



# SANFORD UNDERGROUND RESEARCH FACILITY

**SOUTH DAKOTA SCIENCE AND TECHNOLOGY AUTHORITY**

## **Severe Weather Trigger Action Response Plan (TARP)**

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## Air Quality

- The AQI is measured on a scale from 1 – 500. A lower score indicates high-quality air, while a higher score indicates low-quality air. An AQI of 51 and above will initiate an alert for air quality.
- The TARP shown in Table 1: Air Quality TARP describes the specific response guidelines that shall be followed.

<b>BLUE ALERT</b> Air Quality: AQI 51-150	<b>YELLOW ALERT</b> Air Quality: AQI 151-200	<b>RED ALERT</b> Air Quality: AQI 201+
<ul style="list-style-type: none"> <li>• Continuous monitoring of weather warning systems</li> <li>• AQI: <a href="https://www.airnow.gov/">https://www.airnow.gov/</a> <a href="https://denr.sd.gov/des/aq/aarealtime.aspx">https://denr.sd.gov/des/aq/aarealtime.aspx</a></li> <li>• NWS: <a href="https://www.weather.gov/">https://www.weather.gov/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Notifications made to affected personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Notifications made to affected personnel</li> <li>• Announce via sitewide communications</li> </ul>
<b>SURFACE</b>		
<ul style="list-style-type: none"> <li>• Assess all outdoor activity and evaluate appropriateness of initiating new tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Affected personnel to identify nearest safe location and be prepared to move inside</li> <li>• Limit outdoor tasks for workers.</li> </ul>	<ul style="list-style-type: none"> <li>• Suspend all affected outdoor activities</li> <li>• All personnel to immediately move indoors</li> </ul>
<b>UNDERGROUND ACCESS</b>		
<ul style="list-style-type: none"> <li>• Check for sufficient air quality and ventilation for underground work areas, including underground shafts.</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate underground work tasks until the alert is cancelled.</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate suspending underground work and relocate to fresh air until the alert is cancelled.</li> </ul>

**Table 1: Air Quality TARP**

- Considerations:
  - Limit strenuous outdoor activity, particularly for individuals with pre-existing respiratory issues and workers 55 years or older.
  - Remain in fresh air until the alert has been cancelled.
- Event Follow-Up:
  - Supervisor to account for their assigned personnel.
  - Coordinate with external emergency support as needed.
  - Perform damage assessment inspection across site as needed.
  - All personnel shall report any injuries, illness or operational disruptions via the internal incident notification process (ESH-(3000-F)-173324 First Report).
  - Evaluate and provide for formal communication needs. All formal communications are to be approved and issued by the SURF Laboratory Director and/or Director of Communications.
  - Evaluate for external reporting requirements (e.g., Cooperative Agreement, LBNF/DUNE, LZ, etc.).

## Cold Temperatures

- Wind Chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. Therefore, the wind makes it feel much colder. The Cold Temperature TARP includes the effects of Wind Chill.
- The TARP shown in Table 2: Cold Temperatures TARP describes the specific response guidelines that shall be followed until the alert has been cancelled.

