This manual was prepared by Dale A. Webb with assistance from Karen Kenagy, Sharon Thomas, Cathi Duncan, Paul Hart and other Steward Observatory Safety Committee Members. It is designed to be an on-line, web based document which may be updated on a quarterly basis. This document may be copied or printed at any time and it will contain a date and version number.

Prepared By:

Dale A. Webb
Safety Manager

Karen Kenagy
Assistant Safety Manager

Approver:

Buell T. Jannuzi
Director

Jeffrey S. Kingsley
Associate Director

Approver:

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Assistant Vice President, U of A Risk Management Services
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Director’s Statement
Section I
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THE UNIVERSITY OF

ARIZONA

TUCSON, ARIZONA

HEALTH AND SAFETY POLICY
February 27, 2013

The mission of the University of Arizona is to ‘discover, educate, serve, and inspire.’ The Department of Astronomy and Steward Observatory supports this mission by pursuing world leading astrophysical research and sharing the knowledge we gain through our education and outreach efforts. We help everyone understand the Universe in which we live. We have been and will continue to be successful in our efforts because of the dedication, passion, and skill that the employees of the Department of Astronomy and Steward Observatory bring to our efforts every day. It is our obligation to ourselves and to each other that all of us are able to carry out our work in a safe environment and without negatively affecting our health. This not only protects the health of our individuals, but of our organization as well.

The purpose of this policy statement is to highlight the importance we attach to ensuring that proper safety and health conditions are maintained throughout Steward Observatory.

The Department of Astronomy and Steward Observatory are committed to:

- Promote a work environment in which all employees are involved and have a sense of ownership in the importance of safe and healthy operations.
- Promote the philosophy that safety is a priority with everything that we do.
- Promote an awareness and mitigation of known risks to people, property and the environment.
- Integrate safety, health and environmental considerations into project planning, design, construction and operations to minimize harm or loss.
- Enable compliance with University, State, and Federal laws, regulations, and policies regarding health and safety.
- Provide adequate training that addresses the safety and health responsibilities of all personnel.
- Recognize, reward and reinforce our safety, health and environmental achievements, innovations, and behaviors.

To help us meet these commitments, we:

- Charge all employees with the responsibility and accountability for Health and Safety in their area.
- Appoint Karen Kenagy and Dale Webb as Safety Representatives* for the Observatory. They will report for this aspect of their responsibilities to the Assistant Director, Business Services for the Observatory.
- Establish a Safety Committee, co-chaired by Karen and Dale, with active representatives from each major project or sub-unit of the Department and Observatory, with the charge to help identify issues or concerns that need to be addressed and to share safety knowledge, experience, and training throughout the Department and Observatory.
- Will ensure that regular safety inspections are carried out and any resulting concerns are addressed to ensure compliance with our safety and health policies.

Safety Committee members will help develop and maintain a Health and Safety Manual outlining appropriate safety rules and procedures and promote these best practices through a Safety Awareness Program.

We expect all Department/Observatory members will work to ensure that the work environment for research, teaching, and outreach programs at Steward Observatory is safe and healthy.

Buell F. Jannuzi
Director

Jeffrey S. Kingsley
Associate Director

Mark Buckmaster
Assistant Director, Business Services
Subject: Safety Organization: Safety Management System Members
Section: II
Date: 03/29/2019 (Rev 10)
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Steward Observatory
Safety Management System Members

SO Director
Buell Jannuzi

Assistant Director, Business Services
Mark Buglewicz

Safety Manager
Dale Webb

Associate Safety Manager
Karen Kenagy

U of A Risk Management Services
Advisors to SOSC
Julia Rosen

ETS
Carmen Otero

Mountain Operations

Computing Support
Chris Johnson

Electronics
Frank Gacon

Mt Lemmon
Jim Grantham
Joe Hoscheidt

Kitt Peak
Bill Wood

Sunnyside
Gary Rosenbaum

VATT
Paul Gabor
Taras Golota
Gary Gray

Sky Center
Alan Strauss

Mirror Lab

Casting
Pat Peak

Facility Engineering
Bruce Hille

Integration
Jeff Urban

Optics Shop
Dan Caywood

ITL
Mike Lesser

SOBO
Mark Buglewicz
Gabe Coronado

Faculty
Chad Bender

IR
Ken Don

Engineering Advisors
Kurt Kenagy
Kerry Gonzales
Mario Rascon

Mat Rademacher

MGIO
Eric Buckley

LBTO

Shane Olsen
Amando Alvarado

SMT/ARO

John Little
David Carroll

MMT

Alyson Ford
Tom Folkers
Sean Keel

John Di Miceli
Brian Comisso
Tom Gerl
Cory Knop
Subject: Safety Organization: **Safety Management System**  
**Mission and Responsibility**  

Section: II  
Date: 11/26/18 (rev 2)  
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The Health and Safety Management System, with all its elements, is administered by the Safety Organization, which consists of one or more Safety Representatives appointed by the Associate Director for Administration and a Steward Observatory Safety Committee. This Safety Organization, along with the U of A Risk Management Services, serves as an advisor to assist the line management and employees in fulfilling their requirements. All safety plans, procedures, equipment requirements, training, and program audits, are subject to approval by the Associate Director for Administration.

The Safety Committee is the mechanism for employees to voice concerns or observations on safety-related issues to the Observatory management. It is intended that there be a Safety Committee Member from each department or organization within the observatory.

The Safety Representative(s) are appointed by the Assistant Director, Business Services to assist with the development and implementation of the Steward Observatory Safety Management System. The Safety Representative(s) will be available to assist in safety Inspections, attend scheduled meetings, help maintain a Safety Awareness Program, and be an advisor to management on safety issues. In addition, its members shall:

1. Conduct yearly Bi-Annual Safety Committee Meetings and monthly Executive Safety Committee Meetings.
2. Post the provided Bi-Annual Safety Meeting minutes on the Steward Observatory Safety website as it becomes available, to assure the availability to all employees and each member of their department or organization.
3. Review all safety documentation and assist in the development of safety policy and safety procedures, including a Steward Observatory Safety Manual.
4. Assist with accident investigation and recordkeeping.
5. Conduct periodic safety audits/inspections.
6. Administer the Observatory safety programs and new employee orientation programs.
7. Assist in the preparation and review of safety plans.
9. Represent the Observatory in visits or investigations by outside government agencies and insurance agencies.
10. Be responsible for conducting or overseeing all safety training, safety footwear and eye wear programs.
11. Review all plans for new construction or renovation to ensure conformity with appropriate regulations and guidelines, when asked to do so by U of A Risk
The Safety Representative has the authority to stop any work activity if, in his or her judgment, continuation of such activity constitutes an imminent threat to personnel, site equipment, or property.

Each individual employee is responsible for performing assignments in a manner that will not endanger themselves or their fellow employees. Each employee is responsible for:

1. Following all of the Steward Observatory safety policies, programs, and procedures.
2. Utilizing all safety equipment in the proper manner.
3. Promptly reporting all unsafe conditions to their supervisor.
4. Promptly reporting all work related injuries, illnesses, and near misses to their supervisor.
5. Promptly seeking appropriate medical attention when injured on the job.

Implementation of the safety management system is a line responsibility. The ultimate responsibility for safe operations resides with each Telescope and Laboratory Director or Manager who are responsible for the following:

1. Implementation of the Steward Observatory and University of Arizona Safety Policies.
2. The conduct of a safety management system suitable for his or her area of responsibility.
3. Providing the Associate Director for Administration and/or his Safety Representative(s) with an assessment of the level of risk associated with their operations.
4. Ensuring that all necessary training has been provided prior to work assignment.
5. Providing all necessary safety equipment.
6. Selecting and employing work practices to reduce potential for accident or injuries.
7. Supervising staff performance to ensure that required work practices are employed.
8. Arranging appropriate medical attention for employees in the event of an injury.
9. Promptly reporting any accidents, injuries or near misses, according to established procedure.
OUTSIDE CONSULTANTS

The Observatory may, as needed, recommend the use of “expert” outside consultants to assist in determining safety policy.

CONTRACTORS

Contractors on University/Observatory property are expected to take all reasonable precautions in the performance of the work under his/her contract. Protect the health and safety of employees and the public. Minimize danger from all hazards to life and property and will comply with all health, safety and fire protection regulations and requirements (including reporting requirements) required by Federal, State or local authorities.
Safety Policy
Section III
Pg 1 - 19
An accident is an unexpected consequence to an event resulting in personal injury or property damage.

CATEGORIES OF ACCIDENTS

Personal Injury - Any personal injury or occupational illness involving a Steward Observatory employee, visitor, or member of the public due to an accident associated with the operation of the Observatory.

- Injuries that are fatal or imminently fatal
- Injuries that are disabling and/or permanent, or require hospitalization
- All other injuries

Near Miss - Any accident which had the potential for personal injury or occupational illness involving persons at or near the scene of the accident. Or, any accident which could have caused personal injury or occupational illness if any personnel were at or near the scene of the accident.

Property Loss - Any accident, not in one of the above categories, which involves a property loss or damage to any UA property and is deemed worthy of documentation by an Observatory Safety Representative. Property losses greater than $10,000.00 must be reported to U of A Risk Management Services within one working day of the discovered loss. Property losses less than $10,000.00 must be reported within 10 working days of the discovered loss.

Public Interest - Any accident which is likely to give rise to inquiry by the public or news media. Where a Public Interest accident is declared, all employees should immediately be notified and advised on communication with the news media. A public spokesperson should be appointed and all statements and information issued through that person. All accidents in this category, which may also fit another category, shall be classified as such by the Associate Director of Administration.

RESPONSIBILITY FOR NOTIFICATION

All category A and B accidents shall be investigated immediately by an Observatory Safety Representative in cooperation with U of A Risk Management Services, the Assistant Director, Business Services and the Telescope or Laboratory Director or Manager involved. In addition, the Safety Representative shall appoint an Investigating Committee. The Chairman of the Investigating Committee shall issue a final written report. The written report prepared by the Investigating Committee shall be distributed to the Associate Director for Administration, U of A Risk Management Services, the Steward Observatory Business Manager and other appropriate personnel.
All other personal accidents shall be investigated by the Safety Representative and the Telescope or Laboratory Director or Manager. If deemed necessary, the Safety Representative will appoint an Investigating Subcommittee of the Safety Committee. The Safety Representative will chair this committee and issue a final written report. The written report prepared by the Investigating Subcommittee will be distributed to the Assistant Director, Business Services, U of A Risk Management Services, the Steward Observatory Business Manager and other appropriate personnel.

The Safety Representative and appropriate supervisor shall investigate any property damage and near-miss accidents deemed appropriate. Other personnel as needed will aid the Safety Representative.

For all categories, it is prudent to assume the accident will at least be a valuable learning experience and any supervisor on hand should request, where practical, a photographic record.

**RESPONSIBILITY FOR INVESTIGATING**

A Supervisor’s Report of Injury/Illness Form must be filed with U of A Risk Management Services for every employee injury accident within 24 hours of the occurrence and should include the signature of the injured employee’s supervisor. The supervisor of the person or area involved in the accident is responsible for completing the report and giving copies to the Safety Representative. The Safety Representative shall give copies to the Associate Director for Administration and the Steward Observatory Business Manager. Copies of the Supervisor’s Report of Injury/Illness Form and Near-Miss Form are available in the “Form” section of this manual and on the U of A Risk Management Services website.

http://risk.arizona.edu/insurance/workers-compensation and https://workerscomp.arizona.edu/

In the event of a fatality or incident requiring immediate medical treatment, the supervisor must report the accident immediately via telephone call to Arizona Department of Administration - Risk Management Division at 1-800-837-8583. A telephone call, e-mail or text message to the Associate Director for Administration, U of A Risk Management Services, the Safety Representative(s) and the Steward Observatory Business Manager are also required.
All accidents should be reported, since there may be unforeseen medical complications.

Completing a Near-Miss FYI Report is at the discretion of the Safety Representative/Supervisor/Employee for a near-miss accident.

**RESPONSIBILITY FOR EXTERNAL REPORTING**

Any employee who knows of an unsafe condition or has witnessed an unsafe act, is responsible for reporting the condition or act to the Safety Representative.

Motor vehicle accidents occurring on public highways involving property damage or personal injury are to be reported to the State Police and/or the Local Police. If University of Arizona vehicles are involved, reports must be filed with the University of Arizona Motor Pool. This should be coordinated with the Steward Observatory Business Office. **If U.S. Government vehicles are involved, reports must be filed with the GSA Motor Pool as well.**

Driving citations received while driving on authorized University business must be reported immediately to that person’s supervisor. Any driving citations received while driving on off work hours that change the driver’s status per the University’s Fleet Safety Policy, must be reported immediately to that person’s supervisor. Supervisors must report these incidents to U of A Risk Management Services. The University Fleet Safety Policy can be found at: [http://risk.arizona.edu/fleetsafetypolicy](http://risk.arizona.edu/fleetsafetypolicy)
For the safety of all employees, it is essential that each employee be motivated to work and behave in a safe manner. It is up to each supervisor to provide this motivation. Part of this motivation will come with a consistent response from management to unsafe actions and violations of safety regulations.

Steward Observatory requires strict compliance with this manual and established work procedures. Failure to comply may result in disciplinary action. The following are guidelines for handling such situations:

1. Any supervisor, lead man, or journeyman responsible for the work of others, who witness an unsafe act, must react immediately, without consultation, with higher authority. His/her action will be limited to correcting the infraction, eliminating the hazard, and appropriate counseling of the offender. A report of the incident must be made to that person’s supervisor.

2. Each Manager or Supervisor, upon notification of an unsafe act by one of his/her employees, has the responsibility to follow up and determine if discipline is warranted under the guidelines established in Policy 403.0 in the Human Resource Classified Staff Manual. For more information and the official University of Arizona documentation and procedures on this subject please go to: http://hr.arizona.edu/policy/classified-staff/403.0
The UA Pandemic Response Planning Subgroup, part of the Campus Emergency Response Team (CERT) has developed appropriate measures to be taken during a potential pandemic influenza outbreak.

The COOP Plan is also used to identify critical resources required to maintain levels of operation during other catastrophic events.

These measures include:
- Campus Plan
- Continuity of Operations Plan
- Campus Communications
- Subgroup Members
- Useful Pandemic/Emergency Response Information

More detail on the above can be found at the U of A website: [http://cert.arizona.edu/pandemic_plan.html](http://cert.arizona.edu/pandemic_plan.html)

The Pandemic Influenza-Continuity of Operations Plan (COOP) for Steward Observatory has been completed and is on file with the UA Police Department, Brian Seastone at 621-3507. The Plan is also on file with the Steward Observatory Director, Buell Jannuzzi.

This plan is to be reviewed and updated annually

Individuals and Families should use the CDC Pandemic Flu Planning Checklist to make sure you and your family are prepared for this type of situation. It is available at: [http://www.flu.gov/planning-preparedness/index.html](http://www.flu.gov/planning-preparedness/index.html)
Employees who are injured on the job may seek medical care at a variety of places, including their own private physician.

Do not hesitate to call 911 if an employee has sustained a major injury or if they are complaining of chest pain. For life threatening injuries, go to the nearest emergency room or trauma center. Tell the medical provider that this is a work-related injury.

You may also see your primary care physician for work related injuries. Tell the medical provider that this is a work-related injury.

For non-life threatening injuries, medical treatment for employee injuries is available at Campus Health Service. The Campus Health Service can see employees for uncomplicated or simple on-the-job injuries for the first visit, but may refer employees to Occupational Health Clinics in the Tucson community for follow up care.

They also provide medical care for certain types of work place injuries or illnesses, mostly related to potential exposures to infectious materials or chemical agents. Other injuries are generally seen in the Campus Health Service, Urgent Care.

In the event of a job-related injury or exposure, you can come to the Campus Health Service Triage/Urgent Care area on the first floor of the building, or call Triage/Urgent Care at 621-6493 or the Switchboard at 621-6490. You will be directed appropriately at that time. You may also choose to be seen at any hospital, urgent care center, or your private practitioner’s office.

Any incident / illness requiring medical treatment must be reported to the employee’s supervisor within 24 hours.

U of A Risk Management Services, Worker’s Compensation and OSHA require all supervisors to complete a “Supervisors Report of Injury”, within 24 hours of being notified. WebConnect is the preferred method for reporting employee injuries. If a supervisor has not yet registered with U of A Risk Management Services, and needs to report an injury during off hours or when the system is unavailable, a paper injury report form can be completed and faxed to U of A Risk Management Services. The paper version of the Supervisor’s Report of Employee Injury/Illness, is intended to be used only when WebConnect is not readily available.

WebConnect link on the U of A Risk Management Services web site is: https://workerscomp.arizona.edu/

Fillable PDF Form can be found on the U of A Risk Management Services web site: http://risk.arizona.edu/block/insurance-forms

The best place for employees to be cared for are Occupational Health Clinics, who are used to using the Worker’s Compensation system, determining work status, and getting employees back to work in a timely manner. However, the employee has a right to seek care where they wish.

Questions: contact Anna Llamas, 621-3626, allamas521@email.arizona.edu
Please use this information to help employees decide where to go for care.

If you have **any questions** about where to send an employee, you may contact:

Campus Health Triage Nurse, 621-6493, M, T, Th, F 8:00 am - 4:30 pm, Wed 9:00 am - 4:30 pm

Highland Commons
1224 E. Lowell St., Tucson, AZ 85721
(Northwest corner of Highland & 6th Street)

<table>
<thead>
<tr>
<th>Injury</th>
<th>Decision</th>
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<tr>
<td>Amputation (severed body part)</td>
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<tr>
<td>Massive Trauma (multiple injuries)</td>
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<tr>
<td>Chest Pain</td>
<td>Call 911</td>
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<tr>
<td>Broken bones – that protrude through the skin</td>
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<tr>
<td>Electrocutions/electrical jolt/arc flash</td>
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<td>Fall Arrest with Suspension</td>
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<td>Loss of consciousness including seizures</td>
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<td>Chemical exposure <strong>with</strong> difficulty breathing</td>
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<tr>
<td>New Back Pain</td>
<td>Send directly to an Occupational Health Clinic. Listed Below</td>
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<tr>
<td>Orthopedic Injuries including those with and without broken bones, and</td>
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<tr>
<td>Non-Acute Chronic Injuries or conditions that have been present for some time (example: allergies to chemicals used)</td>
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<tr>
<td>Repetitive Use Injuries (example: wrist pain from lots of typing or lifting)</td>
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<tr>
<td>Exposures to chemicals <strong>without</strong> difficulty breathing</td>
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<tr>
<td>Blood Borne Pathogen Exposures (exposures to fluids with possible infectious or unknown organisms in it)</td>
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<tr>
<td>Dermatitis (skin irritations)</td>
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<tr>
<td>Chemical splashes to the eye, chemical burns to the skin. (If chemical splash/burn impacts majority of the body call 911)</td>
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<tr>
<td>Foreign Body in the eye</td>
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<tr>
<td>Possible infectious diseases from research work</td>
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<tr>
<td>Animal bites or scratches</td>
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<tr>
<td>Cuts/abrasions/burns/lacerations</td>
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**Tucson Occupational Health Clinics**

**Concentra Medical Centers, 3 locations:**
- 4600 S. Park Ave., Suite 5 Tel: 889-9574 Hours: 7am – 8pm Mon - Fri
- 2005 W. Ruthraff Rd., Suite 111 Tel: 293-7250 Hours: 8am – 5pm Mon - Fri
- 3402 E. Broadway Blvd Tel: 881-0050, Hours: 8am – 5pm Mon – Fri

**MBI Occupational Healthcare**
- 1001 E. Palmdale Tel: 807-1060 Hours: 8am – 5pm Mon – Fri

**Sunnyside Clinic**
- 3681 S. Palo Verde Rd. Tel: 750-8855 Hours: 7:30am-11am & 1:00pm–4pm Mon- Fri.

**Tucson Occupational Medicine**
- 888 S. Craycroft Rd. Suite 150 Tel: 747-0446 Hours: 8am – 5pm Mon - Fri
- 1661 W. Grant Rd. Tel: 628-4340 Hours: 8am – 5pm Mon - Fri
- 2945 W. Ina Rd., Suite 103 Tel: 877-8600 Hours: 8am – 5pm Mon - Fri
The University of Arizona has a comprehensive U of A Risk Management Services and Loss Prevention Program. This program contains provisions and requirements for establishing scheduled safety inspections of buildings, grounds, equipment, and University vehicles. For more information and the official University of Arizona documentation and procedures on this subject please go to: [http://risk.arizona.edu/safety-loss-prevention](http://risk.arizona.edu/safety-loss-prevention)

OSHA also has provisions and requirements for Safety Inspections. For more information on these provisions go to: [https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=OSHACT&p_id=2743](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=OSHACT&p_id=2743)

As a guide for Steward Observatory employees, we have included in this manual a non-comprehensive guide for making routine safety inspections of observatory facilities. It is our policy that all operational observatory facilities will be inspected by at least one Safety Representative at least twice per year. Where there are continuous or unabated safety infractions, inspections will be made on a more frequent basis. A copy of this guide is provided for your convenience below.

Safety inspections should be conducted of all Steward Observatory Facilities at least twice per year, and more often if there are unabated safety infractions. The inspections should be conducted by at least one authorized Safety Representative, preferably with a member of management or a site Safety Representative in attendance.

**Pre-inspection discussion:**

1. Safety concerns . . . what is the most unsafe job?
2. What is the department attitude towards safety?
3. Is there a lockout/tagout program and is it used?
4. Are there confined space issues, hazmat issues, etc?

**A. Telescope Inspection:**

1. Look for, loose wires, possible pinch points, lockout/tagout devices, oil leaks, cryogenic safety (proper connectors, gloves, long sleeves, face masks, etc), telescope movement lights or sirens, fall protection devices, including tie off points, and guard rails.

2. Look or listen for extended loud noise levels, flammable liquids exposed, unsafe ladders, access issues, control issues, sharp points or corners, unguarded belts or pulleys, etc.
B. Machine Shop Inspection:

1. Look for unguarded belts and pulleys, loose wires, machines too close to each other, oil leaks, housekeeping, fluid disposal, two hand control buttons, emergency shut off switches, safety glass availability and use by operators and visitors, access to electrical panels, evidence of lockout/tagout, air nozzles over 35 lbs. for cleaning, slippery conditions, availability of first aid kit and telephone.

2. Check steel storage racks, parts bins and general condition of machines and equipment. Are hazardous metals being machined? If so, are there proper precautions in place. Check grinding wheels for aluminum build up, and proper spacing of tool rests and eye shields.

