeled and personnel who may come into contact with these materials must have training for the procedures used in the event of an exposure to a harmful substance.

Equipment Operating Manuals

All equipment is to be operated in accordance with the manufacturer's instructions, as specified in the equipment's operating manual. Copies of operating manuals must be kept with each piece of equipment in the NEES facility. Each person intending to use any equipment in the NEES facility must attend a safety training session. No equipment can be operated without specific authorization based on evidence of past training (e.g. valid operator's certification) or training provided on site.

Vehicle Operation

Vehicular collisions are a costly and potentially life threatening. Collisions can involve fatalities, injuries as well as property and vehicle damage. NEES@UCSB remote field sites necessitate travel to reach them, therefore supervisors and operators should follow best practices when driving:

- Obey all traffic laws and rules.
- Do not exceed the posted or safe and practical speed limit.
- Use signals and driving lights.
- When towing equipment or materials, abide by rules and limitations.
- When towing equipment or materials, insure that the vehicle has the horsepower and braking capacity, hitches and loads are secure and brake lights are working.

- Consider inclement weather (snow, wind, rain) and any limitations these may impose on travel to and from remote sites.

No staff member, researcher or student may operate a vehicle without a valid license for the specific type of vehicle. Only personnel that have been trained and evaluated are allowed to operate any mobile vehicle in use on campus or at a worksite. Worksite supervisors are responsible for assuring that only authorized personnel are operating vehicles or mobile equipment. Operators are obliged to demonstrate their understanding of any vehicle's functions, operating instructions, limitations, and emergency procedures before use. Operators must have in their possession a valid state driver's license before attempting to operate any vehicle. Worksite supervisors are required to assure operators have a valid license and have demonstrated understanding and competence, etc., before allowing them to operate vehicles.

Where allowed by state law, motor vehicle driving records (MVR's) may be obtained from the relevant state authority or employees may be asked to provide a valid copy of their MVR to the MSO, PI or Safety Officer. Employees without a valid state driver's license in their possession may not operate any mobile vehicle. Employees with bad records are not allowed to operate facility vehicles or personal vehicles on NEES@UCSB business.

Staff members who drive to remote field sites may do so in their own vehicles providing they have adequate insurance. Staff members driving University vehicles are covered under the relevant University insurance plan.

Correcting Workplace Hazards

Hazards discovered either as a result of a scheduled periodic inspection or during normal operations must be corrected by the supervisor in control of the work area, or by cooperation with the *NEES@UCSB* Facilities Manager. Supervisors of affected employees are expected to correct unsafe conditions as quickly as possible after discovery of a hazard, based on the severity of the hazard.

Specific procedures that can be used to correct hazards include but are not limited to the following:

- Stopping unsafe work practices and providing retraining on proper procedures before work resumes
- Reinforcing and explaining the need for proper personal protective equipment and ensuring its availability
- Barricading areas that have chemical spills or other hazards and reporting the hazardous conditions to a supervisor
- Following Locking Out and Tagging Out procedures when servicing or working with machinery that could unexpectedly energize or release energy causing injury to an employee. These guidelines include:

    1. Identifying all power or energy sources for each piece of equipment.
    2. Notifying everyone who would normally use the equipment that they should not attempt to start or energize the machinery while it is being serviced.
    3. Shutdown the equipment using the proper established procedures.
    4. Locking out the equipment from its power source to prevent accidental surges or energy releases. This includes disconnecting a power cord from the wall or applying locks to isolate each power source.

5. Tag the equipment to indicate that it is being serviced and should not be used. The tag should include the reason for the lock, name and number of the person who applied the lock, and the date on which the lock was applied.
6. After the equipment has been serviced all lock out/tag out devises should be removed and all personnel who normally use the machinery should be notified that the equipment can be safely used.