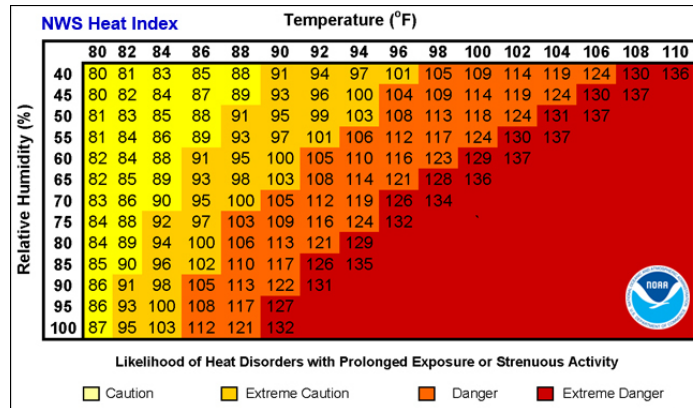
BLUE ALERT Temperatures: 32 to 15°F (0 to -10°C)	YELLOW ALERT Temperatures: 15 to -15°F (-10 to -25°C)	RED ALERT Temperatures: < -15 °F (<-25 °C)
<ul style="list-style-type: none"> <li>• Continuous monitoring of weather warning systems</li> </ul>	<ul style="list-style-type: none"> <li>• Notifications made to affected personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Notifications made to affected personnel</li> <li>• Announce via sitewide communications</li> </ul>
<ul style="list-style-type: none"> <li>• Evaluate clothing for environmental conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Dress in layers of warm, wind-resistant, waterproof clothing</li> </ul>	<ul style="list-style-type: none"> <li>• Cover all exposed skin, particularly the face and hands</li> </ul>
<ul style="list-style-type: none"> <li>• Review activities for risk to frigid temperatures</li> <li>• Ensure shaft heating equipment is operational</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate all outdoor activity and appropriateness of initiating new tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate all activities and appropriateness of continuing tasks</li> </ul>
	<ul style="list-style-type: none"> <li>• Ensure exposed personnel are not working alone</li> <li>• Inspect shaft infrastructure for possible ice buildup</li> <li>• Inspect headframes for possible ice buildup</li> <li>• Monitor and adjust critical systems including the Oro Hondo fans/isolation damper, and the Yates and Ross Shaft heaters as necessary</li> </ul>	
<ul style="list-style-type: none"> <li>• Ensure a heated environment is available within 30 minutes of the work location</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure a heated environment is available within 10 minutes of the work location</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure a heated environment is available within 5 minutes of the work location</li> </ul>

***Table 2: Cold Temperatures TARP***

- Considerations:
  - Wear appropriate workwear. Supplemental personal protective equipment (PPE) can be obtained by SDSTA procurement if needed.
    - ◆ Wear several layers of loose clothing.
    - ◆ Make sure to protect the head, ears, face, hands and feet in extremely cold weather.
    - ◆ Boots should be waterproof and insulated.
  - Schedule work during the warmest part of the day.
  - Avoid touching cold metal surfaces with bare skin.
  - Periodically monitor workers' physical condition.
  - Schedule frequent short breaks in warm dry areas to allow the body to warm up.
  - Provide engineering controls such as radiant heaters, ensuring that all newly introduced heat sources are designed to prevent secondary hazards (e.g., fire, carbon monoxide, etc.).
  - Evaluate mobile equipment requirements during extreme cold.
- Event Follow-Up:
  - The following actions are to be initiated once the alert has been cancelled:
    - Supervisors to account for their assigned personnel.
    - Coordinate with external emergency support if needed.
    - Perform damage assessment inspection across site as needed.
    - All personnel shall report any injuries, property damage or operational disruptions via the internal incident notification process (ESH-(3000-F)-173324 First Report).
    - Area Supervisors/Duty Officer to inspect for environmental loss including spills, chemical releases, etc. and immediately report to the ESH Department.
    - Evaluate and provide for formal communication needs. All formal communications are to be approved and issued by the SURF Laboratory Director and/or Director of Communications.
    - Evaluate external reporting requirements (e.g., Cooperative Agreement, LBNF/DUNE, LZ, etc.).

## Heat Index

- SDSTA recognizes the acute health risks associated with heat, both on the surface and in the underground facility. Primary engineering controls are supported by secondary administrative controls to provide a healthy environment for all SURF activities. Engineering controls are critical to maintaining a regulated environment in established, maintained and inspected areas within the underground facility. Physical requirements for the underground facility can be found in the Facility Access Standard.
- The heat index in Figure 1, Heat Index is used to estimate heat-related risks to workers.



**Figure 1: Heat Index**

- The TARP shown in Table 3: Heat Index TARP describes the specific response guidelines that shall be followed until the alert has been cancelled.

