

SGP CART SAFETY ORIENTATION

Revised 10/14/04

1 INTRODUCTION

Welcome to the Atmospheric Radiation Measurement Program's Southern Great Plains (SGP) Climate Research Facility. Argonne National Laboratory (ANL) manages this U.S. Department of Energy (DOE) site. It is very important that all visitors comply with all DOE and ANL safety requirements, as well as those of the Occupational Safety and Health Administration (OSHA), the National Fire Protection Association, and the U.S. Environmental Protection Agency, and with other requirements as applicable.

2 VISITOR SIGN-IN AND SIGN-OUT

All visitors to the SGP CART site are required to complete a Site Access Request (SAR) form before visiting the site.

Visitors are required to sign the visitor sign-in log and get a visitor badge anytime they visit the Central Facility site; likewise, be sure to sign out if you are leaving the site, even if it is for lunch and you plan to come back to the site. It is very important that you sign in and sign out so that, in case of an emergency, we have a way to track where you are. The visitor sign-in log is located in the Central Facility Administration Trailer.

Visitors going to SGP CART Extended Facilities or other SGP CART facilities are required (1) to make a check-in call from the site to notify Site Operations (580-388-4053) of the time of arrival on-site and (2) to call again and notify Site Operations of the time of departure. Any pertinent information regarding the site or operations at the Extended Facility, such as severe weather, will be coordinated between Site Operations and the visitor during the check-in call.

When performing work at locations other than the main site, telephone contact may be used to communicate with Site Operations after your initial sign-in. You must have a cellular telephone when working at remote sites, and the number of that telephone must be given to Site Operations so you can be contacted in the event of an emergency.

If you are traveling to the El Reno Extended Facility (EF) it is mandatory upon arrival that you sign in at the Fort Reno Headquarters, there will be signs indicating where you should go.

3 DRESS CODE

The following dress code is applicable at all SGP CART facilities:

- Long pants (no shorts)
- Shirt (may be short-sleeved as long as you have 4-in. sleeve or longer)
- Shoes that have a substantial sole (and, if out in the field, shoes with ankle support)
- NO sandals or thongs allowed

4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

4.1 Hard Hat

- Required when at the Central Facility 60-m tower.
- Required when installing or operating elevated instrumentation where chance of injury from elevated structures is present. The Site Safety Officer will determine when visitor installations or activities require hard hats. The Central Facility has a limited supply of hard hats available for use by visitors.
- Required when in construction areas.

4.2 Safety Glasses

- Required in construction areas and other installation activities where eye injury could occur. Discussion of installation plans with the Site Safety Officer will determine the requirements for personnel to wear safety glasses.
- Recommended during periods of high winds.

4.3 Work Gloves

Work gloves are required when doing any work where hand injury is possible.

4.4 Special PPE When Handling Liquid Nitrogen

The Central Facility has an on-site supply of liquid nitrogen contained in 160-L Dewar flasks. Smaller Dewar flasks can be filled from these larger containers. A fill hose is provided at the 160-L Dewar flask location. When using liquid nitrogen at any SGP facility, the following PPE is required to be worn:

- Safety goggles
- Full-face shield
- Elbow-length gauntlets
- Chemical full-body apron

5 SMOKING, ALCOHOL, DRUGS, AND FIREARMS

Smoking is prohibited inside any of the buildings, enclosures, and trailers at the SGP CART site. Smoking is allowed outside in non-fire-danger areas only. Smoking debris is to be placed in authorized receptacles only.

Alcoholic beverages, illegal drugs, and firearms are strictly prohibited at any SGP CART facility or site.

6 HAZARDS

During your visit, we want you to be aware of some of the hazards that you might encounter and also to become familiar with safety rules designed to mitigate these hazards. We have divided them into four hazard categories as follows:

- Electrical
- Chemical
- Nonionizing radiation
- Natural
- Driving Hazards

6.1 Electrical Hazards

6.1.1 De-energizing Equipment

Always de-energize electrically hazardous equipment before performing maintenance on it; that is, never work on live circuits that could expose personnel to an electrical hazard. If you are unsure as to whether or not the work you are planning involves electrical hazards, notify the Site Safety Officer before performing the work.

6.1.2 Lock-Out/Tag-Out Standard

We abide by OSHA's Lock-Out/Tag-Out Standard, which states that you will lock out and tag out an electrical device before working on it, so that it cannot be re-energized accidentally. Lock-out/tag-out procedures and equipment are supplied by the Site Safety Officer.