For more information and the official University of Arizona documentation and procedures on this subject please go to: http://risk.arizona.edu/shop-safety

C. Vehicle Inspection:

Includes cars, trucks, fork lifts, cranes, snow plows, tractors, etc.

1. Check overall appearance and condition.

2. Check brakes, lights, turn signals, horns and back up warning systems.

3. Look for worn tires, missing parts, crane inspection certificates, worn, leaking, or gashed hydraulic hoses.

4. Be sure chains and lifters are in good shape on the cranes.

5. Do road graders and other highway vehicles have slow moving warning signs or revolving lights that work?

6. Do all vehicles have fire extinguishers, and small safety kits with first aid items?

D. Fall Protection:

1. Are there proper tie off points for employees working at heights?

2. Does each employee have his/her own full body harness and is there a record of each inspection for each harness?

3. Are there records of inspections of other fall protection equipment?

4. Has each employee attended a Fall Protection Training course and submitted a copy of their certification to their Safety Representative for their records?

5. Is there a Fall Rescue Plan documented at your facility?
E. Housekeeping:

1. Are floors maintained in a clean, safe dry manner, with no holes or protrusions such as nails, slippery areas, or tripping hazards such as extension cords?

2. Is equipment stored properly, at least 18 inches from the ceiling in sprinkler system areas and not in aisles?

3. Are eating areas and bathrooms cleaned and sanitized on a regular basis?

F. Electrical:

1. Look for blocked electrical panels and shut off, extension cords being used in place of permanent wiring, and flexible electric cords without strain relief.

2. Are all boxes, feeder and branch circuits identified at the outlet and in the panel box?

3. Are boxes and/or breakers equipped with lock holders for lockout/tagout?

4. Are cords or wires run through walls without approved conduit?

G. Compressed Gas:

1. Look for cylinders to be chained to walls or in approved standing containers.

2. Are cylinders marked properly and do they have safety relief valves?
   - Cylinders should not be stored in hallways, corridors, near flammables, or combustibles.

3. Is hydrogen being used and if so, is it in a well-ventilated area and being kept at a safe distance from flammable gases and people?

4. Are rules concerning transportation of gases being followed?

H. Welding Areas:

Welding should only be done in a well-ventilated area, away from flammables. Only approved welding equipment in good condition should be used and should have anti-flash back valves installed.

1. All welders must attend a Welding Safety Training Course and submit a copy of their certification to their Safety Representative for their records.

2. Cylinders must be kept in approved carts or containers.
   - Acetylene cylinders shall be stored with the valve end up.
   - All cylinders that are not in use shall have valve protection caps in place, especially when being moved.
   - When moving cylinders, work is finished, and the welder has left the area, all cylinder valves should be closed.
- Proper safety equipment in good, safe condition, including gloves and welding safety eyewear or helmets must be used.
- Precaution must be taken to assure that visitors to a welding area cannot look at the flash or be exposed to it without proper equipment.

I. Signs and Labels:

1. Are there proper exit signs, equipment warning signs, chemical labels, in use signs, fire extinguisher location signs, safety eyewear warning signs, etc. visible and in the proper locations?

J. Fire Safety:

1. Look for current inspection stickers on fire extinguishers.
2. Check for accumulations of trash and flammable materials, weeds and debris.
3. Is there a fire alarm system and/or smoke detectors?
4. If there is a furnace, are there carbon monoxide detectors?
5. Are routine tests for fire apparatus and fire drills performed and documented?
6. Has there been training on proper usage of a fire extinguisher and a list of approved persons to handle extinguishers?

K. Fork Lift and Crane Safety:

1. Check equipment, approved certifications, approved operator lists, and look for leaking hydraulic hoses or cylinders.
2. Is there an approved man lift or safety platform with guard rails and can it be secured to the fork lift mast?
3. Check the fork pins, stops, cowling, body cage, and tires for wear.
4. Are the forks in the lowest position when the fork lift is parked and not in use?

L. Security:

1. Check fences, locks on doors, windows etc.
2. Are there after-hour workers and good parking lot lights?
3. Is there an alarm system and does it go to police directly?
M. Stairs and Handrails:

1. Are the stairs painted to indicate a level change?
2. Are handrails located at the right height?

N. Ladders:

1. Check all ladders for proper feet, damage, OSHA approval in electrical shop, etc.
   - Wood ladders should not be painted because paint can mask problems.

O. Portable Hoists and Winches:

1. Look for current certification; is wire rope connected properly, cable spooling properly, and are weight limits marked?
2. Is there an inspection log for the hoist?
3. Check associated slings, chains and web straps are in good condition and have regular inspection.

P. Fuel Tanks:

1. Check to see if there are barricades, proper signage, vents, and emergency shut off valves?
   - If it is **underground**, is it due for removal or is it a double tank?
   - If it is **above ground**, is it a double tank or is it located in a spill proof container?
2. Are there leak test valves in the external tank? If so, at each inspection perform a leak test by opening the valve to see if fuel leaks out.

Q. Used Oil Management:

All telescopes and laboratories use oil and grease which must be disposed of properly.

1. Check that the facility has a plan and accurate records on the disposal of all used oil and grease.
2. Check that new oil and greases are stored properly.
3. Are old oils in drums in spill proof containers?
R. Chemicals:

There should be specially made flammable liquid storage cabinets for oil based paints, thinners and solvents.

1. Look for proper storage of chemicals and other flammable compounds.
2. Are there persons trained to handle chemicals?
3. Is there an updated GHS (Global Harmonization System) manual in the vicinity of chemical usage?
4. Is there a policy to receive a current SDS (Safety Data Sheet) from the vendor selling the product, to the person using it, and have updated SDS’s been placed in the GHS manual located in the vicinity of use?

S. Respiratory Protection:

1. Identify areas that might require respiratory protection.
2. Check respirators are available and being fitted and used properly.

T. Lasers:

1. Are lasers being used and if so, what class are the lasers?
2. Are there proper protections in place for the class of laser being used?
3. Verify a laser safety program is initiated and identifies who is authorized to use lasers and where.

U. General:

1. Is asbestos or lead-based paint an issue and is there a management plan for dealing with it?
2. Are there workers who must go in confined spaces and if so, is there a program for safety in place?
3. If it is in a remote place, are there person’s always available, trained in first aid, or a certified EMT?
4. Check for first aid cabinets in all areas where there are likely to be cuts and injuries, such as machine shops, shipping areas, or repair facilities.
References:

Abrasive wheels 29 CFR 1910.215
Compressed gases .101, .252
Electrical installations .301
Emergency lights .261
Exits and egress .37
Fire extinguishers .157
Hazard communication .1200
Hoisting equipment .66, .179
Housekeeping .141
Ladders .25, .26, .27
Lockout / Tagout .147
Machine guarding .211, .211
Manlifts .68
Personal protective equipment .132 -.137
Powered industrial trucks .178
Pneumatic tools .243
Signs .145+
Tanks and storage .106
Welding .252
Woodworking machines .213
Work platforms .66, .67
This Safety Manual is intended to be an on-line, web based manual that utilizes hyperlinks to keep it current with the U of A Risk Management Services policies as well as OSHA Policies. The original manual contained 46 sections and was approved with signatures by the Management of Steward Observatory and the U of A Risk Management Services in July/August of 2008.

This manual may be updated when necessary for formatting, but not to changes in policy or procedure, unless a policy and/or procedure change is mandated by OSHA or U of A Risk Management Services.

A “Letter of Approval” form must be submitted to the Safety Committee to document all changes to the manual. Each time a revision or new section is added, an e-mail will be sent to the Steward Observatory Safety Committee, the Director of U of A Risk Management Services, and the Associate Director of Steward Observatory requesting their approval.

The e-mail to the safety committee will state, “This policy will be voted on by this committee at the next Tri-annual Safety Meeting provided there is a quorum, and will be open for at least one month prior to the meeting to give each committee member time to read and comment.”

After approval by vote of the Safety Committee, an e-mail will be sent to the U of A Risk Management Services and Steward management requesting them to send a responding e-mail authorizing the change. Copies of those e-mails will be kept on file along with the original submitted documents requesting the change.

A record has been kept of all changes to this manual since that time and the revised sheet(s) will be indicated with the revision number (Rev #) after the title on the “Subject” line. The revised sheet(s) will also reflect the new “Date” of the revision.
LETTER OF APPROVAL
Steward Observatory Safety Manual Changes

Date:

To: Jeff Kingsley, Steve Holland

From: Dale Webb and Karen Kenagy

Attached are copies of [name] sections for the Steward Observatory Safety Manual written in 2009. They have been approved by vote of the Steward Observatory Safety Committee and have been reviewed by at least one member of the U of A Risk Management Services.

If you approve of these sections, please respond with a written note stating that.

Thank You.........Dale and Karen
All employees will have their performance measured in the area of safety by the following metrics appropriate to their position:

A. Did you perform your assignments in a manner that will not endanger yourself or your fellow employees?

B. Have you adhered to established safety policies, programs and procedures?

C. Have you utilized safety equipment in a proper manner?

D. Have you reported unsafe conditions, work related injuries or illnesses and near misses to your supervisor?

E. Have you promptly sought medical attention if injured on the job?

F. Have you worked with your supervisor to establish a required training program for your job and have you taken said training?

G. Is the work area that you and your employees occupy consistently kept clean and free of hazards?

In addition to the above, each employee should be asked to perform a self-evaluation and list the areas in which he/she excels and areas that could use improvement. This should include such items as identifying barriers to safety in the workplace and how those barriers can be overcome. This is also a good time for each employee and his/her supervisor to work together to establish a training program for the following year.

If you are a supervisor or manager, some or all of the following additional evaluation metrics will be considered in your performance evaluation:

A. Have you established a safety training program for each of your employees and required them to participate?

B. Have you consistently held “Tailgate Safety Meetings” as required in Section V of the Safety Manual?

C. Are you consistent in requiring your employees to wear personal protective equipment when necessary?

D. Is the work area that you and your employees occupy consistently kept clean and free of hazards? Did you inspect the area on a regular basis?

E. Are Safety considerations always incorporated into the scheduling process in order to complete the job properly?

F. Have you required employee compliance with safety requirements and rules, and stopped work if there is non-compliance?
G. Have you recognized and reinforced safe behaviors, and corrected unsafe behaviors when first observed?

H. Have you made safety and health a part of job standards and procedures?

I. Did you request safety and health technical assistance when necessary?

J. Did you report and investigate accidents and take appropriate corrective actions?

K. Did you establish emergency procedures for your employees and their work area?

L. Have you asked all of your employees to do a department or area safety evaluation in which employees identify barriers to good safety practices, and then followed up to correct those barriers?

The above listing is not designed to be all-inclusive, but a minimum. Additional metrics may be added from time to time depending on accident rates and other factors.
The Steward Observatory has published a Director’s Statement that indicates the Observatory commitment to ensuring a workplace that is as safe and healthy as reasonably practicable and that all relevant contractual and statutory requirements shall be complied with. This declaration provides a framework for the management of health and safety and indicates relevant objectives.

Steward Observatory is committed to excellence in the areas of environment, safety, and security (ES&S). This commitment is an essential part of our business. Creative and cost-effective ES&S solutions are necessary for our long-term success. Meeting this commitment is a responsibility shared by everyone, including contractors and third parties. High standards of ES&S performance shall be directed by the following principles:

**Commitment** - All employees understand the need for and demonstrate a strong commitment to high standards of ES&S performance.

**Build Trust** - The Observatory conducts its operations in a manner of building trust on ES&S issues with its employees, government, and the public. We recognize and respond to any legitimate community concerns about the environmental and health safety impact of our programs.

**Accident Prevention** - All employees strive for the goal of no accidents, injuries, unsafe work practices, or conditions.

**Reduction of Emissions/Releases** - Reduction and prevention of waste and emissions/releases are among the objectives of all operations. Reuse and recycle materials when it makes good economic and environmental sense to do so. Consider possible environmental impact when making decisions, including those concerning facilities management and construction projects.

**Emergency Preparedness** - Emergency preparedness is a vital function and is the responsibility of management and supervision at all levels.

**Compliance** - The Observatory complies with all applicable environmental, health, and safety laws and regulations.

**Training/Education** - The Observatory proactively assures that employees are adequately trained and educated on ES&S issues. We limit occupational injuries and illnesses by emphasizing safety education and safe work practices for all employees.

**Measurement of Performance** - ES&S performances are measured and communicated company-wide. Compliance reviews and audits are periodically conducted.

**Communication** - The Observatory provides appropriate and timely information about its ES&S commitments, responsibilities, and achievements to its employees and the public, and participates in appropriate industry-sponsored ES&S initiatives and programs.
Safety Forms

The forms in this section are for example only. Please download and save the form you need from the “Safety Manual Forms” section to your computer, so that you may complete it and save it as a PDF file.

Section IV

Pg 1 - 14
## Aerial Lift Inspection

<table>
<thead>
<tr>
<th>Operator:</th>
<th>Date:</th>
<th>Model/Serial No:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Unit Type: Scissor Lift

### 1. Pre Start-Up Walk-Around

<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels, tires and Axils – condition/inflation</td>
<td>OK</td>
</tr>
<tr>
<td>Hydraulic components - condition/leaks</td>
<td>OK</td>
</tr>
<tr>
<td>Data plate - accurate/legible</td>
<td>OK</td>
</tr>
<tr>
<td>Annual inspection certification - valid/legible</td>
<td>OK</td>
</tr>
<tr>
<td>Battery tray - opens/closes easily, latches shut</td>
<td>OK</td>
</tr>
<tr>
<td>Turret turntable - gears/lock pin/stops</td>
<td>N/A</td>
</tr>
<tr>
<td>Counterweight</td>
<td>N/A</td>
</tr>
<tr>
<td>Cover panels - open/close easily, latch/lock shut</td>
<td>N/A</td>
</tr>
<tr>
<td>Engine - fluids/filters/belts/hoses</td>
<td>N/A</td>
</tr>
<tr>
<td>Batteries - clean/dry/secure/caps-cables/level</td>
<td>N/A</td>
</tr>
<tr>
<td>Fuel tank - level</td>
<td>N/A</td>
</tr>
<tr>
<td>Hydraulic oil level</td>
<td>N/A</td>
</tr>
<tr>
<td>Lights and strobes</td>
<td>N/A</td>
</tr>
<tr>
<td>Placards/labels/decals</td>
<td>N/A</td>
</tr>
<tr>
<td>Boom valley/under platform - leaks/debris</td>
<td>N/A</td>
</tr>
<tr>
<td>Accessory plugs and cables</td>
<td>N/A</td>
</tr>
<tr>
<td>Boom/lift arms - general condition/wear</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 2. Powered Checks

<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine – starts/oil pressure</td>
<td>NO</td>
</tr>
<tr>
<td>Battery - charge level</td>
<td>NO</td>
</tr>
<tr>
<td>Gauges and instruments – hour meter/warning lights</td>
<td>NO</td>
</tr>
<tr>
<td>Ground and platform controls</td>
<td>N/A</td>
</tr>
<tr>
<td>~Boom/Lift arms - raise/lower/extend/retract</td>
<td>N/A</td>
</tr>
<tr>
<td>~Turret rotate</td>
<td>N/A</td>
</tr>
<tr>
<td>~ Drive - forward and reverse</td>
<td>N/A</td>
</tr>
<tr>
<td>~ Steer - left and right</td>
<td>N/A</td>
</tr>
<tr>
<td>~Platform - tilt/rotate/extend</td>
<td>N/A</td>
</tr>
<tr>
<td>~Horn</td>
<td>N/A</td>
</tr>
<tr>
<td>~ Outriggers/stabilizers/pothole protection</td>
<td>N/A</td>
</tr>
<tr>
<td>~ Extendable axles</td>
<td>N/A</td>
</tr>
<tr>
<td>~ Function-enable (deadman) pedal/switch</td>
<td>N/A</td>
</tr>
<tr>
<td>Manual/auxiliary controls</td>
<td>N/A</td>
</tr>
<tr>
<td>Safety interlocks</td>
<td>N/A</td>
</tr>
<tr>
<td>Other:</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 3. Workplace Inspection

<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop-offs or holes</td>
<td>NO</td>
</tr>
<tr>
<td>Bumps and floor/ground obstructions</td>
<td>NO</td>
</tr>
<tr>
<td>Debris</td>
<td>NO</td>
</tr>
<tr>
<td>Overhead obstructions</td>
<td>NO</td>
</tr>
<tr>
<td>Energized power lines</td>
<td>NO</td>
</tr>
<tr>
<td>Hazardous locations</td>
<td>NO</td>
</tr>
<tr>
<td>Ground surface and support conditions</td>
<td>NO</td>
</tr>
<tr>
<td>Pedestrian/vehicle traffic</td>
<td>NO</td>
</tr>
<tr>
<td>Wind and weather conditions</td>
<td>NO</td>
</tr>
<tr>
<td>Other possible hazards</td>
<td>NO</td>
</tr>
</tbody>
</table>

### Comments:

Operator's Initials: 
Alternate Operator's Initials:
UA DEPARTMENTAL EMERGENCY
STATUS REPORT

To be completed by Building Manager, Dean, Director or Department Head at the time of the incident.

Department: __________________________________________________________

Building name: _________________________ Floors: _______________________

Completed by: _________________________________________________________

Location: ______________________________ Phone: _______________________

DESCRIBE URGENT NEEDS: e.g., rescue, severe flooding:
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Personnel Status:

Number of personnel present or accounted for: ___________________________

Number of persons missing: _________________________________

Names: ______________________________________________________________

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Number requiring medical assistance: _________________________________

Nature of injuries: ☐ Urgent ☐ Minor

Is anyone trapped in building? ☐ Yes ☐ No

Where? _____________________________________________________________

In elevator? ☐ Yes ☐ No

Where? _____________________________________________________________
Building Status:

Fire? (if so, pull alarm) ☐ Yes ☐ No
Structural? ☐ Yes ☐ No
  ☐ Major damage (partial building or floor collapse)
  ☐ Moderate Damage (furniture overturned, light fixture down)
  ☐ Minor damage (cracks, books off shelf)

Utilities:

- Electricity ☐ OFF ☐ ON
- Water ☐ OFF ☐ ON
- Gas ☐ OFF ☐ ON
- Emergency Power ☐ OFF ☐ ON

Communications:

- Phones: ☐ OFF ☐ ON

Hazardous Materials:

- Chemical spills: ☐ YES ☐ NO

Where: __________________________________________________________

- Biological spills: ☐ YES ☐ NO

Where: __________________________________________________________

- Radiation Contamination: ☐ YES ☐ NO

Where: __________________________________________________________

Observations/Needs: ______________________________________________

________________________________________________________________

________________________________________________________________

________________________________________________________________

________________________________________________________________

Complete this form and hand it to the first Police Officer or Fire fighter who arrives at your assembly location. This information will assist the first responders with the initial scene assessment.
CAREER CONVERSATIONS

**Step 1:** employee completes self-reflection, then shares with supervisor

<table>
<thead>
<tr>
<th>Employee’s Name</th>
<th>Click or tap here to enter text.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee’s Title</td>
<td>Click or tap here to enter text.</td>
</tr>
<tr>
<td>Department/Unit</td>
<td>Click or tap here to enter text.</td>
</tr>
<tr>
<td>Reflection Period</td>
<td>Click here to enter a date. to Click here to enter a date.</td>
</tr>
</tbody>
</table>

**ACKNOWLEDGING ACCOMPLISHMENTS**

At least 3 of my notable accomplishments during this reflection period

Click or tap here to enter text.

**Supervisor’s Response:**

Click or tap here to enter text.

**HIGHLIGHTING KEY STRENGTHS**

At least 3 key strengths that make me effective in my role and examples of how I have applied them

Click or tap here to enter text.

**Supervisor’s Response:**

Click or tap here to enter text.

**SETTING GOALS FOR SUCCESS**

At least 3 goals I would like to work toward during the next 6-12 months

Click or tap here to enter text.

**Supervisor’s Response:**

Click or tap here to enter text.

**MAKING SMART CHANGES**

3 things I want to do more, do less, start, stop, or change to be even more effective in my role *(Focus on behaviors, practices, etc.)*

1. Click or tap here to enter text.
2. Click or tap here to enter text.
3. Click or tap here to enter text.

**Supervisor’s Response:**

Click or tap here to enter text.

**Step 2:** supervisor and employee meet and discuss, then supervisor makes summary responses, and signs

**Supervisor’s Signature** 

Click here to enter a date.

*If employee’s overall performance is less-than satisfactory, please describe the plan of action*

Click or tap here to enter text.

**Step 3:** employee reviews supervisor’s response, adds optional final comments, and signs

**Employee’s Signature**

Click here to enter a date.

**Employee’s Final Comments (optional)**

Click or tap here to enter text.
SAFETY & TRAINING ADDENDUM
To
UA CAREER CONVERSATION
For
ASTRONOMY & STEWARD OBSERVATORY,
DEPARTMENTS #0422 & #0404

Employee Name

EID#

Position Title (Full Title)

Period Covered:

to

For Completion by the Employee:

I. SAFETY:

a. Do you have specific safety concerns with the work environment?

b. Do you perform activities in a safe manner. (Y or N):

c. Do you encourage safety of others on a regular basis. (Y or N):

d. Have you read, understood and supported the policies and procedures of the Steward Observatory Safety Manual? (Y or N):

For Completion by the Employee with the assistance of the Supervisor:

II. TRAINING and CERTIFICATIONS (This may include safety, required institutional trainings, outside work certifications, etc.)

Please complete and attach the EMPLOYEE RECORD OF SAFETY, TRAINING & CERTIFICATIONS and / or attach relevant records verifying training.
# EMPLOYEE RECORD OF SAFETY, TRAINING AND CERTIFICATIONS
TO THE
UA CAREER CONVERSATION
FOR
THE DEPARTMENTS OF ASTRONOMY AND STEWARD OBSERVATORY

<table>
<thead>
<tr>
<th>TRAINING</th>
<th>ASSIGNED BY</th>
<th>CYCLE</th>
<th>REQUIRED</th>
<th>DATE ASSIGNED</th>
<th>DATE COMPLETED</th>
<th>DATE OF PLANNED COMPLETION</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example - PPE Uses</td>
<td>Supervisor</td>
<td>2 years</td>
<td>Yes</td>
<td>6/18/2018</td>
<td>8/20/2018</td>
<td>n/a</td>
<td>SO online presentation</td>
</tr>
<tr>
<td>Nondiscrimination / Anti-Harassment</td>
<td>UA</td>
<td>Annual</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy Training</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Driving</td>
<td>UA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPR / AED / First Aid</td>
<td>Supervisor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Possible Required Trainings /</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>certs.</td>
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<tr>
<td>UA: Conflict of Interest /</td>
<td></td>
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Instructions for Completion of this Form

This form is designed to be downloaded to your computer so that you may complete it and save it as a PDF file. Please provide a complete, detailed description of events within 24 hours after the incident/near miss. Additionally, please provide any other necessary information, such as witness reports, diagrams, or photos. Witness reports should provide a name and contact information.