Supervisors should use the "Hazard Correction Report" to document corrective actions, including projected and actual completion dates. If necessary, supervisors can seek assistance in developing appropriate corrective actions by submitting a "Report of Unsafe Condition" to the Safety Committee. If deemed necessary by the Safety Committee, campus resources such as EH&S or the UCSB Police Department can be contacted to implement safety measures.

If an imminent hazard exists, work in the area should cease, and the appropriate supervisor must be contacted immediately along with the NEES@UCSB Facilities Manager. If the hazard cannot be immediately corrected without endangering employees or property, all personnel need to be removed from the area except those qualified and needed to correct the condition. These qualified individuals will be equipped with necessary safeguards before addressing the situation.

Analyzing Workplace Accidents

All accident reports become part of the permanent operations record. The University and/or the Safety Committee will analyze the dates, times and conditions of accidents in order to determine the effectiveness of plans and if any trends exist.

Job Hazard Analysis

The purpose of the Job Hazard Analysis is to identify tasks that have the potential to produce major losses to persons, property or the environment and to itemize the steps involved in critical processes to help insure all steps are followed, especially steps that necessary to minimize risks. The specific tasks (and associated hazards of regular tasks) as well as construction or modifications associated with specific experiments and major upgrades or improvements will be documented.

Job Hazard Analysis (JHA) can be accomplished by the following:

a. Determine Critical Tasks. The Critical Task Inventory Worksheet (see attachments) evaluates tasks based on the safety risks they pose and the frequency they must be accomplished.
b. Analyze Critical Tasks. Break down tasks into specific steps that identify areas of risk and remedies. Specific, step-by-step, procedures can address repetitive tasks, while non-repetitive tasks can be addressed through more general best practices.
c. Implement Procedures and Practices. When best practices are identified, or when new procedures are written, they must be explained. Staff may need to be re-trained.
d. Audit. Checks should be made that new procedures and practices are followed.
e. Review. For every accident analysis, it should be noted if it occurred in performance of any defined task. If so, then the practices and procedures for the task should be reviewed. If not, then whether the task should be specifically identified should be reviewed.

The tasks required to operate field experiment sites are varied. Repairing or replacing equipment can require many different tools, follow many decision branches and involve activities from shoveling dirt to soldering.

For upgrades, improvements, expansions, major repairs and other activities that may require equipment, work teams, contractors, on-site storage, materials and otherwise significant changes to the facilities, a project specific safety and accident prevention plan will developed that identifies potential hazards. In particular, modifications or improvements that alter the location of safety documents, safety and fire suppression equipment, evacuation routes or any other aspect of site safety as documented in this plan or verbally conveyed will be listed in the project plan and will address the issues during the construction phase and after its completion. In other words, major changes to the site may affect the list of critical tasks, standard procedures and even general practices.

OSHA Action Plan

Safety inspections done under the California Occupational Safety and Health Act (Cal/OSHA) are made by the California Division of Industrial Safety without advance notice. Insofar as it is possible, inspections must be conducted in a manner compatible with University operations. NEES@UCSB staff should immediately contact the PI or Management Service Officer (currently Giulia Brofferio, 805.893.8281. If neither is available, then the University department of Environmental Health and Safety (EH&S) should be contacted directly at 805.893.7534.

Staff or students should not respond to questions directly or attempt to represent the University, but never impede an inspection. Per University policy of the Office of the President, the PI or MSO responding to an inspection should immediately contact EH&S and defer to any EH&S representative qualified to represent the University.

Emergency Action Plan

Prior to working at any laboratory of field site, all employees and contractors must be instructed on how to respond to emergencies, including the following actions or directions that must be followed during and after the emergency:

- Where and how to report a fire or other emergency
- Location of fire extinguishers when there is no automated suppression system
- Evacuation procedure, including exit routes
- Procedures for any staff who must remain to operate critical equipment
- Procedures to account for all employees after evacuation
- Procedures to follow for any employee performing rescue or medical duties
- Name and/or title of persons who may be contacted for more information
- In the absence of other instructions, the Management Service Officer, Kathy Scheidemen, 805.893.8231 is the first contact in an emergency.