BLUE ALERT	YELLOW ALERT	RED ALERT
Risk Level: Lower (Caution) Heat Index: < 91°F	Risk Level: Moderate to High Heat Index: 91°F to 115°F	Risk Level: Very High to Extreme Heat Index: > 115°F
<ul style="list-style-type: none"> <li>• Continuous monitoring of weather warning systems</li> </ul>	<ul style="list-style-type: none"> <li>• Notifications made to affected personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Notifications made to affected personnel</li> <li>• Announce via sitewide communications</li> </ul>
SURFACE		
<ul style="list-style-type: none"> <li>• Monitor surface activities</li> <li>• Monitor cooling systems</li> </ul>	<ul style="list-style-type: none"> <li>• Notify supervisory personnel to regulate outdoor surface activities</li> </ul>	
UNDERGROUND ACCESS		
<ul style="list-style-type: none"> <li>• Monitor operability of the primary exhaust fans</li> </ul>	<ul style="list-style-type: none"> <li>• Notify supervisory personnel to regulate activities in low ventilation areas</li> </ul>	<ul style="list-style-type: none"> <li>• Remove personnel from low ventilation areas</li> <li>• Suspend access to low ventilation areas</li> </ul>

**Table 3: Heat Index TARP**

- Considerations:
  - Provide workers with water, rest and a location to cool themselves.
  - Allow workers more frequent breaks.
  - Modify work schedules, as necessary.
  - Train workers to recognize the signs and symptoms of heat-related illnesses and their prevention.
  - Ensure ventilation systems in buildings and the underground facilities are designed and maintained to provide adequate airflows for environmental conditions.
  - Follow the requirements of the Work Planning and Control process for any work activities when there is a Heat Index rating of 115°F or greater.
- Event Follow-Up:
  - The following actions may be initiated once the alert has been cancelled:
    - ◆ Supervisor to account for their assigned personnel.
    - ◆ Perform damage assessment inspection across site as needed.
    - ◆ Coordinate with external emergency support if needed.
    - ◆ Verify that critical cooling systems are operational (e.g., primary ventilation fans, air compressors, chillers, etc.).
    - ◆ All personnel shall report any injuries, property damage or operational disruptions via the internal incident notification process (ESH-(3000-F)-173324 First Report).
    - ◆ Evaluate and provide for formal communication needs. All formal communications are to be approved and issued by the SURF Laboratory Director and/or Director of Communications.
    - ◆ Evaluate for external reporting requirements (e.g., Cooperative Agreement, LBNF/DUNE, LZ, etc.).



## High Winds

- High winds can be associated with storms or may act as a single weather event. Wind measurements fall into two categories:
  - Sustained Winds (for one hour or more)
  - Wind Gusts (any duration)
- The TARP shown in Table 4: High Wind TARP describes the specific response guidelines that shall be followed until the alert has been cancelled.

<b>BLUE ALERT</b> Windy: 20-30 mph (32 kph – 48 kph)	<b>YELLOW ALERT</b> Very Windy: 30-40 mph (48 kph – 64 kph)	<b>RED ALERT</b> High Winds: > 40 mph/gust 58 mph (> 64 kph/gust 92 kph)
<ul style="list-style-type: none"> <li>• Continuous monitoring of weather warning systems</li> </ul>	<ul style="list-style-type: none"> <li>• Notifications made to affected personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Notifications made to affected personnel</li> <li>• Announce via sitewide communications</li> </ul>
<b>SURFACE</b>		
<ul style="list-style-type: none"> <li>• Review plan to secure mobile cranes and elevated work platforms</li> </ul>	<ul style="list-style-type: none"> <li>• Regulate surface activities:               <ul style="list-style-type: none"> <li>· Suspend all mobile crane and aerial lift operations</li> <li>· Seek shelter away from elevated temporary structures (e.g., scaffolds)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Assess all outdoor activity and evaluate appropriateness of initiating new tasks (e.g., loading loose material, etc.)</li> <li>• Monitor condition of nearby surface infrastructure for impacts from wind</li> </ul>	<ul style="list-style-type: none"> <li>• Affected personnel to identify nearest safe location and be prepared to move inside</li> </ul>	<ul style="list-style-type: none"> <li>• All personnel to immediately move indoors</li> </ul>
<ul style="list-style-type: none"> <li>• Identify unsecured materials and tools susceptible to wind (e.g. plywood, sheeting, ladders, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Secure materials and tools susceptible to wind</li> </ul>	
<b>UNDERGROUND ACCESS</b>		
<ul style="list-style-type: none"> <li>• Evaluate shaft hoisting activities</li> </ul>	<ul style="list-style-type: none"> <li>• Be prepared to suspend personnel hoisting operations</li> </ul>	<ul style="list-style-type: none"> <li>• Suspend all shaft work and move workers to a safe location</li> <li>• Suspend personnel hoisting operations               <ul style="list-style-type: none"> <li>· Any active trips are to be completed</li> <li>· Emergency availability for egress purposes only</li> </ul> </li> </ul>

