



## Lightning Safety Standards in Outdoor Sport and Industry

NTRA Safety & Integrity Alliance

May, 2018

Insufficient hazardous weather cancel/delay protocols expose racetrack and regulatory officials to conflicting priorities of life-safety versus best business outcomes. Results of negligent weather cancel/delay decision protocols have safety impacts up to and possibly including loss of life.

The sheer size and scope of racing and training facilities coupled with the number of participants requires preplanning and protocols to be in place prior to a hazardous weather or lightning episode. Those potentially affected by lightning include jockeys, gate crew, officials, outriders, participants in the outdoor paddock process, surface maintenance crews and spectators in the outdoor stands.



A survey of current North American protocols for horse racing and training weather delay or cancellation indicate sporadic or nonexistent foreplanning. Industry adoption of proven, readily available weather, and especially, lightning detection technologies will remove subjectivity from the decision process.

Numerous lightning safety protocols have been developed for various other outdoor sporting events and activities such as golf, mining, large venue events, etc. Many of these protocols can be found on the National Lightning Safety Institute website at [lightningsafety.com](http://lightningsafety.com). Almost all pre-existing policies for outdoor sports or industries mandate a minimum of 30 minutes after all lightning is out of a defined area before resuming activities. Those that specify a safety radius establish a range of 6 to 15 miles lightning clearance depending on the layout of the facility, industry-specific hazards, and time needed to adequately move participants to safety.

### NTRA Safety & Integrity Alliance – Code of Standards 2018

#### 4.K. Race Cancellation Policy

Racetrack Members, in conjunction with its Stewards, Jockeys, and Horsemen, shall develop protocols that are consistent with **ARCI-007-025 (G)** for the delay/cancellation of races due to inclement weather, lightning or other hazardous racing conditions. Such protocols shall take into consideration specific weather conditions and shall include a pre-determined method for establishing consensus among stakeholders.

Members shall implement commercial lightning detection equipment or services and work with the regulatory authority, horsemen and jockeys to establish lightning cancelation/delay protocols, for both training and racing, that are consistent with **ARCI-007-020(M)**.

### **Association of Racing Commissioners International – Model Rules v.8.5**

#### **ARCI-007-020 Facilities and Equipment**

##### **M. Lightning**

(1) The association shall implement or subscribe to a commercial, real-time lightning detection service that has been independently and objectively verified. The lightning detection service must include strike distance/radius notifications enabling lightning delay decision-making. The detection service must be available to the stewards at all times and to designated officials during training hours.

(2) The association shall designate a responsible official for monitoring lightning conditions during training hours. When lightning is detected within 8 miles radius of the racetrack, the designated official shall order suspension of all outdoor training activities and alert participants to seek shelter. Outdoor training activities may resume 30 minutes after the last lightning strike within an 8 mile radius as indicated by the lightning detection service.

(3) The association shall designate a responsible official for enforcing any training delay.

#### **ARCI-007-025 Operations**

##### **G. Dangerous Weather Conditions**

(1) The association shall develop a hazardous weather and lightning protocols to be approved by the Regulatory Authority.

(2) The Regulatory Authority shall designate the personnel responsible for immediately investigating any known impending threat of dangerous weather conditions to determine if conditions exist which warrant delay and/or cancellation of a performance and/or the notification to the public of such threatening weather conditions. The first priority of all decisions made shall be the well-being and safety of all persons and animals.

(a) The stewards shall commence a race delay when lightning is detected within 8 miles radius of the racetrack and remain in effect until a minimum of 30 minutes has passed since the last strike is observed within an 8 mile radius.

### **National Oceanic and Atmospheric Administration, National Weather Service**

#### **Lightning Safety and Outdoor Sports Activities**

<http://www.lightningsafety.noaa.gov/sports.shtml>

**When should activities be stopped?**

In general, a significant lightning threat extends outward from the base of a thunderstorm cloud about 6 to 10 miles. It's important to account for the time it will take for everyone to get to safety. Here are some criteria that could be used to stop activities.