Please send completed forms to your supervisor, and to Karen Kenagy, at Kenagy@email.arizona.edu with copies to Dale Webb at dwebb@as.arizona.edu and Mark Buglewicz at buglewic@email.arizona.edu.
STEWARD OBSERVATORY INCIDENT/NEAR MISS REPORT FORM

This form is to be utilized to report an event, condition, situation, or action that could have resulted in an injury, death, or serious property damage at a Steward Observatory facility or location. The information provided in this form is intended to be utilized for proactive, preventative purposes and not for disciplinary purposes.

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Steward Observatory
New Employee Training Requirements
– SAMPLE –

*(R = Required Training, D = Desirable Training)*

Supervisors and Managers shall provide work specific training for each employee based on the work tasks and site specific hazards.

Employee Name: ____________________________  Date: ____________________________
Job Title: ____________________________  Supervisor Signature: ____________________________
Job Duties: ____________________________  Reviewed By: ____________________________

(Safety Officer Signature)

Circle work sites and training requested below

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Steward Observatory

Safety Eyewear Purchase Authorization

Date: ______________________

This form is to authorize ___________________________ to purchase prescription safety eyewear.

(employee name)

This program is 100% employee paid by credit/debit card at time of order, including the cost of an eye examination and prescription. For reimbursement of the cost of the eyewear or $100.00; whichever is the lesser amount, the employee must provide proof of the following:

- eyewear meets or exceeds the ANSI Z87-1989 standard
- this completed signed form
- a valid receipt/invoice
- submit to the Safety Officer for reimbursement within 90 days of purchase

To obtain safety eyewear the employee must go to the Northern Safety vendor website: https://www.northernsafety.com/Product/RXSAFETYEYEWEAR/3M-Prescription-RX-Safety-Eyewear

You'll be able to choose from a $169 Basic Package with over 20 styles in Hoya’s plastic frames or a $199 Enhanced Package which includes the entire Basic Package plus over 30 additional frame styles from the Hoya Collection, including titanium and stainless steel.

The program makes available a selection of single, bifocal, trifocal and progressive additional lens designs, anti-fog coating, or anti-scratch, easy-clean coating, solid or gradient tint, integrated, detachable or permanently attached sideshields.

Once an employee is reimbursed for the safety eyewear, she or he is required to wear said eyewear on the job and encouraged to wear them off the job.

____________________________________  ______________________________________
Employee Name (Please Print)  Employee Signature

____________________________________  ______________________________________
Supervisor Signature  Safety Officer Signature

____________________________________  ________________________________
Account Number  Project Number
Safety Footwear Purchase Authorization

Date: __________________________

This form is to authorize ___________________________ to purchase safety footwear.

(employeename)

The employee will pay all expenses and be reimbursed the cost of the footwear or $100.00; whichever is the lesser amount. There are no restrictions on the style or brand of said footwear however, the employee must provide proof of the following:

- footwear meets or exceeds the ASTM/ANSI standard
- this completed signed form
- a valid receipt/invoice
- submit to the Safety Officer for reimbursement within 90 days

It is the responsibility of the employee to provide evidence that existing safety shoes require replacement. Except in the case of accident/damage to the shoes, replacement will not be approved more than once per year.

Once an employee is reimbursed for the safety footwear, they are required to wear them on the job.

_________________________________________  _______________________________________
Employee Name (Please Print)                 Employee Signature

_________________________________________  _______________________________________
Supervisor Signature                         Safety Officer Signature

_________________________________________  _______________________________________
Account Number                               Project Number
Department of Astronomy and Steward Observatory

TRAINING DOCUMENT:

Steward Observatory On-Line Safety Manual: Training for review of the Steward Observatory Safety Manual located at website:

https://www.as.arizona.edu/safety

Level: General Awareness of Safety Policies and Procedures

Frequency:  □  New Hire  □  Review

Description: Review of policies and procedures in the Steward Observatory Safety Manual.


I have read, understand, and have had the opportunity to ask questions and they have been satisfactorily answered by my Supervisor or a SOSC member regarding The Steward Observatory Safety Manual.

Employee Name (Print): ___________________________ Date: ________________

Employee Signature: ___________________________

Supervisor Signature: ___________________________ Date: ________________

Work Section: ________________________________

QUESTIONS:

Received by: __________________

Date: __________________

Please submit the completed form to your Supervisor. After you and your supervisor have signed and dated the form, make copies of the completed form for each of you. Your supervisor will forward the original form to personnel which will be placed in your personnel file.
Safety Programs and Requirements
Section V
Pg 1 - 95
Steward Observatory maintains records of all information required by 29 CFR 1910.1001 and information otherwise known concerning the presence, location and quantity of asbestos containing material, ACM, in all facilities. The Observatory will:

1. Provide, at no cost to employees who perform housekeeping operations in an area containing ACM an annual asbestos awareness-training course.


3. Provide, upon request, all materials relating to the employee information and the training program to appropriate regulatory officials.

Warning labels must be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers. Labels are placed in areas noticed by employees who are likely to be exposed such as, at the entrance to mechanical room/areas. Signs may be posted instead of labels.

Provide and display warning signs at each regulated area and approaches to regulated areas so an employee may read the signs and take necessary protective steps before entering the area.

The most effective way to protect workers exposed beyond the permissible exposure limit, is to minimize exposure using engineering controls and good work practices.

An Asbestos Regulated Area is an area where employees may be exposed to airborne concentrations of fibers of asbestos. Each person entering a Regulated Area must be supplied with and required to use a respirator. Steward Observatory will supply respirators at no cost to the employee, and ensure they are used.

The Observatory will institute a medical surveillance program for employees who are or will be exposed to airborne concentrations of fibers of asbestos at or above the time weighted average (TWA) and/or excursion limit, consisting of initial and periodic (at least annual) examination. All medical examinations and procedures will be performed by or under the supervision of a licensed physician, and provided without cost to the employee at a reasonable time and place.

If an employee discovers a new deposit of something that could be asbestos and it is not on the existing records, he or she shall notify his/her supervisor, who in turn will call U of A Risk Management Services to examine the site. U of A Risk Management Services will determine the best course of action which may be to call a professional firm to handle the situation, or may be to follow certain guidelines and abate the problem.

For more information and the official University of Arizona documentation and procedures on this subject, please go to: http://risk.arizona.edu/asbestos
According to OSHA, back injuries are the Number One workplace safety problem. According to the Bureau of Labor Statistics, more than one million workers suffer back injuries each year, and back injuries account for one of every five workplace injuries or illnesses and one fourth of compensation claims. [http://www.osha.gov](http://www.osha.gov)

While OSHA does not have any written rules to follow to reduce back injuries, they do have several recommendations as shown in OSHA Fact Sheet No OSHA 93-09 which can be viewed at the website shown above. Further there are a number of places that make general recommendations that are mostly common sense. At Steward Observatory we recommend all employees follow proper lifting and carrying techniques to help reduce the number of back injuries.

Always wear the proper personal protection for the job. When lifting or carrying heavy equipment, wear sturdy safety shoes and gloves. A hard hat and eye protection may also be required. Special lower back support belts may be necessary when lifting however, back belts are not a final solution. See [http://www.cdc.gov/niosh/docs/94-127/](http://www.cdc.gov/niosh/docs/94-127/) for more information.

The process of lifting something properly involves several considerations.

1. Stretch prior to lifting.

2. If the material is too heavy, get help. Tip the load to see how light or heavy it is before attempting to lift it. If the load is too large to grip firmly or comfortably, it is too large to carry alone. Do not attempt to lift any load over 50 pounds alone.

3. Check the load for splinters, staples, loose strapping, or other hazards that could injure the hands or cause a tripping hazard.

4. When preparing to lift, place one foot alongside the object and one foot behind it. Keep the back straight. Grip the load firmly with the palms of the hand.

5. Ensure your body weight is centered over the feet. Draw the object close if necessary. Lift the object straight up, using the legs and keeping the back straight.

6. When turning while carrying a load, shift the feet rather than twisting the body. Feet should be pointed in the direction of travel before lifting the object.

7. Do not try to lift an object above waist level in one motion. Set the load on a table or bench, then adjust the grip to lift it higher.

8. Before carrying a load, check the intended route for tripping hazards. Also, check doorways to make sure there is enough clearance.

9. Use just as much caution when carrying a light load.
10. When carrying long loads, carry it on the shoulder, keeping the front end high. If two or more people are going to carry a load, decide ahead of time how it is going to be done.

There are other causes of back injuries besides improper lifting. For example back injuries can also be a result of improper work motions such as continued bending over, or twisting and turning. As a normal rule it is best to perform work while standing or sitting erect. In some cases this may require longer handled tools, or other specialized equipment. If you feel strain on your back as a result of working in an unusual position or with unusual motion, discuss the situation with your supervisor and/or Safety Representative.
The University of Arizona blood borne pathogens program has been developed in accordance with 29 CFR 1910.1030. All personnel who may come in contact with blood or other body fluids as part of their duties should be familiar with the Exposure Control Plan and should at all times practice Standard or Universal Precautions.

All human blood and certain human body fluids are treated as if known to be infectious for the human immunodeficiency virus, the Hepatitis B and C Viruses, and other blood borne pathogens.

Training and annual refresher training on the Blood borne Pathogen Standard shall be furnished to all employees who have been determined to be covered by this standard.

Personal protective equipment shall be provided to affected employees at no cost to the employee, as well as Hepatitis B vaccinations, as required. Personal protective equipment provided to these employees shall be worn in all situations where there is a possibility exposure to human blood and/or body fluids.

For more information and the official University of Arizona documentation on this subject, please go to: http://risk.arizona.edu/bloodborne-pathogens

For information on training, please go to: http://risk.arizona.edu/training/bloodborne-pathogen

To view the OSHA website on this subject, please go to: https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051
Compressed gases are dealt with under the OSHA Standard (29CFR1910.101) which can be found at: [http://www.osha.gov/SLTC/compressedgasequipment/standards.html](http://www.osha.gov/SLTC/compressedgasequipment/standards.html)

One of the OSHA websites names the Stony Brook University websites as a very complete discussion of this subject, so for your convenience, I recommend if you want very good information on this subject, go to: [http://www.sunysb.edu/facilities/ehs/occupational/cg.shtml](http://www.sunysb.edu/facilities/ehs/occupational/cg.shtml)

The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965, which is incorporated by reference as specified in Sec. 1910.6.

Further, if you will be involved in the transportation of larger quantities of compressed gases, it is mandatory you read the training requirements under the Hazardous Materials Regulations entitled Code of Federal Regulations, Title 49, Subpart H, 172.700-172.704 from the Pipeline and Hazardous Materials Safety Administration (PHMSA) at this website: [http://hazmat.dot.gov/regs/rules.htm](http://hazmat.dot.gov/regs/rules.htm)

**After reading the referenced Stoneybrook website, one should know all of the important information on this subject; however, as a convenience, the major requirements are summarized below:**

**CYLINDER STORAGE**

Cylinder storage has safety implications. Remember these guidelines when storing cylinders:

1. Store cylinders upright.
2. Group cylinders by compatibilities of gas.
3. Store full and empty cylinders apart and have them tagged or labeled.
4. Store gases so that old stock is used first.
5. Secure cylinders with chains or cables or special holders designed for that purpose such as cylinder carts or wall holders. Never secure cylinders to conduit carrying electrical current.
6. Make sure fire extinguishers near cylinder storage area are appropriate for the types of gases being stored.

7. Store oxygen cylinders at least 20 feet from flammables or combustibles or separate them by a 5-foot high, fire resistant barrier in accordance with NFPA requirements.

8. Keep oil and grease away from oxygen cylinders, valves, and hoses. If your hands, gloves or clothing are oily, do not handle oxygen cylinders. Oxygen and compressed air are not the same thing. Do not use them interchangeably.

9. Compressed gases may not be stored, permanently or temporarily in hallways or corridors of the University. And, section 3003.3.1 of the 2003 International Fire Code (the current fire code that applies to all State of Arizona facilities) requires that compressed gas cylinders be secured against unauthorized access.

**CYLINDER HANDLING AND TRANSPORTATION**

1. Always transport cylinders with the regulator removed and the safety cap installed. Use a cylinder cart, do not roll them by hand along the floor or transport them on forklifts. All cylinders should be treated as full and handled accordingly.

2. Always use the correct pressure regulator for the specific gas.

3. CGA fittings differ for inert gases (e.g., He, Ar, N₂), flammable gases (e.g., H₂) and oxidizers (e.g., O₂, N₂O). The modification or retrofitting of CGA fittings or relief valves is **NOT** allowed.

4. All compressed gas cylinders must be clearly marked with the correct chemical name. Shoulder labels must clearly identify the contents of a cylinder. **DO NOT** rely on cylinder color to identify the gas.

5. If more than 1,000 lbs of cylinders are carried in a truck, the vehicle must be appropriately placarded and the driver needs a Commercial Driver’s License and Hazmat Endorsement.

6. Never open valves until regulators are drained of gas and pressure-adjusting devices are released. When opening cylinders, point outlets away from people and sources of ignition, such as sparks or flames. Open valves slowly. On valves without hand wheels, use only supplier recommended wrenches. On valves with hand wheels, never use wrenches. Never hammer a hand wheel to open or close a valve.

7. Never put any gas cylinder in an enclosed environment such as a car trunk or a station wagon because if the valve has even a small leak, it could present an exposure, asphyxiation, fire and/or explosion risk.
8. Cylinders should be carried in the back of an open truck in a standing position and chained to a rack. If they must be transported laying down, they should be blocked in a manner to keep them from rolling around or banging against each other, and they must not be used until they have been in a standing position for several hours.

9. The transportation of cylinders and compressed or liquid gases is largely controlled by the U.S. Department of Transportation, and its affiliate which can be explored further at: http://www.fmcsa.dot.gov/safety-security/safety-security.htm

10. The practice of “Transfilling” (where the contents of a compressed cylinder is transferred to another cylinder) requires specific training and is a potential hazard. It can only be completed with prior institutional approval at: http://risk.arizona.edu/references/gas-handling

11. There are minimum requirements for the use of toxic and/or corrosive gases at: http://risk.arizona.edu/search/node/compressed%20gas

**TRAINING**

All employees using or handling compressed gases must be trained in the safe use of the material and pressurized systems. Permanent records/logs must be kept on all persons who have completed such training. Additional training is required if you will be involved in the transportation of larger quantities of compressed gases.
The Site Safety Representative will ensure all potential confined spaces at each telescope or laboratory are evaluated in accordance with the OSHA regulation, 29 CFR 1010.146. A Confined Space Program will be implemented for all areas where there is a need to perform any activity within a Confined Space as defined by the OSHA standard. The confined Space Program will be reviewed annually and as regulations require.

Confined spaces may have limited openings for entry and exit, unfavorable natural ventilation and not designed for continuous worker occupancy. General examples include: pits, septic tanks, storage tanks, telescope cells, vessels, vaults, and furnaces. Specific examples in Steward Observatory include the pit under the test tower in the Mirror Lab and the interior of the mirror cell on the LBT.

Steward Observatory will inform employees of the existence and danger posed by the permit-required confined space (PRCS), by posting PRCS danger signs, conducting awareness training, or by other means. Areas listed on the Steward Observatory Confined Space inventory are required to be posted with a sign that reads, “DANGER – PERMIT REQUIRED CONFINED SPACE – DO NOT ENTER”.

All Confined Space authorized personnel are expected to take an active role in maintaining a safe Confined Space Program. Each individual entering or attending a Confined Space shall be trained regarding the hazards associated with Confined Space entry. Training shall be provided prior to performing assigned duties that require a Confined Space entry, or prior to a change in duties. Untrained employees will be prevented from entering the PRCS.

Those spaces meeting the criteria of a Confined Space and having a known potential to contain hazardous atmospheres will be designated as a PRCS. Untrained personnel are not permitted entry into areas meeting OSHA criteria for confined spaces until pre-entry procedures demonstrate special training is not required. Procedures for entry without the need of a written permit or attendant into certain confined spaces are detailed in the Confined Space Program.

In the event of a need for Confined Space rescue, only appropriately trained and authorized personnel may enter a confined space for rescue purposes. Training for rescue and emergency services must be in accordance with 1910.146(k). This section requires annual rescue simulation exercises, CPR, and first-aid certification.

For more information on the official University of Arizona documentation on this subject, please go to: http://risk.arizona.edu/search/node/confined%20space
Crane Safety is a major area of concern to OSHA and as a result there are many references to crane safety in OSHA documents. Crane safety is also a major area of concern to Steward Observatory as there are many cranes of different types in the Observatory. If you will be involved in the operation of cranes, you should familiarize yourself with these major OSHA websites: http://www.osha.gov

If you will be making unusual or significant lifts, you should read section 46 and understand it before proceeding.

All Observatory cranes are to be professionally inspected on an annual basis, and fixed immediately if not certified, or locked out if not fixed immediately. Cranes should be visually inspected before each use to determine that the cables are not frayed, hand controls work properly, and proper safety hooks are in use.
Cryogenic Liquids are extremely cold and can produce a severe burn comparable to frostbite, or worse. Very small amounts of liquid are converted to large volumes of gas that can create asphyxiation and/or pressure hazards. Cryogenic liquids may only be used by persons trained in the safe use of gases. Please refer to section V, page 6, “Compressed Gases” section, for more on this subject.

When handling cryogenic liquids, the following precautions must be taken:

1. Wear a face shield and safety goggles. A face shield or safety eyewear with/without side shields worn alone, do not give adequate protection.

2. Wear a long sleeve garment such as a lab smock.

3. Cryo-thermal gloves or loose-fitting gloves are required. They allow the filler to remove them quickly to avoid a burn.

4. When handling large volumes, it is recommended high top shoes with cuff less pants, be worn outside the shoes. This is to prevent fluid from getting inside the shoes or being trapped in the pants cuff.

5. Transportation of liquefied gases must be accomplished in a manner that no occupant of the vehicle or bystander could possibly be exposed to a liquid spill or to a reduced oxygen atmosphere as a result of a liquid spill or boil off. All liquefied gas containers will be securely fastened to the vehicle in which they are being transported.

6. Where the volume of the expanded gas from a cryogenic liquid has the potential to displace significant amounts of oxygen in the work area, a survey must be completed by the user. The survey is to describe the extent of the potential hazard and the controls necessary to eliminate or control the hazard. For example; when transporting Liquid Nitrogen in an elevator the following procedure is to be followed:

Cryogenic Liquid Containers - Elevator Transport:

Care must be exercised when transporting liquid containers in elevators. If possible, transport the container only on a freight elevator that is not generally used for personnel transport. After the container is placed in the elevator, the elevator should be locked out to all other users. The sender should remain outside the elevator and activate it. Another person should be available on the receiving floor to take the liquid container off the elevator at its destination. If a freight elevator is not available, a passenger elevator can be used provided it is locked out to all other users. If it is absolutely necessary to have an attendant in the elevator with the container, an escape pack supplemental breathing apparatus must be carried in the elevator. Do not transport a liquid container at any time in an elevator with any other personnel in the car.

http://www.gawda.org/
http://risk.arizona.edu/references/cryogenics
http://www.airgassgcatalog.com/catalog/ap017.pdf
http://www.airproducts.com/~media/Files/PDF/company/safetygram-27.pdf
For the protection of Steward Observatory employees, the following guidelines regarding electrical safety have been developed. An electrical safety program must be implemented in accordance with the OSHA standard, Subpart S, for workplace safety when dealing with electrical safety. This OSHA website is shown below for your convenience. OSHA 29 CFA requires safe work practices be utilized when working on or near exposed energized parts.

The Steward Observatory employees are to comply with Section 1910.132(d) which requires employers to assess the workplace to determine if hazards are present, and if present, must select proper personal protective equipment to protect employees and must provide proper training for the use of the equipment.

All electrical wiring and equipment shall comply with the National Electric Code (NEC). Below are some of the general work rules established by Steward Observatory for its employees.

1. Employees are not permitted to work on or near any part of an electric power circuit that the employee could come in contact with in the course of their work. Circuits should be de-energized and the required lockout/tagout procedure performed. If an employee must work on an energized circuit, they are required to have the proper arc flash PPE and follow the arc flash procedures.

2. In areas where the exact location of underground electric power lines is unknown, employees using tools which could come in contact with an underground power line shall be provided with insulated gloves. Before digging, always call Arizona Blue Stake at 1-800-782-5348 or go to www.azbluestake.com.

3. Working spaces, walkways and similar locations must be kept clear of electrical cords to eliminate hazards.

4. Worn or frayed electric cords should not be used. Additionally, cords should not be fastened with staples, hung from nails, or suspended by wires.

5. Plugs equipped with grounding prongs must have the prong in place.

6. Only trained persons should perform work related to their area of expertise on circuits of 30 volts AC or 50 volts DC or greater. By definition, a Qualified Person is someone familiar with the construction and operation of the equipment and the hazards involved, and who can demonstrate knowledge of the technical and safety issues in the use and maintenance of the equipment involved.

7. The two-person rule should be in effect while work is completed on these circuits and lockout/tagout procedures implemented.

8. On call-ins, the two-person rule will be in effect. If the call-in pertains to power loss to any portion of a building or site, a site electrician must be present in order to restore power to the site, especially if entrance to a high-voltage area is required.

9. Non-grounding adapters are not to be used without approval from the site electrician.
10. When high voltage equipment is being operated or is present, "High Voltage" signs must be displayed. High voltage is defined for this purpose, as voltage above 240 volts AC.

11. Do not open or close an electrical switch unless you are familiar with its purpose.

12. All new wiring installations must be made or reviewed by a qualified electrician.

13. Ground Fault Circuit Interrupts (GFCI) must be utilized with power equipment such as pumps and power tools, if they are to be utilized when working around water or on outdoor applications.

14. No employee should attempt to repair or use defective electrical fittings. Users should inspect all electrical equipment before use, for hazards which could cause serious harm or death.

15. Each telescope operation or department is responsible for properly training and appointing their Qualified Persons who are able to perform electrical work.

