

**ES&H STANDARD OPERATING PROCEDURE (ES&H SOP)**

Title: ATMOSPHERIC RADIATION MEASUREMENT CLIMATE RESEARCH FACILITY/NORTH SLOPE OF ALASKA/ADJACENT ARCTIC OCEAN (ACRF/NSA/AAO) PROJECT OPERATING PLAN (U)

Location: North Slope of Alaska and Adjacent Arctic Ocean

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Primary Hazard(s) Addressed: Living and working in extreme Arctic climate.



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## 1.0 PURPOSE, SCOPE, AND OWNERSHIP

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<b>Purpose</b>	This ES&H Standard Operating Procedure defines and informs SNL personnel, contractors, and other ARM collaborators of ES&H policies and procedures associated with working at the ARM Climate Research Facility/North Slope of Alaska/Adjacent Arctic Ocean (ACRF/NSA/AAO) project sites.
<b>Scope</b>	The ES&H policies and procedures outlined in this document cover all ACRF North Slope work activities and apply to all ACRF project personnel living, working at, and/or visiting the ACRF North Slope project facilities. Other operating procedures are also incorporated as attachments and references.
<b>Ownership</b>	This ES&H Standard Operating Procedure is owned by Department 6383 at Sandia National Laboratories. Any suggestions for improvements should be directed to the owners: <i>M. D. Ivey</i> , 505- 284-9092, <a href="mailto:mdivey@sandia.gov">mdivey@sandia.gov</a> .
<b>Location of the Most Current Version of This Plan</b>	The ES&H Standard Operating Procedure is located in the ACRF/NSA/AAO Project files located at Sandia National Laboratories, Albuquerque, NM, and at the ACRF North Slope project sites in Barrow and Atqasuk, Alaska.
<b>Appendices</b>	ACRF/NSA/AAO Barrow and Atqasuk Visitor Guide ACRF/NSA/AAO Alternate Buddy System ACRF/NSA/AAO Bear Safety Plan ACRF/NSA/AAO Cold Weather Hazards ACRF/NSA/AAO Duplex Rules ACRF/NSA/AAO ES&H Policy Statement ACRF/NSA/AAO Emergency Response Plan ACRF/NSA/AAO Activity Specific Firearm Safety Plan for ACRF/North Slope of Alaska ACRF/NSA/AAO Operating Procedures for the Use of Scaffolds at ARM Climate Research Facility/North Slope of Alaska Meteorological Towers ACRF/NSA/AAO Site Safety Orientation ACRF/NSA/AAO Tip Tower Lowering Procedure ACRF/NSA/AAO Vehicle Use Policy

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## 2.0 RESPONSIBILITIES

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<b>Site Project Manager</b>	<p>The ACRF/NSA/AAO Site Project Manager is responsible for ensuring that personnel who perform work:</p> <ul style="list-style-type: none"><li>• are qualified and certified to perform specific tasks at the site</li><li>• have read this plan and those appendices determined by the Site ES&amp;H Coordinator to be relevant to the person's work activities,</li><li>• have affirmed that they have read and understood this ES&amp;H SOP procedure , as well as all appendices relevant to their work assignment, as determined by the ACRF/NSA/AAO Site ES&amp;H Coordinator, and</li><li>• have completed a Site Access Request, if not a resident in Barrow or Atkasuk.</li></ul>
<b>6300 ES&amp;H Coordinator</b>	<p>The 6300 ES&amp;H Coordinator is responsible for reviewing ES&amp;H documents and providing assistance to ACRF/NSA/AAO personnel for compliance with Sandia corporate ES&amp;H requirements.</p>
<b>Site ES&amp;H Coordinator</b>	<p>The Site ES&amp;H Coordinator is responsible for the following:</p> <ul style="list-style-type: none"><li>• Maintaining this document.</li><li>• Ensuring that site personnel have access to ES&amp;H documents.</li><li>• Communicating training requirements to site personnel.</li><li>• Recording and reporting accidents and occurrences.</li><li>• Conducting accident investigations per emergency response plan in section 8.0 of this SOP.</li></ul>
<b>Site Facility Manager</b>	<p>The Site Facility Manager is responsible for the following:</p> <ul style="list-style-type: none"><li>• Ensuring that all routine daily ACRF/NSA/AAO operations on the North Slope are conducted in accordance with the policies outlined in this document.</li><li>• Ensuring that all site visitors are receiving the Site Safety Orientation Power Point Briefing.</li></ul>
<b>Guests and Visitors</b>	<p>Guests and visitors may include SNL, DOE, local officials, or other personnel <b>not routinely working on projects at the site</b>. All guests and visitors not part of an escorted tour group shall:</p> <ul style="list-style-type: none"><li>• Submit a Site Access Request at <a href="http://www.db.arm.gov/SARS2/">http://www.db.arm.gov/SARS2/</a> for approval by Valerie Sparks, ACRF/NSA/AAO Project Office Administrative Assistant, before arrival at the Site.</li><li>• Affirm that all relevant and required ES&amp;H materials have been reviewed.</li><li>• Follow directions given by site personnel.</li><li>• Follow hazard warnings posted or otherwise instructed.</li><li>• <b>Not</b> operate any project equipment without explicit authorization by the ACRF/NSA/AAO Site Project Manager or the designee.</li></ul>

**Escorted  
Tour Groups**

School and other escorted tour groups shall:

- Have an escort who has satisfied all requirements as a project participant.
- Follow directions of their escort.
- Follow hazard warnings posted or otherwise instructed.
- **Not** operate any project equipment without explicit authorization by the ACRF/NSA/AAO Site Project Manager or the designee.