**If you see lightning.** The ability to see lightning varies depending on the time of day, weather conditions, and obstructions such as trees, mountains, etc. In clear air, and especially at night, lightning can be seen from storms more than 10 miles away provided that obstructions don't limit the view of the thunderstorm.

**If you hear thunder.** Thunder can usually be heard for a distance of about 10 miles provided that there is no background noise. Traffic, wind, and precipitation may limit the ability to hear thunder to less than 10 miles. If you hear thunder, though, it's a safe bet that the storm is within ten miles.

If the skies look threatening. Thunderstorms can develop directly overhead and some storms may develop lightning just as they move into an area.

#### **When should activities be resumed?**

Because electrical charges can linger in clouds after a thunderstorm has seemingly passed, experts agree that people should wait at least 30 minutes after the last thunder before resuming outdoor activities.

### **Weather Safety: Lightning Safety and Preparedness Factsheet**

National Oceanic and Atmospheric Administration

<https://www.weather.gov/media/owlie/lightning-safety.pdf>

#### **What You Might Not Know About Lightning**

**All thunderstorms produce lightning and are dangerous. In the United States, in an average year, lightning kills about the same number of people as tornadoes and more people than hurricanes.**

**Lightning often strikes outside the area of heavy rain and may strike as far as 10 miles from any rainfall.**

Many lightning deaths occur ahead of storms or after storms have seemingly passed.

**If you can hear thunder, you are in danger.**

Don't be fooled by blue skies. If you hear thunder, lightning is close enough to pose an immediate threat.

#### **National Lightning Safety Institute**

[http://lightningsafety.com/nlsi\\_pls.html](http://lightningsafety.com/nlsi_pls.html)

#### **Personal Lightning Safety Tips**

1. PLAN in advance your evacuation and safety measures. When you first see lightning or hear thunder, activate your emergency plan. Now is the time to go to a building or a vehicle. Lightning often precedes rain, so don't wait for the rain to begin before suspending activities.

2. IF OUTDOORS...Avoid water. Avoid the high ground. Avoid open spaces. Avoid all metal objects including electric wires, fences, machinery, motors, power tools, etc. Unsafe places include underneath canopies, small picnic or rain shelters, or near trees. Where possible, find shelter in a substantial building or in a fully enclosed metal vehicle such as a car, truck or a van with the windows completely shut. If lightning is striking nearby when you are outside, you should:

A. Crouch down. Put feet together. Place hands over ears to minimize hearing damage from thunder.

B. Avoid proximity (minimum of 15 ft.) to other people.

3. IF INDOORS... Avoid water. Stay away from doors and windows. Do not use the telephone. Take off head sets. Turn off, unplug, and stay away from appliances, computers, power tools, & TV sets. Lightning may strike exterior electric and phone lines, inducing shocks to inside equipment.

4. SUSPEND ACTIVITIES for 30 minutes after the last observed lightning or thunder.

5. INJURED PERSONS do not carry an electrical charge and can be handled safely. Apply First Aid procedures to a lightning victim if you are qualified to do so. Call 911 or send for help immediately.

6. KNOW YOUR EMERGENCY TELEPHONE NUMBERS.

### **Lightning Safety for Organized Outdoor Athletic Events**

Practice and training increase recreation performance. Similarly, preparedness can reduce the risk of the lightning hazard. Lightning is the most frequent weather hazard impacting athletics events. Baseball, football, lacrosse, skiing, swimming, soccer, tennis, track and field events...all these and other outdoor sports have been visited by lightning.

Education is the single most important means to achieve lightning safety. A lightning safety program should be implemented at every facility. The following steps are suggested:

1. A responsible person should be designated to monitor weather conditions. Local weather forecasts - from The Weather Channel, NOAA Weather Radio, or local TV stations - should be observed 24 hours prior to athletic events. An inexpensive portable weather radio is recommended for obtaining timely storm data.