To view the OSHA website related to electrical standards please go to:

http://www.osha.gov/SLTC/electrical/standards.html

For additional information and the official University of Arizona documentation please go to:

http://risk.arizona.edu/block/lockout-links
Incident Command System

The Incident Command System (ICS) is a modular emergency management system designed for all hazards and levels of emergency response. This system creates a combination of facilities, equipment, personnel, procedures, and communication operations with a standardized organization structure. The system is used locally, statewide and throughout the United States as the basis for emergency response management. ICS at the University of Arizona facilitates the University’s ability to communicate and coordinate response actions with other jurisdictions. In addition, the system facilitates coordination with external emergency response agencies as well.

Every incident regardless of size, has an Incident Commander (IC). The initial Incident Commander is someone with the most information and who is responsible for overseeing the initial incident, until relieved by a higher authority, or first responders. The IC is in complete control of the incident, regardless of rank or title. All individuals associated with the emergency must listen to and follow the instructions of the IC.

The following components characterize the Incident Command System:

- Common terminology applied to organization elements, position, titles, facility designations and resources.

- Generic position whereby multiple individuals are trained for each emergency response role and follow prepared action checklists.

- Modular organization based on activating only those organizational elements required to meet current objectives.

- Integrated communication so information systems operate smoothly among all response agencies involved.

- Unified command structure, so organization elements are liked to, for a single overall structure with appropriate span-of-control limits.

- Manageable span of control whereby supervisory demand is held in the one-to-three to one-to-seven range.

- Comprehensive resource management for coordinating and inventorying resources for field responses.

- Consolidated action plans, which contain strategy to meet objectives at both the field response and EOC levels.
Incident Commander Structure

Structure - ICS is structured with expandable functional sections

   a. Incident Commander (IC) and Command Staff
   b. Operations
   c. Planning
   d. Logistics
   e. Finance/Administration

a. Incident Commander
The Incident Commander (IC) has the authority and responsibility to manage the incident response effort, with general guidance from the Emergency Operations Center (EOC). Designation of the "IC" being automatically as the first emergency responder arrives on the scene. This may evolve and be passed on to others depending upon the complexity, length, and severity of the incident.

The IC, in consultation with emergency responders, determines the classification of the incident, the required response, and expands the emergency response organization as needed.

The IC assumes all emergency response responsibilities until they are formally delegated to others. If a situation escalates, additional positions are assigned and resources obtained. Determination of personnel to assume the role of IC will be based on response time, availability of qualified personnel, nature of the incident, level of training, and the demands of the position.

b. Command Staff
The IC may assign an immediate command staff consisting of the following positions and responsibilities:

- Safety Officer – provides overall operational safety authority
- Information Officer – acts as sole media contact; distributes information
- Liaison Officer – interfaces with cooperating agencies
- Scribe – to record the events

c. General Staff
Operations Section: The Operations Section is responsible for all incident tactical activities. The Operations Section is divided into groups (e.g. fire, law enforcement, emergency medical, facilities management, the Campus Emergency Response Team).

Planning Section: The Planning Section collects and analyzes data regarding operations and prepares extended incident actions plans. Incident Assessment, Resource Status, Recovery and Documentation are units under this division.
**Logistics Section:** The Logistics Section is responsible for meeting the resource needs of the Operations Section. This can include procuring specialized equipment and supplies, communication services, providing food and water to response personnel, and meeting the transportation requirement of the incident.

**Finance Section:** The Finance Section is activated for the purposes of determining the short and long term fiscal impacts of the emergency, and for providing payments to vendors for the use of supplies and equipment.

d. **Campus Emergency Response Team (CERT):** The CERT plays an active, supportive role in campus emergencies. The CERT Chair, Sr. Vice President for Campus Life, manages and activates CERT usually after notification by the Chief of Police. CERT supports the IC and the emergency, by bringing together key campus personnel to help plan and coordinate campus emergency efforts.
The University of Arizona has a comprehensive emergency action plan that defines employee responsibilities in the event of personal injury, radiation spill, chemical spill, biological spill, fire, bomb threats & suspicious objects, suspicious or threatening parcels and letters, etc. The U of A documentation of this plan should be required reading for all employees and should be posted permanently on all safety bulletin boards.

The Steward Observatory emergency response/action plan addresses emergencies that may reasonably be expected in the workplace, fulfills the requirements listed in OSHA1910.38 and provides the following kinds of information:

1. Assignment of emergency planning tasks
2. A site map of each building or facility showing exits and safety equipment
3. A list of potential workplace emergencies
4. A workplace summary that identifies chemicals and hazardous materials and the location of MSDS sheets
5. Escape procedures and emergency escape route assignments
6. Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
7. Procedures to account for all employees after emergency evacuation has been completed
8. Rescue and medical duties for those who are to perform them
9. The preferred means of reporting fires and other emergencies; and
10. Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan

The Observatory will ensure all its facilities have an employee alarm system which complies with OSHA 1910.165, and before implementing the emergency action plan, the observatory will designate and train a sufficient number of employees to assist in the safe and orderly evacuation of employees.
In addition, the Observatory will have a Fire Prevention Plan which includes the following:

1. A list of major workplace fire hazards, their proper handling and storage procedures, and the type of fire protection equipment or systems which can control them

2. Names or job titles of those personnel responsible for maintenance of equipment and systems installed to prevent or control ignitions of fires

3. Names or job titles of those personnel responsible for control of fuel source hazards

The Observatory will also control accumulations of flammable and combustible waste materials and residues so they do not contribute to a fire emergency. And last, the Observatory shall provide proper training of employees and maintenance of equipment designed to control fires.

For information and the official University of Arizona documentation on this subject please go to: [http://risk.arizona.edu/emergency-procedures](http://risk.arizona.edu/emergency-procedures)
Emergency Notification Procedures

When dialing 9-1-1 to request emergency assistance from a campus telephone extension, you will be connected to the UAPD Communications Center.

When dialing 9-1-1 to request emergency assistance from an ITL number, you will be connected to the Pima County 9-1-1 Center.

When dialing 9-1-1 to request emergency assistance from a cell phone, you will be connected to the Pima County 9-1-1 Center.

Before you call remember to:

- Call from a safe location
- Remain calm
- Be prepared to give the Dispatcher as much information as you can such as,
  - what is the emergency
  - where is the emergency
  - are there injuries
  - how serious are the injuries, etc. *(the dispatcher will ask you questions as well)*
  - **DO NOT hang up until you are told to do so.** The Dispatcher may give you instructions. Follow those instructions, if you can do so safely.

Emergency Preparedness

Building Managers/Department Heads/Designees:

a. Meet with all of your personnel in the EAL (Emergency Assembly Location) - You are the Incident Commander until such time as the emergency personnel arrive.

b. Have emergency telephone numbers with you

c. Take roll and account for all your personnel
   - If someone is missing attempt to locate via telephone or mobile phone
   - If unable to locate, notify emergency responders immediately

d. Contact the next person in your chain of command
Important Telephone Numbers

Campus telephone numbers for life-threatening emergencies:

- From any office or campus public phone: 9-1-1
- From your cell phone: 9-1-1

*Explain the location and type of problem to the operator immediately*

Telephone numbers for non-life-threatening emergencies:

- UAPD (University Police Department): 621-8273
- Facilities Management: 621-3000
- Radiation Control: 626-6850
- Custodial Services: 621-7558
- Parking and Transportation: 621-1108

Where to Get Information During a Large Scale Emergency

- KNST Radio 790
- UA web page: www.arizona.edu

Local television stations:

- KVOA TV - Channel 4
- KGUN TV - Channel 9
- KOLD TV - Channel 13 or 7
- UA Student Union - Information Desk (if Student Union is affected)
- Park Student Union (serves as back up)
Department/Building Emergency Operations Plan

Department Name Address:

Department Name: University of Arizona Imaging Technology Lab
Address: 325 S Euclid Ave, Suite 117
Fax: 520-628-2859

Building Manager Information:

UA Real Estate Administration
520-621-1813

Building Manager Alternate Information:

Name: Michael Lesser
Office telephone: 520-621-4236
Cellular phone/pager: 520-240-3934
Fax: 520-628-2859
Email: lesser@itl.arizona.edu

Emergency Assembly Location – Primary Location

Complex entrance at 12th St and Tyndall

Emergency Assembly Location – Secondary Location (to be used only if the primary area is not available.)

City of Tucson building parking lot (800 E 12th Street)

Departments in the Building:

Department Name: Only ITL
Departmental Emergency Staff:

<table>
<thead>
<tr>
<th>Name</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Lesser</td>
<td>520-240-3934</td>
</tr>
<tr>
<td>David Ouellette</td>
<td>520-271-2102</td>
</tr>
</tbody>
</table>

Identification of Hazards in the Building:

<table>
<thead>
<tr>
<th>Room Number</th>
<th>Type of Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Room (Rm 10)</td>
<td>Compressed gas cylinders (Nitrogen, Oxygen, Helium)</td>
</tr>
<tr>
<td>Chemistry Lab (Rm 11)</td>
<td>Flammable organics</td>
</tr>
<tr>
<td>Chemistry Lab (Rm 11)</td>
<td>Many chemicals including Hydrofluoric Acid (highly toxic, liquid form)</td>
</tr>
<tr>
<td>Outside Dewar Prep (Rm 72)</td>
<td>Cryogenic liquid Nitrogen</td>
</tr>
<tr>
<td>Flex Room (Rm 50)</td>
<td>Compressed gas cylinder (Helium)</td>
</tr>
</tbody>
</table>
Audible and Visible Alarms: Fire and security alarms are monitored by Central Alarm

a) Fire Alarm Sound: The fire alarm is a loud continuous bell, horn or siren accompanied by strobe lighting. (Building is not equipped with strobe lighting)

b) Elevator Alarm Sound: The elevator alarm is a continuous bell and is not as loud as the fire alarm. (Building is not equipped with an elevator)

<table>
<thead>
<tr>
<th>Room Number</th>
<th>Type of Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Building</td>
<td>Security (motion and glass breakage)</td>
</tr>
<tr>
<td>Chemistry (Rm 11)</td>
<td>Emergency shower</td>
</tr>
<tr>
<td>Hybridization and Packaging (Rms 19 &amp; 22)</td>
<td>Timers</td>
</tr>
<tr>
<td>Substrate (Rm 27)</td>
<td>Air flow monitor on fume hood</td>
</tr>
</tbody>
</table>

Critical Operations Found in the Building:

The following employees should make themselves available to the Building Manager to explain the following critical operations: These employees should report to the EAL (Emergency Assembly Location) and report to the Building Manager, who can then coordinate with the first responders.

<table>
<thead>
<tr>
<th>Critical Operation Name</th>
<th>Location</th>
<th>Responsible Party</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid Thinning</td>
<td>Chemistry Lab</td>
<td>Michael Lesser</td>
<td>520-240-3940</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For information and details regarding this site:

Contact: MGIO Base Camp
Telephone: 621-8650
          928-428-2739
Fax: 928-428-2854

Address:
U of A – MGIO
1480 W. Swift Trail
Safford, Arizona 85546
**Department Name:** Steward Observatory  
**Address:** 933 N. Cherry Ave., Bldg. 65

**Building Manager Information:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Gabriel Coronado</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office No:</td>
<td>304-6880</td>
</tr>
<tr>
<td>Mobile No:</td>
<td>304-6880</td>
</tr>
<tr>
<td>Fax No:</td>
<td></td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:coronadg@email.arizona.edu">coronadg@email.arizona.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Mark Buglewiez</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office No:</td>
<td>621-6536</td>
</tr>
<tr>
<td>Mobile No:</td>
<td>954-0714</td>
</tr>
<tr>
<td>Fax No:</td>
<td>621-0103</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:mbug@as.arizona.edu">mbug@as.arizona.edu</a></td>
</tr>
</tbody>
</table>

**Emergency Assembly Location:**

Use the nearest safe stairs and proceed to the nearest exit. Proceed to the designated Department Emergency Assembly Location.
**Departmental Emergency Staff:**

The following employees should make themselves available to the Building Manager to explain the following critical operations: These employees should report to the EAL (Emergency Assembly Location) and report to the Building Manager, who can then coordinate with the first responders.

### 5th Floor

<table>
<thead>
<tr>
<th>Department</th>
<th>Responsible Person</th>
<th>Cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSST</td>
<td>Linden Hickey</td>
<td>621-2288</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department</th>
<th>Responsible Person</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBT</td>
<td>Christian Veillet</td>
<td>349-4576</td>
</tr>
</tbody>
</table>

### 2nd Floor

<table>
<thead>
<tr>
<th>Department</th>
<th>Responsible Person</th>
<th>Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin/Classrooms</td>
<td>Michele Cournoyer</td>
<td>621-2727</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department</th>
<th>Responsible Person</th>
<th>Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrared (IR)</td>
<td>Lee Tinnin</td>
<td>621-2727</td>
</tr>
</tbody>
</table>

### 4th Floor

<table>
<thead>
<tr>
<th>Department</th>
<th>Responsible Person</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMT</td>
<td>Cory Knop</td>
<td>977-1843</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department</th>
<th>Responsible Person</th>
<th>Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAO</td>
<td>Patricia Orosz-Coghlan</td>
<td>621-5290</td>
</tr>
</tbody>
</table>
U of A Risk Management Services has prepared the following information. For hard copies of these procedures contact U of A Risk Management Services at 621-1790.

**Biological Spill**

Biological spills outside biological safety cabinets will generate aerosols that can be dispersed in the air throughout the laboratory. These spills are very serious if they involve microorganisms that require Biosafety Level (BSL) 3 containment, since most of these agents have the potential for transmitting disease by infectious aerosols. To reduce the risk of inhalation exposure in such an incident, occupants should hold their breath and leave the laboratory immediately. The laboratory should not be reentered to decontaminate and clean up the spill for at least 30 minutes. During this time the aerosol will be removed from the laboratory by the exhaust air ventilation system. Appropriate protective equipment is particularly important in decontaminating spills involving microorganisms that require BSL 2 or BSL 3 containment. This equipment includes lab coat with long sleeves, back-fastening gown or jumpsuit, disposable gloves, disposable shoe covers, safety goggles and mask or full-face shield. Use of this equipment will prevent contact with contaminated surfaces and protect eyes and mucous membranes from exposure to splattered materials.

**Spills Involving a Microorganism Requiring BSL 1 or BSL 2 Containment**

- Alert people in immediate area of spill.
- Put on proper personal protective equipment.
- Cover spill with paper towels or absorbent pads.
- Carefully pour a freshly prepared 10% (vol./vol. w/water) dilution of household bleach around the edges of the spill and then into the spill. Avoid splashing.
- Allow a 15-minute contact period.
- Use paper towels to wipe up the spill, working from the edges into the center.
- Clean spill area with fresh towels soaked in disinfectant.
- Place towels in a red plastic bag for disposal in the bio-hazardous waste.

**Spills Involving a Microorganism Requiring BSL 3 Containment**

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the laboratory to evacuate.
Chemical Spill

The range and quantity of hazardous substances used in laboratories require preplanning to respond safely to chemical spills. Knowledgeable and experienced personnel should only perform the cleanup of a chemical spill. Spill kits with instructions, absorbents, reactants, and protective equipment should be available to clean up minor spills. A minor chemical spill is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel. All other chemical spills are considered major. Contact U of A Risk Management Services at 621-1790, to ensure proper procedures are being taken to clean up the spill.

Minor Chemical Spill:

- Alert people in immediate area of spill.
- Wear protective equipment, including safety goggles, gloves, and long-sleeve lab coat.
- Avoid breathing vapors from spill.
- Confine spill to small area.
- Use appropriate neutralizer for inorganic acids and bases. Absorb neutralized spill, collect residue, place in container, and dispose as chemical waste.
- For other chemicals, absorb spill with vermiculite, dry sand, or diatomaceous earth. Collect residue, place in container and dispose as chemical waste.
- Clean spill area with detergent and water.

Major Chemical Spill and Exposure:

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the immediate area to evacuate.
- If spilled material is flammable, turn off ignition and heat sources.
- Call Chemical Spill Emergency Response number (621-1790).
- Close doors to affected area.
- If the exposure is to hydrofluoric acid, contact area should immediately be flushed with water and calcium gluconate applied to the burn area.
- Have person knowledgeable of incident and laboratory assist emergency personnel.
Fire
Small fires can be extinguished without evacuation. However, an immediate readiness to evacuate is essential in the event the fire cannot be controlled. Only trained personnel should use fire extinguishers. Never enter a room that is smoke filled. Never enter a room containing a fire without a backup person. Never enter a room if the top half of the door is warm to touch.

Small Fire:
- Evacuate the immediate area.
- Activate the nearest fire alarm pull station.
- If you choose to use a fire extinguisher, always maintain an accessible exit.
- Avoid smoke or fumes.
- Report all fires to U of A Risk Management Services.

Major Fire:
- Alert people in area to evacuate. Close doors behind you to confine fire and smoke.
- Activate nearest fire alarm and call Fire Emergency Response number (9-1-1).
- Evacuate to safe area or exit building through stairwell; do not use elevator.
- Have person knowledgeable of incident and area assist emergency personnel.

Mobility Impaired Persons:
If a person with a mobility impairment is able to exit the building without use of the elevator, then evacuation should follow the appropriate route out of the building. If exit from the building is only possible by use of the elevator, follow the procedures outlined below: The mobility-impaired person should proceed or ask for assistance to the nearest enclosed or exterior stairwell or area of rescue assistance and remain there. In case of a fire, enclosed building stairwells are "safe refuge areas," and have a higher fire resistive rating. The mobility-impaired person should notify an individual (i.e. a co-worker, supervisor, instructor, or building monitor) of their specific location. If possible, the mobility-impaired person can notify 9-1-1 of their location. Make sure the door to the stairwell is closed. Open doors will violate the "safe refuge area" and will allow smoke, and possibly fire, into the stairwell. Once outside, anyone with information should inform the Tucson Fire Department (TFD) Incident Command Center that there is a mobility-impaired person in a stairwell, which floor the person is on, and location of the stairwell or refuge area. When stairwell evacuations are necessitated, such decisions and evacuations will be made by TFD.

University Personnel Should Never Attempt to Carry Anyone Down the Stairs
Do not re-enter the building until advised by emergency response personnel, even if the alarms have ceased.
Portable Fire Extinguisher Training

Training Requirements for Use of Portable Fire Extinguisher:

- Provide an educational program to familiarize employees with general principals of fire extinguisher use and the hazards involved with incipient stage fire fighting 29 CFR 1910.157(g)(1).
- Provide this education when employees are first hired and once a year thereafter. 29 CFR 1910.157(g)(2).
- Enroll in "Fighting Fires with Portable Fire Extinguishers" training on the Risk Management Services website, using this link: https://risk.arizona.edu/training/fire-extinguishers

How Most Fire Extinguishers Work

Learn How to P.A.S.S.

- **Pull** the pin. Some units require the releasing of a lock latch, pressing a puncture lever, or other motion
- **Aim** the extinguisher nozzle (horn or hose) at the base of the fire
- **Squeeze** or press the handle
- **Sweep** from side to side at the base of the fire until it goes out. Shut off the extinguisher. Watch for reigniting and reactivate the extinguisher if necessary.

Fire Extinguishers Type

- "**A**" Effective on fires composed of burning wood, paper, plastics, and fabrics
- "**B**" Effective on fires fueled by flammable liquids or grease
- "**C**" Effective on fires involving electric current
- "**D**" Effective on fires fueled by combustible metals such as magnesium and sodium, and other finely divided metal particles

Fire Prevention Procedures

To prevent a fire, the building should maintain a good housekeeping policy by storing flammable and combustible materials in an approved manner and avoiding accumulation of flammable and combustible materials in work areas and exit hallways.

The Building Manager, Deans, Directors and Department Heads, work with U of A Risk Management Services to ensure that there is no excess accumulation of flammable and combustible materials in the building.

Facilities Management provides custodial services to the building.

A schedule of custodial services for the building may be obtained by contacting the Facilities Management at 621.7558.
Potential Fire Hazards

The following are potential fire hazardous identified in this building: *(Check all that apply)*

- [ ] Combustible materials (e.g. paper, cardboard, wood, etc.)
- [ ] Flammable/combustible gases in laboratories
- [ ] Flammable/combustible solids in laboratories
- [ ] Cleaning fluids
- [ ] Grease
- [ ] Gasoline/diesel
- [ ] Oils
- [ ] Other: ___________________________

Summary

- Prepare occupants in your department and building ahead of time for emergency evacuations
- Know your building occupants
- Train faculty, staff and students to be aware of the needs of people with disabilities and know how to offer assistance
- Hold evacuation drills, with the assistance of UAPD and U of A Risk Management Services in which occupants participate, and evaluate drills to identify areas that need improvement
- Plans must cover regular working hours, after hours, and weekends
- People with disabilities should consider what they would do and whether they need to take additional steps to prepare for an emergency situation

*Everyone needs to take responsibility for preparing for emergencies!*
Medical and First Aid

In case of serious injury or illness on campus, immediately call University Police at 9-1-1, or use emergency phone. Give your name; describe the nature of the problem and the location of the victim. University Dispatchers will notify Emergency Response Personnel. Police Officers are trained in CPR and First Aid.

**Quickly perform these four steps:**
- Determine welfare of victim by asking, "Are you okay," and "What is wrong?"
- If victim is unconscious, check pulse and breathing. Provide CPR or artificial respiration or obtain an AED if necessary
- Control serious bleeding by direct pressure and elevation of the wound
- Keep victim still and comfortable; have them lie down if necessary

**Bleeding and Wounds**
- Apply direct pressure on wound
- Use clean cloth or hand
- Elevate body part
- Apply pressure to blood vessel if necessary. Add more cloth if blood soaks through. Never remove bandage once applied
- Keep pressure on wound until help arrives
- Use tourniquet ONLY as a last resort

**Burns, Thermal & Chemical:**
- Immerse burned area in cold water
- Flood chemical burn with cool water for 15 minutes
- Cover burn with dry bandage
- Keep victim quiet and comfortable

**Choking and Airway Obstruction**
- If victim is coughing, or able to speak, stand by and allow victim to cough object up
- If unconscious, check victim's mouth and clear of foreign matter
- Give abdominal thrusts (Heimlich Maneuver)
- Continue thrusts until airway cleared.