Per OSHA standard 1910.38, this plan may be communicated orally if there are 10 or fewer employees, and for field site visits, this is a recommendation.
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9726&p_table=STANDARDS

Disaster Preparedness

Planning ahead for disasters is critical for being able to recover safely and quickly. Understand and know the location and proper use of fire extinguishers, fire alarms, emergency exits, telephones, eyewash fountains and safety showers. In addition, every project will be required to have an on-site disaster kit. **It is the responsibility of the Safety Officer to develop a project-specific disaster kit and to make it readily available at the project site.** This must be done prior to engaging in any operation of the *NEES@UCSB* equipment. The disaster kit should contain the following:

1. First aid kit
2. Contact information of nearby hospitals, police and fire departments.
3. Maps of project site showing routes to nearby hospitals.
4. Evacuation routes in the event of fire, earthquake or other natural disasters.

Personnel should be prepared to respond safely to the following:

- Fire or evacuation alarm;
- Accidental spills or release of radioactive, chemical or other toxic materials;
- Injury of a co-worker;
- Earthquake; and
- Other natural or man-made disaster.

Fire

All employees should be aware of fire safety and prevention procedures for the sites in which they work. Prevention of fire includes:

- Correct use of extension cords, electrical outlets, heaters, and all other machinery or equipment that could potentially lead to a fire if not used and properly maintained.
- Never leave an open flame unattended.
- Employees should be familiar with the facility's safety plan in the event of a fire including:
    - Responding to any alarm and exiting the building immediately without stopping to take anything.
    - Knowing the location of any and all exits and stairways. Never use elevators.
    - Pulling alarms if you pass one on the way out of the building.

As a general rule, UCSB does not expect its employees to fight fires. Just sound the alarm – pull the fire alarm or call 911 – and get out of the building as quickly as possible and report to your group's emergency assembly area. Do not re-enter the building until you have been notified by the authorities to do so.

All flammable materials including flammable solvents and generator fuel must be stored in proper quantities and in flammable storage cabinets. Proper storage can prevent sudden combustion of the materials as well as protect the materials themselves from exposure to heat or open flames.

Accidents

All accidents and near miss incidents must be reported immediately to the Facility Manager.

Electric shock

Do not touch persons rendered unconscious by electric shock unless you are sure that they are no longer in contact with the source of the electricity or that the power has been turned off.

Earthquake

During any earthquake, you should take cover immediately. After the quake, assess the situation and follow instructions given by the Facility Manager or other supervisor. If the earthquake is severe, you will be asked to evacuate the building. Wait for instructions before re-entering the building or before leaving the area.

First Aid

This section will familiarize you with guidelines for treatment of minor injuries and for the application of first-aid for more serious injuries in the period of time before professional medical staff are able to treat the injured person.

Universal Precautions

When treating an injury universal precautions should be taken to prevent or minimize exposure to blood or other potentially infectious materials:

- Minimize contact with blood or other infectious materials when an employee has sustained an injury or while providing first aid. When practical, use gloves, facemasks, and eyewear.
- Treat all exposed items as a biohazard and either dispose of them according to regulation or disinfect them properly to minimize further contact.
- Clean and disinfect all workplace surfaces, receptacles, tools, etc., that may have been exposed.
- Following correct procedures when reporting incidence of exposure to infectious material.

The full standards for Bloodborne Pathogen Control can been viewed on the EH&S website: http://www.ehs.ucsb.edu/units/biosafety/biorsc/UCSB_Bloodborne_Pathogens_Exposure_Control_Plan.doc

The following can be used to document of an exposure: http://www.ehs.ucsb.edu/units/biosafety/biorsc/BBP_Post_Exposure_Evaluation.doc

Wounds

A wound is caused when a tissue in our body is torn or cut.