**Project  
Participants**

Project participants are SNL employees, SNL contractors, and ARM-program personnel from other collaborating organizations **routinely working** at the site. These personnel shall:

- Carry out the same actions required of site visitors as noted previously.
- Become familiar with and adhere to the guidance provided by this document, and any other relevant appendices, operating procedures or additional instructions.
- Provide feedback and offer improvements with regard to ES&H matters.
- Report all accidents and occurrences to the ACRF/NSA/AAO Site ES&H Coordinator.
- Obtain and maintain current all necessary training requirements.

### 3.0 TRAINING QUALIFICATIONS

**Job Training/Qualifications** All Members of the Workforce for SNL shall remain current in required job-related training and skills while working at the ACRF North Slope of Alaska Project Sites. Guests and visitors may also be required to undergo training if their work activities at the sites warrant such training. The ACRF/NSA/AAO Site ES&H Coordinator can make this determination.

**ES&H Training** All Members of the Workforce for SNL, as defined by the SNL ES&H Corporate Policy System, shall be compliant with the SNL mandatory ES&H Training Course, ESH100. Offsite contractors will fulfill ES&H requirements as determined by the SNL ES&H Coordinator as well as take any ES&H training deemed appropriate by their employers.

<b>Table 1 – Training Classes That May Apply to Members of the Workforce To Be Determined by ACRF/NSA/AAO ES&amp;H Coordinator</b>	
<b>Class</b>	<b>Course Number in SNL Training and Employee Development System (TEDS)</b>
ACRF/NSA/AAO Site Safety Orientation	On-Site Power Point Presentation
All Terrain Vehicle and Snow Machine	Safety Briefing and Hands-On Training in Barrow and Atkasuk
Basic Electrical Safety	ELC 106 & ELC 106R
CPR Training	MED 104 for SNL Personnel and American Heart Association Training, Red Cross, or approved equivalent course for Contractors
Crane, Rigging, Hoisting Training	RGH 100 or RGH 100R
Cryogen Safety	PRS 115
Fall Prevention and Protection and Awareness Training	FPP 105 for SNL Personnel and Ilisagvik College for Contractors
Firearms Training (Includes Puncture Wound First Aid)	FST 100 for SNL Personnel and American Heart Association Training for Contractors
First Aid	MED 102 for SNL Personnel and American Heart Association Training for Contractors or Firearms and Puncture Wound-Specific Training as Part of FST100
Forklift Operator Training	FKL-153, and FKL 153G (for Contractors)
Hazardous Waste and Environmental Management	ENV 112
Chemical Safety Training	CHM 100
Laser Safety	LAS 202
Occupational Noise	NSE100
Pressure Safety	PRS 150 & PRS 150R for SNL Personnel and Pressure Safety Training Video for Contractors
Project Equipment & Instrumentation	Instruction, User, and Maintenance Manuals located at ACRF/NSA/AAO Sites

Site Specific Laboratory Training	CHM 100 & 103
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**ACRF/North Slope/-Specific Training**

SNL employees and SNL contractors must also complete the required training that is applicable to their work activities at ACRF/NSA/AAO facilities. The determination of classes or approved equivalents, that may apply, as shown in Table 1, will be made by the ACRF/NSA/AAO Site ES&H Coordinator or the contracting entity, as appropriate.

**Guest Visitors and Other ARM Personnel**

Upon request of the Site ES&H Coordinator, guests, visitors and other ARM personnel will complete and provide evidence of comparable relevant training and/or experience prior to engaging in work activities at ACRF/NSA/AAO facilities.

This ES&H Standard Operating Procedure and all appendices relevant to the person's work assignment, as determined by the ACRF/NSA/AAO Site ES&H Coordinator, can be found on the ACRF/NSA/AAO Web pages at the Visiting The Site and ES&H Materials links. <http://www.arm.gov/sites/nsa/visit> .

**Recommended Reading**

The following documents provide additional information on ES&H management at ACRF/NSA/AAO facilities:

<b>Table 2 – Recommended Reading</b>	
<b>Title</b>	<b>Location</b>
Corporate Policy: ESH100 Environment Safety & Health	Available to Sandia Personnel Only at Sandia Web
Sandia National Laboratories Primary Hazard Screening-Climate Research Facilities on the North Slope of Alaska	SNL ACRF/NSA/AAO Project Office



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## 4.0 DEFINITIONS and ACRONYMS