6.1.3 Ground Fault Circuit Interrupters

All outdoor receptacles, all receptacles located within 6 ft of exterior doors, and all receptacles around sinks or other water supplies shall be protected by ground fault circuit interrupters.

6.1.4 Excavation and Penetration

If you need to excavate or penetrate the ground or an existing facility, enclosure, or trailer wall, please contact the Site Safety Officer for approval before starting work. Excavations in the ground require a digging permit.

6.1.5 Portable Electrical Equipment

All portable electrical equipment (except double-insulated tools) must have a three-prong grounding plug. All portable electrical equipment shall be in good working order and is subject to inspection by the Site Safety Officer or his or her designee before use.

6.1.6 Electrical Extension Cords

If electrical extension cords are to be used, they shall be the three-wire type and have a hard or extra hard usage rating. They shall be in good condition and not compromised in any way. They shall not be connected in series,

spliced, or taped. The Site Safety Officer will inspect all extension cords coming to the SGP CART site.

6.1.7 Aluminum and Metal Ladders

Because of the conductivity of aluminum and other metals, no aluminum or metal ladders are allowed on-site. Ladders brought to the site must be in good working condition.

6.2 Chemical Hazards

6.2.1 Hazard Communication Standard

We abide by OSHA's Hazard Communication Standard. Haz/Com is also known as the "Employee Right To Know Law" and is commonly addressed in a Chemical Hygiene Plan at laboratories and universities and in private industry.

The OSHA standard specifies that personnel have the right to know of chemicals that are used on-site. This requirement is accomplished through the chemical manufacturer's Material Safety Data Sheet (MSDS), labels on products or containers, and the education that this standard exists.

6.2.2 Bringing Chemicals On-Site

If you are bringing any chemicals to the site, please identify them on the applicable previsit forms, or notify the Site Safety Officer. Include any chemical item, even one as benign as distilled or drinking water. All chemicals brought to the site shall be labeled and have a Material Safety Data Sheet.

6.2.3 Flammable Chemicals

All flammable chemicals shall be stored in an approved flammable storage cabinet.

6.2.4 Chemicals Used in Quantity at the SGP CART Site

Chemicals that the SGP CART site uses in quantity are helium, liquid nitrogen, and carbon dioxide.

Helium: Helium is used to launch the weather balloons and is an asphyxiant. Our supplies are kept outside.

Liquid Nitrogen: Liquid nitrogen is used to cool certain instruments. It is a cryogenic material, and hazards consist of asphyxiation and burns. The SGP CART site's main supply Dewar flasks are stored outside, and quantities needed for instrument use are taken inside trailers in smaller Dewar flasks. All personnel are required to wear personal protective equipment and obtain approval from the Site Safety Officer when using liquid nitrogen.

Carbon Dioxide: Carbon dioxide is an asphyxiant and is used in the Central Facility's fire suppression systems. The Central Facility has four trailers with fire suppression systems; they are the calibration trailer, the optical trailer, the Raman lidar trailer and Cloud Radar trailer. The fire suppression system works by dumping copious amounts of carbon dioxide in the trailer, lowering the oxygen content so that it suffocates the fire. Because it is a asphyxiant and potentially harmful to people, we have taken special precautions, the bulleted items listed below explain life safety protocol and features of the fire suppression system:

Fire Suppression System

Fire Suppression Alarm Bell Protocol

Steady bells and strobe indicate that either a smoke or heat detector has been activated.

Slow Pulsed bells and strobe indicate that both smoke and heat detector have been activated, this starts a 30 second countdown, during this countdown the CO2 system may be manually delayed, by pressing in and holding the large mushroom shaped abort button located near doors. With the button pressed in the system will not discharge. Once the button is released, you have 25 seconds before the system will discharge.

Fast Pulsed bells and strobe indicates that the solenoid actuator has opened the master cylinder valves and the 30-second pneumatic delay

has started, at which time the CO2 system may not be manually delayed.

Pneumatic Siren: Should the above bells and strobe malfunction, the system has a pneumatic siren that works by having the CO2 flow past a turbine that creates a siren sound (much like community tornado siren). This means that the solenoid actuators have been tripped and shortly the CO2 will fill the room. Evacuate immediately.

REMEMBER ABOVE ALL ELSE

If you hear bells and see strobes, hold your breath and get out of the trailer immediately.

6.3 Nonionizing Radiation Hazards

This site contains radio frequency, microwave, and laser radiation. All radiation is well contained, and appropriate engineering controls are in place to protect personnel; however, if you plan to work on instruments and are required to deliberately disable safety engineering controls (e.g., a laser interlock), then you must gain approval from the Site Safety Officer before commencing any work.