Types of wounds:

- Incised wounds caused by sharp instruments. These wounds bleed extensively.
- Contused wounds caused by crushing. These wounds look bruised.

- Lacerated wounds caused by rough surfaces. These wounds bleed less.

Wounds pose two dangers, namely bleeding and infection.

Treating bleeding

a. Press the sides of the wound together.
b. Raise the injured part of the body above the heart (only if fracture is not suspected).
c. With your palm, gently press a pad bigger than wound until bleeding reduces.
d. If bleeding continues, add new pads without removing original pad.
e. Bandage firmly but not too tightly.

Avoiding infection

a. The first aid provider must wash own hands thoroughly with soap and water.
b. Follow all bloodborne pathogen guidelines. Including the Human Blood Cleanup Protocol (Attachment #2)
c. External wounds should be cleaned thoroughly with potable water and should be dried with sterile gauze.
d. Wound should be covered with sterile or dry sterile gauze and bandaged once bleeding is controlled
e. Cotton should not be allowed to be in direct contact with wound.
f. Antiseptic cream applied to a wound should not be mixed with water.

Burns and Scalds

Burns are caused when skin comes in contact with dry heat like fire/flames, hot metal, live wires, etc. Scalds are caused by moist heat like boiling water, steam, oil, tar, etc.

The degree of a burn is indicated by the degree of damage to the tissues. Degrees of burning are:

- First degree: the skin appears reddened.
- Second degree: Blisters are seen on the skin.
- Third degree: There is destruction of deeper tissues with scarring.

Dangers from burns include:

- Excessive loss of body fluids.
- Severe pain.
- Infection in affected area.
- After healing, they could leave scars and restrict movements.

Treating Extensive Burns

a. Try to keep the patient calm.
b. Do not remove adhering particles of charred skin.
c. Cover the burnt area with a clean dressing and bandage.

d. If hands are burnt, they should be placed above the level of victim's heart.

e. If feet or legs are burnt, they should be elevated.

f. If face is burnt, sit up the patient and observe for breathing difficulty. Maintain an open airway if respiratory problems develop.

g. Do not open the blisters on victim's skin.

h. Try and remove all rings, bangles, belt and boots from the victim's body immediately as it may be difficult later if the limbs begin to swell.

i. If medical help can not reach the victim within an hour of the burn, and if the victim is conscious and not vomiting, try to feed a weak solution of salt, soda and water (approximately one teaspoon of salt and half teaspoon of baking soda per quart of water).

Treating Minor Burns

a. Clean the affected area gently with water.

b. Immerse the burnt area in cold water.

c. Never apply cotton wool directly over burnt area.

d. No greasy substance should be used over the affected area.

Fractures

Fracture is defined as complete or partial breakage of a bone. Types of fractures include:

a. simple – broken ends of the bone do not cut open the skin

b. compound – broken end of the bone may be in contact with open air.

c. Complicated – an internal organ is broken in addition to the fracture bone.

Signs of fracture include:

a. Severe pain at and/or around place of fracture.

b. Swelling and tenderness over the area with partial discoloration.

c. Inability to perform normal movements of the affected part.

d. Deformity of the limb. The limb may also appear shorter.

e. Crackling sound or unnatural movements.

Treatment for Fractures

a. Fractures generally occur with other injuries like wounds. Symptoms like heavy bleeding must receive priority for first-aid over a fracture.

b. Patient should be handled gently avoiding all unnecessary movements.

c. If broken ends of the bones are seen above the skin, the wound should neither be washed nor treated with antiseptics.

d. The fractured area should not be handled unnecessarily.

e. No attempt should be made to reduce the fracture or to bring the bones to normal position.

f. The fracture area and joints on both sides of fracture should be immobilized by using bandages. It is essential that rescuer be familiar with the use of bandages.