**Table 4: High Wind TARP**

- Considerations:
  - Be aware of flying debris and wear appropriate eye protection and other suitable PPE.
  - Personnel unable to access a designated storm shelter shall:
    - ◆ Stand clear of roadways as a gust may blow you into the path of an oncoming vehicle.
    - ◆ Shelter in a substantial building with at least normal headroom.
    - ◆ Take cover next to a building or under a shelter.
    - ◆ Avoid sheltering in or next to high profile vehicles.
    - ◆ Use handrails where available on outdoor walkways.
    - ◆ Avoid elevated areas such as roofs.
  - Avoid driving if possible. When driving is necessary, take extra precautions.
  - Remain sheltered until the alert has been cancelled.
- Event Follow-Up:
  - The following actions are to be initiated once the alert has been cancelled:
    - ◆ Account for affected personnel.
    - ◆ Coordinate with external emergency support if needed.
    - ◆ Stay away from downed power lines.
    - ◆ Report damaged utilities to appropriate provider.
    - ◆ Perform damage assessment inspection across site as needed.
    - ◆ Physical observations shall be performed in the individual work areas and at select remote locations. Observations shall include:
      - ◇ Damaged infrastructure
      - ◇ Downed powerlines
      - ◇ Environmental damage
    - ◆ Area Supervisors/Duty Officer shall report any property damage or operational disruptions via the internal incident notification process (First Report).
    - ◆ Area Supervisors/Duty Officer to inspect for environmental loss including spills, erosion, chemical releases, etc. and immediately report to the Environmental Manager.
    - ◆ Evaluate for external reporting requirements (e.g., Cooperative Agreement, LBNF/DUNE, LZ, etc.).
    - ◆ Evaluate and provide for crisis communication needs (internally/externally).

## Thunderstorms

- Thunderstorm risk categories include:
  - Thunderstorm Watch (Slight Risk): Thunderstorms are expected to be few or isolated. Thunderstorms with large hail, damaging winds and/or tornadoes are possible, but the exact time and location of storm development is still uncertain. A watch means, be prepared for storms.
  - Thunderstorm Warning (Moderate Risk): Thunderstorms are expected to be more organized, numerous or widespread. A thunderstorm is imminent or occurring. A thunderstorm wind equal to or greater than 40 miles per hour (mph) (64 kilometers/hour [km/hr]) and/or hail of at least a half-inch diameter is defined as approaching severe.
  - Severe Thunderstorm (High Risk): Severe thunderstorms with the potential for tornadoes, damaging windstorms and/or large hail are expected. A thunderstorm is occurring. A severe thunderstorm is one that produces winds of 58 mph (93 km/h) or stronger and/or hail of at least one-inch diameter or larger.
- The Thunderstorm TARP below includes hail, heavy rains and lightning; any one of which may trigger a change in alert status.
- Lightning
  - The following 3 separate TARPs address these risks, although color-coded risk levels and associated controls are universal.
    - ◆ Lightning as a component of a thunderstorm (See Table 5: Thunderstorm TARP)
    - ◆ Lightning by itself (See Table 6: Lightning TARP)
    - ◆ Lightning hazards associated with explosives (ESH-(5000-S)-73375 Explosive Material Management Standard)

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## Thunderstorms

- The TARP shown in Table 5: Thunderstorm TARP, describes the specific response guidelines that shall be followed until the alert has been cancelled.