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<b>AAO</b>	Adjacent Arctic Ocean
<b>Authorized User</b>	Trained personnel who operate equipment, instrumentation, and systems at the North Slope Project Sites.
<b>ARM</b>	Atmospheric Radiation Measurement (Program)
<b>Collaborator</b>	Individual associated with an organization with which ARM has some form of agreement for collaboration with the ACRF/NSA/AAO Site.
<b>DOE</b>	Department of Energy
<b>ES&amp;H</b>	Environment, Safety & Health
<b>NEPA Checklist</b>	National Environmental Policy Act Checklist
<b>NOAA/GMD</b>	National Oceanic & Atmospheric Administration/Global Monitoring Division
<b>NSA</b>	North Slope of Alaska
<b>NSA Facilities</b>	Barrow ACRF Facility Site, Atqasuk ACRF Facility Site
<b>NSB</b>	North Slope Borough
<b>OP</b>	Operating Procedure
<b>PHS</b>	Primary Hazard Screening
<b>PPE</b>	Personal Protective Equipment
<b>Project Participants</b>	SNL employees, SNL contractors, or other ARM-associated personnel routinely working at the North Slope Project Site.
<b>Remote Location</b>	Work facilities other than the ACRF facilities in Barrow and Atqasuk
<b>SOP</b>	Standard Operating Procedure
<b>SHEBA</b>	Surface Heat Budget of the Arctic
<b>Site Access Request</b>	Written request to the ACRF/NSA Site Visit Administrator for site visits accommodations and/or other services. Requests are submitted at <a href="http://www.arm.gov/about/forms">http://www.arm.gov/about/forms</a> , and must be approved, before arriving at the ACRF/NSA/AAO Site. This form must be completed in its entirety.
<b>SNL/NM</b>	Sandia National Laboratories, Albuquerque, New Mexico
<b>SM</b>	Site Project Manager
<b>TEDS</b>	Training and Employee Development System; a database that tracks training for SNL project participants.
<b>UIC-NARL</b>	Ukpeagvik Inupiat Corporation (UIC) - (former) Naval Arctic Research Laboratory.
<b>Visitors and Guests</b>	SNL or DOE employees, other ARM project-related DOE Contractor Employees, local officials, visiting scientists, students, dignitaries, etc., visiting the ARM Climate Research Facility/North Slope Project Site.

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## 5.0 HAZARDS IDENTIFICATION

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**5.1 Animals** - The most serious animal threat on the North Slope comes from polar bears (See the “ACRF/NSA/AAO Bear Safety Plan” at [http://www.arm.gov/sites/nsa/docs/nsa\\_bsp.pdf?id=51](http://www.arm.gov/sites/nsa/docs/nsa_bsp.pdf?id=51) for worker guidelines concerning the polar bear hazard). Rabies is also endemic in the resident fox population. Site personnel are instructed to avoid foxes.

**5.2 Chemicals and Hazardous Materials** – Use of chemicals and hazardous materials, except for consumer products used in consumer quantities, is not expected to be a common or routine activity at the ACRF/NSA facilities. Use of all hazardous chemicals and materials is subject to the Site Project Manager’s approval. An MSDS is required and appropriate procedures must be developed as needed for work activities involving hazardous chemicals: (For additional information, see the “ACRF/NSA/AAO Site Safety Orientation” document at [http://www.arm.gov/sites/nsa/docs/nsa\\_saf.pdf?id=48](http://www.arm.gov/sites/nsa/docs/nsa_saf.pdf?id=48)).

**5.3 Electrically Energized Equipment** – Project participants will perform work according to their training and safety guidelines, keep equipment maintained, and not perform any service or repair to electrical distribution systems or equipment for which they are not qualified and authorized by the Site Project Manager. Guidelines for electrical instrument maintenance and repair are available in the manuals specific for each instrument.

**5.4 Extreme Cold with Wind** – This is the most serious weather related hazard associated with work on the ACRF/NSA/AAO Site. The North Slope of Alaska is north of the Arctic Circle at north latitudes ranging from 69° to 72°. The North Slope is covered with ice and snow typically nine months of the year (September-May). During part of November, all of December, and most of January, the sun does not come above the horizon; this is what is referred to as the “polar night.” During this period, very low temperatures are encountered. The record low temperature at Barrow is 57° F below zero. Lower temperatures can occur on the coastal plain farther away from the coast. Temperatures in the range of 25° to 45° F below zero are common in winter. On the arctic coastal plain these low temperatures often occur in combination with moderate to high winds. Typical wind chill factors are 60° to 80°F below zero. With these wind chills, exposed flesh freezes in one to two minutes. Excursions to triple digit below zero wind chills are not unusual. Appropriate training, clothing, equipment and work policies are necessary to assure outdoor safety under these conditions. When people move around within the populated areas, the cold weather conditions impose minor burdens. In such areas, exposure is limited to minutes, and the array of buildings in the populated area reduces the wind at ground level so that the actual wind chill is less severe than in the surrounding countryside.

The greatest cold-weather hazard occurs for ARM personnel when working outdoors on the tundra or sea ice for sustained periods (i.e., greater than one hour). Appropriate cold-weather clothing includes hooded parkas, insulated pants, thermal underwear, insulated boots, inner gloves and outer mittens, face masks, and goggles (all chosen with appropriate low temperature ratings). The amount of clothing needed at any given time is a judgment call, depending upon the prevailing and forecasted weather. Overheating can be a significant