Heat Stroke and Heat Exhaustion

Heat Stroke and Heat Exhaustion are dangerous conditions that arise in very warm weather or work conditions. They can be prevented through the following actions:

a. Taking caution when you must be in the sun and getting out of direct sunlight at the first signs of exhaustion.
b. Wear light, loose-fitting clothing such as cotton so sweat can evaporate. Wear wide-brimmed hat with vents.
c. Drink lots of fluids throughout the day. Thirst is not a reliable sign that your body needs fluids.

Though related, they must be treated differently.

Heat Stroke

Heat Stroke is a severe condition that requires emergency care and usually hospitalization. It can develop rapidly; usually in people who's cooling mechanism (sweating) is impaired. Strenuous activity in a hot environment is usually the cause. Heat Stroke is marked by:

- Unconsciousness or abnormal mental state (dizziness, confusion, hallucination or coma)
- Flushed, hot, usually dry skin
- Elevated blood pressure
- Hyperventilation
- Core temperature of 105F (40 C) or more

Treatment:

- Contact emergency services (911)
- Move person to cooler environment
- If conscious, put in a bath of cool water
- Alternatively, moisten skin with lukewarm water and fan with cool air
- Give cool fluids by mouth if person capable of swallowing

Heat Exhaustion

Heat Exhaustion is caused by the inability of the body to cool because of lack of fluids or electrolytes. It generally occurs in humid conditions that reduce the evaporative effect of sweat. The results are similar to shock. Heat Exhaustion is marked by:

- Pale cool, moist skin
- Profuse sweating
- Muscle cramps or pains
- Faintness or dizziness
- Headache weakness, thirst, nausea
- Core temperature 100F (38C) or higher

Treatment:

- Rest in a cool, shaded area
- Give cool fluids such as water or sports beverages.
- Salty snacks, raisins and bananas are also good if tolerated
- Loosen or remove clothing
- Do NOT give beverages with alcohol or caffeine

Electrical injuries

When a body part comes in contact with a live electric wire or cable carrying a live current, the person receives an electric shock. The electric shock could be produced only when the electric current passes through human body, which is in contact with the earth. It passes more readily if the contacting body part is wet or moist. In wet conditions, even lower voltages could be dangerous.

Depending on the voltage and duration of contact, one or all of the following may occur.

a. fatal stoppage of heart
b. sudden stoppage of breathing due to paralyses of breathing muscles
c. superficial or deep burns

Treating victims of electric shock

a. The source of current should be switched off if the victim is in contact with the current. This must be done with rescuer standing on a dry piece of wooden board.
b. Never use a knife or scissor to cut the current carrying wire.
c. If the current is of very high voltage, arching may occur. The victim should be dragged using non-conductive material like a wooden stick, plank or dry nylon rope.
d. If the victim is not breathing properly, artificial respiration should be given.
e. If required, treat for burns.
f. The victim should be transferred to a hospital as soon as possible. Even for mild electrical injuries, consultation with a doctor is desirable as some effects of electric shock materialize hours/days after the incident.

Contents of First-Aid Kit

The following basic items should be present in the first-aid box at all times.

- Latex gloves.
- Sterile dressing to stop bleeding.
- Cleansing agent/antibiotic towelettes to disinfect.
- Antibiotic ointment to prevent infection.
- Burn ointment to minimize risk of infection.
- Adhesive bandages in a variety of sizes.
- Eye wash solution.
- Thermometer.

Remote Field Site Safety Plan

In addition to the general guidelines listed above. The following location specific guidelines will be followed to address the special requirements of each field site and the laboratory.