2. Suspension and resumption of athletic activities should be planned in advance. Understanding of SAFE lightning shelters is essential. SAFE evacuation sites include:

- a. Fully enclosed metal vehicles with windows up.
- b. Substantial buildings.
- c. The low ground. Seek cover in clumps of bushes.

3. UNSAFE LIGHTNING SHELTER AREAS include all outdoor metal objects like flag poles, fences and gates, high mast light poles, metal bleachers, golf cars, machinery, etc. AVOID trees. AVOID water. AVOID open fields. AVOID the high ground.

4. **Lightning's distance from you** is easy to calculate: if you hear thunder, it and the associated lightning are within auditory range...**about 6-8 miles away**. The distance from Strike A to Strike B also can be 6-8 miles. Ask yourself why you should NOT go to shelter immediately. Of course, different distances to shelter will determine different times to suspend activities. A good lightning safety motto is: "If you can see it (lightning) flee it; if you can hear it (thunder), clear it."

5. If you feel your hair standing on end, and/or hear "crackling noises" - you are in lightning's electric field. If caught outside during close-in lightning, immediately remove metal objects (including baseball cap), place your feet together, duck your head, and crouch down low in baseball catcher's stance with hands on knees.

**6. Wait a minimum of 30 minutes from the last observed lightning or thunder before resuming activities.**

7. People who have been struck by lightning do not carry an electrical charge and are safe to handle. Apply first aid immediately if you are qualified to do so. Get emergency help promptly

### **Lightning Safety in the Mining Industry**

#### 4. Personnel Safety Issues

Lightning safety should be practiced by all people during thunderstorms. If thunder is heard, the accompanying lightning is within one's hearing range, and evacuation to a safe location should be immediate. Measuring lightning's distance with detection equipment (see above) is useful. **The National Lightning Safety Institute recommends suspending all outdoor activities when lightning crosses a 10-mile radius. Activities should not be resumed until 20-30 minutes has expired from the last observed thunder or lightning. This is a conservative approach — perhaps it is not practical in all circumstances.** Safety is the prevailing directive.

Specifically for outdoor workers, we suggest an action protocol of:

- Yellow Alert – Lightning is 20-40 miles (30-60 km) distant. Be cautious.
- Orange Alert – Lightning is 11-19 miles (16-30 km) distant. Be aware.
- Red Alert – Lightning is 0-10 miles (0-16 km) distant. Suspend activities and go to shelter.

When lightning threatens, standard safety measures should include the following: avoid water and all metal objects; get off the higher elevations, including rooftops; avoid solitary trees; stay off the telephone. A fully enclosed metal vehicle — van, car, or truck — is a lightning-safe refuge because of the quasi-Faraday Cage effect. (Go to YouTube's "Faraday Cage" for a demonstration.) A large permanent building can be considered a safe place. Shipping containers (MilVans/Conex) can be converted to safe shelters. In all situations, people should avoid becoming a part of the electrical circuit.

Every organization should consider adopting and promulgating a lightning safety plan specific to its operations. An all-encompassing general rule should be: "If you can hear it (thunder), clear it (evacuate); if you can see it (lightning), flee it."

### 2014-15 NCAA Sports Medicine Handbook

#### Guideline 1E Lightning Safety, July 1997 (Rev. July 2013, June 2014)

<http://www.ncaapublications.com/productdownloads/MD15.pdf>

2. For large-scale events, continuous monitoring of the weather should occur from the time pre-event activities begin throughout the event.

3. Venue-specific activity-suspension, venue evacuation, and activity-resumption plans:

a. Upon the first sound of thunder, lightning is likely within **eight to 10 miles** and capable of striking your location. Please note that thunder may be hard to hear if there is an athletics event going on, particularly in stadia with large crowds. Lightning can strike from blue sky and in the absence of rain. At least 10 percent of lightning occurs when there is no rainfall and when blue sky is often visible somewhere in the sky, especially with summer thunderstorms. Lightning can, and does, strike 10 (or more) miles away from the rain shaft. Be aware of local weather patterns and review local weather forecasts prior to an outdoor practice or event.

d. To resume athletics activities, lightning safety experts recommend waiting 30 minutes after both the last sound of thunder and last flash of lightning. A useful slogan is “half an hour since thunder roars, now it’s safe to go outdoors.” At night, be aware that lightning can be visible at a much greater distance than during the day as clouds are being lit from the inside by lightning. This greater distance may mean that the lightning is no longer a significant threat. At night, use both the sound of thunder and seeing the lightning channel itself to decide on re-setting the 30-minute “return-to-play” clock before resuming outdoor athletics activities.