**Fainting, Unconsciousness and Shock**
- Have victim lie down and rest
- Keep victim comfortable, not hot or cold
- Place victim on side if unconscious
- Ask or look for emergency medical I.D.
- Treat other injuries as necessary
Fractures and Sprains
- Keep the victim still
- Keep injured area immobile

Hydrofluoric Acid:
- Flood chemical burn with cool water for 15 minutes
- Apply calcium gluconate cream to burn area

Banner University Medical Center-UC is the only local hospital that has a burn program. Banner University Medical Center-UC admits burns patients and may occasionally transfer a burn patient but has a close working relationship with Maricopa, if a transfer is necessary.

Banner University Medical Center-UC ED physicians will start initial burn care and then consult Banner University Medical Center-UC Burn Director, Gary Vercruysse, to evaluate the patient immediately.

The SDS (Safety Data Sheet) would be helpful to bring with the burn patient. However, if that is not readily available, we would need to know:

- concentration of hydrofluoric acid
- time of exposure
- type of exposure (skin, ophthalmic, GL, pulmonary)

Mouth-to-Mouth Rescue Breathing
- Place victim on side and remove foreign matter from mouth with finger
- Place victim on back
- Tilt victim's head back to open airway
- Close victim's nostrils with fingers
- Exhale until victim's chest expands
- Repeat every 1-2 seconds after chest deflates
- Keep trying until help arrives
- If unable to give breath, check victim for airway obstruction

Poisoning and Overdose
- Determine what substance is involved and how taken
- Call Poison Control Center at 626-6016 or 1-800-222-1222
- Stay with victim and assist as directed by Poison Control
Radiation Spill

Spreading of radiation beyond the spill area can easily occur by the movement of personnel involved in the spill or cleanup effort. Prevent spread by confining movement of personnel until they have been monitored and found free of contamination. A minor radiation spill is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel. All other radiation spills are considered major. Call the Radiation Control Office (626-6850) to ensure proper procedures are being taken to clean up the spill.

Always Remember to "S.W.I.M."
- **Stop** the spill
- **Warn** other personnel
- **Isolate** the area
- **Minimize** the exposure to radiation and contamination

Minor Radiation Spill

- Confine the spill immediately
- Alert people in immediate area of spill and keep non-essential personnel out of the area
- Notify Laboratory Manager or Radiation Safety Office (626-6850)
- Wear protective equipment, including safety goggles, disposable gloves, shoe covers, and long-sleeve lab coat
- Place absorbent paper towels over liquid spill. Place towels dampened with water over spills of solid materials
- Using forceps, place towels in plastic bag. Dispose in radiation waste container
- Monitor area, hands, and shoes for contamination with an appropriate survey meter or method - Repeat cleanup until contamination is no longer detected

Major Radiation Spill

- Attend to injured or contaminated persons and remove them from exposure
- Alert people in the laboratory to leave the immediate area
- Have potentially contaminated personnel stay in one area until they have been monitored and shown to be free of contamination
- Notify Laboratory Manager or Radiation Safety Office (626-6850)
- Close doors and prevent entrance into affected area
- Have person knowledgeable of incident and laboratory assist emergency personnel
Suspicious or Threatening Parcels & Letters

Letter and Parcel Bomb Recognition Clues

It is possible, although highly unlikely, a staff member may someday receive a suspicious parcel or letter. Biological or chemical threats targeting individuals or departments can frequently be controlled by screening of materials. University Police and responding Public Safety agencies have plans in place to deal with these types of threats. Following the procedures below will activate those plans and promote the highest level of safety while minimizing the disruption associated with these incidents.

Mail and package delivery to each department should be screened for suspicious letters and/or packages. Common features of threat letters/packages/bomb recognitions are:

- Excessive or foreign postage
- Excessive securing material (i.e., tape, string)
- Excessive weight, rigid envelope, and/or feel of a powdery or foreign substance
- Foreign mail, air mail and special delivery
- Hand written or poorly typed address
- Incorrect titles or titles with no name, misspelled words
- Lopsided or uneven envelope
- Misspelling of common words
- Mysterious delivery; Shows a city or state in the postmark that does not match the return address
- No return address
- Oily stains, residues, discoloration or odor
- Protruding wires or aluminum foil
- Restrictive markings such as "Confidential", "Personal", etc.
- Shows a city or state in the postmark that does not match the return address

Suspicious letters and packages should not be opened and should not be handled any more than absolutely necessary. If there is nothing leaking from the suspicious item, leave it alone and call University Police at 9-1-1.

If you open a letter/package that claims to have contaminated you, but there is no substance seen or felt in the envelope or on the letter, chances are you have not been contaminated. Call University police at 9-1-1 and tell them exactly what you have done and what information you have in regard to the threatening letter. They will dispatch the appropriate personnel to your location to follow-up on your possible exposure and to document what has taken place. DO NOT handle the suspicious item anymore and DO NOT let anyone else handle the item.

If an evacuation is warranted, University Police will activate the building fire alarm. Evacuate the building by walking to the nearest exit and calmly direct others to do the same. Once outside, move to a clear area at least 150 feet from the affected building. Keep walkways and roads clear for emergency responders.
If you open a letter/package that claims to have contaminated, you and there is some sort of foreign substance in the envelope or package:

- Place the letter back into the envelope/package, close it back up, or cover the letter and substance with anything (cloth, paper, etc.). Do not remove this cover.
- Alert others in the area to leave
- Wash all exposed skin with soap and water
- If your clothes are covered with a significant amount of the substance, carefully remove the contaminated clothing and if possible, place them into a plastic bag
- Call University Police at 9-1-1 to report the situation and tell the dispatcher you have opened the envelope/package. Tell the dispatcher there was a substance inside and what you have done up to that point.

Do not handle! Keep anyone from going near it. Leave the area, notify your supervisor, and call University Police at 9-1-1.

Police and U of A Risk Management Services responders can evaluate the risk to those in the room at the time of potential exposure as well as any impact on the remainder of the building. Based upon that risk assessment, further emergency measures may be implemented as necessary. If the risk is found to be minimal, other areas of the facility will not be disrupted and any necessary actions to return the area involved to normal activity will begin as soon as possible.

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### Suspect Letter and Package Indicators

- No return address
- Mailed from foreign country
- Excessive or no postage
- Restrictive markings
- Strange odor
- Lopsided package
- Protruding wires
- Oily stains on wrapping

**Address:**
- Badly typed or written
- Misspelled
- Title with no name
- Wrong title with name

**Precautions:**
1. Never accept mail, especially packages while in a foreign country.
2. Make sure family members and clerical staff know to refuse all unexpected mail at home or office.
3. Remember IT MAY BE A BOMB. Treat it as suspect.
Bomb

Threat Checklist

Note the following:

Exact time of call

Exact words of caller

Did the voice sound familiar? If so, whom did it sound like?

Were there any background noises?

Did the caller make any remarks?

Was the caller’s voice:

- Calm
- Deep
- Stutter
- Stressed
- Slow
- Loud
- Accent
- Nasal
- Crying
- Broken
- Angry
- Lisp
- Slurred
- Giggling
- Rapid
- Excited
- Disguised
- Sincere
- Squeaky
- Normal

Person receiving call:

Telephone number call received at

Date of call

Report Call Immediately to UAPD at 9-1-1
**Telephone Threat**

- Remain calm. Do not hang up! Listen carefully.

- Try to keep the caller calm and talking so that you can gather more information.

- Identify the type of threat and note any details offered.

- Write down all information.

- Attempt to find out why the caller is upset.

- Note any characteristics about the call and caller:
  - Time of the call
  - Age and sex of the caller
  - Emotional state
  - Background noises
  - Speech pattern, accent
  - Immediately after the call ends, notify University Police at 9-1-1 and supply them with the information obtained

**Written Threat**

If the threat is received by mail, do not further handle the letter, envelope, or package.

- If the threat is received by e-mail, save the entire e-mail message, including any attachments and print out a copy for police.

- Call University police at 9-1-1, and notify your supervisor.
Utility Failure

The University of Arizona has a maintained infrastructure of utilities that is generally uninterrupted. However, emergencies such as electric power failure, natural gas leaks, and plumbing failure do occur. During these emergency situations, remaining calm and following the listed procedures will help minimize the disruption to everyday activities.

Elevator Failure

- All campus elevators are equipped with emergency phones connected directly to University Police. If you are trapped in an elevator, contact University Police via the emergency phone. Do not climb out of the elevator and get on top of the car. If you discover an emergency (i.e., trapped occupants) involving an elevator, phone University Police immediately at 9-1-1.

Plumbing Failure/Flooding

- Call Facilities Management at 621-3000 immediately, tell respondent of the exact location and severity of leak
- If there are electrical appliances and outlets near the leak, use extreme caution
- If there is any possible danger, evacuate the area
- If you know the source of the water and can safely stop it (i.e. unclog the drain, turn off the water, etc.) do so cautiously
- Be prepared to assist as directed in protecting objects that are in jeopardy. Take only essential steps to avoid or reduce immediate water damage, by covering, removing or elevating them.

Power Outage

- Remain calm
- If possible, call Facilities Management at 621-3000
- If you are in an unlighted area, proceed cautiously to an area that has lighting. Provide assistance to others in your area that may be unfamiliar with the space
- If instructed to evacuate, proceed cautiously to the nearest exit

Major campus buildings are equipped with an emergency light system that within 10 seconds of electrical failure, provide enough illumination in main corridors and stairways for safe exiting.
Evacuation Procedures

A building occupant is required by University policy and State law, to evacuate the building when the fire alarm sounds.

There may be instances when the building may be evacuated without a fire alarm sounding.

Review emergency evacuation routes with all employees at least once a semester.

When evacuating the building or work area:

- Stay calm, do no rush or panic
- Safely stop your work
- If safe, gather your personal belongings; take prescription medications and keys with you
- If safe, close but DO NOT LOCK your office door and window(s)
- Use the nearest safe stairs and proceed to the nearest exit
- Help others identify safe passage out of the building
- Do not use the elevators
- Proceed to the designated EAL (Emergency Assembly Location)
- Check in with the Building Manager, Dean, Director or Department Head
- Await instruction from the Building Manager, Dean, Director or Department Head as to where you should go or do.

Building Managers:

Make yourself known to the first responders, or the Incident Commander, in the event that they have questions for you

DO NOT go home, or leave for other locations without first obtaining authorization from your Dean, Director or Department Head.
Evacuation of Mobility-Impaired Persons

These guidelines for the evacuation of mobility-impaired persons from university buildings have been endorsed by the U of A Risk Management Services, University Police Department, Tucson Fire Department, Disability Resource Center, Residence Life, and the ADA/504 Officer. They are general guidelines to address most evacuation scenarios.

**Emergency Situations:**

If a person with a mobility impairment is able to exit the building without use of the elevator, then evacuation should follow the appropriate route out of the building. If exit from the building is only possible by use of the elevator, follow the procedures outlined below:

- The mobility-impaired person should proceed or ask for assistance to the nearest enclosed or exterior stairwell or "area of safe refuge" and remain there. In case of a fire, enclosed building stairwells are "safe refuge areas," and have a higher fire resistive rating. The mobility-impaired person should notify an individual (i.e. a co-worker, supervisor, instructor, or building monitor) of their specific location. If possible, the mobility-impaired person can notify 9-1-1 of their location.

- In Residence Halls, if the mobility-impaired occupant cannot leave his or her room immediately without the assistance of another person, they should remain in the room. Notification can be made by calling 9-1-1.

- Make sure the door to the stairwell is closed. Open doors will violate the "safe refuge area" and will allow smoke, and possibly fire, into the stairwell.

- Once outside, anyone with information should inform the Tucson Fire Department (TFD) Incident Command Center that there is a mobility-impaired person in a stairwell, which floor the person is on, and location of the stairwell or refuge area. When stairwell evacuations are necessitated, such decisions and evacuations will be made by TFD. **UNIVERSITY PERSONNEL SHOULD NEVER ATTEMPT TO CARRY ANYONE DOWN THE STAIRS.**
Non-Emergency Situations:

Persons with a mobility impairment who need assistance leaving a building in a non-emergency situation (elevator outage, etc.) should follow the procedures outlined below:

- Contact UAPD (621-8273). UAPD will send personnel to the location to assess the situation and will contact TFD for all evacuations. Improper evacuation techniques could harm the evacuee; therefore, UAPD will not evacuate any mobility-impaired person because they are not trained to do so.

- Elevator outages will be reported to Facilities Management (Residence Life Maintenance for Resident Halls) by UAPD for immediate response. However, in the event of elevator cars stuck between floors, no removal of passengers will be performed until the car is properly leveled.

- TFD will address non-emergency evacuations on a priority basis. This may mean a delayed response until TFD can respond.

- UAPD personnel may remain with the person until egress is restored (i.e. elevator has been repaired) or TFD responds. They will maintain contact with TFD and Facilities Management to determine response time.

For help and information about preparing and planning for emergency situations, contact:

Chief Brian Seastone  
Campus Emergency Planning Manager  
The University of Arizona Police Department  
520-621-7539 seastone@uapd.arizona.edu

or

U of A Risk Management Services  
The University of Arizona  
520-621-1790
Environmental Compliance

Steward Observatory is dedicated to following the leadership of the University of Arizona, U of A Risk Management Services, in the area of Environmental Compliance. All employees are urged to go to the following link and read the entire section to be fully informed of your responsibilities in this area:

http://risk.arizona.edu/environmental-compliance
Ergonomics

Steward Observatory is dedicated to following the leadership of the University of Arizona, U of A Risk Management Services in the area of Ergonomics. All employees are urged to go to the following link and read the entire section so as to be fully informed of your responsibilities in this area: http://risk.arizona.edu/ergonomics
Fire Prevention

OSHA's Fire Prevention Plan (FPP) regulation found at 29 CFR 1910.38 Subpart L, requires specific program elements. The Steward Observatory Fire Prevention Plan addresses fire emergencies reasonably anticipated to occur through all phases of the construction, repair alteration, or demolition at our site. The FPP is in place to control and reduce the possibility of fire and to specify the type of equipment to use in case of fire. The plan addresses the following:

- Workplace fire hazards and their proper handling and storage procedures
- Potential ignition sources for fires and their control procedures
- Type of fire protection equipment or systems
- Personnel responsible for maintenance of equipment and systems installed to prevent or control ignition of fires and for control of fuel-source hazards
- Emergency evacuation plans for orderly egress

Under this plan, our employees will be informed of the plan's purpose, preferred means of reporting fires and other emergencies, types of evacuations to be used in various emergency situations, and the alarm system. The plan is closely tied to our Emergency Action Plan where procedures are described for emergency escape procedures, procedures to account for all employees after emergency evacuation has been completed, and rescue and medical procedures.

Flammable or combustible materials may not ignite on their own without an external source of ignition. The following procedures are used to control known ignition sources:

- Flammable materials are kept separate from any possible heat sources
- Welding activities are confined to the outside when possible, and to the welding shop
- When welding is required, a proper fire watch or fire detection system is established along with the necessary extinguishing material. See page 88 of this section, Welding, Cutting, and Hot work.
- Fuel, oil and other stored flammable products are kept in bulk storage containers designed to minimize the hazard of fire, and are controlled

Once hazards are evaluated and equipment is installed to control them, that equipment must be monitored on a regular basis to ensure it continues to function properly. Strict guidelines for maintaining the equipment are followed, as set forth by National Fire Protection Association and OSHA.
Regular waste disposal and adherence to our Recycling Program help to eliminate the accumulation of waste materials, combustible paper and cardboard. It is each employee’s responsibility to ensure that his/her work area is as clean of these types of materials as possible.

Training will be provided for each employee who volunteers to use fire prevention equipment. Employees shall not use fire-prevention equipment without appropriate training. Employees must demonstrate an understanding of the training and the ability to use the equipment properly before they are allowed use of the equipment. All untrained personnel are expected to immediately evacuate the building upon the alarm.

In anticipation of the discovery of an uncontrolled fire, all employees should become familiar with the layout of the site, exit pathways, and the location of fire extinguishers. Emergency lighting should be installed in all buildings to illuminate exits and means of egress. Fire extinguishers need to be checked monthly and tested annually in accordance with an established schedule. All fire extinguishers at each site shall be appropriate for the type of fire anticipated.

To view the OSHA website go to: [http://www.osha.gov](http://www.osha.gov)

For more information and the official University of Arizona documentation on this subject, please go to: [http://risk.arizona.edu/emergency-procedures](http://risk.arizona.edu/emergency-procedures)
Flammable and Combustible Liquids

There will be no individual flammable or combustible liquid containers larger than 60 gallons. Only approved containers may be used. Aggregate volumes of flammable liquids greater than 10 gallons must be kept in an approved flammable liquid storage cabinet. Open flame and smoking are not permitted in flammable or combustible liquid use or storage areas. Smoking is not allowed on University of Arizona property. Combustible liquids are not to be poured into a drain due to the potential for formation of gas pockets in the trap. All containers are to meet NFPA requirements.

http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=30&cookie%5Ftest=1

Other important information dealing with fire safety is available at the U of A Risk Management Services website. It is important you familiarize yourself with this information.

http://risk.arizona.edu/fire
GENERAL and INTERRELATED SAFETY REQUIREMENTS

The Steward Observatory Health and Safety Program consists of several interrelated components. These individual programs, together with the policies and procedures outlined in this manual and on the U of A Risk Management Services website, comprise the entire Health and Safety Program. In all cases, the U of A Risk Management Services will have final say over any safety matter.

The Steward Observatory Safety Program is based on the U of A Risk Management Services Program together with the following standards:

**Standards**

- Occupational Safety and Health Administration 29 CFR 1910
- NFPA Volume 1 through 12 (Includes National Electric Code, Sprinkler System Code, Life Safety Code and other parts of the National Codes)
- International Building and Fire Codes, International Code Conference
- National Fire Prevention Code ARIZONA

**Arizona Division of Occupational Safety and Health Inspections**

The Arizona Division of Occupational Safety and Health (ADOSH) operates under an approved plan with the U.S. Department of Labor and OSHA to retain jurisdiction over occupational safety and health issues within Arizona. All Steward Observatory facilities are subject to inspection by an ADOSH compliance officer, in accordance with the provisions of OSHA 1910. Inspections will normally be made during regular working hours. Unless authorized by the Secretary of Labor or designee, advance notice of the inspection will not be given. U of A Risk Management Services will be notified immediately if a compliance officer requests an interview and inspection.

The compliance officer will be escorted without delay to the office of the Associate Director for Administration, where he or she will present credentials. The compliance officer will conduct an opening conference at which time he or she will explain the purpose of the visit, outline the scope of the inspection, provide the employer with copies of applicable laws, regulations, standards, etc. He or she will also furnish copies of any complaints submitted to OSHA by employees and ask for a designated employer representative to walk around with them. The employer representatives will normally be the Site Safety Representative and a designated member of U of A Risk Management Services. The employer representatives will accompany the Compliance Officer during the site inspection.
Following the opening conference, the compliance officer will conduct the inspection. Inspections are performed on a priority system as listed:

- Priority 1 – Catastrophe or fatality
- Priority 2 – Employee complaints
- Priority 3 – Occupational health and environmental control
- Priority 4 – Target industries
- Priority 5 – Random cross section

The compliance officer may:

- Privately talk with or question any employee
- Question any employee in the area being inspected
- Sample air, water, dust, chemicals, and other environmental conditions
- Photograph any area
- Examine records
- Request and copy specific medical records and monitoring data
- Request immediate correction of a violation if there is an imminent danger

Upon completion of the inspection, the compliance officer will confer with the Associate Director for Administration and U of A Risk Management Services representative and advise the following:

- Disclosure of violations noted
- Recommendations of citations and penalties for each violation
- Within a reasonable time frame after the termination of the investigation, the employer shall receive, by certified mail, the notification of penalty including the period of abatement
- The employer, upon receipt of said notice, has fifteen (15) working days within which to notify the Secretary that he wishes to contest the citation of the proposed assessment

The safety provisions in this manual and in the specific safety procedures of each site are based on Federal and State regulations and on industry consensus standards. This manual is intended to provide employees with minimum acceptable standards for the protection of life and health. Employees who would like more details on specific safety provisions are encouraged to contact the Site Safety Representative for additional information.

For more information and the official University of Arizona documentation on this subject please go to:

http://risk.arizona.edu/
Hazard Communication/Chemical Safety

The Occupational Safety and Health Administration (OSHA) established two programs to protect employees who work with hazardous chemicals. The OSHA Laboratory Standard applies to employees involved in the laboratory who use hazardous chemicals, while the OSHA Hazard Communication Standard (or Worker Right-to-Know) applies to all other employees who work with hazardous chemicals. In addition, hazardous materials are classified by no less than three Federal agencies:

- Environmental Protection Agency (EPA)
- Department of Transportation (DOT)
- Occupational Safety & Health Administration (OSHA)

Hazardous waste is regulated under OSHA and EPA. It is the duty of Steward Observatory employees to adhere to The University of Arizona policies and procedures when it comes to Hazard Communication and all other aspects of chemical safety. The University of Arizona policies give reference to all other applicable OSHA policies. Please go to: http://risk.arizona.edu/chemical-hazard-communication
Lab Cleanout Guidelines

1. Liquids greater than or equal to one gallon need to be properly tagged.

2. Liquids less than one gallon in the original bottle with the original label do not need to be tagged.

3. Solids in the original container with the original label do not need to be tagged.

4. Any container marked with lab shorthand or abbreviations needs to be tagged with the chemical name written on the tag.

5. Unknowns must be tagged “Unknown” and be kept separate from all other chemicals.

6. Chemicals need to be segregated according to chemical class. (Acids, Flammable Liquids, etc.) They must also be boxed according to chemical class. **One person should be able to lift the box.** Write the total number of individual containers in the box on the side of the box.

7. A written inventory for each box needs to be provided for review prior to removal. The inventories can be emailed to hazmat@email.arizona.edu

8. When all the above criteria have been met, contact U of A Risk Management Services at 621-5861 or hazmat@email.arizona.edu and arrangements will be made for removal. Lab cleanouts are handled on a first come first served basis.
Frequently Asked Questions

Question: Where do I get hazardous waste tags and wires?

Answer: If you are a part of the Chemistry Department, the stockroom supplies tags and wires. U of A Risk Management Services provides the tags and wires to all other departments. Tags and wires can be requested by sending an email to hazmat@email.arizona.edu. Please provide a building and room number for delivery.

Question: Where do I get waste containers?

Answer: The 3.5 gallon pails are available from local and national suppliers.

Question: When will I get my buckets back?

Answer: Waste buckets will be returned as part of the next scheduled pick up for your building.

Question: My scheduled pick up day falls on a holiday or during the Christmas shutdown. When will my waste be removed?