6.4 Natural Hazards

The SGP CART facilities are located in rural Oklahoma and Kansas, and there is a myriad of natural hazards one might encounter. Some of the more evident natural hazards are the following.

6.4.1 Terrain

Rural areas have uneven ground surfaces, protruding rocks, tree branches, and other vegetation that may make walking somewhat difficult. Remember to always look before taking a step, and avoid possible tripping hazards.

6.4.2 Snakes

Oklahoma and Kansas have many different species of snakes, and most are nonpoisonous. The bite of a nonpoisonous snake can cause pain and infection but is rarely serious. Three types of poisonous snakes are found in

Oklahoma and Kansas, and their bites can cause serious illness and even death. The following poisonous snakes are found in the CART area:

- Eastern, western, and pygmy diamondback rattlesnakes
- Water moccasin
- Copperhead

First Aid for Snakebite

1. Stay calm.
2. Look at snake for identification (shape of head, color, and markings).
3. Seek help.
4. Keep the bite at the level of the heart.

6.4.3 Arachnids and Insects

6.4.3.1 Spiders

Black Widow: The black widow is a small, shiny spider, less than half of an inch long but with a leg span of up to 2 in., with a red hourglass shape on its underside. A bite from a black widow spider can cause severe pain and muscle spasms, heavy sweating, stomach cramps, nausea, vomiting, tightness in the chest, breathing difficulty, and a sharp rise in blood pressure.

Brown Recluse: The brown recluse spider is brown or brown-yellow in color and has a dark violin-shaped area on the back. The brown recluse is found under rocks and woodpiles, as well as in closets and attics. A bite from the brown recluse can cause severe pain, reddening, blistering, and death of the tissue, followed by deep ulceration at the site of the wound. The bite may not be noticed at first. Pain at the bite site begins one to four hours later.

First Aid for Spider Bite: Try to identify the type of spider. If possible, kill the spider without smashing it beyond recognition. Call the Safety Officer or Shift Supervisor, and advise them of the situation. Then seek medical attention for your bite.

6.4.3.2 Ticks

The Lone Star tick, the American dog tick, the brown dog tick, and the black-legged tick or deer tick frequent Oklahoma and Kansas. Most ticks are capable of transmitting a variety of diseases, including Rocky Mountain

spotted fever, Colorado tick fever, Lyme disease, and even tularemia (a disease that causes toxins in the blood; high fever is a symptom).

First Aid for Tick Bites:

1. Remove ticks with tweezers, with a slow steady squeeze.
2. Wash area thoroughly with soap and water.
3. Mark the date of the bite on the calendar. If any flu-like symptoms (such as fever, muscle pain, extreme fatigue, headache, and chills), joint pain, swollen glands, or a rash appears, see your physician. Symptoms of Lyme disease may not develop for up to two months.

To avoid ticks, tuck pant legs into socks; spray an insect repellent on pants.

6.4.3.3 Fleas and Chiggers

To avoid exposure to fleas and chiggers, do not walk in uncultivated areas or heavy vegetation. Spray an insect repellent on pants.

6.4.3.4 Gnats and Mosquitoes

Gnats: Although most gnats are not bothersome, Oklahoma and Kansas have a gnat (the buffalo gnat) that bites much like a mosquito. To repel these gnats, apply Avon Skin-So-Soft™ or vanilla extract.

Mosquitoes: To avoid contact with mosquitoes, spray an insect repellent on the outside of clothing and, if repellent is designated for it, spray on bare skin.

6.4.3.5 Blister Beetles

Blister beetles are small insects that have yellow and black strips running the entire length of the body. Their bite produces immediate pain, redness, itching, and swelling that can persist for hours.

6.4.3.6 Hornets, Wasps, Bees, and Scorpions

Hornets, Wasps, and Bees: Hornets, wasps, and bees all have a stinger, but honey bees have a stinger attached to a poison sac that is left in the wound when a sting occurs. Wasp and hornets retain their stinger and may sting repeatedly.

First Aid for Hornet, Wasp, or Bee Sting: If a stinger is present, remove the stinger from the wound by scraping a blunt object, such as a dull blade, across the wound. Symptoms usually resolve within a few hours. If symptoms such as difficulty in breathing or rapid severe swelling occur, seek medical attention.

Scorpion: All scorpions in Oklahoma and Kansas can produce a painful sting, but serious life-threatening symptoms are rare.