Note: Weather watchers, real-time weather forecasts and commercial weather-warning and lightning monitoring devices or services are all tools that can be used to aid in the monitoring, notification, and decision-making regarding stoppage of play, evacuation and return to play.

### 2015-16 SEC Commissioner’s Regulations

#### Governing Conference Competition, Championships and Tournaments

<http://assets.espn.go.com/SEC/media/2016/Final%20Commissioners%20Regulations.pdf>

The Commissioner's Regulations governing Conference competition, championships and tournaments are written as a guide for all SEC competition between its members, and are considered the standard source of information on policies and procedures for the conduct of Conference competition. These Regulations are divided into two parts: 1) general administrative policies and procedures that apply to SEC competition as a whole, and 2) specific regulations for each sport.

**Lightning Policy.** Each member institution must have the capability of determining when lightning strikes are within specified distances of the competition site for all outdoor events.

When lightning is detected within a minimum of 10 miles from the competition site, home team management shall utilize the public address system to inform those in attendance that inclement

weather including lightning is within 10 (or more) miles and that should patrons vacate the facility for safe shelter, they will be allowed to re-enter with a ticket stub.

When lightning is detected within eight (8) miles of the competition site, competition shall be suspended. Competition may be resumed after 30 minutes of no detected lightning strikes within an eight mile radius. A 10 minute warm-up period may be granted following this 30 minute suspension.

Additionally, the home institution shall notify the head referee/umpire when lightning is detected within 15 miles of the competition site.

In cases of severe weather being detected prior to the start of competition: A maximum of 10 minutes may be used, at the discretion of the home institution, for the marching band, national anthem and introductions, immediately following the 30 minute time period of no detected lightning strikes.

#### **National Athletic Trainers' Association Position Statement:**

##### **Lightning Safety for Athletics and Recreation**

Walsh et. al., *Journal of Athletic Training*, 2013

[http://lightningsafety.com/nlsi\\_pls/NATA\\_2013.pdf](http://lightningsafety.com/nlsi_pls/NATA_2013.pdf)

#### **Establish a Lightning-Specific Emergency Action Plan**

Formalize and implement a comprehensive proactive emergency action plan (EAP) specific to lightning safety for each venue. The plan should have the following components:

1. Promote lightning-safety slogans supported by the National Weather Service.
  - a. "NO Place Outside Is Safe When Thunderstorms Are In The Area!"
  - b. "When Thunder Roars, Go Indoors!"
  - c. "Half An Hour Since Thunder Roars, Now It's Safe To Go Outdoors!"
2. Establish a chain of command that identifies a specific person (or role) who is to make the decision to remove individuals from the field or activity. This person must have recognized and unchallengeable authority to suspend activity.
3. Use a reliable means of monitoring the local weather. Before the event, identify a specific person (a weather watcher) who is responsible for actively looking for threatening weather and is charged with notifying the chain of command.
4. Identify safe locations from the lightning hazard in advance of the event for each venue.
5. Identify specific criteria for suspending and resuming activity in the EAP

#### **Lightning and General Weather Awareness**

6. Use a designated weather watcher and the National Weather Service to monitor local weather.

7. Consider subscribing to a commercial, real-time lightning detection service that has been independently and objectively verified.

### Criteria for Postponement and Resumption of Activities

14. Postpone or suspend activities if a thunderstorm appears imminent before or during activity. Watch the skies for locally developing or approaching storms that have not yet produced lightning.