threat. Overheating caused by overexertion leads to perspiration, which in turn degrades the insulating value of clothing. Upon cessation of exertion, overheating can easily turn to hypothermia. Consequently, exertion and protective clothing need to be carefully balanced, and adjusted as needed to minimize or preferably prevent perspiration. Additional equipment required for extended (multiple-day) outdoor work activities in cold weather includes first aid and emergency survival supplies, lighting, radio or cellular telephone communications to summon help, and provisions for emergency shelter. Extended outdoor work activities in cold weather require advance planning and the development of activity-specific work plans. Contact the Site ES&H Coordinator for more information. Additional information and policies regarding cold weather hazards can be referenced in the “ACRF/NSA/AAO Cold Weather Hazards” document at [http://www.arm.gov/sites/nsa/docs/nsa\\_cwh.pdf?id=43](http://www.arm.gov/sites/nsa/docs/nsa_cwh.pdf?id=43). Under most circumstances, a buddy system is used for work activities at the ACRF/NSA/AAO facilities. Occasional deviations to this buddy system are covered in the “ACRF/NSA/AAO Alternate Buddy System” document located at [http://www.arm.gov/sites/nsa/docs/nsa\\_abs.pdf?id=25](http://www.arm.gov/sites/nsa/docs/nsa_abs.pdf?id=25). Alternate procedures include keeping another individual informed as to one's work plans when working alone, contingency planning for transportation equipment failure (snow machine, all terrain vehicle, 4-WD truck etc.), and a cautious avoidance of white-out conditions (extreme low visibility) that can result in disorientation. A cellular phone with spare battery with adequate capacity for the work session is mandatory for all individuals working alone at ACRF/NSA/AAO facilities that are located away from populated areas.

Some work activities in association with the ARM/NSA mission may involve extended, multi-day work activities in remote locations significantly removed from populated areas on the North Slope of Alaska. In these cases, wilderness survival training (e.g. the skills and equipment required to survive arctic conditions in an overnight emergency shelter in the event of a storm or other unexpected event) may be necessary.

The determination of the need for survival training for such unusual work activities will be made by the ACRF/NSA/AAO Site Project Manager and the ES&H Coordinator on a case-by-case basis. Survival training is not required for routine work activities at the Barrow and Atkasuk ACRF/NSA/AAO facilities.

**5.5 Firearms** – Shotguns with slug ammunition are available as a protective measure when working away from populated areas because of the polar bear hazard (Refer to the “ACRF/NSA/AAO Bear Safety Plan” located at [http://www.arm.gov/sites/nsa/docs/nsa\\_bsp.pdf?id=51](http://www.arm.gov/sites/nsa/docs/nsa_bsp.pdf?id=51)

Firearm hazards can arise from weapon mishandling or malfunction. Initial training and annual training refreshers are required for all ARM personnel authorized to carry firearms. Hearing and eye protection shall be used during all firearm-training events. All ARM/SNL employees, who are trained to use firearms, shall be enrolled in the Sandia Hearing Conservation Program prior to the handling and use of firearms.

Annual training in NSE100 (noise safety training) or an approved equivalent is required for everyone enrolled in the Hearing Conservation Program. Sandia also recommends that all contractors authorized to handle and use project firearms enroll in a Hearing Conservation Program. The specific details concerning administration of this hearing conservation program are left to the discretion of the contractor's management. (For a complete description of the

policies and procedures for carrying firearms at ACRF/NSA/AAO facilities, see the “Activity Specific Firearm Safety Plan for ARM/North Slope of Alaska” document located at [http://www.arm.gov/sites/nsa/docs/nsa\\_fsp.pdf?id=43](http://www.arm.gov/sites/nsa/docs/nsa_fsp.pdf?id=43).

As an alternate protective measure, ARM personnel may be escorted by persons trained as Bear Guards during periods when bear activity is likely or has been observed by others in the work area. Bear Guards are used by scientific researchers on Arctic field projects such as the many on the North Slope of Alaska that are funded by National Science Foundation. Bear Guard training will be coordinated through the Alaska Fish and Wildlife Service.

**5.6 Fire Safety** - Fire is a special hazard in Polar Regions on the North Slope because combustion sources (e.g. portable heaters) are commonplace. Loss of shelter in the Arctic can be fatal. Fire is a recognized hazard on the North Slope, and the usual safety measures, such as monthly inspection of fire extinguishers and smoke alarms, proper electrical wiring, good housekeeping, control of smoking and appropriate training are rigorously exercised. In remote locations where loss of shelter caused by fire would pose a severe threat, backup shelter or survival gear not threatened by fire shall be incorporated into work plans.

**5.7 Lasers** - Some instrument components at the ACRF/NSA/AAO facilities contain lasers capable of inflicting eye injury. All laser use at the ACRF/NSA/AAO facilities will be monitored by the ACRF/NSA/AAO Site ES&H Coordinator. All laser systems will be used in accordance with the manufacturer’s instructions and SNL's ES&H Corporate Policy System. Laser Classifications numbers I (1) through IV (4) are described in the SNL’s Corporate Policy System and laser safety web sites such as [http://www.asu.edu/radiationsafety/laser/chap\\_3.html](http://www.asu.edu/radiationsafety/laser/chap_3.html).

**All Members of the Workforce are prohibited from working on systems where there is a potential for exposure to laser energy at class 2 or above.**

This means instruments with internal lasers of class 2 or above can only be opened by any Member or the Workforce with appropriate current training.

All employees working with class 2 or 3a are recommended to take LAS 202 and employees working with class 3b or 4 laser are also required to take LAS 202 prior to working with lasers. Additional operating procedures for instruments with lasers will be developed on an as-needed basis.