First Aid for Scorpion Sting: First aid is similar to a wasp sting.

6.4.3.7 Cattle and Electric Cattle Fences

At times, the pasture outside of the instrument areas may contain cattle. Cattle are, for the most part, docile animals. Please do not provoke them.

Because of the cattle, all exposed instrumentation, shelters, and platforms have either a single-strand electric fence or a barbed-wire fence. Be careful not to touch the electric wire because a mild shock is likely. All electric fences have gates; please use them. Be careful around barbed-wire fences because the small barbs are very sharp and can cause injury.

6.4.3.8 Badgers, Skunks, and Coyotes

Badgers: The badger is fairly prevalent in most parts of Kansas and Oklahoma. Badgers are small (average, 20 lb) mammals that feed on small rodents, fruits, and roots. They have very sharp teeth and long sharp claws and are quite aggressive. In cooler weather, the badger will make a burrow and remain there for several months. The opening to the burrow is 6 to 8 inches in diameter. The badger is a defensive animal and will usually only attack if provoked. Should you spot a badger hole, keep your distance, and do not put your feet or hands into the hole.

Skunks: The skunk is fairly prevalent in most parts of Kansas and Oklahoma. This small mammal produces a very unpleasant odor when excited or threatened. Please keep your distance from these animals. They also can carry rabies; if bitten, seek medical attention immediately.

Coyotes: The coyote is fairly prevalent in most parts of Kansas and Oklahoma. Coyotes are small dog-like mammals. They attack small animals and livestock. Coyotes are, for the most part, very shy and afraid of

humans. They do, however, sometimes carry rabies; so, if bitten, seek immediate medical attention.

7 EMERGENCY SERVICES

Local authorities (to include police, fire, and medical services) have been identified for each of the SGP CART site facilities. Routine and emergency coordination for these emergency services will be provided through telephone contact with the Central Facility Control Center at 580-388-4053.

8 EMERGENCY SITUATIONS

If emergency situations arise, first take the immediate required action (first aid, cardiopulmonary resuscitation [CPR], etc.), and then contact the Central Facility to advise of the situation. More information and guidance on emergency situation actions and reporting will be provided by the contact with the Central Facility.

9 SEVERE WEATHER

The Central Facility will establish the "site weather alert condition" (red, yellow, or green). The Central Facility has access to near real-time weather radar displays, plus access to the Internet weather advisory services, including the National Weather Service advisories and radar displays.

Coordination between the Central Facility and field personnel shall allow for sufficient advance warning of impending severe weather.

9.1 Site Weather Alert Condition

The SGP CART site currently uses a three-color system to denote the weather alert status for any given site. The site weather alert condition status will be established and modified as needed by coordination between the Central Facility and applicable personnel on-site. The following categories define the SGP CART weather alert condition status.

9.1.1 Green — Normal Condition

No weather watches or warnings are in effect for the site area.

9.1.2 Yellow — Watch Condition

The yellow weather alert condition is established when forecasted weather conditions may result in a severe weather situation. Severe weather is classified as thunderstorms, tornadoes, heavy rain or snow, flash floods, winter storms, heavy fog, or any other weather condition that may hamper or affect site operations and personnel. During the watch condition, Central Facility and field personnel shall maintain their alertness to the surrounding weather conditions. Any changes noticed shall be immediately coordinated between the Central Facility and field personnel via telephone.

9.1.3 Red I — Warning Condition

The red I weather alert condition is established when forecasted severe weather is imminent. The important aspect of the red I condition is for the field personnel to implement acute heightened awareness of the surrounding weather conditions and to be aware that the potential exists for a condition that may require field personnel to seek shelter at any moment. If the severe weather includes lightning, large hail, and high winds and if these events are observed within 5 mi of the site and are moving toward the site, all outside work shall be immediately stopped. At the Central Facility, personnel shall remain inside the designated site building. Field personnel shall evacuate the site to a safe location. On reaching the safe location, field personnel shall call and notify the Central Facility of their location, status, and any other relevant information until the weather threat has passed.

9.1.4 Red II — Warning: Take Cover

The red II weather alert condition denotes the threshold for immediate evacuation to an adequate storm shelter. At the Central Facility, all personnel shall immediately proceed to the storm shelters, taking the cellular telephone and flashlight.

At remote facilities without storm shelters, personnel who have not otherwise sought a safe location shall immediately seek a low-lying area, such as a ditch or ravine, for cover.