15. All individuals must be completely within an identified safe location when thunderstorms are already producing lightning and approaching the immediate location and when the distance between the edge of the lightning storm and the location of the outdoor activity reaches 5 nautical miles (nmi; roughly 6 statute miles or 9.26 km; Table2).

16. Allowing time for individuals to evacuate the premises, leave outdoor facilities, and be completely within the designated safe location(s) must be taken into consideration in the lightning-safety plan.

17. Activities should be suspended until 30 minutes after the last strike of lightning is seen (or at least 5 nmi away) and after the last sound of thunder is heard. This 30-minute clock restarts for each lightning flash within 5 nmi and each time thunder is heard. Consideration must be given to patrons leaving safe locations and returning to the venue.

### 3. Use a Reliable Means of Monitoring the Weather

In addition to weather monitoring via the NWS, commercial real-time lightning detection services are available. As of 2012, 3 major providers of these lightning-detection services are available in the United States: US National Lightning Detection Network (NLDN), operated by Vaisala Inc (Tucson, AZ); US Precision Lightning Network (USPLN), operated by WSI Corporation (Andover, MA), and co-owned by TOA Systems, Inc (Melbourne, FL); and WeatherBug Total Lightning Network, operated by WeatherBug (Germantown, MD).

The NLDN has been operated continuously since January 1989, and its performance has been well documented. The NLDN detects cloud-to-ground lightning in real time with a median location error of 250 m and a flash-detection efficiency of more than 90%. The USPLN has been in operation for many years but only began services in the United States in 2004. According to the operator, verification of the USPLN began in 2010. The WTLN has been in operation across the contiguous United States with a growing network of sensors since early 2009. It detects both cloud-to-ground lightning and lightning aloft. Preliminary testing indicates that the WTLN performs about as well as NLDN for cloud-to-ground lightning. The WTLN performance for lightning aloft has not been well verified.

Real-time notification services are available, usually for a fee, from some of the aforementioned companies or from secondary providers who are subcontractors of these companies. These services provide notification when lightning has been detected within various distances and when the area has been lightning free for various time periods (Table 4). The details of these thresholds should be adjusted for each individual situation, especially the necessary time to communicate the decision and evacuate to safety for larger venues or gatherings.



**Table 4. Common Alerts for Real-Time Notification of Lightning**

| Alert   | Meaning  |
|---|--|
| "Heads up"  | Lightning within 15 mi (13 nmi)                              |
| "Begin safety procedures"                                     | Lightning within 10 mi (8.68 nmi)                            |
| "You are now in danger; safety procedures should be complete" | Lightning within 6 mi (5.2 nmi)                              |
| "All clear"   | Lightning has not been detected at 15 mi (13 nmi) for 30 min |

Abbreviation: nmi, nautical mile.

Any typical electronic communications device, such as a pager, cell phone, smartphone, or e-mail can transmit via automatic notification. Although such notification services can be useful, they should only supplement the procedures listed above. In certain scenarios, these devices can actually lull the untrained into a false sense of security. Notification services work best for already formed active thunderstorms that are moving into the area. The process, however, will not be effective for the first strike of a new, nearby storm. Also, if the data source only detects cloud-to-ground lightning, it will miss the 70% intracloud lightning that can change into potentially deadly cloud-to-ground lightning at any time. Yet if one does not know how to interpret the data or warnings or is not familiar with the EAP and how to implement it, having a system may be worse than not having a system at all. Notification systems may be useful as supplements, but they should never replace the designated weather watcher and NWS monitoring, nor should they be allowed to provide a false sense of security. A potentially deadly cloud-to-ground strike can occur at any time from the intracloud lightning.

Handheld lightning detectors are available from numerous manufacturers, but the performance of these handheld devices has not been independently verified, and they should not be used as the sole source for determining when to move to a safe location. Other commercial services claim to predict lightning rather than detect and report on lightning that is already present. Unfortunately, all devices have certain shortfalls, and many have not been independently or objectively verified. It is crucial for personnel to be cognizant of the latest research on lightning devices and to rely on a designated weather watcher.