**5.8 Mechanical Hazards** - Use of forklifts, cranes or other mobilized equipment must comply with required safety precautions, inspection and certification. Refer to the SNL Corporate Policy: ESH100 Environment Safety & Health .

<https://my.sandia.gov/authsec/portal/cps/environmentalSafetyHealth>

for guidance in these areas. Training classes are available for these work activities and are listed in Table 1.

**5.9 Noise Producing Equipment** - One of the instruments at the Barrow ACRF/NSA/AAO Site is a Radio Acoustic Sounding System (RASS). The RASS incorporates a sound source that makes a loud noise during its periodic measurement cycle. This noise source does not pose a hearing loss hazard to site personnel engaged in work activities that are not directly adjacent to the RASS unit (e.g. work in the instrumentation shelter or any of the outdoor instrument platforms). RASS maintenance and repair activities may necessitate that personnel be in close proximity to the sound source. Hearing protection (foam plugs or muffs) are required in such situations.

**5.10 Non-Ionizing Electromagnetic Radiation** - Instrument radar systems at the ACRF/NSA/AAO facilities emit non-ionization radiation. Exposure levels for persons engaged in normal site activities are non-hazardous since the beam energy is directed in the vertical direction. Personnel shall obey all signs that have been placed to restrict personnel from areas where non-ionizing radiation may pose a hazard.

**5.11 Other Thermal and Environmental Hazards** - Technicians working with soldering irons, electric heat guns or other similar sources may encounter burn hazards. Proper protective equipment such as tongs and insulated gloves shall be used to prevent hot objects from coming in contact with bare skin. In addition, contact of bare skin with extremely cold objects could result in injury. The threat of hypothermia or frostbite in cold weather conditions discussed above must be understood and avoided. Heavy clothing, ice and darkness compound slip and fall hazards at ACRF/NSA/AAO facilities. Extreme care must be exercised while maneuvering on slippery surfaces - whether on foot or with vehicles. No work activities should be carried out in closed, unventilated spaces such as sealed shipping containers since suffocation hazards may exist.

**5.12 Remote work-site hazards** – The distance from prompt emergency assistance, and use of snow machines and all terrain vehicles at remote areas, requires that the work policies outlined in the “ACRF/NSA/AAO Alternate Buddy System” located at [http://www.arm.gov/sites/nsa/docs/nsa\\_abs.pdf?id=49](http://www.arm.gov/sites/nsa/docs/nsa_abs.pdf?id=49) and the transportation policies outlined in the “ACRF/NSA/AAO Site Safety Orientation” be carefully understood and followed.

**5.13 Scaffolds, elevated platforms, and portable ladders** - Working at heights greater than four feet presents the threat of falling, if proper precautions are not taken. Workers must assure that: they use the right equipment; the equipment is erected and maintained in a safe manner; and activities are performed in a thoughtful and safe manner. Typical elevation hazards are compounded under cold and/or icy conditions. (For more information on guidelines used at the ACRF/NSA/AAO Site for work on elevated surfaces, consult the SNL ES&H Corporate Policy System, Section 4F, and the ACRF/NSA Operating Procedures for the Use of Scaffolds at ARM Climate Research Facility/North Slope of Alaska Meteorological Towers document).

**5.14 Transportation** - Most transportation hazards for North Slope of Alaska project personnel involve on-road vehicles. Certain restrictions apply concerning the use of project vehicles.

Special precautions are required for snow machine or all-terrain vehicle transportation to and from ACRF/NSA/AAO facilities. Transportation by these travel modes to remote work areas carries an injury hazard potential resulting from vehicle turnover or collision with other objects. Vehicle malfunction could result in unanticipated sustained exposure to severe weather conditions as discussed above. Refer to the “ACRF/NSA/AAO Site Safety Orientation located at [http://www.arm.gov/sites/nsa/docs/nsa\\_saf.pdf?id=28](http://www.arm.gov/sites/nsa/docs/nsa_saf.pdf?id=28) for policies regarding use of these vehicles.

Two other special transportation situations may arise: Charter aircraft are occasionally used in ARM projects on the North Slope of Alaska. Special provisions can be made for the use of charter aircraft for personnel transport. Certain DOE restrictions apply. Consult the ACRF/NSA/AAO Site Project Manager and Sandia ES&H Corporate Procedure: ESH100.2.IS.15 Manage Aviation Safety, for more information on the use of charter aircraft. <https://my.sandia.gov/authsec/portal/cps/environmentalSafetyHealth/policy/process/procedure?procedure=ESH100.2.IS.15&section=all>

Infrequently, travel by small boat is also required. Project personnel traveling via this mode of transportation should insure that adequate personal floatation devices and personnel survival gear is available. The Site Project Manager should be consulted for the development of an activity-specific safety plan for situations involving marine transport.

**5.15 Working under low and flat light conditions** – Low light level increases the hazard associated with polar bears, transportation and personal navigation. Under low light conditions, special care is required. Note that “flat light” is the diffused lighting that occurs under cloudy skies when the ground is snow covered. Under flat light conditions, there are no shadows cast, and the topography of snow-covered surfaces is impossible to judge. Snowdrifts, and ditches in the snow cannot be differentiated from flat, unbroken snow-covered ground. Extreme care is required when using snow machines and ATVs under these circumstances.