Upon assessment that the severe weather event has passed, personnel shall cautiously exit the storm shelter and immediately survey the area, noting any observed damage.

After completion of the initial damage assessment, call and notify the Central Facility that you have safely survived the severe weather event, and relay information on any damage observed. The Central Facility will advise what additional actions need to be taken.

9.2 Hot Weather Exposure

Three heat-related illnesses can be caused by hot weather exposure.

9.2.1 Heat Stroke

Heat stroke is life-threatening. The victim's temperature control mechanisms stop working. The body temperature can rise so high that brain damage and death may occur if the body is not cooled quickly.

Symptoms of Heat Stroke: Symptoms include dry, hot red skin and a very high body temperature.

First Aid for Heat Stroke: First aid is to cool the victim down as quickly as possibly, and call for medical help.

9.2.2 Heat Exhaustion

Heat exhaustion is less dangerous than heat stroke. Heat exhaustion typically occurs when people work in a warm, humid place where body fluids are lost through heavy sweating.

Symptoms of Heat Exhaustion: Symptoms include cool, moist pale or red skin or heavy sweating, dilated pupils, headache, nausea, and dizziness.

First Aid for Heat Exhaustion: First aid is to get the victim into a cooler place. Place victims on their back, with feet up. Cool by fanning or applying cold packs, and give 1/2 cup of water every 15 minutes.

9.2.3 Heat Cramps

Heat cramps are muscular pains and spasms due to heavy exertion and usually involve the abdominal muscles and/or the legs. It is generally thought that the loss of water and salt from heavy sweating causes cramps.

9.2.4 Hot Weather Hazard Prevention

- Drink plenty of liquids such as water and fruit and vegetable juices. Avoid soda pop and coffee.
- Restrict strenuous activity during hot periods.
- Wear loose-fitting light-colored clothing, preferably made of natural fibers such as cotton. Man-made fibers do not absorb water well. Wear a hat.

9.3 Cold Weather Exposure

9.3.1 Cold Weather exposure

During Oklahoma winter's, cold weather is almost a certainty. There are two main personnel effects cold weather can produce.

9.3.2 Hypothermia

Hypothermia results when the body loses heat faster than it can produce it. When this situation first starts to occur the blood vessels start to constrict, and hands and feet are first effected. Next involuntary shivers begin to occur. The shivering is your body's first warning sign. Further heat loss produces speech difficulty, forgetfulness, and loss of manual dexterity, collapse, and finally death.

9.3.3 Frostbite

As your blood vessels constrict to keep vital organs warm, hands and feet can experience frostbite. Hands and feet are the first body parts effected. Usually your hands and feet begin with a burning sensation, then enter a numbing phase. The numbing phase is very dangerous and actual frostbite may occur.

9.3.4 Cold Weather Exposure Prevention

Dress warmly, wear layered clothing. Cover all exposed flesh. If clothes become wet change as soon as possible.

Set up a work/rest regiment. During your rest period go into a warm area and drink warm beverages.

Check the Wind Chill Chart to determine cold weather exposure hazard guidance based upon wind and temperature.

9.3.5 Cold Weather Driving

Take along hot liquids (e.g., decaffeinated coffee), blankets, and flashlights to aid you if your vehicle becomes stranded in cold weather.

In snow and icy condition, remember to allow extra time to get to your destination. Also bring along a container of sand or kitty litter to assist you in the event you get stuck.

Remember if roads are slick and hazardous call the Highway patrol for their advice, and then notify the Central Facility of the situation.

10.0 RURAL DRIVING HAZARDS

The SGP CART facilities are located in rural Oklahoma and Kansas, which means to access these sites you must travel on non-paved roads (i.e., dirt and sand/gravel roads). Thus, it is important to coordinate with the Central Facility to receive the latest on road conditions. Remember that many of the rural roads have unmarked and blind intersections so proceed cautiously. Finally, with the increase of the deer population in both Oklahoma and Kansas, please heighten your awareness and slow down, when traveling in areas that would conceal a deer (i.e., areas that have high vegetation or are wooded). Deer tend to travel about mostly at dusk and dawn.

11.0 SAFETY VIOLATIONS/DISCREPANCY

The Site Safety Officer and Site Operations Manager have the authority to cease operations of any activity that is in violation of federal, state, or local safety regulations or is in violation of the items covered in this orientation. Any person has the authority to cease operations that are immediately dangerous to life and health (imminent danger). The Site Safety Officer or the Site Operations Manager (or both) shall be immediately notified of any safety or emergency incident occurring at any SGP ACRF facility.