<b>BLUE ALERT</b> <u>Thunderstorm Watch:</u> Lightning: 40 - 20 miles (64-32 km/h) Hail: Expected Heavy Rains: Expected	<b>YELLOW ALERT</b> <u>Thunderstorm Warning:</u> Lightning: 20 – 10 miles (32-16 km/h) Hail: ½” in diameter Heavy Rains: ½”	<b>RED ALERT</b> <u>Severe Thunderstorm:</u> Lightning: 10 – 0 miles (16-0 km/h) Hail: 1” in diameter Heavy Rains: 1”
<ul style="list-style-type: none"> <li>Continuous monitoring of weather warning systems</li> </ul>	<ul style="list-style-type: none"> <li>Notifications made to affected personnel</li> </ul>	<ul style="list-style-type: none"> <li>Notifications made to affected personnel</li> <li>Announce via sitewide communications</li> </ul>
	<ul style="list-style-type: none"> <li>Assess hazardous processes to be made secure (e.g., fuel distribution; LN transfers and other chemical processes, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Suspend hazardous processes</li> </ul>
<b>SURFACE</b>		
<ul style="list-style-type: none"> <li>Assess all outdoor activity and evaluate appropriateness of initiating new tasks</li> </ul>	<ul style="list-style-type: none"> <li>Affected personnel to identify nearest safe location and be prepared to move inside.</li> </ul>	<ul style="list-style-type: none"> <li>All personnel to immediately move indoors</li> <li>All personnel to remain off structural steel above surface collar area within the headframe</li> </ul>
<ul style="list-style-type: none"> <li>Review plan to suspend and secure mobile cranes and elevated work platforms</li> </ul>	<ul style="list-style-type: none"> <li>Prepare to suspend all mobile crane and aerial lift operations and secure equipment</li> <li>Ensure no work is taking place in low-lying areas subject to flooding.</li> <li>Seek shelter with overhead protection and away from windows.</li> <li>Refer to ESH-(5000-S)-73375 Explosive Material Management Standard for additional lightning precautions.</li> </ul>	<ul style="list-style-type: none"> <li>Regulate surface activities               <ul style="list-style-type: none"> <li>Suspend all mobile crane and aerial lift operations</li> <li>Seek shelter away from elevated structures (e.g., scaffolds, walkways, conveyors)</li> <li>Shelter in place with overhead protection and away from windows.</li> <li>Remove all personnel from low-lying areas subject to flooding.</li> </ul> </li> </ul>
<b>UNDERGROUND ACCESS</b>		
<ul style="list-style-type: none"> <li>Evaluate shaft hoisting activities</li> </ul>	<ul style="list-style-type: none"> <li>Be prepared to suspend personnel hoisting operations</li> </ul>	<ul style="list-style-type: none"> <li>At 10 miles, Director of ESH and Deputy Director of Operations will be notified.</li> <li>If lightning is within 5 miles, suspend shaft work, move workers to a safe location and suspend all personnel hoisting.               <ul style="list-style-type: none"> <li>Any active trips are to be completed</li> <li>Emergency availability for egress purposes only</li> </ul> </li> <li>If lightning is within 2 miles:               <ul style="list-style-type: none"> <li>All hoisting activities shall cease.</li> </ul> </li> </ul>

**Table 5: Thunderstorm TARP**

Source: National Weather Service

- Considerations:
  - Shelter in a substantial building with at least normal headroom.
  - Avoid taking shelter in equipment with tall attachments such as cranes.
  - Avoid taking shelter inside a truck or vehicle carrying hazardous materials such as explosive materials, fuel, chemicals, etc.
  - Seek a low-lying (not subject to flooding) open place away from trees, poles or metallic infrastructure if you are caught outside.
  - Position yourself away from windows, doors and skylights to avoid broken glass.
  - Shield head and body with protective covering if caught outdoors.
  - Remain sheltered until the alert has been cancelled.
  - If you come upon a flowing stream where water is above your ankles, stop, turn around and go another way. Never try to walk, swim or drive through swift water.
  - If you are in a piece of mobile equipment and unable to seek shelter in a substantial building:
    - ◆ Park in a safe location.
    - ◆ Close the windows.
    - ◆ Do not touch the metal frame.
  - The alert will not be cancelled until 30 minutes have passed from the last lightning strike.
- Event Follow-Up:
  - The following actions are to be initiated once the alert has been cancelled. Please refer to ESH-(6000-S)-176589 Severe Weather Management Standard section 4.0 Responsibilities:
    - ◆ Supervisor to account for their assigned personnel.
    - ◆ Coordinate with external emergency support if needed.
    - ◆ Perform damage assessment inspection across site as needed.
    - ◆ All personnel shall report any injuries, property damage or operational disruptions via the internal incident notification process (ESH-(3000-F)-173324 First Report).
    - ◆ Area Supervisors/Duty Officer to inspect for environmental loss including spills, erosion, chemical releases, etc. and immediately report to the ESH Department.
    - ◆ ERT to inspect unpaved roadways for damage after a half inch of heavy rains when threat has passed.
    - ◆ Complete inspections per the ESH-(8000-A)-209187 Stormwater Pollution Prevention Plan.
    - ◆ Evaluate and provide for formal communication needs. All formal communications are to be approved and issued by the SURF Laboratory Director and/or Director of Communications.
    - ◆ Evaluate for external reporting requirements (e.g., Cooperative Agreement, LBNF/DUNE, LZ, etc.)