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## 6.0 PARTIAL LIST OF EQUIPMENT AND MATERIALS

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- Equipment**
- ACRF/NSA/AAO - related Instrumentation
  - Test equipment
  - Hand and power tools
  - Communication devices
  - Personal Protective Equipment (PPE) - hearing protection, gloves, other cold weather clothing, and firearms.
  - Communication devices - phones, cell phones, pagers, 2-way radios, etc.
  - Personal locator beacons
  - Vehicles - snow machines, all terrain vehicles, 4W drive, etc.
  - Cold weather survival gear
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## 7.0 OPERATING PROCEDURES

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**Introduction** ACRF/NSA/AAO site operations involve a complex array of instruments at each of the facilities. Each of these instruments will be operated in accordance with guidelines outlined in operation manuals that accompany each instrument. In addition to instrument manuals, project personnel shall also read and be familiar with the following work policies and procedures. The documents are available by going to <http://www.arm.gov/sites/nsa/visit> and clicking on the “ES&H Materials” link.

ACRF/NSA/AAO Barrow and Atqasuk Visitor Guide  
ACRF/NSA/AAO Alternate Buddy System  
ACRF/NSA/AAO Bear Safety Plan  
ACRF/NSA/AAO Cold Weather Hazards  
ACRF/NSA/AAO Duplex Rules  
ACRF/NSA/AAO ES&H Policy Statement  
ACRF/NSA/AAO Emergency Response Plan  
ACRF/NSA/AAO Activity Specific Firearm Safety Plan for ARM/North Slope of Alaska  
ACRF/NSA/AAO Operating Procedures for the Use of Scaffolds at ARM Climate Research Facility/North Slope of Alaska Meteorological Towers  
ACRF/NSA/AAO Site Safety Orientation  
ACRF/NSA/AAO Tip Tower Lowering Procedure  
ACRF/NSA/AAO Vehicle Use Policy (Includes the Snow Cat)  
Snow Machine Operation (Video tape)  
ATV – All Terrain Vehicle Operation (Booklet)

**Equipment Maintenance** Required maintenance procedures for the various climate-monitoring instruments are outlined in the instrument or equipment manuals that are located at each of ACRF/NSA/AAO sites. Instrument mentors or other knowledgeable ACRF/NSA/AAO operations personnel are also resources for equipment maintenance information.

## 8.0 EMERGENCY PROCEDURES AND ACTIONS

**General** The following are general instructions for handling emergency situations at ACRF/NSA facilities but not remote facilities. Emergency situations include but are not limited to fire; accident with injury; failure of transportation equipment resulting in exposure to cold weather or bears; wet clothing without shelter during the cold season. Emergency response plans for personnel working at remote facilities distant from Barrow or Atqasuk are developed on a project-specific basis. Contact the Site Project Manager for assistance in these situations. See the ACRF/NSA/AAO Emergency Response Plan for detailed responses to specific emergencies.

<b>Table 3 – Emergency Response Plan Summary</b>	
<b>Step</b>	<b>Action</b>
1	Provide or obtain emergency assistance as required. Medical, Fire, Security, and Search & Rescue numbers are given in Table 4 - Emergency Actions.
2	Secure the hazardous item or area to avoid further harm or damage.
3	Secure the incident area and related equipment, and/or other materials to facilitate a formal investigation at a later time if warranted, but do not incur additional risk in so doing. Do not allow interference with the incident area equipment or conditions until the determination of need for, or completion of, an investigation is made.
4	Begin documentation of events - witness statements, incident area photographs, weather conditions and other relevant factors <b>AS SOON AS PRACTICAL</b> . Do not expose individuals to unnecessary additional hazards in order to establish formal documentation.



**Emergency Actions** In the event of an emergency in the **immediate vicinity of Barrow** (including the Barrow ACRF/NSA/AAO Site), carry out the following procedures:

<b>Table 4 – Emergency Actions in Barrow</b>			
	<b>Determine extent and degree of emergency.</b>		
	<b>Emergency responders or site personnel will contact:</b>		
	<b>Steps</b>		
		<b>Ambulance, Fire, Police</b>	<b>911</b>
	<b>1a or</b>	<b>Barrow Site Facility Manager</b>	Walter Brower (907) 852-5818 (work) (907) 878-4780 (mobile)
	<b>1b</b>	<b>Barrow Site Chief Operator</b>	Jimmy Ivanoff (907) 852-5818 (w) (907) 878-3824 (m)
	<b>2</b>	<b>UIC Science Manager</b>	Anne Jensen (907) 852-0930 (w) (907) 878-5656 (m)
	<b>3a or</b>	<b>NSA Site Project Manager and Site ES&amp;H Coordinator</b>	Mark Ivey (505) 284-9092 (w) (505) 553-2304 (bb) (505) 266-1012 (h)
	<b>3b or</b>	<b>Backup: Site Technical Operations Manager</b>	Jeff Zirzow (505) 284-4446 (w) (505) 269-9340 (m) (505) 281-9896 (h)
	<b>3c or</b>	<b>Backup: Department Manager</b>	Mark D Ivey (505) 284-9092 (w) (505) 553-2304 (bb) (505) 266-1012 (h)
	<b>3d or</b>	<b>Backup: SNL Center ES&amp;H Coordinator</b>	Marty McRoberts (505) 284-5249 (w) (505) 803-2614 (bb)
	<b>3e</b>	<b>OOPS Line at Sandia National Laboratories</b>	(505) 844-0311 (non-emergency)
		<b>Optional:</b>	
	<b>4a or</b>	<b>Barrow Public Safety (Police)</b>	(907) 852-6111
	<b>4b or</b>	<b>Wildlife Assistance</b>	(907) 852-0350
	<b>4c</b>	<b>Search &amp; Rescue Assistance (if stranded away from navigable roads)</b>	(907) 852-2808

