Long Wavelength Array (LWA) Safety Manual

April 9, 2007

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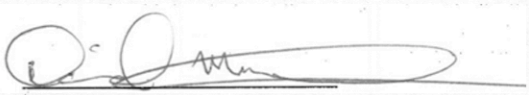

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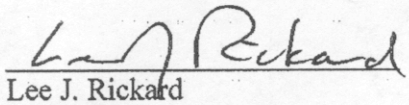

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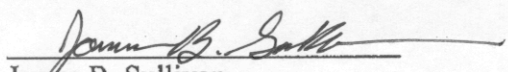

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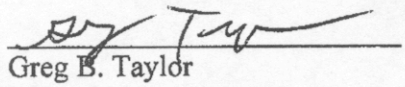

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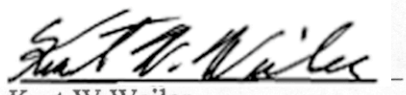

Kurt W. Weiler
Head, RIOS Branch
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1. Policy

Safety of all people working on the Long Wavelength Array (LWA) Project is of paramount importance. The LWA project management is committed to providing a safe environment, and to minimizing danger from all hazards to life and property. Project staff with concerns about their safety or the safety of their colleagues must stop work immediately and resolve the issues with their supervisory chain before work can be resumed.

It is the prime responsibility as an employer to provide a safe working condition for every employee. To fulfill that responsibility requires the active cooperation of every employee. This manual describes the basic safety rules as they apply to the operations at the LWA sites. The LWA management has agreed on these safety policies and rules. The responsibility for ensuring that these policies and rules are correctly interpreted and applied is the task of the line responsibility of the lead staff member on the site.
The LWA site is a multidisciplinary project. The nature and diversity of this project presents unique situations not normally encountered in typical workplace environments. Consequently, the LWA project has developed this Safety Manual which details measures to be taken by all staff members and employees to ensure the health, safety and welfare.

As a staff member or employee of the LWA project, you are required to read and understand this Safety Manual as part of your employment. You are encouraged to keep the manual nearby and refer to it whenever you are engaged in operations covered by the various sections of the manual to ensure proper procedures are followed.

The LWA project will comply with all health, safety, and fire protection regulations and requirements of the various jurisdictions to which they are subject. This manual presents the minimum acceptable standards for the protection of life and health for the LWA and Long Wavelength Demonstrator Array (LWDA) sites.

As a general proposition, state statutes and regulations implementing Federal Environmental and health and safety laws are applicable to LWA operations. State inspections or similar activities, which require the payment of fees, may be exempt for Government-owned property. These laws apply in the absence of a Congressional waiver of Federal immunity. For facilities other than Government-owned property, compliance with state requirements is mandated.

The LWA will make every attempt to provide equipment and create conditions to make for a safe workplace. Safety education shall be provided to all employees as necessary. This manual supersedes all previous LWA site health and safety manuals and shall not be altered or deviated from without formal revision or amendment by the LWA Safety Staff.

Contractors

Any contractors at any LWA site are expected to take all relevant measures in the performance of the work under his/her contract to protect the health and safety of employees and of the public and to minimize danger from all hazards to life and property and will comply with all Safety requirements (including reporting requirements) required by contract or site policy.

2. Introduction

This site safety guide summarizes good practice for all workers at the LWA and LWDA sites. Our intention is to ensure the health and well-being of everybody working at these sites. All people working at an LWA site must read this manual and understand proper safe conduct. Such conduct is vital for the successful execution of LWA and LWDA site operations.

In addition to following our code of conduct for research and operations, LWA staff must also recognize the safety rules and guidance of our hosts at the VLA site, the National Radio Astronomy Observatory. Issues of disagreement or interpretation between the LWA Project and NRAO will be resolved at the executive level of the organizations.

If you have concerns or doubts about your safety or the safety of others at the site, stop work immediately and consult your supervisory chain for clarification. If you are the lead staff member and have concerns, use your best judgment. This may include cessation of work until the hazards are understood and mitigated.

Contact numbers

Fire or other emergency: 911 – (goes to VLA array operations)
LWA Project Management: Greg Taylor, 505-277-5238
NRAO-NM Safety Officer: James Sullivan, 505-835-7344
NRAO-NM VLA Site Operations: 505-835-7180
Socorro General Hospital: 505-835-1140
NM State Police: 505-835-0741
Socorro Sheriff: 505-835-0941
UNM Safety Officer: [TBD. Interim is Greg Taylor]

3. Accident/Incident Reporting

In the event of an accident or incident at an LWA site proper medical attention should be sought from the VLA EMTs, the Socorro Hospital, or other facility as appropriate. The Project Office should be notified and the appropriate forms filled out. These forms are required by the State of New Mexico for potential Workers Compensation Claims. Other forms may be necessary depending on the home institute of the reporting individual. If the individual is unable to complete these forms then it becomes the duty of the employee's supervisor to have the forms processed in a timely fashion.