## Lightning

- The TARP shown in Table 6: Lightning TARP, describes the specific response guidelines that shall be followed until the alert has been cancelled.

BLUE ALERT 40-20 miles (64-32 km)	YELLOW ALERT 20-10 miles (32-16 km)	RED ALERT 10-0 miles (16-0 km)
<ul style="list-style-type: none"> <li>Continuous monitoring of weather warning systems</li> </ul>	<ul style="list-style-type: none"> <li>Notifications made to affected personnel</li> </ul>	<ul style="list-style-type: none"> <li>Notifications made to affected personnel</li> <li>Announce via sitewide communications</li> </ul>
	<ul style="list-style-type: none"> <li>Assess hazardous processes to be made secure (e.g., fuel distribution, LN transfers, explosive material handling and other chemical processes, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Suspend hazardous processes</li> </ul>
<b>SURFACE</b>		
<ul style="list-style-type: none"> <li>Assess all outdoor activity and evaluate appropriateness of initiating new tasks</li> </ul>	<ul style="list-style-type: none"> <li>Affected personnel to identify nearest safe location and be prepared to move inside</li> </ul>	<ul style="list-style-type: none"> <li>All personnel to immediately move indoors</li> <li>All personnel to remain off structural steel above surface collar area within the headframe</li> </ul>
<ul style="list-style-type: none"> <li>Review plan to suspend and secure mobile cranes and elevated work platforms</li> </ul>	<ul style="list-style-type: none"> <li>Prepare to suspend all mobile crane and aerial lift operations and secure equipment</li> </ul>	<ul style="list-style-type: none"> <li>Regulate surface activities               <ul style="list-style-type: none"> <li>Suspend all mobile crane and aerial lift operations</li> <li>Seek shelter away from elevated structures (e.g., scaffolds, walkways, conveyors)</li> </ul> </li> </ul>
<b>UNDERGROUND ACCESS</b>		
<ul style="list-style-type: none"> <li>Evaluate shaft hoisting activities</li> </ul>	<ul style="list-style-type: none"> <li>Be prepared to suspend personnel hoisting operations</li> </ul>	The following will occur if lightning is within 5 miles of SURF: <ul style="list-style-type: none"> <li>Suspend shaft work and move workers to a safe location</li> <li>Suspend personnel hoisting operations               <ul style="list-style-type: none"> <li>Any active trips are to be completed</li> <li>Emergency availability for egress purposes only</li> </ul> </li> <li>At 2 miles, suspend all hoisting operations</li> </ul>