### U.S. Army Training and Doctrine Command

#### Guide for Lightning Protective Measures for Personnel, January 2002

[http://lightningsafety.com/nlsi\\_pls/US-Army-Lightning-Protection-Safety-Guide.pdf](http://lightningsafety.com/nlsi_pls/US-Army-Lightning-Protection-Safety-Guide.pdf)

#### 3.3.1.2 During Deployment – Activity Curtailment

If lightning activity threatens during the deployment, a number of incremental steps to minimize personnel exposure are necessary.

##### 1) Criteria: Lightning at 30 miles.

###### Actions:

- a) Notify personnel of increased lightning hazard.
- b) Prepare to cease unnecessary outdoor activity.

c) Have nonessential personnel find shelter.

2) Criteria: Lightning at 15 miles. Or thunder heard by personnel, but no lightning flash observed.

Actions:

a) Secure outdoor equipment.

b) Cease outdoor activity other than securing equipment and critical tasks.

c) Personnel not occupied due to activity curtailment should move to designated lightning shelter.

3) Criteria: Lightning at 8 miles or lightning observed.

Actions:

a) Immediate cessation of outdoor activity. Abandon efforts to secure equipment if not completed.

b) All personnel take cover in designated shelter. If no other shelter is available, personnel can move to hardtop automobiles for shelter. Personnel on foot should find low risk locations and disperse if no other options are available.

Most periods of lightning activity move with a storm front and are often relatively brief. If sporadic lightning activity is present between 15 mile and 30 mile ranges, limited critical tasks may be undertaken outdoors but personnel must be informed of the hazard. Tasks that are especially hazardous during lightning storms, such as working with antenna masts or emplacing the grounding system, should not be performed at this time. In this circumstance, real time monitoring of lightning and fast personnel notification is crucial. Once lightning is observed within 8 miles, outdoor activity should again cease.

3.3.1.3 During Deployment – Activity Reinstatement

Reinstatement of activities are in the reverse order of the above. If possible, delay resumption of outdoor activities (especially grounding and antenna mast work) until lightning moves out of the 30 mile range. If absolutely required, allow only critical tasks once lightning moves out of the 15 mile range.

### **Is College Football's Lightning Policy Too Restrictive? No**

*Forbes.com*, Marshall Shepherd, Sept 7, 2015

<https://www.forbes.com/sites/marshallshepherd/2015/09/07/is-college-footballs-lightning-policy-too-restrictive-no/#57818dc736f0>

*Dr. J. Marshall Shepherd, a leading international expert in weather and climate, was the 2013 President of American Meteorological Society (AMS) and is Director of the University of Georgia's (UGA) Atmospheric Sciences Program. Dr. Shepherd is the Georgia Athletic Association Distinguished Professor and hosts The Weather Channel's Sunday talk show Weather Geeks, Prior to UGA, Dr. Shepherd spent 12 years as a Research Meteorologist at NASA-Goddard Space Flight Center and was Deputy Project Scientist for the Global Precipitation Measurement (GPM) mission. In 2004, he was honored at the White House with a prestigious PECASE award. Shepherd is frequently sought as an expert on weather and*

*climate by major media outlets, the White House, and Congress. He has over 80 peer-reviewed scholarly publications and numerous editorials. Dr. Shepherd received his B.S., M.S. and PhD in physical meteorology from Florida State University.*

The opening weekend of college football is like a holiday for many fans, including me. I love college football. I attended Florida State University and direct the Atmospheric Sciences Program at the University of Georgia. Both schools have strong college football programs so it is in my blood. Both schools were among a group of several schools affected by lightning delays on opening Saturday. Ultimately, the University of Georgia game was suspended after the threat of a 2nd weather delay. Other games throughout the nation, but primarily the South, were delayed or canceled. Meteorologist Alex Lamer provided a nice overview of the climatology with the lightning delays mapped to it (see Figure). It prompted @JohnBakerFSU to tweet to me the following question:

Is the NCAA's lightning policy too restrictive?

My answer: A resounding NO.