<b>Sandia staff (Sandia staff member who was the initial point of contact above) will contact all of the following:</b>			
<b>5</b>	<b>Department Manager</b>	Mark D Ivey	(505) 284-9092 (w) (505) 553-2304 (m) (505) 266-1012 (h)
<b>6</b>	<b>OOPS Line at Sandia National Laboratories</b>		(505) 844-0311 (non-emergency)
<b>7</b>	<b>Sr. Manager</b>	Rush Robinett	(505) 845-9015 (w) (505) 239-1119 (m)
<b>8</b>	<b>Division ES&amp;H Manager</b>	Craig Nimmo	(505) 844-7227 (w) (505) 803-8586 (m)
<b>9</b>	<b>Division Office, Executive Assistant</b>	Deborah Marchand	(505) 845-9918 (w)
<b>10</b>	<b>ARM ES&amp;H Officer</b>	Monte Brandner	(630) 252-2885 (w) (630) 988-9706 (m) (630) 985-3170 (h)
<b>11 or</b>	<b>ACRF/Technical Coordinator</b>	Jim Mather	(509) 375-4533 (w) (509)420-0698 (m)
<b>12</b>	<b>ARM Operations Manager</b>	Doug Sisterson	(630) 252-5836 (w) (630) 450-2929 (m)

**Emergency Actions** In the event of an emergency in the **immediate vicinity of Atqasuk** (including the Atqasuk ACRF/NSA/AAO facility), carry out the following procedures:

<b>Table 4 – Emergency Actions in Atqasuk</b>			
	<b>Determine extent and degree of emergency.</b>		
	<b>Emergency responders or site personnel will contact:</b>		
	<b>Steps</b>		
		<b>Ambulance, Fire, Police</b>	<b>911</b>
	<b>1a or</b>	<b>Atqasuk Site Facility Manager</b>	Doug Whiteman (907) 633-3200 (work) (907) 633-4848 (home)
	<b>1b</b>	<b>Barrow Site Facility Manager</b>	Walter Brower (907) 852-5818 (work) (907) 878-4780 (mobile)
	<b>2</b>	<b>UIC Science Manager</b>	Anne Jensen (907) 852-0930 (w) (907) 878-5656 (m)
	<b>3a or</b>	<b>NSA Site Project Manager and Site ES&amp;H Coordinator</b>	Mark Ivey (505) 284-9092 (w) (505) 553-2304 (bb) (505) 266-1012 (h)
	<b>3b or</b>	<b>Backup: Site Technical Operations Manager</b>	Jeff Zirzow (505) 284-4446 (w) (505) 269-9340 (m) (505) 281-9896 (h)
	<b>3c or</b>	<b>Backup: Department Manager</b>	Mark D Ivey (505) 284-9092 (w) (505) 553-2304 (bb) (505) 266-1012 (h)
	<b>3d or</b>	<b>Backup: SNL Center ES&amp;H Coordinator</b>	Marty McRoberts (505) 284-5249 (w) (505) 803-2614 (m)
	<b>3e</b>	<b>OOPS Line at Sandia National Laboratories</b>	(505) 844-0311 (non-emergency)
		<b>Optional:</b>	
	<b>4</b>	<b>VHF Channel 68</b>	

**Sandia staff (Sandia staff member who was the initial point of contact above) will contact all of the following:**

<b>5</b>	<b>Department Manager</b>	Mark D Ivey	(505) 284-9092 (w) (505) 553-2304 (bb) (505) 266-1012 (h)
<b>6</b>	<b>OOPS Line at Sandia National Laboratories</b>		(505) 844-0311 (non-emergency)
<b>7</b>	<b>Sr. Manager</b>	Rush Robinett	(505) 845-9015 (w) (505) 239-1119 (m)
<b>8</b>	<b>Center ES&amp;H Manager</b>	Craig Nimmo	(505) 844-7227 (w) (505) 803-8586 (m)
<b>9</b>	<b>Division Office, Executive Assistant</b>	Deborah Marchand	(505) 845-9918 (w)
<b>10</b>	<b>ARM ES&amp;H Officer</b>	Monte Brandner	(630) 252-2885 (w) (630) 988-9706 (m) (630) 985-3170 (h)
<b>11 or</b>	<b>ACRF/Technical Coordinator</b>	Jim Mather	(509) 375-4533 (w) (509)420-0698 (m)
<b>12</b>	<b>ARM Operations Manager</b>	Doug Sisterson	(630) 252-5836 (w) (630) 450-2929 (m)

**Emergency  
Actions**

In the event of an injury or illness, the ACRF/NSA/AAO Site ES&H Coordinator will take the following steps:

<b>Table 6 – Reporting Injury and Illness</b>	
<b>Step</b>	<b>Action</b>
1	Contact the Sandia National Laboratories Department Manager.
2	Prepare the 2050P form and forward it to the ACRF/NSA Project Office for retention.
3	Assist in the preparation of the Interim Report, if needed.
4	For injury or illness involving Sandians, follow the steps for the Oops Notification Process and the steps for Reporting Injuries and Illness outlined in Chapter 16 of the SNL ES&H Corporate Policy System.