**Table 6: Lightning TARP**

- Considerations:
  - Shelter in a substantial building with at least normal headroom.
  - Avoid taking shelter in equipment with tall attachments such as cranes.
  - Avoid taking shelter inside a truck or vehicle carrying hazardous materials such as explosive materials, fuel, chemicals, etc.
  - Seek a low-lying (not subject to flooding) open place away from trees, poles or metallic infrastructure if you are caught outside.
  - Position yourself away from windows, doors and skylights to avoid broken glass.
  - Shield head and body with protective covering if caught outdoors.
  - Remain sheltered until the alert has been cancelled.
  - If you come upon a flowing stream where water is above your ankles, stop, turn around and go another way. Never try to walk, swim or drive through swift water.
  - If you are in a piece of mobile equipment and unable to seek shelter in a substantial building:
    - ◆ Park in a safe location.
    - ◆ Close the windows.
    - ◆ Do not touch the metal frame
- Event Follow-Up:
  - Supervisor to account for their assigned personnel.
  - Coordinate with external emergency support if needed.
  - Perform damage assessment inspection across site as needed.
  - All personnel shall report any injuries, property damage or operational disruptions via the internal incident notification process (ESH-(3000-F)-173324 First Report).
  - Area Supervisors/Duty Officer to inspect for environmental loss including spills, erosion, chemical releases, etc. and immediately report to the ESH Department.
  - ERT to inspect unpaved roadways for damage after a half inch of heavy rains when threat has passed.
  - Evaluate and provide for formal communication needs. All formal communications are to be approved and issued by the SURF Laboratory Director and/or Director of Communications.
  - Evaluate for external reporting requirements (e.g., Cooperative Agreement, LBNF/DUNE, LZ, etc.).



## Tornado

- The TARP shown in Table 7: Tornado TARP, describes the specific response guidelines that shall be followed until the alert has been cancelled.

<b>BLUE ALERT</b> Active weather in the area	<b>YELLOW ALERT</b> <b>Tornado Watch</b> Tornadoes are possible in and near your area	<b>RED ALERT</b> <b>Tornado Warning</b> A Tornado is sighted or indicated by weather radar in your area
<ul style="list-style-type: none"> <li>Continuous monitoring of weather warning systems</li> </ul>	<ul style="list-style-type: none"> <li>Notifications made to affected personnel</li> </ul>	<ul style="list-style-type: none"> <li>Notifications made to affected personnel</li> <li>Announce via sitewide communications</li> </ul>
<b>SURFACE</b>		
<ul style="list-style-type: none"> <li>Review plan to secure mobile cranes and elevated work platforms</li> </ul>	<ul style="list-style-type: none"> <li>Regulate surface activities:               <ul style="list-style-type: none"> <li>Suspend all mobile crane and aerial lift operations</li> <li>Seek shelter away from elevated temporary structures, e.g., scaffolds</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>Familiarize the location of designated shelter areas</li> </ul>	<ul style="list-style-type: none"> <li>Affected personnel to identify nearest safe location and be prepared to move to designated shelter areas</li> </ul>	<ul style="list-style-type: none"> <li>All personnel to immediately move to designated shelter areas</li> </ul>
<ul style="list-style-type: none"> <li>Assess all outdoor activity and evaluate appropriateness of initiating new tasks (e.g., loading loose material, etc.)</li> <li>Monitor condition of nearby surface infrastructure for impacts from wind</li> <li>Identify unsecured materials susceptible to wind (e.g. plywood, sheeting, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Secure materials susceptible to wind</li> </ul>	
<b>UNDERGROUND ACCESS</b>		
<ul style="list-style-type: none"> <li>Evaluate shaft hoisting activities</li> </ul>	<ul style="list-style-type: none"> <li>Be prepared to suspend personnel hoisting operations</li> </ul>	<ul style="list-style-type: none"> <li>Suspend all shaft work and move workers to a safe location</li> <li>Suspend personnel hoisting operations               <ul style="list-style-type: none"> <li>Any active trips are to be completed</li> <li>Emergency availability for egress purposes only</li> </ul> </li> </ul>

**Table 7: Tornado TARP**

- Considerations:
  - Seek shelter in designated shelter areas.
  - Position yourself away from vehicles, windows, doors and skylights to avoid broken glass.
  - If caught outdoors:
    - ◆ Shield head and body with protective covering.
    - ◆ Seek a low-lying (not subject to flooding) open place away from trees, poles or metallic infrastructure.
  - Remain sheltered until the alert has been cancelled.
- Event Follow-Up:
  - The following actions are to be initiated once the alert has been cancelled:
    - ◆ Supervisors to account for their assigned personnel.
    - ◆ Coordinate with external emergency support if needed.
    - ◆ Perform damage assessment inspection across site as needed.
    - ◆ All personnel shall report any injuries, property damage or operational disruptions via the internal incident notification process (ESH-(3000-F)-173324 First Report).
    - ◆ Area Supervisors/Duty Officer to inspect for environmental loss including spills, erosion, chemical releases, etc. and immediately report to the ESH Department.
    - ◆ Evaluate and provide for formal communication needs. All formal communications are to be approved and issued by the SURF Laboratory Director and/or Director of Communications.
    - ◆ Evaluate for external reporting requirements (e.g., Cooperative Agreement, LBNF/DUNE, LZ, etc.).