Inspections

Safety inspections will be conducted by the Safety Officer or any staff member at every regular visit (currently scheduled on a monthly basis) and before any significant operations or activities that involve staff, researchers or visitors to NEES@UCSB field sites. A log that includes the day, time and signature of the inspector will be maintained at the site and a copy kept offsite as necessary. The inspection will include the following steps and any others that may be appropriate:

- Visual inspection of enclosed and immediately surrounding grounds for any debris; electrical wires; damage to buildings, walkways and roadways; any damages due to earthquakes, fires, lightning or vandalism.
- Inspection of all electrical systems for loose wires; leaking batteries; damage due to lightning, fire or surges; exposed wires, etc.
- Inspection of First Aid Kit for completeness. Missing items should be replaced as necessary (either immediately or with the next visit).
- Assure that phone, cellular phone or other emergency communications equipment is operable.

First Aid Kit

The remote field sites pose unique safety situations. In addition to the items listed above, the following items should be included.

- At least one gallon of drinkable water. High temperatures can occur at the remote sites making heat stroke and heat exhaustion more likely. Drinking water must always be on hand
- Salt tablets for the prevention or treatment of heat stroke and exhaustion.
- Snake bit kit. Rattlesnakes are common in both remote sites and victims may wish to have some treatment.
- Insect repellent. The sites can be heavily infested with biting insects.
- Blankets. The remote sites are additionally susceptible to cold weather. A staff or visitor who becomes cold or injured during inclement weather will need heat insulation.

Flammable Liquids

Some Field Sites or some work plans utilize portable, gasoline-powered, electrical generators or power tools. Never attempt to fill gas powered equipment when it is running. Only use approved containers of no more than five (5) gallons. Do not attempt to siphon gasoline from autos. Insure all equipment is grounded before filling.

Laboratory Safety Plan

In addition to all the general safety practices outlines above, safety at the laboratory, where cables and equipment are constructed has a unique set of safety precautions.

- To the extent practical, keep the work area clean of debris, glass or metal fragments, residue, etc.
- When leaving the area, insure that all equipment is turned off, especially soldering, welding or other heat equipment. Valves to compressed air tanks should be properly shut.
- Observe proper practices when lifting heavy objects such as batteries.
- Do not obstruct walkways or exits with construction materials.
- Insure proper ventilation when working with any solvents, paints or other volatile liquids.
- Insure proper lighting at all times.

Power Tools

NEES@UCSB does not operate any fixed power tools nor authorize any employee to do so. Please utilize UCSB services for drills, lathes, etc.

Always wear eye protection (and gloves if applicable) and never wear loose clothing while operating machinery. Any person using power tools must be authorized to use the equipment and should follow the guidelines for safe operation.

- Evaluate surrounding area before turning on the power tool
- Make sure material that is being operated on is secure
- Make sure power tool is OFF before unplugging it and only change parts of the tool when it has been unplugged from its power source, i.e, Lockout
- Any equipment that is faulty or needs repair must be unplugged, drained of power or fuel and clearly marked as needing repair, i.e. Tagout

When leaving the area, insure that all equipment is turned off, especially soldering, welding or other heat equipment. Valves to compressed air tanks should be properly shut. When working on an elevated surface or using a ladder, observe safety guidelines to prevent a fall. These guidelines include correct ladder selection and placement, securing to an acceptable structure, and climbing safely.

Observe proper practices when lifting heavy objects such as batteries. Never attempt to lift an object that is too heavy as this action could lead to serious back injury. Do not obstruct walkways or exits with construction materials. Insure proper ventilation when working with any solvents, paints or other volatile liquids. Insure proper lighting at all times.

Incident Report Procedures

Any injuries that occur during activities related to the research operations and maintenance of the NEES@UCSB facilities, either at UCSB, or at the remote field sites, must be reported back to the project safety officer, the principal investigator, the Earth Research Institute (ERI) departmental safety representative (DSR), and ultimately the University administration.

A form is available at the NEES@UCSB website that must be completed and returned to the project safety officer or departmental DSR. This form can be found http://nees.ucsb.edu/training by clicking on the incident report form link.