When an employee witnesses or comes upon an accident or incident, he or she should attempt to contact emergency services (e.g., call 911) and then render any aid or assistance possible until relieved by emergency services personnel. Of primary importance is the physical condition of anyone injured as a result of the accident.
This section provides direction for investigation of accidents or incidents. Cooperation is required from all individuals involved in incidents and accidents at an LWA site. This includes personal injury, property loss or damage, and near miss incidents.

The effort needed to investigate an accident depends upon the severity of the injury, the number of persons involved, property loss, and whether the hazardous condition had been previously reported.

After an accident or incident has occurred employees must notify their immediate supervisor of all workplace injuries or illnesses as soon as possible. An Accident/Incident Report form must be filed by the employee and signed by the supervisor with the UNM Safety Officer for every accident. If the accident or incident involved a fatality or hospitalization the accident must be reported immediately to the Safety Officer. If you are responsible for contractors or visitors to whom an accident befalls, you must report it immediately to the UNM Safety Officer.

An Accident/Incident Report should be filed with the UNM Safety Officer by the end of the next working day after the accident or incident. The UNM Safety Officer and the Supervisor involved shall investigate all accidents and incidents.

The categories of accidents includes Personal Injury (any injury or illness due to an accident associated with the operation of an LWA site), a Near Miss (any accident which had the potential for personal injury or illness involving persons at or near the scene of the accident), or Property Loss (any accident, not in one of the above categories, which involves a property loss and is deemed worthy of documentation by the UNM Safety Officer).

4. General Safety

4.1 Appropriate Attire

It is the responsibility of each Supervisor, to determine the type of clothing that his or her employees may or may not wear in order to perform their jobs in a safe manner. Such clothing may be required by a Material Safety Data Sheet or recommended by the experience of a supervisor. Certain types of clothing may not be allowed because of a hazard it may pose to an employee. An example might be, wearing loose clothing around machinery.

General Clothing allowed for the LWA sites are as follows.

1. Long work pants (no shorts) should be worn at all times when working at the LWA sites.
2. If possible long-sleeved shirts should be worn when working at the site.
3. Hard toe foot protection shall be worn at all times at the LWA sites when working with any thing that could cause a foot injury. Sandals and open toe shoes are prohibited at all times. (See section 4.4 on PPE for more information).
4. Safety Glasses shall be worn whenever working around tools or materials that can cause flying debris. (See section on 4.4 PPE for more information).

4.2 Workspaces and Fire Alarms

Workspaces should be kept clean and free from hazards. Care should be taken as to the placement of cables and placement of equipment. In particular, the equipment hut of the LWDA is small so be sure to refrain from placing objects where they could become a tripping hazard.

All Project members working at an LWA site are expected to be familiar with the fire alarms and carbon monoxide detectors, and the location of all fire extinguishers. Workers at an LWA site who are not familiar with the locations and use of these devices, should inform their team leader.

4.3 Electrical Power Safety

All electrical wiring and equipment shall be in compliance with the National Electric Code (NFPA 70) and all work practices shall be in compliance with OSHA and the NFPA 70E.

This project will use electrically powered equipment- both field tools and rack-mounted systems. Unless a worker is deemed a qualified person to use, service, or modify this equipment, he or she must not use or make any repairs or changes to this equipment.

Any LWA staff member or employee who is not trained in electrical work or does not currently have an electrical license shall not work on any circuits of 30 volts AC or 50 volts DC or greater. The two-person rule (see section 5) shall be in effect for working on circuits of 408 volts AC or greater. Lockout/Tagout procedures must be used for the circuits described above.

Working on circuits of 30 volts AC or 50 volts DC or greater by Qualified Persons, while energized, shall be done only when work cannot be done while de-energized and in compliance with safe work practices and using appropriate protective equipment.

Ground Fault Circuit Interrupters (GFCI) shall be used at all times when working with non-battery powered, portable electrical tools and equipment unless nuisance tripping or a GFCI of proper capacity is not available. The GFCI shall be tested for proper operation before each use. When a GFCI is not used, the equipment operator and the supervisor

shall assure a proper grounding connection between the tool and the electrical service ground. Without GFCI, tools and equipment shall not be used in damp locations. Proper personal protective equipment shall be used.

Fuse or breaker removal will not be preformed unless the person performing the tasks has an electrical license. A hotstick, insulated gloves and safety eyewear will be used for the removal of any fuses in transformers or fused disconnects energized by 12740 Volts AC. If further access to the equipment is required, it will be de-energized followed by proper grounding. NO primary cable work (due to the static charge buildup in primary cables) will be performed during lightning storm or bad weather conditions.