## Reduced Visibility

- Common causes of reduced visibility include fog, wind, smoke, rain and blizzards.
  - Fog is water droplets and ice particles suspended in air that form a barrier restricting visibility.
  - Wind, when combined with certain environmental conditions such as snow, rain, smoke and dust, can cause debris to be suspended in the atmosphere.
  - Smoke can come from many sources such as wildfires (nearby and far away), prescribed fires and burning wood in fireplaces or stoves inside the home. In addition to possible health effects (see air quality), large quantities of smoke can generate visibility impacts to both the work environment and in nearby areas.
  - Rainfall intensity can impact visibility and create travel conditions such as road glare or roadside hazards (e.g.: inundated potholes).
  - Blizzards are severe winter storms which may include large amounts of snow and blowing snow that can result in whiteout conditions. A ground blizzard may develop with little or no concurrent (or new) snowfall.
- The TARP shown in Table 8: Reduced Visibility TARP, describes the specific response guidelines that shall be followed until the alert has been cancelled.

BLUE ALERT Visibility: 1 - 0.5 mile (1.6 - 0.8 km)	YELLOW ALERT Visibility: < 0.5 – 0.25 mile (0.8 – 0.4 km)	RED ALERT Visibility: < 0.25 mile (0.4 km) *Blizzard warning, dense fog advisory*
• Continuous monitoring of weather warning systems	Notifications made to affected personnel	• Notifications made to affected personnel • Announce via sitewide communications
SURFACE		
• Assess all outdoor activity and evaluate appropriateness of initiating new tasks	• Mobile equipment to operate with: <ul style="list-style-type: none"> <li>· Headlights on</li> <li>· Rotating beacon and hazard lights, if equipped</li> <li>· Reduce speed - drive to conditions</li> </ul> • Evaluate outdoor activities • Be prepared to suspend hazardous processes (e.g., explosive material handling, fuel distribution, LN transfers and other chemical processes)	• Suspend: <ul style="list-style-type: none"> <li>· Nonessential travel to/from site</li> <li>· Nonessential work outdoors</li> <li>· Hazardous activities and processes</li> </ul>
UNDERGROUND ACCESS		
• Confirm adequate visibility in shafts	• Be prepared to suspend use of cage hoist e.g. limiting scheduled trips, etc.	• Evaluate providing earlier cage access and/or evacuation to the surface if an operational status change is anticipated

**Table 8: Reduced Visibility TARP**

- Considerations:
  - Evaluate travel requirements.
  - Avoid pedestrian travel on vehicular travel ways and in poorly illuminated areas. Use high visibility/reflective clothing or supplemental lighting as needed.
- Event Follow-Up:
  - The following actions are to be initiated once the alert has been cancelled:
    - ◆ Supervisors to account for their assigned personnel.
    - ◆ Coordinate with external emergency support if needed.
    - ◆ Perform damage assessment inspection across site as needed.
    - ◆ All personnel shall report any injuries, property damage or operational disruptions via the internal incident notification process (ESH-(3000-F)-173324 First Report).
    - ◆ Evaluate and provide for formal communication needs. All formal communications are to be approved and issued by the SURF Laboratory Director and/or Director of Communications.
    - ◆ Evaluate external reporting requirements (e.g., Cooperative Agreement, LBNF/DUNE, LZ, etc.).

## **Revision History**

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<b>Rev</b>	<b>Date</b>	<b>Section</b>	<b>Paragraph</b>	<b>Summary of change</b>	<b>Authorized by</b>
01	1/22/25	NA	NA	New Document	CCR 1063