Answer: Pick up days that fall on a holiday or during the Christmas shutdown are delayed until after the missed day. For example, a pick up day that falls on Thanksgiving will be delayed until the Monday after Thanksgiving. Always notify U of A Risk Management Services that you need a pick up. You will then be notified of the rescheduled day.
**CHEMICAL WASTE DISPOSAL BASICS**

**STEP 1** Ready Container
- 3.5 gal. plastic pails preferred (available from Campus Stores)
- Cut plastic plug from hole and locate hole 90° from handle
- Secure lid before filling
- Write bldg. name and room no. under handle for return (w/ permanent marker)

**STEP 2** Tag
- Attach a chemical waste tag w/ a wire tie before filling (available from Risk Management & Safety)
- Include name of person who knows about the waste, phone number, bldg. name and room no.

**STEP 3** Accumulate Waste
- Write complete name of chemicals on tag as they are added to container (in English w/ no. 2 pencil or ballpoint pen – no abbreviations or formulas)
- If different compatible wastes are combined - accumulate according to the following groups, if possible:
  - Non-chlorinated organics
  - Chlorinated organics
  - Acids & heavy metal solutions
  - Chromic acid & sulfuric acid
  - Bases
  - Cyanides
  - Photo fixer
  - Color photo developer
  - Oil
- Segregate solids and liquids
- Always keep container closed when not adding waste.

**STEP 4** Request Pick-Up
- Write volume percentage of each chemical in container on tag
- Request pick-up when you want waste removed - whether container is full or not (see four contact options below)
- Provide: name of person who knows about the waste, phone no., dept., bldg. and room no., waste location in room, waste quantity and container size and indicate whether more tags are needed

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For more information on Request Waste Pick-Up – contact Risk Management & Safety at 621-5861 (phone), 626-4925 (FAX), hazmat@email.arizona.edu (e-mail) or http://w3p.arizona.edu/riskmgmt/chemical_waste_pick_up_form.htm (on-line)
Hearing Conservation

The Steward Observatory Hearing Conservation Program details areas that exceed minimum noise levels as set by The Occupational Noise Exposure Standard (OSHA 191.95), which requires hearing protectors be provided to all general industry employees exposed to an 8-hour TWA of 85 decibels or more. The Site Safety Representative and/or U of A Risk Management Services person will conduct a hazard assessment to determine what types of noise control measures are needed. The wearing of hearing protection is mandatory when working in a designated area. Employees are also encouraged to use hearing protection in other noisy areas.

All employees who are required to work in any area where hearing protection is required are required to participate in the Hearing Conservation Program. In addition to wearing hearing protection, these employees are to be given annual hearing tests. U of A Risk Management Services must approve audiograms for individuals who work in noise-hazard areas. The results are analyzed by the test provider to see if the employee has sustained a work-related hearing loss. The test is provided at no cost to the employee. For more information and the official University of Arizona documentation on this subject, please go to https://risk.arizona.edu/occupational-safety/industrial-hygiene/noise-hearing-conservation

OSHA website: https://www.osha.gov/SLTC/noisehearingconservation/
**Housekeeping**

The University of Arizona generally provides housekeeping services to all of its facilities. However, it is the responsibility of all employees to adhere to good housekeeping procedures and to keep their work area neat, clean, and uncluttered.

Several OSHA regulations require written housekeeping procedures. These regulations are:

- 29 CFR 1910.38(b) – Fire Prevention Plan
- 29 CFR 1910.1030(c) & (d) – Blood borne Pathogens

Many other regulations also lead to or reference housekeeping procedures and for this reason, Steward Observatory requires its employees to adhere to the following general policies and procedures:

- Provide sufficient or required safe clearances and access to any and all work stations, exit corridors, fire extinguishers, fire blankets, electrical disconnects, safety showers, other emergency aids, doors, and access to stairways. The usual public access way is at least 44 inches wide, but could be more in some circumstances
- Clearly mark to distinguish walkways from areas not for pedestrian traffic. All aisle ways, exits, and markings shall conform to the International Fire Code, Chapter 10
- Keep aisles and walkways free of physical obstructions that would prevent access and do not block exit signs
- Keep floors clean; dry as possible; slip resistant; and free of waste, unnecessary material, oil and grease, protruding nails, holes or loose boards. Work sites where waste or dirt accumulates should be cleaned at least daily and waste materials disposed of properly
- Tools should be picked up and stored properly at the end of each work day
- Keep doorways and loading docks free of debris and other obstructions
- Clean up spills immediately after they occur and do not allow boxes of “stuff” to accumulate on the floor. If it is important enough to keep, it should be stored safely on a shelf and not become a tripping hazard. Also, do not store anything within 18 inches of the ceiling if the room has a fire sprinkler system or 24” if fire sprinkler system is not present
- Establish a monthly or quarterly procedure to walk through your work area and dispose of unused and unneeded “stuff”. If you have unneeded stuff with residual value, contact the Surplus Property Coordinator in the Business Office who will arrange for disposal
Laser Safety

Lasers are now utilized in many parts of Steward Observatory. OSHA has published guidelines for Laser Safety and Hazard Assessment under STD 01-05-001 – PUB 8-1.7

If you are going to be involved with the operation or installation of lasers, you should read this document so you are aware of the hazards. It can be accessed at: https://www.osha.gov/SLTC/laserhazards/

The University of Arizona is very involved in the control of lasers, especially class 3 and 4. If you will be operating lasers, you are required to go through the mandatory University Radiation Safety Training Program. Details on this program can be obtained at: https://orcbs.arizona.edu/

If you will be involved in the installation of a new class 3 or 4 laser, contact the Radiation Control Office to inform them of the installation before it is installed or turned on.
Lockout/Tagout

The Lockout/Tagout Program is designed to comply with OSHA 1910.147 and covers servicing and maintenance of telescopes, antennas, machines, and other equipment in which unexpected energizing or release of stored energy could cause an injury. The Program establishes the minimum procedures for the control of electrical, mechanical, pneumatic, hydraulic, chemical, or other energy during construction, servicing, and maintenance.

An Energy Control Program is required where an employee is required to remove or bypass a guard, or if an employee is required to place any part of the body in an associated danger zone existing during an operating cycle. The Energy Control Program consists of energy control procedures, employee training, and periodic inspections to ensure the equipment is isolated from the energy source and rendered inoperative.

The energy control procedures outline the scope, purpose, authorization, rules, and techniques utilized to control energy. The procedures include the following:

- Notify the telescope operator or machine operator and any other affected employees in the area of the lockout
- Be aware there may be more than one energy source
- Be aware that stored energy must be dissipated or restrained to prevent possible injury. After the lock is in place, verify the isolation of energy by attempting to operate the device or otherwise test for the presence of energy
- When repair or service is complete, verify the area is clear before restarting the equipment
- Place the equipment back in service in accordance with the energy control procedures
- If more than one employee is working on a locked out piece of equipment, each affected employee shall place a lock on the equipment to prevent startup
- If a piece of equipment has been locked out and the employee whose lock is on the equipment has left the site, every attempt should be made to verify the lockout was not inadvertently left in place. This must be accomplished before the lock is removed by someone other than the employee that placed the lock
- If no contact can be made with the individual, a qualified engineer must inspect the entire situation before the lock can be removed
Training shall be conducted for authorized and affected employees. Employees, whose work is in the area of energy control procedures, shall be instructed in the procedures and prohibition to remove controls. Retraining will be conducted when there is a change in job assignments, machines, processes, or energy control procedures. The Safety Representative will certify the training has taken place and is up to date. Only authorized employees performing the work shall do lockout. Affected employees shall be notified of the removal of the lockout devices.

For much more information and the official University of Arizona documentation, as well as access to training on this subject, please go to: http://risk.arizona.edu/block/lockout-links
Machine Guarding/Tools

Machine Guards
The following types of dangerous moving parts require guarding:

The Point of Operation: The point where work is performed on the material, such as cutting, shaping, boring or forming of stock

Power Transmission Apparatus: The components of the mechanical system that transmit energy to the part of the machine performing the work. These components include flywheels, pulleys, belts, connections, couplings, cams, spindles, chains, cranks and gears

Other Moving Parts: Parts of the machine which move while the machine is working, can include reciprocating, rotating and transverse moving parts, as well as feed mechanisms and auxiliary parts of the machine. Guards must meet these minimum general requirements:

- **Prevent Contact**: The guard must prevent hands, arms or any part of your body or clothing from making contact with dangerous moving parts.

- **Secure**: Guards should not be easy to remove or alter; a guard that can easily be made ineffective is no guard at all. Guards and safety devices should be made of durable material that will withstand the conditions of normal use. They must be firmly secured to the machine.

- **Protect from Falling Objects**: The guard should ensure that no objects could fall into moving parts. A small tool that is dropped into a cycling machine could easily become a projectile that could injure someone.

- **Create No New Hazards**: A guard defeats its own purpose if it creates a hazard of its own such as a shear point, a jagged edge, or an unfinished surface which can cause a laceration. The edges of guards should be rolled or bolted in such a way that they eliminate sharp edges.

- **Create No Interference**: Guards should be designed so equipment can be maintained and lubricated without having to remove them.
Machine/Tool Safety Requirements

General safety rules apply to both stationary and portable equipment. The following rules apply to every machine or power tool used:

- Keep your work area well lit and dry
- Keep tools sharp, oiled and stored in a safe, dry place. Regularly inspect all tools, cords and accessories. Repair or replace problem equipment immediately
- Keep your work area clean. Sawdust, paper and oily rags are a fire hazard and can damage tools
- Use safety features like three-prong plugs, double insulated tools and safety switches. Be sure all machine guards are in place before using any equipment
- Use personal protective equipment when necessary. This might include safety eyewear, gloves, hearing protection, or respiratory protection
- Dress accordingly for the job. Never wear clothing or jewelry that could become entangled in power tools. Ties are a real no-no around rotating spindles!!
- Only qualified personnel may install or repair equipment
- Use the right tool for the job. Do not force a small tool to do heavy work
- Keep electric cables and cords clean and free from kinks. Never carry a tool by its cord, or pull a plug from the wall by the cord
- All visitors to machine shops are required to have safety eyewear if equipment is in operation
- Never leave loose tools on other equipment, telescopes, antennas, or vehicles
- All stationary equipment in labs, shops or other work areas should be secured to the floor or bench surface
Grinding Wheels

It is important for all employees who use a grinder to be familiar with the mounting operation, speed, and use of the grinder and different wheels. The following guidelines represent minimum acceptable safety practices for grinder use:

- Inspect the grinding wheel before installation
- Never alter the mount hole or force a wheel on the spindle
- Make sure the safety flanges are used to mount the wheel
- Adjust the tool rests to within 1/8" of the wheel. Be sure the guards are properly positioned to be effective and put on your PPE before grinding.
- Make grinding contact without bumping the wheel
- Grind only using the face of the straight wheel
- Use a disk wheel for side grinding
- Never grind aluminum on a standard wheel

For more information on UA policies, please see: http://risk.arizona.edu/shop-safety
A comprehensive medical surveillance program has been developed by Steward Observatory in conjunction with the existing University of Arizona program described in Section 9 of the Laboratory Chemical Safety Manual in the hyperlink below.

https://orcbs.arizona.edu/files/forms/Laboratory%20Chemical%20Safety%20Manual.pdf

The primary reason for this program is to help to ensure the continuing welfare of each employee exposed to potentially hazardous situations. The program is specifically designed to determine their ability to safely wear personal protective equipment, to determine the extent of exposure to hazardous chemicals or situations and to provide medical treatment and advice. All facets of the program have been designed to comply with medical monitoring guidelines presented in the Code of Federal Regulations Parts 1910 and 1926, DOT regulations, and RCRA requirements.

Participation in the program is mandatory for personnel who may be required to work around hazardous chemicals or materials. In addition, audiograms are required for individuals who work in high noise areas over 85db. Depending on your answers to the medical exam questions, a medical questionnaire and a physical may also be required for respirator use and employees who work with asbestos or RCF.

These employees shall receive post offer baseline, annual, and exit examinations as applicable. If exam results indicate an employee has an unusually high risk of exposure, the Observatory will exclude that person from projects with potential for exposure. Likewise, if results indicate a person’s inability to safely work under specific physical conditions or to wear specific protective equipment, that individual will not be placed in such risk situations. In the event of a worksite accident, failure of personal protective equipment, or evidence that extensive exposure to a hazardous substance has occurred, an incident specific evaluation and possible physical may be provided for the employee based on hazardous exposure information. All routine medical consultations and examinations shall be approved by U of A Risk Management Services. For assistance, call 621-1790.

OSHA regulations require each employee in the program be provided the opportunity of an exit medical examination if the last physical was longer than six (6) months earlier. U of A Risk Management Services will schedule an appointment with a local clinic, at a convenient time for the employee, prior to the termination date. A copy of the results will be mailed to the employee’s home address. If the employee fails to report to the clinic for the scheduled examination, the lack of action shall be taken as a declination.

Please refer to Section IV, Pg 14 to complete a “UA Authorization for Non-Injury Medical Exam” form.
Mountain Travel and Habitat

Steward Observatory operates telescopes, labs, shops and other facilities on several mountains in Southern Arizona. Each of these sites have the potential for hazardous weather conditions year around including heavy rain, flash floods, very high winds, and ice and snow particularly in the winter months. In its effort to minimize risk to employees and visitors who must travel in the mountain areas, the Steward Observatory has established the following policies and procedures:

1. Employees and visitors are encouraged to either stay on the mountain for the night if they must work late, or leave the mountain in time to arrive at the bottom by sunset. If emergency situations require travel after dark, they are required to carry a two-way radio and make arrangements with another employee on the mountain to monitor the radio channel until the traveling person reaches the bottom/top of the mountain. When the traveling person arrives at their destination, they must announce their arrival to the monitor at the other end.

2. Each observatory department that has vehicles which are primarily used to travel to/from mountain sites, will outfit those vehicles with proper supplies that can be used in the event of an accident or breakdown on mountain roads. The supplies should be kept in a duffel bag and will include at least the following:

   - Listing of all emergency telephone and radio contact numbers (This information should be updated quarterly from the MGIO web site by each department)
   - Fire extinguisher
   - Crank or shake flashlight
   - Small shovel
   - Ice scraper
   - First aid kit
   - Pocket lighter or butane mini-torch
   - Emergency blanket per passenger
   - Bag of sand
   - Snow chains
   - Tool kit which includes pliers, duct and electrical tape, screwdrivers, plastic warning sign, set of jumper cables, and a 20-foot tow strap
3. It is recommended each employee or visitor traveling to mountain sites, must be given and required to read, the MGI0 Orientation package or the observer guidelines, on the University of Arizona website for the Mount Lemmon, Mount Bigelow, Mount Hopkins and Kitt Peak telescopes. All employees and visitors are warned / advised to take appropriate clothing such as gloves, heavy coat, hat, boots, etc. In addition, it is advised they carry a supply of water and food.

- It is required for Mount Graham, they have a hand-held or vehicle radio that is operational and turned onto the proper channel and have established a contact to monitor travel if after hours.

- They are trained in snow-chain application and have the snow chains mounted to all four wheels, if there is sufficient snow on the road or it has been required by MGI0 Recommendation.

- Employees and visitors are also responsible to have a full fuel tank in their vehicle before going to the Mountain. Tires are inflated properly and have an inflated spare tire. Wipers are operational and wiper fluid in the container.

**Advice for the Mountain Traveler**

If you are an infrequent visitor or employee worker to any of the mountain sites and have a chance to share a ride to/from the mountain and leave the driving to one who is experienced, that should be your decision.

If you decide to drive yourself, you should consider and adhere to the following:

- If there is snow on the ground, or the possibility of snow or mud, you should only take a four-wheel drive vehicle and be sure you know how to properly use the four-wheel drive. Remember, going at high speed on flat land is very bad when you are in four-wheel drive. Different four-wheel vehicles go in and out of four-wheel drive with very different procedures, so know your vehicle type.

- When you are driving down steep mountain grades and find that you are beginning to “ride” your brakes, shift the transmission to a lower gear. Let your engine do the braking so that you do not damage the brake system by overheating the rotors or brake drums.

- If the road has snow cover, you should proceed slowly with chains correctly mounted to all four wheels and cautiously try to stay as close to the center of the road as possible. Remember, a plowed road may look to be much wider than it really is and the soft shoulder on either side of the road may not support the weight of the vehicle. If there are snow plows on the road, you are required to adhere to the current set of MGI0 or relevant mountain instructions for passing plows. If your vehicle is on ice or slippery road and it begins to skid, you should turn your wheels in the direction of the skid, provided of course, it does not take you over the edge.
Final Note

These policies and procedures apply to Mount Graham visitors and employees. Because the roads are more heavily traveled and the weather conditions are usually less severe on Kitt Peak, Mount Lemmon, Mount Bigelow, and Mount Hopkins, there is no firm requirement for two-way radios and a standby radio monitor most of the time. Employees will have radios in the Observatory vehicles.

All employees and visitors are required to adhere to posted speed limits, or travel at slower than posted limits if conditions require slower travel.

Other concerns for employees and visitors to the telescopes and labs on the mountain sites are the prevalence of poisonous animals/bugs such as snakes and scorpions. On Kitt Peak it is not unusual to find cattle roaming across the highway and if it is dusk or nighttime, one may not have a lot of time to react and apply the brakes. Be sure to drive safely and not too fast.

Lightning is a major concern on mountaintops. No one should be standing near corded telephones, electrical appliances, electric sockets or plumbing during a lighting storm. Avoid water activities like taking a shower and try to get into a large, fully enclosed, substantially constructed building. The next best shelter is an all-steel vehicle with closed windows. Be sure not to touch anything but the seat. To determine the danger, use the National Lightning Safety Institute, NSSI, 30/30 Rule. When you see lightning, count the time until you hear thunder. If the time is 30 seconds or less, the lighting is 9.66 km or approximately 6 miles away and you should immediately go to a safe place.

It is not unusual to see small groups of people walking along the side of the highways. Although they usually go off in the desert, sometimes they will attempt to stop you or flag you down. If this happens, you should use extreme caution and stay in your vehicle. Be sure the doors are locked and only roll your window down part way to allow you to communicate with them, but does not allow them to reach into the vehicle. If the group requests assistance, evaluate the situation and determine if you can provide assistance without compromising your own safety. Offer to contact authorities for the group to request assistance. If at any time you feel threatened, immediately drive away from the area and call 9-1-1 and report the incident.

(we may need to determine what the legal boundaries are between providing reasonable assistance to someone in need as opposed to what might be interpreted by law enforcement as aiding illegal immigration).

If you notice a small fire a short distance from the highway, but in the desert, you should approach the area cautiously, remaining in your vehicle if possible. A small fire may be the start of a brush fire that needs to be reported to authorities, or it may be a campsite. As fires may spread quickly, and determined to be a fire rather than a camp fire, it is important to note the location and contact authorities by calling 9-1-1 to report the incident immediately. If it is a camp fire and it is unattended, report it to the authorities ASAP by calling 9-1-1.
If you approach an obvious automobile accident that is not attended by official authorities such as an ambulance or police vehicle, and feel qualified to be a first aid provider, you should stop and render aid within the level of your training and abilities. Call for police or medical assistance as needed. Arizona has a Good Samaritan Statute (Arizona Revised Statutes 32-1471), which provides qualified immunity from liability for a person(s) rendering aid at the scene of an emergency.

For more information and the official University of Arizona documentation and procedures on this subject, please go to: http://risk.arizona.edu/fleetsafetypolicy
Office Safety

Every employee should endeavor to keep his or her office clean and neat. Excess accumulation of paper products should be avoided to minimize the potential for fire and to eliminate tripping hazards.

Electrical outlets must not be overloaded, and extension cords are not to be used in place of permanent wiring.

Wiring should be routed so as not to present a tripping hazard, even if low profile cable protectors are required.

All electrical power strips or bars should be kept off the floor and secured. They must be UL approved and have a resettable circuit breaker on the strip.

Freestanding bookcases should be stable and/or secured to the wall to prevent tipping. Heavy books should be placed on the bottom shelves.

File cabinets should be opened one drawer at a time to prevent tipping. Whenever possible, cabinets should be loaded from the bottom-up, with the heaviest accumulation in lower drawers.

Ergonomics is the study of fitting the work/job to the individual. Office furniture and equipment must accommodate various body types. For more information and all of the official University of Arizona documentation on this subject please go to: http://risk.arizona.edu/ergonomics

Indoor air quality is a concern of the University and Steward Observatory. For more information and all of the official University of Arizona documentation on this subject please go to: http://risk.arizona.edu/indoor-environmental-quality
Personal Protective Equipment

Protective equipment shall be provided and used as required, and shall be maintained in a sanitary and reliable condition. Each Department shall specify and provide employees with personal protective equipment as required to safely perform their assigned tasks. Each Department is also responsible for training employees in the proper use of any of the provided equipment. Specific requirements and related standards are found in OSHA 29CFR 1910.132-140. For more information and the official University of Arizona documentation on this subject, please go to: http://risk.arizona.edu/personal-protective-equipment

While Steward Observatory is committed to minimizing hazards as much as possible at the source, this step is not always feasible. Use of personal protective equipment (PPE) completes other measures Steward Observatory takes to create a safe work environment for all.

Engineering and administrative controls are the installation of equipment, other physical facilities, procedures and work practices designed to minimize or eliminate the potential for an adverse exposure to hazards. Whenever engineering controls are not available or in conjunction with administrative controls are not fully capable of individual protection, the employee must wear protective clothing or personal protective equipment (PPE).

Steward Observatory supervisors are responsible for continuously assessing their workplace to determine if hazards are present or are likely to be present, which would necessitate the use of PPE. Steward Observatory does not expect total reliance on PPE to protect against hazards, but rather to use PPE along with sound manufacturing practices, guards, engineering and administrative controls.

Eye Protection

A variety of safety equipment is available to keep every employee safe and injury free. Steward Observatory provides basic plan safety eyewear to all who need them. In addition, Steward Observatory will pay up to $100.00 per year toward the purchase of prescription safety eyewear that meet the ANSI standards and are approved as required by your supervisor. If you are approved for prescription safety eyewear, you are expected to wear the equipment while at work and strongly encouraged to wear it while away from work. The safety devices and procedures listed below are all ways to ensure eye protection and continued eye health. Protective eye and face equipment must comply with ANSI guidelines and be marked directly on the piece of equipment (e.g. eyewear frames and lenses).