Additional Resources

UCSB Injury and Illness Prevention Program	http://www.ehs.ucsb.edu/units/iipp/iipprsc/greenbook.htm
Hazard Reporting Form	http://www.ehs.ucsb.edu/units/iipp/iipprsc/iippforms/hazrptform.pdf
Material Data Safety Sheets (MSDS)	http://ehs.ucsb.edu/units/labsfty/labrsc/chemistry/lschemmsds.htm
IIPP Forms	http://www.ehs.berkeley.edu/iipp/formdirectory.html
Job Hazard Analysis	http://www.osha.gov/Publications/osha3071.pdf
Blood borne Pathogen Control Plan and Reporting Form	**http://www.ehs.ucsb.edu/units/biosafety/biorsc/BBP_Post_Exposure_Evaluation.doc**

Acknowledgement

This Project is supported in part by the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) Program of the National Science Foundation under NSF cooperative agreement CMS-0217421 and CMMI-0927178.

Appendix

All participants taking place in research experiments at the field sites must complete the following forms and submit to the Safety Officer:

- Acknowledgement of General Field Hazards and Policies Form
- Medical Release, Emergency Contact Information, and Medical Information Form

Acknowledgement of General Field Hazards and Policies Form

Because scientists, students, and contractors on NEES@UCSB experiments are exposed to a variety of situations and experiences that are different from those found in the classroom, office, or lab, special rules of conduct are necessary. Traveling and fieldwork involve hazards and risks, so each person must exercise care to avoid personal injury to themselves and others. Examples of dangers specific to fieldwork are; the use of portable power tools, heavy lifting, mobility equipment, pressurized wellheads, shovels, picks, poisonous snakes, insect bites, toxic plants and uneven terrain. Other dangers, as well as damage to property, may be created by carelessness. A NEES@UCSB experiment may involve access to certain private or restricted properties and use of private facilities. Continued access to these properties will depend upon proper consideration for these resources by everyone involved. Researchers or students who abuse NEES@UCSB or other property during a field experiment, or who jeopardize the health and safety of other people, will be required to leave immediately. The Safety Officer (or on-site designate) has the authority to make this decision. NEES@UCSB has the following rules and recommendations that apply to field activities.

1. Release, Waiver and Indemnity Agreement. A release is to be signed by all participants. Minors (under the age of 18) must have a parental form signed. All participants must read the NEES@UCSB safety plan completely located at the NEES@UCSB website (http://www.nees.ucsb.edu/safety), and understand that there are inherent risks in field experimentation that may be different from laboratory experimentation.

2. Medical Care. Medical information must be submitted by all participants (form on last page of this document). Any participant who has medical problems (e.g. asthma, diabetes, metabolic disorders, allergies, trick knees) should so inform the Safety Officer. If you require special medications, it is your responsibility to insure that they are available when needed. Field activities are sometimes in very remote areas and immediate medical assistance is not possible.

3. Every participant must have medical insurance, and provide information on the carrier to the Safety Officer.

4. Clothing and protective cover. Wear suitable clothes, and bring a hat. Long pants, and boots are essential in some areas. Open-toed shoes (sandals, thongs, bare feet) are not acceptable. Field dangers such as sunstroke, insect bites, and encounters with cacti or thorny shrubs can be prevented by proper clothing. Insect repellent and sunscreen are often required. Before starting an experiment at one of the field sites, it is important to check the weather conditions just prior to arriving on site. Weather can often be extremely hot or cold, depending on the time of the year and on the particular site, and all visitors should be prepared for this.

5. General field hazards. Insects, poisonous snakes, and toxic plants may be found on any field experiment. Wearing suitable clothing and boots helps reduce these hazards. Remember to check yourself for ticks, which can transmit diseases such as Rocky Mountain spotted fever, Lyme disease, etc. If you are allergic to such things as bee stings, you must bring appropriate medication. Participants are expected to stay out of thunderstorms, particularly at high elevations, and out of flash flood-prone areas in any rain.