Power-line hazards

The erection of temporary antennas and masts must occur well away from electrical power lines and transformers. Good practice is to construct any antennas and masts within the 50m radius of the array, at a location well away from any antenna cables and the equipment shelter. Keep in mind that the antenna cables carry power for the antenna baluns.

4.4 Personal Protective Equipment

Personal Protective Equipment (PPE) is to protect against injury by creating a barrier against workplace hazards. PPE is provided, and is to be used where required to lessen the likelihood of injury and/or illness.

Eye and Face Protection: Prevention of eye injuries requires that all persons exposed to any work processes that generate potential eye hazards wear protective eyewear. This includes employees, visitors, researchers, contractors, or others at an LWA site.

Head Protection: Head protection is required for all employees, visitors, and contractors at the site when the likelihood of a head injury may occur. Bump caps/skull guards will not be worn as substitutes for safety caps/hats because they do not afford protection from high impact forces or penetration by falling objects.

Foot Protection: Safety shoes with impact and compression protection are required to be worn in work areas when carrying or handling materials such as parts or heavy tools, which could be dropped onto the feet or when materials or equipment could potentially roll over an employee's feet. Safety shoes with puncture protection are required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury. Sandals and open toe shoes are prohibited at all times.

Hand Protection: Suitable gloves shall be worn when hazards from chemicals, cuts, lacerations, abrasions, punctures, burns, and harmful temperature extremes are present.

5. Two Person Rule

1. General

The isolated locations of the Long Wavelength Array (LWA) stations make it necessary that some tasks, which could otherwise be completed by a single employee, be performed by two persons so as to insure the safety of the persons completing these tasks. No employee should perform any task alone if the individual feels that the job cannot be completed safely without the assistance or presence of a second person. In general, the two-person rule shall be in effect under the following conditions:

A. Working from any external platform or scaffolding, building roof; or

B. Working with any energized electrical circuits above 408 volts AC. The second person does not need to be a Qualified Person; or

C. If the assistance of the second person is not required to complete the task, the second person must be within hailing distance of the person performing the task; or

D. For any work to be carried out at a station at night time.

2. VLA Site

Within the central site, unless prohibited by some other rule or unusual condition, employees may work alone during daylight hours. This rule applies to the control building and areas of the VLA site within the normal traffic flow. The LWDA site is outside the normal traffic flow, therefore an employee working alone is required to check in with the VLA operator by phone upon arriving and departing from the LWA site. At night time a two person rule will be in effect at the LWDA site.

6. Team Lead

Any team visiting the site needs to have a designated lead. The lead is responsible for ensuring that safe working procedures are followed and that, in the event of an emergency, the appropriate emergency personnel and LWA management are contacted.

Each work team must conduct a “tail-gate briefing” at the start of the day or the commencement of any new work during the day to discuss the plan of the day and any

associated hazards. A brief walk-through of the site should also be conducted in order to identify any new or unusual conditions.

7. Natural Hazards

The LWDA site is located on the Plains of San Agustin, NM, near the VLA Antenna Assembly building. Known natural hazards here include rattlesnakes and lightning. New Mexico is also home to the Bubonic plague, rabies and Hanta virus. West Nile virus is spread by mosquitoes.

The plague, rabies and Hanta virus are carried primarily by rodents. These creatures like to live in small holes. Exercise care when working in areas where rodents may have taken up residence (e.g., underneath the LWDA shelter).

Rattlesnakes live in all areas of New Mexico and inhabit the area on and around many of the LWA sites. It is very important that all staff members and employees of the LWA project pay close attention to the area around where they are walking and working. Rattlesnakes like to crawl under things that will conceal and protect them. If you have to move something that has been in place over night it is very important to be careful when moving the item.

8. Lightning Safety

Because of the remote locations of the LWA sites it is sometimes difficult to determine the threat from lightning during storms. Any personnel working in such locations should be aware of weather conditions and be prepared to cease work and get to a safe location if the threat from lightning is imminent. The following rules apply to all personnel working at or on the LWDA site.

Work shall cease, and personnel shall immediately proceed to a "Safe Location" under the following conditions.
1. A lightning stroke is observed within a 6 to 12 mile range of the work location. The range, in miles, can be roughly determined by counting seconds until you hear the thunder from an observed strike and dividing the result by 5 and;
2. The storm is observed to be approaching the work site or:
3. The range and direction, as described, are determined by a sensing device or;
4. Upon notification by or from the UNM Safety Officer or by calling the VLA Array Operations at 835-7180.