- Be sure equipment guards are in place on plant machinery and they are used with additional eye protection
- Know the location and operation of emergency eyewashes and showers

• Street-wear eyewear are not designed to be safety eyewear and should never be used as such

• Face shields should not be used alone. Always use other eye protection such as goggles or safety eyewear with face shields

• Safety equipment should be maintained in good condition and replaced when defective

• Have your eyes tested regularly. If you need corrective lenses, get them and use them

**Hand Protection**

Keep these points in mind to protect your hands as you work:

• Gloves should fit properly and be maintained in the same careful way as other safety equipment

• Know the symptoms of carpal tunnel syndrome and seek medical attention immediately if you suspect you may have this condition

• In the event of a hand injury, know proper first-aid procedures. Offer only the help you are trained to provide

• Proper protective gloves must be worn when working with acids or other chemicals which may be injurious to the skin

**Hard Hats**

Hard hats must be worn at all times by all persons, including visitors and employees, in all work areas that represent potential situations resulting in head injury. This includes indoor and outdoor construction areas, all areas where there are employees working above you, and during crane lifts and other overhead operations.
Protective Footwear

All employees shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling, rolling objects, or objects piercing the sole, and where employee’s feet are exposed to electrical or chemical hazards. This policy incorporates the requirements of the OSHA Regulations 1910.136, “Occupational Foot Protection” and ANSI Z41-1991, “American National Standard for Personal Protection-Protective Footwear.”

It is the responsibility of Steward Observatory Management to perform a job hazard analysis to determine the need for foot protection. The Observatory will provide up to $75.00 per year reimbursement to be applied toward the purchase of protective footwear that meets the ANSI Standard Z41-1991. It is the responsibility of the employee to wear the protective footwear at all times when working in the designated areas. Employees are encouraged to wear the protective footwear at home and away from work if in hazardous areas.

For more information and the official University of Arizona documentation on this subject, please go to: http://risk.arizona.edu/personal-protective-equipment

To obtain Personal Protection Footwear, you must first obtain written authorization from your supervisor using the approved “Safety Footwear Purchase Authorization” form, which can be found in Section IV, page 12 of this manual or the online safety forms section. After you have completed the form and have your supervisor’s signature on the form, you may then purchase the footwear and provide the approved form and original receipt to the Safety Officer who will arrange for reimbursement.

To obtain Prescription Safety Eyewear, you must first obtain written authorization from your supervisor using the approved “Safety Eyewear Purchase Authorization” form, which can be found in Section IV, page 11 of this manual or the online safety forms section. After you have completed the form and have your supervisor’s signature on the form, you may then purchase the eyewear.

Go to the University web site shown above and click on the link “Prescription Safety Eyewear Program”. You will be required to provide your Net Id and password. From there, follow the instructions at the site to obtain the eyewear. When you receive the eyewear, provide the approved form and invoice to the Safety Officer who will arrange for reimbursement.
The University of Arizona, U of A Risk Management Services has a very complete Respiratory Protection Policy that complies with the OSHA Respiratory Protection Standard 29 CFR 1910.134. Steward Observatory, its management, and employees are required to comply with The University policy.

For the official documentation on this subject, please go to:
http://risk.arizona.edu/occupational-safety/industrial-hygiene/respirator-certification-procedure

OSHA reference, please go to:
http://osha.gov

**Medical evaluation**

Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job, and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that employers must implement to determine the employee's ability to use a respirator.

**Respiratory Fit Testing**

Before an employee wears any type of respirator PPE, including an N95, half-mask, or powered air-purifying respirator, the employee is required to complete a respirator medical form found in the link above.

The employer shall ensure that an employee is fit tested and trained prior to initial use of the respirator.

The employer shall ensure that employees using respirators pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) and shall be administered using an OSHA-accepted QLFT or QNFT protocol.

Fit tests determine the respirator make, model, style, and size of respirator that will be worn.

**Frequency**

Medical evaluations, fit testing, and training are required annually. Employers are required to maintain fit test and training records on all employees.
Automated External Defibrillator (AED)

An Automated External Defibrillator (AED) is a medical device designed to analyze the heart rhythm and deliver an electric shock to victims of ventricular fibrillation, to restore the heart rhythm to normal. Ventricular fibrillation is the uncoordinated heart rhythm most often responsible for sudden cardiac arrest.

Placement of AEDs

- AEDs should be conveniently installed to ensure response within 3-5 minutes
- Areas where many people work closely together, such as assembly lines and office buildings
- Close to a confined space
- Areas where electric-powered devices are used
- Outdoor worksites where lightning may occur
- Health units where workers may seek treatment for heart attack symptoms
- Company fitness units and cafeterias
- Remote sites, such as off-shore drilling rigs, construction projects, marine vessels, power transmission lines, and energy pipe lines.

The U of A Risk Management Services along with the UA Sarver Heart Center, oversees the AED program on campus. AEDs are included in all new building construction & major renovations. There is a process in place to evaluate prospective departments that would like to have an AED in their building. Please contact Frank Perez at 626-8739 to arrange a meeting to assess your needs. Departments that are ready to purchase their own AEDs must get approval from U of A Risk Management Services.

U of A Risk Management Services assists in coordinating training on the use of AEDs and ongoing maintenance and inspection.
First Aid Supplies

It is advisable for the employer to give a specific person the responsibility for choosing the types and amounts of first-aid supplies and for maintaining these supplies. The supplies must be adequate, should reflect the kinds of injuries that occur, and must be stored in an area where they are readily available for emergency access.

A specific example of the minimal contents of a workplace first-aid kit is described in American National Standards Institute ANSI Z308.1 - 2003, Minimum Requirements for Workplace First Aid Kits.

The kits described are suitable for small businesses. For large operations, employers should determine how many first-aid kits are needed, and if it is appropriate to augment the kits with additional first-aid equipment and supplies. Employers who have unique or changing first-aid needs should consider upgrading their first-aid kits. The employer can use the OSHA 300 log, OSHA 301 reports or other records to identify the first-aid supply needs of their worksite. Consultation with the local fire and rescue service or emergency medical professionals may be beneficial. By assessing the specific needs of their workplaces, employers can ensure the availability of adequate first-aid supplies.

Employers should periodically reassess the demand for these supplies and adjust their inventories.

First Aid Kit Item and Minimum Size or Volume Performance Minimum Requirement

- Absorbent Compress, 32 sq. in. (206 sq. cm), with no side 5.1.1.1 1 smaller than 4 in. (10 cm)
- Adhesive Bandages, 1 x 3 in. (2.5 x 7.5 cm) 5.1.1.2 16
- Adhesive Tape, 3/8 in. x 5 yd. (457.2 cm) total 5.1.1.3 1
- Antiseptic, 0.14 fl. oz. (0.5 g) application 5.1.1.4 10
- Burn Treatment, 1/32 oz. (0.9 g) application 5.1.1.5 6
- Medical Exam Gloves 5.1.1.6 2 pair
- Sterile pad, 3 x 3 in. (7.5 x 7.5 cm) 5.1.1.7 4
- Triangular Bandage, 40 x 40 x 56 in. (101 x 101 x 142 cm) 5.1.1.8 1

First Aid Kit supplies for telescope sites and travel may differ for each site. Please refer to the telescope website for first-aid kit requirements.

Mount Graham International Observatory: [http://mgio.arizona.edu/visitor-safety](http://mgio.arizona.edu/visitor-safety)
Mount Lemmon Sky Center: Please contact Alan Strauss at alan@email.arizona.edu
UA Sky School: Please contact Alan Strauss at alan@email.arizona.edu
Steward Observatory utilizes hazard signs, labels, tags, and placards to keep everyone aware of potential dangers. The following OSHA website details the requirements for signage: [https://www.osha.gov/index.html](https://www.osha.gov/index.html)

All employees need to understand the meaning of the warning signs at the entrances to work areas and the specific location of the hazard. The Site Safety Representative along with the Telescope or Laboratory Director or Manager shall be responsible for identifying areas of work where special hazards exist. The Director or manager is responsible for obtaining, placing, and maintaining appropriate warning signs, labels, or placards at the entrances to the work areas and at the specific location of the hazard.

As part of the communication responsibility, signs are posted throughout each work area indicating the proper procedures to follow when working on or around potential hazards. This includes, but is not limited to, speed limit signs, safety eyewear signage, as well as indicators of hard hat areas. All safety signs must be observed.

Signs are classified according to use. There are five classifications, which are:

- **Danger** - indicates an immediate danger that could result in death or injury. Danger signs use black, red and white colors.

- **Warning** - indicates a potentially hazardous situation which, if not avoided, could result in death or injury.

- **Caution** - warns against potential hazards or unsafe practices and represents the potential for moderate or minor injury. Caution signs have a yellow background, a black panel and yellow letters.

- **Notice** - indicates general safety policies and should not be associated directly with a hazardous situation.

- **Safety Instruction Signs** - convey general instructions relative to safety measures. These signs are white, with green panel and white letters.

Uses of **Labels** are for identifying potential hazards of chemicals in the workplace. Along with signs, they help ensure all workers understand the hazards around them.

**Tags** are sometimes used as signs to prevent accidental injury or illness to employees exposed to potential hazardous conditions, equipment or operations. Tags are used until the identified hazard is eliminated or the hazardous operation is completed.

**Placards** are used in the handling or shipping of hazardous materials.

For more information on this please go to the OSHA website using the link below: [https://www.osha.gov/index.html](https://www.osha.gov/index.html)
This policy was written by Warren Davison in December, 2006 as a result of a near-miss accident and has been included in the Safety Manual as a guide to all Steward Observatory employees and departments.

**Purpose:**

To provide guidelines and a method to establish a safe and intelligent way of moving materials. Although this applies to the Mirror Lab cranes explicitly the directions are applicable at other facilities for moves by fork lifts or other conveyances. The main directive is to get more help when you need it whether it involves something as simple as asking another person to check the rigging or as complex as a written and controlled procedure.

**Definition of a Significant Lift:**

Significant lifts are lifts in which you need to get more information or experience involved to ensure the lift goes safely. The idea is, the more guidelines listed below that apply to the lift, the more help and therefore the more familiar you become with the task until the task can be accomplished safely. These include but are not limited to the following guidelines.

- **a)** If you are unsure the lift is safe, then it is a significant lift and you need to seek help. **ASKING** is always correct.

- **b)** When the action is infrequent or complex. The handling of a 5,000 lb spreader bar may be routine, but a 500 lb special device may be a significant lift, since it has never been done before.

- **c)** The weight is large. This is again a relative term and depends on what you are doing. Special considerations should be given to the following.
  
  - Relative capacity of the device. Lifting 4 tons with a 5 ton crane is more of a significant lift than 10 tons with a 50 ton crane. If you are over 50% of the rated capacity of the device, unless this is a very repetitive lift, it is a significant lift.
  
  - When the absolute weight of the lift exceeds 10 tons, it is a significant lift, even if it is a repetitive lift.
  
  - When hand lifting something which weighs over 150 lbs and requires several people to share the load, it is a significant lift and needs consideration and planning.
d) The clearance is small or the size is large.

- Proximity of people is an important consideration. No one is allowed under a load, but if they need to be near it to secure it with bolts, or around it when it could swing, then it is a significant lift.

- The clearance around an object could make a significant lift. When a little swing could damage something, there needs to be consideration given.

e) The stability of the move is another important consideration.

- If you are close to a condition when turning a load over and it may flop, it is a significant lift.

- When a load may topple when released, it is a significant lift.

- When you use more than one device, like one side lifted with a crane and the other side with a fork lift, it is a significant lift.

- When you know the load will swing or slide when lifted it is a significant lift.

f) When the load is fragile or very costly, increased vigilance is demanded.

- Mirrors are always a significant lift. The only exceptions are mirrors less than 3 meters, the move has been repeated many times, and the rigging and procedure approved and proven.

- Mirrors over 3 meters in size are required to have a senior engineer or scientist present when lifted by a crane.

- Mirrors over 6 meters in size are required to have a written and approved procedure in place and have a senior engineer or scientist present before the lift is made.

g) Complex or special rigging

- Rigging to more than 3 points is tricky. When done for the first time on a load, it is a significant lift.

- When using rigging more than 50% of the rated rigging capacity, is a significant lift.

- An unusual shaped object where the center of gravity is unknown is a significant lift.
Methods of Handling a Significant Lift

a.) The method of handling a significant lift depends on how significant it is. If you are in doubt, then assign a higher level to the action. Seek help and guidance until questions and doubts are answered. Never deny help to anyone who asks. You can delay the lift for a short period of time and help in finding more experience.

The following levels are escalations in complexity and formality and should have an appropriate level for any activity. A knowledgeable person can also reduce the levels if appropriate.

- Discuss the lift and gain the information required.
- Find a coworker with more knowledge or experience to guide the lift.
- Find a supervisor or engineer with sufficient knowledge to guide the lift.
- Have a written procedure for the lift.
- Have a written and reviewed procedure for the lift.
- Have a written and reviewed procedure and an approved safety observer for the lift.
Many departments within Steward Observatory utilize student workers. The students are paid wages and are covered under workers compensation insurance. They are subject to the same rules and have the same responsibilities as all other non-student workers. However, there are some items that must be considered when utilizing student labor. The first major consideration is whether the student is at least 18 years of age. If he or she is not 18, and have not had a driver’s license for at least two years, they are not allowed to drive or operate university vehicles or equipment. Also, they cannot be treated for medical emergency without a written consent form from their parents or guardians. That item by itself means there are certain limitations on what you might ask them to do and where they may be allowed to go. For example, taking an underage person to any of our mountaintops, or on any trip, without a written consent form could be a problem.

OSHA has no specific policies regarding workers under age 18, as their policies apply to all workers. However the Wage and Hour Division of the U.S. Department of Labor has regulations that pertain to workers under the age of 18. For more information on this please go to:
https://www.osha.gov/youngworkers/index.html

For information on drivers go to:
https://www.osha.gov/SLTC/motorvehiclesafety/index.html

The specific University of Arizona rules regarding driving can be found at:
http://risk.arizona.edu/fleetsafetypolicy

The specific University of Arizona rules regarding personal conduct and student responsibilities as workers can be found at:
http://financialaid.arizona.edu/types-aid/work-study/student-employment-manual

In general, all student workers must be given all the same training for any given job that a non-student worker must be given. They should be supervised more closely than a full-time regular hire that presumably has experience. This means, students over the age of 18 who have had a driver's license for over two years, may operate vehicles and moving equipment such as fork lifts, articulating booms, scissor lifts, etc., provided they have received thorough training on such equipment, and it is University owned equipment. If this is rental equipment, the rental contract will normally stipulate ages of operators.

For more information on this subject, please go to:
(http://youth.arizona.edu/sites/youth.arizona.edu/files/documents/minors_policy_final.pdf)

**Fleet safety Policy:** Drivers of standard vehicles such as sedans, pickups, golf carts, etc., that do not require special licensing, must be at least 18 years of age and have been licensed for a minimum of two years prior to driving on university business.

http://www.dol.gov/whd/regs/compliance/whdfs34.htm  Fact Sheet #34
Tailgate Safety Meetings (sometimes called Toolbox Meetings) were first started in the construction industry as a way for contractors to inform their crews of the day’s activities, jobs, dangers, concerns, and questions. They evolved to become commonplace at most job sites and have proven to be major factors in accident reduction. Although we do not regularly operate out of pick-up trucks at the Observatory, we do regularly have new and different tasks that require careful thought and preparation if they are to be done safely and properly. Utilizing open discussion of the tasks to be performed by those experienced in doing the work as well as the engineers or planners of the tasks, will usually beget excellent results with no injuries.

**Tailgate Safety Meetings should be held when:**

- A new task is being performed for the first time, or by different participants.
- Any major task is being performed, even if done before.
- Any task is being performed in crowded or hazardous conditions.
- Any task is being performed with new equipment.

**To prepare for the meeting:**

- Appoint a leader for the meeting.
- Inspect the jobsite for hazards.
- Read the material you plan to discuss.
- Be sure to know the regulations, guidelines and company rules related to the day’s work or task.
- Invite the crew to ask questions and make suggestions, and answer or consider them all.
- If there is disagreement on a method, obtain an expert to get an opinion
- Obtain feedback from the crew on the meeting.
- Involve the crew in preparing for the meeting and future meetings.
- Look into complaints, concerns or suggestions brought up by the crew and keep good records of each meeting, time, place, and subject.
- Be sure every one of the crew members know that performing the job safely is paramount.
All personnel whose work requires them to be on or under any elevated structure such as a telescope, antenna, wind tower, water tank or other similar structure are required to wear hard hats or other approved head protection if there is someone working above. All visitors are to conform to this rule or remove themselves from the hazard.

No one is to be at or on a telescope unless they have permission from the Telescope Operator on duty. When there is more than one operator present, permission should be obtained from the Operations Manager or Site Manager. Special precautions must be observed if it is necessary to move the telescope when someone is on or near it. In this event, there must be a qualified operator at the controls at all times the telescope is in motion. The person on the telescope must be provided with communications to the operator at all times. If the telescope is remotely operated, the operator shall communicate orally with other persons on the structure before starting the movement of the telescope. Anyone planning to be on the telescope structure when it is in motion shall be advised before climbing, as to the danger areas around the drives, and should know the location of all emergency stop switches. He or she shall also follow all safety rules such as wearing proper safety harnesses with appropriate tie-off points, and utilization of other personal protective equipment that may be called for.

When telescopes have work platforms that are located or can be moved to more than four feet above floor level, said platforms shall have guardrails around all open sides. Further, when these platforms are movable in an up/down motion, all possible pinch points shall be guarded.

No one shall work on the telescope drives or control systems where dangerous voltages exist, or on electronic gear or drive gears without first informing the operator on duty and having appropriate lock-out tagout locks in place. The telescope operator shall if necessary, stop any unsafe operation of this nature.

Except when absolutely necessary, no one is to be on a telescope or dome in adverse weather conditions such as, rain, snow, sleet, high winds, etc. Some personnel will have to climb under these conditions, in order to check snow and ice loads. Steel and aluminum structures are slippery when wet, and care should be taken when climbing in these conditions. In all cases where climbing is done in adverse weather conditions, the climber is to be tied off in a proper manner and there is to be two persons or at least an open communication line to someone within a close proximity to help.

In the event that any personnel “freeze,” or are injured on a telescope, antenna or other structure, notify the telescope operator immediately and/or call for emergency help. If at all possible, the person in need of aid should be secured to the structure until help arrives.

No loose materials, tools or equipment are to be left on any telescope or other structures at any time for any reason.
At telescopes or other structures where it is common to have overhead workers on a frequent basis, a flashing or revolving light should be installed to warn persons coming into the area to wear safety hard hats and to proceed with caution. An alternative is for maintenance workers who frequently work on ladders or overhead platforms to carry with them small, portable flashing lights to set up when they are working at heights. Signs placed in the path at the point of entry into a space where there are overhead workers or cranes in operation is also acceptable.

The telescope operator on duty has full authority to enforce these regulations, as well as other Safe Practice regulations such as Lock-out Tagout, Confined Space Rules, etc. They have the authority to stop any activity at the telescope that in their opinion, is dangerous to personnel or the equipment. This is to assure that only competent personnel work at jobs on or around the telescope, that the telescope operator is always fully informed when personnel are working, and that reasonable safety precautions are taken. The operator’s responsibility and authority are not limited to these regulations alone. They shall impose any additional safety measures they deem necessary under any particular circumstance.

If there is any doubt as to the safety of any activity, the telescope operator shall stop that activity and consult with the Operations Manager or Site Manager.

For additional information and the official University of Arizona documentation, please go to: http://risk.arizona.edu/fall-prevention
Transporting Injured Employees

To establish guidelines for transporting injured or ill employees located on the University of Arizona Campus or in the city of Tucson, the following guidelines should be implemented.

Serious Injury or Illness

Call 911 if an employee becomes seriously injured or ill while on duty. If a person has suffered or may be suffering a heart attack or stroke, has severe breathing difficulties or is not breathing, has lost consciousness after an injury, has an epileptic seizure, has suffered a fractured neck, spine or femur, has gone into shock, has lost a significant of blood, has had a limb amputated, etc., any responding employee must:

- Call 911 and request assistance describing the situation
- Notify the injured or ill person’s supervisor
- Provide any first aid and comfort prior to the arrival of emergency personnel
- Never drive or move anyone with the above injuries or illness

A UAPD officer will always respond to 911 calls and be in communication with dispatch and paramedics. UAPD cannot transport injured employees. The responding officer will provide a written case number for the incident.

Non–Serious Injury or Illness

If an employee is not seriously ill or injured while on duty, then accompany that person to a medical care facility by whatever means deemed appropriate such as, walk, drive, or use a UA vehicle.

- Locate the MSDS (if applicable) and provide to injured employee
- Notify the employee’s supervisor
- Supervisors shall ensure that they or a co-worker, accompany the injured or ill person to the medical care facility but they must let the medical facility know the injury or illness is work related
- The injured/ill employee can drive on himself or herself to a medical facility. The employee can choose to go to any medical facility
- Provide the employee with the Workman’s Comp address and phone number to give to the medical personnel for work related injuries

If emergency personnel are clearly not necessary and if the employee requires medical attention or wishes to return home but feels he/she cannot manage alone, the injured/ill employee may notify, or request to have notified, a family member or another individual arrange for transportation.
Steward Observatory has telescopes and equipment in remote and isolated sites. In addition, it has facilities that include complicated, large moving equipment such as that at the Mirror Lab, and it has processes that require the presence of hazardous chemicals. Because of these facts and the nature of our research, it is often advisable that some tasks which could be completed by one person, be performed by two persons in order to increase safety. No employee should perform any task alone if that individual feels the job cannot be completed safely without assistance or the presence of a second person. In general, the Two-Person Work Rule shall be in effect under the following conditions:

1. Working from any external platform, scaffolding, or building roof. This would include scissor lifts and the like.
2. Working with any energized electrical circuits above 408 volts AC. The second person does not need to be qualified.
3. Accessing any parts of the telescope under hazardous weather conditions.
4. Working on moving equipment or machinery which is not designed with a seat or work station.
5. Working with hazardous chemicals or in areas of very high temperatures.
6. Working in manholes or confined spaces.

There may be emergency or unplanned circumstances where it seems to be important to work alone, despite the above rules and guidelines. If that happens, and the person who feels that he/she must perform a task and is willing to perform that task without benefit of a second person in attendance, that person should first contact his/her supervisor and advise the supervisor of the circumstances. The supervisor may give approval to perform the task if both persons feel confident the task can be performed safely. Usually if this happens, there will be a direct, hand-held two-way radio or cell phone on an open line between the worker and someone who is in a place close enough to respond quickly, if needed. Video monitoring of some work situations might also be considered in some circumstances.