6. Head and eye protection. Use eye protection when using, or are around, hand or power tools, including shovels, picks, hammers, saws, weed trimmers, drills, etc... Hard hats are not required when working at the field sites except when: 1) other contractors are at the site, such as drillers or mobile shaker trucks; or 2) when working in and around the SFSI permanent or temporary structures. Hard hats will be provided if this is the case.

7. Firearms. Possession of firearms or facsimiles at any time during any field experiment is forbidden.

8. Drugs, tobacco, alcohol, and driving restrictions. Alcoholic beverages may not be consumed at any time while traveling in the vehicles nor during any activity in which the vehicles are operating in a stationary mode. Drivers may not consume alcoholic beverages prior to driving. Smoking is not permitted in any UCSB vehicle. Use or possession of illegal drugs at any time is also forbidden.

9. In addition to this document, you have been provided access to the NEES@UCSB safety plan (http://nees.ucsb.edu/assets/training/safety-policy.pdf). You will also been given a safety briefing prior to commencement of work at the field site, where site-specific hazards related to the particular experiment, as well as general field hazards related to the particular site will be discussed.

TO: Safety Officer, NEES@UCSB

I have read the "Acknowledgement of General Field Hazards and Policies" and have read the NEES@UCSB safety policy (http://www.nees.ucsb.edu/safety). I understand the requirements and conditions stated therein, and agree to abide by these regulations.

_____ _____

SIGNATURE DATE

Waiver:
In consideration of being permitted to participate in any way in the field experiments, I, for myself, my heirs, personal representatives or assigns, **do hereby release, waive, discharge, and covenant not to sue** The Regents of the University of California, its officers, employees, and agents from liability **from any and all claims against The Regents of the University of California, its officers, employees and agents,** resulting in personal injury, accidents or illnesses (including death), and property loss arising from, but not limited to, participation in the field experiments.

Assumption of Risks:
I understand that conducting field experiments has inherent dangers, including but not limited to 1) minor injuries such as scratches, bruises, and sprains 2) major injuries such as eye injury or loss of sight, joint or back injuries, heart attacks, and concussions to 3) catastrophic injuries including paralysis and death. **I hereby assert that my participation is voluntary and that I knowingly assume all such risks.**

Indemnification and Hold Harmless:
I also agree to INDEMNIFY AND HOLD The Regents of the University of California HARMLESS from any and all claims, actions, suits, procedures, costs, expenses, damages and liabilities, including attorney's fees brought as a result of my involvement in the field activities and to reimburse them for any such expenses incurred.

Severability: The undersigned further expressly agrees that the foregoing waiver and assumption of risks agreement is intended to be as broad and inclusive as is permitted by the law of the State of California and that if any portion thereof is held invalid, it is agreed that the balance shall, notwithstanding, continue in full legal force and effect.

Acknowledgment of Understanding:
I have read this waiver of liability, assumption of risk, and indemnity agreement, fully understand its terms, and **understand that I am giving up substantial rights, including my right to sue**. I acknowledge that I am signing the agreement freely and voluntarily, and **intend by my signature to be a complete and unconditional release of all liability** to the greatest extent allowed by law.

_____
SIGNATURE

_____
NAME PRINTED

_____
DATE

Medical Release, Emergency Contact Information, and Medical Information Form

In case of accident, injury, or illness, I hereby authorize you to arrange for emergency medical care and to notify the person named below.

IN CASE OF AN EMERGENCY, NOTIFY:

Name: _____

Address: _____

Phone(s) (_____) _____

Signature and Date _____

Printed Name_____

Home Address and Institution_____
_____

MEDICAL INFORMATION:

List any special medication that you are allergic to, or other special medical problems that the Safety Officer or Project PI/Engineer should be aware of:
_____
_____
_____

Provide the name of your medical insurance carrier, group number, identification number, and telephone numbers of the carrier and your primary care physician (if applicable).
_____
_____
_____