A "Safe Location" is defined as a properly protected building. <u>The current LWDA shelter should not be used for this purpose, except as a last resort.</u>

Upon ceasing work, personnel under the threat from lightning, shall report the lightning threat to the VLA Array Operations at 835-7180 and notify them of their decision to stop work and go to a "Safe Location."

Affected personnel may resume work when the storm that is the source of lightning has moved or is moving away and lightning strikes are observed to be more than 12 miles away.

9. Outdoor Work (Protection from the Elements)

9.1 Heat exhaustion and dehydration

Summer temperatures can be quite high and conditions at the site are dry. In addition, there is limited shade at the site. There is an awning inside the shelter that can be quickly deployed following the directions (please note the wind conditions and do not attempt to set up the awning if winds greater than 10 mph persist). In summer conditions dehydration, heat exhaustion and sun burn are all potential problems for any Project staff working in the field. In order to prevent these problems, observe the following safety procedures:

- Do not go to the site without water, allowing for several liters of water per person per day.
- Drink plenty of liquid and eat salty snacks while working at the site. Dehydration can creep up on you, and you may not feel thirsty even though you need water.
- There is no refrigeration at the site, so any food needs to be brought in appropriate coolers to avoid spoilage.
- Wear hats with brims, sunscreen and sunglasses in order to minimize exposure to the sun.
- If you're doing physical work at the site, rest at least 5-10 minutes every hour in the shade of the shelter or awnings.
- If a Project member appears to be suffering from heat exhaustion, give that person water and seek medical attention. Symptoms include nausea, head aches, profuse sweating, fainting, dizziness, pale or cool skin.

10. Chemical hazards & Hazard Communication

Installation of equipment may require the use of solvents or sealants or other chemical products. Many of these products are toxic. Consequently, these products must only be used as directed by the manufacturers' guidance notes. The products must only be used in suitably ventilated areas. Respirators, masks, or protective eyewear must be used where mandated by the manufacturer.

Hazard Communication

Hazard Communication also known as HAZCOM and commonly referred to as the "Employee Right to Know" standard, and is designed to inform and educate employees regarding the chemicals to which they may be exposed. There are eight specific requirements for Hazard Communication. These are initiated and maintained by the UNM Safety officer and are outlined below:

1. Establish a written HAZCOM program manual.
2. Maintain a complete chemical inventory
3. Maintain a notebook containing Material Safety Data Sheets (MSDS) for each chemical
4. Label all hazardous chemical containers
5. Provide a chemical hazard awareness education seminar
6. Establish emergency response telephone numbers
7. Develop measures to protect employees in the workplace
8. Develop methods for avoiding accidents with chemicals

Hazardous materials are classified by no less than three federal agencies: the Environmental Protection Agency (EPA), the Department of Transportation (DOT), and the Occupational Safety and Health Administration (OSHA). Hazardous materials can be classified as either physical or health hazards: materials can be hazardous due to their physical properties (reactivity, flammability) or they can cause a detrimental acute or chronic health effect.
It is the responsibility of each employee to use hazardous chemicals in accordance with the manufacturers recommended practices and instructions. The work practices, personal protective equipment, and engineering controls must also be used or addressed in accordance with the manufacturer's requirements.

11. Driving safety

Access to the sites and transport of equipment and personnel around the sites will require the use of motor vehicles. Only authorized drivers may drive Project vehicles. These drivers must obey all speed limits, including those required by local site authorities.

12. Lifting hazards

Do not lift heavy supplies or equipment without appropriate tools or additional help.

13. Workshop hazards

Small hand tools may present moderate hazards. Use appropriate caution with electrically-powered tools including ground fault interrupter technology.

Please inspect the workshop space at the end of each day for potential hazards including powered soldering irons and uncapped solvent and adhesive containers.

14. Generators

Field work may require the use of gasoline or diesel driven generators. These machines can only be operated as approved by the manufacturers. In most cases, these generators can only be used if they are earthed and if suitable ground fault interruption technology is in the circuit.

The use of liquid fuels introduces a fire hazard. Appropriate fire safety measures must be in place, including readily available fire extinguishers of the appropriate type, before these generators can be deployed.

15. Substance abuse

Given the diversity of hazards potentially available at the field sites and the consequences of poor safety practice, substance abuse will not be tolerated. This means that you can not work in the field under the influence of alcohol or drugs. Alcohol (including beer) may not be brought to the site.

16. Environmental Protection

There are no waste disposal facilities at the LWA sites. All trash needs to be packed up and removed at the end of each work day.

Care should be taken to minimize damage to the fragile vegetation on the sites. This vegetation stabilizes the soil and without it the site will suffer from severe erosion.

Certification

I have read and understood all conditions laid forth in this document.

_____ _____

Name Date

(Please send a copy of this signed page to the Interim Project Director, Greg Taylor)