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## **9.0 WASTE DISPOSAL**

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**Waste Disposal** Waste disposal procedures will conform to the site landlord's procedures and must also be consistent with local, state and federal regulations. (NOAA is the landlord on NOAA/CMDL land; UIC Real Estate is the landlord at UIC-NARL; and Atqasuk Corporation is the landlord at Atqasuk) Consult the ACRF/NSA/AAO Site ES&H Coordinator and the Primary Hazard Screening for additional guidance on waste disposal.

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## 10.0 ES&H REPORTING AND DOCUMENTATION

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### Records

The following records are required for ES&H reporting:

- A record of each project participant's familiarity with this document. Annually documented either by receipt of an e-mail or FAX from project participants indicating they have read this document and all relevant appendices.
- ES&H training records for project personnel at SNL will be maintained in the TEDS database. UIC contractor personnel ES&H training records will be maintained as a paper copy by the contractor's employer and as a paper copy by the ACRF/NSA/AAO Project Office at SNL in Albuquerque, NM.

The following records are available, and may have ES&H related information contained in them:

- OMIS Reports: These reports are not required, but are available. They consist of corrective and preventive maintenance reports which may at times contain information about ES&H related events. The contact for access to this database is Martin Stuefer, at [stuefer@gi.alaska.edu](mailto:stuefer@gi.alaska.edu).
- Integrated Safety Management System (ISMS) documents include the Primary Hazard Screening, NEPA Checklists, ES&H Standard Operating Procedure and other ES&H Site specific documents for the ACRF/NSA/AAO project facilities and shall be maintained according to SNL guidelines.

### Plan Review

The following are procedures for the review and familiarity of this document:

All project participants shall read and be familiar with this Project ES&H Plan and any changes or revisions to it. Project participants will indicate completion of their review by sending an e-mail or FAX indicating such to the ACRF/NSA/AAO Project Office at Sandia National Laboratories, New Mexico. E-mail to Valerie Sparks, [vsparks@sandia.gov](mailto:vsparks@sandia.gov) or FAX to Valerie Sparks at (505) 844-0116.

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## 11.0 REFERENCES

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**References** The following is a list of applicable documents:

<b>Title</b>	<b>Location</b>
Environment, Safety, and Health Manual, MN471001, Latest Edition	On Sandia National Laboratories (SNL) IRN web site (Contact ACRF/NSA/AAO Site Project Manager for more information)
ACRF/NSA/AAO Project Documents	At SNL ACRF/NSA/AAO Project Office with selected copies at project sites (Contact ACRF/NSA/AAO Site Project Manager for more information.)

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## 12.0 APPENDICES

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**Appendices** Direct links can be made to these appendices located at the ARM NSA web site; <http://www.arm.gov/sites/nsa/visit> under the ES&H Documents tab. If you have difficulty opening these documents from the ARM NSA web site, please contact Valerie Sparks at (505) 844-7116, [vsparks@sandia.gov](mailto:vsparks@sandia.gov), or Rolanda Jundt at (509) 375-2936, [rolandajundt@pnl.gov](mailto:rolandajundt@pnl.gov).

ACRF/NSA/AAO Barrow and Atkasuk Visitor Guide  
ACRF/NSA/AAO Alternate Buddy System  
ACRF/NSA/AAO Bear Safety Plan  
ACRF/NSA/AAO Cold Weather Hazards  
ACRF/NSA/AAO Duplex Rules  
ACRF/NSA/AAO ES&H Policy Statement  
ACRF/NSA/AAO Emergency Response Plan  
ACRF/NSA/AAO Activity Specific Firearm Safety Plan For ARM/North Slope of Alaska  
ACRF/NSA/AAO Operating Procedures for the Use of Scaffolds at ARM Climate Research Facility/North Slope of Alaska Meteorological Towers  
ACRF/NSA/AAO Site Safety Orientation  
ACRF/NSA/AAO Tip Tower Lowering Procedure  
ACRF/NSA/AAO Vehicle Use Policy (Includes the Snow Cat, Snow Machine Operation (Video Tape), and All Terrain Vehicle (ATV) Operation Booklet)

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## 13.0 AUTHORIZED PROJECT PARTICIPANTS LIST

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**Authorized Project Participants List** A list of authorized project participants is kept on file at the Sandia National Laboratories ACRF/NSA/AAO Project office. Project participants should indicate that they have reviewed this ES&H SOP, and all appendices listed in Section 12.0 of this document, by sending an e-mail or a fax to Valerie Sparks at ([vsparks@sandia.gov](mailto:vsparks@sandia.gov)) or (505)-844-0116, *with the following statement verbatim included in the text of the transmittal (e-mail or FAX).*

I affirm that I have read and understand this ES&H Standard Operating Procedure (ES&H SOP) entitled: “ARM Climate Research Facility/North Slope of Alaska/Adjacent Arctic Ocean (ACRF/NSA/AAO) Project Operating Plan (U)”, as well as all appendices relevant to my work assignment (as determined by the Site ES&H Coordinator), and I agree to operate within and adhere to the stated policies.