**TIP**

Bob Peterson and Cory Knop looked into several radio harnesses that can be used for conveniently holding two-way, hands free radios. The websites are shown below, if you wish to purchase harnesses for your employees.

**Chiefsupply.com**
http://www.chiefsupply.com/search/radio%20harness.aspx

**Uplanders.com**
http://www.uplanders.com/gear-keeper/

**Amazon.com**
http://www.amazon.com/True-North-Stealth-Radio-Harness/dp/B0046C0HEC
**Used-Oil Management**

The Steward Observatory Used Oil Management Plan provides written documentation for used oil records. In addition, the plan details compliance with Environmental Protection Agency (EPA) requirements (found at 40 CFR 279) for used oil generators.

The plan outlines a written description of used oil management procedures, disposal methods, and transportation requirements. Steward Observatory adheres to the following practices:

- Never dump or dispose of used oil in the trash, in sewers, or on the ground
- Make sure collection and storage set-up is leak-proof, spill proof, and tanks have lids or are covered to prevent water from entering
- Use lockable fills to prevent dumping of materials into the tank when it is not supervised
- Maintain collection containers regularly, comply with local fire and safety regulations, and avoid leaks and spills
- Label storage tanks "Used Oil"
- Keep records of used oil sent to recycling
- Never mix used oil with any other material. Keep gasoline, solvents, degreasers, paints, etc, separate to prevent contamination or the mixing of incompatible wastes
- Carefully record the amount of used oil placed into and removed from storage devices
- Construct secondary containment around drums/tanks with a capacity for 100 percent of the contents of the drums stored; the base of the containment area should be sloped so any spilled oil may be recollected and removed
- Equip storage containers with wide-mouth, long-necked funnels to reduce spills during filling
- Equip storage containers with a pressure relief valve to reduce pressure buildup, which could cause leaks
- Keep the area near the storage devices neat and clean
- If there are areas where oil could possibly be spilled, keep a supply of clean up and absorbent materials on hand.
The used oil management standards define a used oil transporter as any person who transports used oil, any person who collects used oil from more than one generator and transports the collected oil, and owners/operators of used oil transfer facilities. Steward Observatory complies with all relevant used-oil regulations, including keeping tracking records of where the used oil is collected and where it will be transported to.

Small quantities of used oil such as vacuum pump oil should be disposed of through the U of A Risk Management Services. [http://risk.arizona.edu/environmental](http://risk.arizona.edu/environmental)

For more information and the official University of Arizona documentation on this subject, please go to: [http://risk.arizona.edu/environmental](http://risk.arizona.edu/environmental)

[http://www.access.gpo.gov/nara/cfr/waisidx_02/40cfr279_02.html](http://www.access.gpo.gov/nara/cfr/waisidx_02/40cfr279_02.html)

**Fluorescent Lamp Disposal**

The Steward Observatory is required to follow the University of Arizona guidelines when disposing of fluorescent & high intensity discharge lamps as they should not be disposed of as regular trash. Most fluorescent lamps contain Mercury which is a highly toxic, heavy metal and HID lamps contain elemental Sodium which is water reactive. For disposal of these lamps, please call the UA Facilities Management Work Desk at 621-3000 to arrange for pick up and disposal. You will be asked to provide the Bldg. name, room number, contact person and phone number. Your request will be put on a daily log and you should see a response within 24 – 48 hours.

When storing these lamps while awaiting pick up by Facilities, you should store the lamps in a closed container that has a label identifying the box as universal waste (labels are available from Facilities department) and the label should be marked with the first date a lamp was placed in the storage container. Care should be taken so the lamps will not be crushed. In the event of a broken lamp, call facilities if possible, so they can clean the spill with a mercury vacuum. If it must be cleaned immediately, wear a mask and carefully place debris in a waste bucket and call U of A Risk Management Services for disposal as a hazardous waste.

For more information and the official University of Arizona documentation on this subject, please go to: [http://risk.arizona.edu/environmental](http://risk.arizona.edu/environmental)
FACT SHEET

What To Do If You Break A Mercury Containing Lamp
February 2010

NOTE: This document is not a substitute for the rules. To properly manage mercury-containing waste lamps as universal waste, you must comply with all applicable provisions in the Arizona Universal Waste Rule (A.A.C. R18-8-273) and the Federal Universal Waste Regulation (40 CFR § 273).

BACKGROUND
Mercury Containing Lamps (lamps) are lighting more homes than ever before, and the Arizona Department of Environmental Quality encourages households to use and recycle them safely. Carefully recycling lamps prevents the release of mercury into the environment and allows for the reuse of glass, metals and other materials that make up a fluorescent light’s structure. Lamps contain a very small amount of mercury sealed within a glass housing. They do not pose a health hazard when used and handled properly, however if broken, mercury can escape and pose a hazard to you or the environment. Please consult the following guidelines for cleaning up a broken lamp.

WHAT IS A MERCURY CONTAINING LAMP?
Bulb or tube portion of an electric lighting device that is designed to produce radiant energy. Includes, but not limited to, fluorescent (tubular and compact fluorescent lamps (CFLs)); high intensity discharge; neon; mercury vapor; high pressure sodium; and metal halide lamps.

BEFORE YOU CLEAN UP: AIR OUT THE ROOM
• Restrict pets and people from the area.
• Open a window and leave the room for 15 minutes or more.
• Shut off forced-air heating/air conditioning system.

WHAT DO YOU NEED?
• Disposable gloves
• Stiff piece of paper or cardboard
• Glass jar with lid or sealed plastic bag
• Sticky tape or damp cloth/paper towel

CLEAN-UP STEPS: HARD SURFACES
1. Wearing gloves, scoop glass fragments and powder into a glass jar or plastic bag.
2. Use sticky tape to pick up any remaining small glass fragments and powder. Wipe the area clean with a damp cloth or paper towels. Place cloth/towels in the glass jar or plastic bag.
3. Do not use a vacuum or broom to clean up the broken bulb on hard surfaces.

CLEAN-UP STEPS: CARPET AND SOFT SURFACES
1. If vacuuming the carpet is needed, remove the vacuum bag (or empty and wipe the canister), and put the bag and vacuum debris in a sealed plastic bag. Vacuuming increases the chances of mercury droplets being dispersed into the air.
2. If clothing or bedding materials come in direct contact with broken glass or powder, the material should be thrown away. Do not wash.
3. You can, however, wash materials that have been exposed to mercury vapor, such as the clothing you are wearing when cleaning the broken lamp, as long as that clothing has not come into direct contact with the materials from the broken lamp.
4. Wipe off shoes with a damp cloth or paper towels. Place the cloth/towels in a glass jar or plastic bag for disposal.

Publication Number: FS 10-03
DISPOSAL OF CLEAN-UP MATERIALS

• Immediately place all clean-up materials outdoors in a trash container or protected area for the next normal trash pickup.
• Wash your hands after disposing of the clean-up materials.

FUTURE CLEANING OF CARPETING OR RUG

• The next several times you vacuum, shut off the forced-air heating/air conditioning system and open a window before vacuuming. Leave open for 15 minutes after vacuuming.

WHAT NEVER TO DO WITH A MERCURY SPILL

• Never use a broom to clean up mercury. It will break the mercury into smaller droplets and disperse them.
• Never pour mercury down a drain. It may lodge in the plumbing and cause future problems during plumbing repairs. If discharged, it can cause contamination of the septic tank or sewage treatment plant.
• Never wash contaminated clothing in a washing machine. Mercury may contaminate the machine and/or pollute the environment. Clothing that has come into direct contact with mercury should be disposed.
• Never walk around if your shoes might be contaminated with mercury. Contaminated clothing can also spread mercury throughout the environment.

MORE INFORMATION

For additional information regarding this subject, please contact ADEQ:
Hazardous Waste Inspections and Compliance Unit
Waste Programs Division
1110 W. Washington St.
Phoenix, AZ 85007
(602) 771-4673 or
toll free at (800) 234-5677 Ext. 771-4673
Hearing impaired persons call
ADEQ’s TDD line: (602) 771-4829
www.azdeq.gov/environ/waste/index.html

WEB SITES THAT MAY PROVIDE ADDITIONAL INFORMATION

• Energy Star Web site on CFLs:
  www.energystar.gov/cfls
• EPA’s Web sites on Mercury and Mercury Containing Products:
  www.epa.gov/mercury
  www.epa.gov/epa/products/mercury.htm
• EPA’s Broken Lamps Clean-up Procedures:
  www.epa.gov/mercury/spills/index.htm#fluorescent
• Local Recycling Options for Households:
  www.epa.gov/bulkbereycling
  www.earth911.org

RECYCLING FACILITIES

The following are some options for lamp disposal. Please contact the facility to verify hours of operation. Some organizations may not accept all types of lamps or may charge a small fee. In addition to those listed below, please check with your local Ace Hardware, Home Depot, or Household Hazardous Waste Collection Facility as other possible recycling locations.

IKEA Tempe
2110 W. IKEA Way
Tempe, AZ 85284
(480) 496-5658

Lighting Resources, LLC
1522 East Victory Street, Suite #4
Phoenix, AZ 85040
(602) 276-4278

WM Universal Waste Lamp Tracker, Inc.
10 South 48th Street, Suite #4
Phoenix, AZ 85043
(602) 353-9282

City of Tucson and Pima County
Main HHW Program – Main Facility
2440 West Sweetwater Drive
Tucson, AZ 85705
(520) 888-6947

Hazardous Products Center (HPC)
6770 East Landfill Road
Flagstaff, AZ 86004
(928) 527-9005
The use of vehicles for university business is governed by the University of Arizona Fleet Safety Policy. This policy was adopted in January 2005 to establish a management framework for fleet safety that will minimize losses and maintain compliance with State rules governing loss control programs for State agencies.

For more information and the official University of Arizona documentation on this subject please go to: http://risk.arizona.edu/fleetsafetypolicy

For information on the required U of A Training, please go to: http://risk.arizona.edu/training

For information on forms dealing with this subject, please go to: http://risk.arizona.edu/forms

There are also several OSHA regulations in 29CFR 1926.601 relating to vehicle safety which can be found at: https://www.osha.gov/SLTC/motorvehiclesafety/index.html
The safety of visitors to any Steward Observatory facility is the responsibility of each visitor’s Observatory host. It is the responsibility of the host to be sure that each visitor complies with all Safety Rules and Procedures. This includes providing each visitor with personal protective equipment to wear when appropriate. Examples include hard hat, eye and hearing protection. If you are the host, be sure you know the Safety Rules and Procedures well, and may include procedures such as Lockout/Tagout. Be sure to inform the Telescope Operator or Site/Operations Manager prior to the visit, you will be escorting visitors into the area.
GENERAL

In accordance with OSHA 29 CFR 1910.21-30, workplaces are to be maintained and kept accessible. The following details some of the general safety requirements:

- All places of employment, passageways, storerooms, and service rooms shall be kept clean, orderly, and in a sanitary condition
- Floors will be maintained, cleaned, dried and in good condition
- There will be no obstructions or protrusions from the surface
- All floor and wall openings or any place where there is a falling object hazard will be appropriately guarded and signed
- All portable ladders will meet ANSI standards and be maintained in good condition
- Damaged ladders will be properly repaired before use or destroyed to prevent use

For more information on this subject go to:

LADDER

The following points summarize many of OSHA’S regulations for ladders and can serve as guidelines for ladder use.

- Do not build makeshift ladders out of chairs, benches or boxes. If the job calls for a ladder take time to find one
- Make sure there is only one person on a ladder at a time, unless the ladder is designed for two
- Check the condition of the ladder before use. Do not use a ladder with broken or cracked rails or rungs or rungs made slippery by grease or oil. The ladder should have good safety feet.
- Do not place a ladder on boxes or blocks to make it taller
- Face front and use both hands as you climb
Do not overreach from a ladder. If your waist reaches past the uprights you have gone too far.

Set ladders up properly by using the 4 to 1 rule. The distance from the wall to the base of the ladder should be one-fourth the distance from the base of the ladder to where it touches the wall.

Hoist tools or materials up to you after you reach the top so both hands are free for climbing.

Do not stand on top of a stepladder or get too close to the top of an extension ladder.

Any portable ladder being used to gain access to an upper level such as a roof, must extend at least three feet beyond that level.

For more information on ladders, check the OSHA regulations, which can be found at 20CFR and 26:


SCAFFOLDS

Working surfaces include scaffolding. Keep both feet firmly on the scaffold with apply these safety precautions:

- Make sure scaffolds are sturdy. Check them daily for any safety defects. Always clear work surfaces of snow, ice or slippery materials. Sand wet planking for sure footing.

- Never overload scaffolds with people, equipment or supplies. Lock casters on mobile scaffolding to prevent movement when working. Use ladder jack scaffolds only for light duty work. Fall and climbing protection devices prevent injury in the event of an accidental slip, trip, or fall on ladders or scaffolding.

For more OSHA information on scaffolds please go to: http://www.osha.gov/SLTC/scaffolding/

For much more information and the official University of Arizona documentation on this subject, please go to: http://risk.arizona.edu/scaffolding-safety
The OSHA requirements associated with welding, cutting and hot work are found in the OSHA Manual 29 CFR 1910.252. For detailed information and regulations go to: https://www.osha.gov/SLTC/weldingcuttingbrazing/

Steward Observatory requires employees to comply with all OSHA, NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work. Hot Work permits must be obtained from U of A Risk Management Services prior to beginning any torch cutting, welding or brazing.

For details of requirements please refer to: http://risk.arizona.edu/fire-safety/hot-work-requirements

The general Steward Observatory policy is that appropriate eye, hand, and body protection will be worn at all times while welding cutting, brazing, or burning. The welder will consider the safety of others in the worksite by placing glare shields, barricades, or other barriers as necessary. The worksite shall be properly ventilated and respirator equipment will be worn when necessary. A fire watch shall be placed for all field-welding operations.

A few practices for working safely apply in many situations:

- When working above ground or floor level, use a platform with toeboards and standard railings or safety harnesses and lifeline. Also, protect workers from stray sparks or slag in the area below an elevated surface where welding is taking place.

- Aim the welding torch away from cement or stone surfaces. Moisture within these materials could cause them to explode when they reach a certain temperature.

- When finished welding or cutting, warn other workers of hot metal by marking or putting up a sign. Keep floors clean by putting electrode or rod stubs in an appropriate container. Keep floors clear of tripping hazards; store tools safely.

- Never use bad conductors, damaged regulators, torches, electrode holders or other defective equipment.

- Do not arc or resistance weld while standing on damp surfaces, or weld in rain.

- Routinely inspect and maintain welding equipment, including welding cylinders. Inspect cylinders regularly to make sure all parts are in good working order, especially manifolds, distribution piping, portable outlet headers, regulators and hose or hose connections. Be sure that welding torches and regulators have flashback arresters installed according to gas flow requirements.
If the welding project itself must take place at a specific location, all fire hazards in the vicinity of a welding or cutting operation must be moved to a safe place before welding may begin.

Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use and should generally be in reach of any welding operation.

Consider a thorough review of the OSHA standards referenced above if welding anything with cadmium, fluorides, mercury or other materials that might give off poisonous fumes. Be sure there is adequate ventilation.

Your supervisor will designate a worker as a “fire watch” whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:

- Appreciable combustible material in building construction or contents is closer than 35 feet to the point of operation
- Appreciable combustibles are more than 35 feet away but are easily ignited by sparks
- Wall or floor openings within a 35-foot radius that expose combustible material in adjacent areas including concealed spaces in walls or floors
- Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings or roofs and are likely to be ignited by conduction or radiation

For much more information, the official University of Arizona documentation, and the National Fire Protection Association Documentation, please go to: [http://risk.arizona.edu/fire-safety/hot-work-requirements](http://risk.arizona.edu/fire-safety/hot-work-requirements)
Steward Observatory operates more than 20 telescopes on four different mountain ranges within Region 3 of the United States Forest Service, three different Arizona State Forest Service districts, and one under the Tohono O’odham Nation.

Although wildfire management is the responsibility of the Arizona State Forest Service districts and Tohono O’odham Nation, we at Steward Observatory need to do all that is possible to protect our employees and our specialized equipment.

Occasional visitors to the telescope sites should be familiar with wildfire safety including:

1. Be observant and look for locations of fire extinguishers
2. Be on the lookout for any forest fires and report fires to Emergency Services
3. Follow Management and/or Forest Service instructions in the event of a required evacuation
4. Follow the “No Smoking” policy on University property

Regular employees and frequent visitors assigned to specific telescope sites should know:

**Safety and Mitigation Measures for Wildfire Prevention:**
- Keep your work area clean and free of combustible materials
- Notify management of combustible material or piles that needs to be removed
- Participate as required in clearing brush and new growth within acceptable limits of the site each spring before fire season
- Follow the “No Smoking” policy on UA property, and enforce no smoking with all site visitors and other regular site personnel
- Implement and utilize a hot work permit system for all metal cutting and welding operations on site

**Be Prepared:**
- Each year, read and be familiar with the Site Emergency Response Plan and Fire Forest Service Fire Operation Plans
- Know the fire evacuation route
- Know the last resort or safe “shelter in place” location for the site
- Be sure your name is on the site emergency contact list and know the method of contact
- Know the site Emergency Coordinator and their contact information
- Know how to shut down your relevant systems in the event of a facility shutdown
• Learn which equipment must be stored or moved in the event of a fire and be ready to act - This may entail action to bring down systems and equipment in a safe manner
• Ensure proper storage of chemicals at all times so that no further action is needed during a wildfire beyond closing a valve or similar action
• Be aware of firefighting equipment (fast attack trucks) and Personal Protective Equipment (N-95 or mask-type respirator) on site and get trained on how to use them and where they are stored
• Take special training for Wildland Fire Training, CPR, Fire Extinguisher, and Red Card Certification as authorized by operations management at each site

Exit Plan:
• Follow the evacuation instructions
• Do not travel without management, ADOT, or Forest Service approval and instruction
• Do not remain at the site unless specifically authorized by UA and Forest Service, and have appropriate training for respiratory protection and other emergency procedures which may be applicable

Return to Site & Recovery:
• Follow the Management, ADOT, and Arizona State Forest Service guidelines for road closures
• Do not travel without management, ADOT, or Arizona State Forest Service approval and instruction
• Be aware of wildlife drawn to telescope site locations due to wildfire and follow the Forest Service or Tohono O'odham safety guidelines
It is the intent of Steward Observatory that all of its employees who are engaged in construction/maintenance activities where fall protection is required under OSHA 29 CFR 1926.501 or 29 CFR 1910.23 adhere to The University of Arizona Fall Protection Policy which can be found at: http://risk.arizona.edu/fall-prevention

In addition:

- No one is to be on any telescope or platform/structure unless necessary and authorized by his/her supervisor. Only those with a reason to climb will be permitted to do so
- All first-time climbers must be accompanied by an experienced climber
- Climbers should restrict themselves to stairs, walkways, or platforms whenever possible
- Exercise good judgment when climbing. Do not climb when tired or ill
- See the Site Safety Representative for guidance in the use of harnesses, lanyards, and tie-offs.
Safety Training
Section VI
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Steward Observatory has established a Forklift Safety Training Program in accordance with OSHA 29 CFR 1910.178. The following information provides the highlights of the safety requirements of the program.

Drivers need to be trained in accordance with Section L of the standard before they operate a lift truck. Not only is it important to know how to professionally operate a forklift, it is vital to know all safety rules of operation. If, at any time, a forklift is found to be in need of repair, defective, or in any way unsafe, the truck must be taken out of service until it is safe to operate. Only a trained and authorized operator is permitted to drive a forklift. A qualified operator is one who has been fully trained, knows the general vehicle design and who has learned safety inspections and safe driving rules. The following “rules of the road” list general guidelines for safe forklift operations.

- Always keep arms and legs inside the vehicle
- Wear protective equipment when required, such as safety eyewear and ear protection
- Face direction of travel, keep your mind on what you are doing and never travel forward with the load blocking your view
- Pedestrians always have the right of way
- Never allow anyone to ride on your forklift. Forks may be used as a lift only with an approved safety platform. An appropriate safety harness and lanyard must be used
- Know the position of your forks at all times
- Obey speed limits. Avoid sudden braking
- Go slow at all intersections and always sound the horn at blind intersections
- Always drive up ramps and inclines and back down ramps and inclines. The center of gravity of the forklift is in a more stable position when operated in this fashion
- Lift or lower the load only when completely stopped, never when in motion
- Cross railroad tracks at an angle, never a right angle
- No horseplay is allowed
- Keep aware of overhead clearances
- Know the load limits of the vehicle
- Watch for obstructions or spills which may cause an accident
- Make sure the load is balanced
- No towing or pushing is allowed with a forklift

When you leave a forklift unattended and remain within 25 feet of the truck, completely lower the load engaging means or apparatus, neutralize controls and set the brakes to prevent movement.

**NOTE:** A powered industrial truck is unattended when the operator is 25 feet or more away from the vehicle which remains in his or her view, or whenever the operator leaves the vehicle and it is not in view.

Examine the forklift prior to use. At a minimum, check the fork pins and stops, all cowling, body parts, and tires for wear. Check fuel, oil, and water levels and report any leaks.

For much more information and the official University of Arizona documentation and procedures on this subject please go to: [http://risk.arizona.edu/powered-industrial-trucks](http://risk.arizona.edu/powered-industrial-trucks)
Steward Observatory and the U of A Risk Management Services have a close working relationship in the area of training. It is intended that all Steward employees be given training in each area of work where there are possible hazards or when it is required under OSHA rules.

The University has a very extensive training program operated by U of A Risk Management Services. For more information and the official University of Arizona documentation and procedures on this program, please go to:
http://risk.arizona.edu/training

Training is an integral part of the OSHA program and therefore there are many website links to training on the OSHA website. To reach many of these links you may go to:
https://www.osha.gov/dte/index.html

In addition to the training programs provided by U of A Risk Management Services, Steward Observatory has established an on-line training program that allows employees to observe quality training presentations, to take tests and get credit for the training received. All employees are encouraged to participate in this activity whenever there is a “free” time slot of 20 to 30 minutes. Employees can go to the Steward Observatory web page and click on “Safety” to get to this manual, and all on-line training classes.

In order to give guidance to employees on the types of training they should receive, all department supervisors have as a part of their responsibility, the obligation to define training requirements for each classification of employee under their supervision. This responsibility should be a line item in each performance appraisal, and in most cases, the supervisor should also take the training he/she suggests for his/her employees.