The current NCAA policy requires that play be suspended if there is lightning within 8 miles of the stadium. It requires a 30 minute delay, but this may vary because the time count will restart if a lightning strike occurs within the 8 mile radius.

WCNC Charlotte Meteorologist Brad Panovich (@WxBrad), one of the most admired and "Twitter Followed" meteorologists in the nation, argues that professional sports leagues like the National Football League and Major League Baseball should emulate the NCAA. I can't disagree with him. In the past two years alone, I have seen pictures or videos of "full, large, metal-containing facilities" or stadiums with cloud-to-ground lightning strikes happening. In fact, this lightning strike at the Cincinnati Reds stadium this past week makes my point abundantly clear. Yes, your photo is going to be awesome for Instagram or Facebook, but you are in danger. Brad Panovich writes to me in a message:

I have long admired the NCAA lightning policy. It is stunning that the pros just have a patch work of facility/stadium and team policies with no centralized system. I mean our neighborhood pool that is life guarded by college kids has a better concrete policy than most pro sports leagues. Which I think if the pros showed a solid policy than a lot of these little leagues and children's sports leagues would emulate as well. Those are the associations and activities that scare me to death. I see kids sporting events always going on during lightning, which 9 times out of 10 the parents are looking at an app trying to play smartphone meteorologist.

Brad nails it and I could end the piece here, but there are a few other quick points to highlight:

While I applaud the University actions, I cringed as I saw many fans still sitting in the stadiums during the various lightning delays. At a few stadiums, the fans only moved to the concourse levels once rain started. I find this amusing and disturbing because "lightning can kill you, rain just gets you wet." Such perception of threat is an entire set of studies in itself for the emerging social sciences-weather literature. I even saw a student run onto the field during a lightning delay at the Tennessee vs Bowling Green State University game.

There were a few other cringe-worthy aspects to the day as well. I saw many broadcasters or fans speaking of the lighting or rain delays as "Severe Weather Delays." I know this is probably in the meteorological weeds for most of the public, but it is important to note that in the United States "Severe Weather" has a very specific distinction that are nicely defined by the National Weather Service.

As a public service announcement, I want to also remind many of the public information offices that lightning is spelled without an "e". I saw this too many times and it is unfortunately quite common. In fact, so much so that on a visit to Weather Geeks, James Spann, the legendary Meteorologist at ABC 33/40 in Birmingham, offers an amusing reminder.

Dr. Kevin Kloesel, University Meteorologist with the University of Oklahoma Office of Emergency Preparedness and I discussed these very issues recently on The Weather Channel, and he is now leading a writing team for the American Meteorological Society to develop a Statement on Weather Safety and Outdoor Venues.

The NCAA should be the rule not the exception. Meteorological knowledge is sufficient for sports organizations to make pro-active decisions and avoid "shocking" outcomes.

### **When Storms Rush In, a Waiting Game Begins**

*New York Times*, Mike Tanier, Sept 23, 2011

<http://www.nytimes.com/2011/09/24/sports/ncaafotball/colleges-play-it-safe-in-stormy-weather.html>

In the old days, nothing delayed or postponed a college football game. Athletes played through blizzards, 60-mile-per-hour winds and pounding rain.

This season, college football games have become like late-summer trips to the municipal pool. If lightning flashes in the distance, whistles blow and it's everybody out.

Last Saturday, a three-hour weather delay caused Oklahoma State's game at Tulsa to kick off around midnight. A game between Baylor and Stephen F. Austin on the same night was halted in the third quarter because of thunderstorms.

Notre Dame Stadium was evacuated twice during the team's season opener, the first evacuations in the building's 80-year history. Games in Michigan, Iowa, Tennessee, New Mexico, West Virginia and elsewhere have been delayed or shortened, often with stadium evacuations. Hampton and Bethune Cookman were delayed in Daytona Beach, Fla., on Thursday night, and with rain in the forecast Saturday for much of the country, there could be more disruptions to come.

The 2011 season has become the Year of the Weather Delay, but the root causes are easy to understand. The N.C.A.A. and its member universities have become more cognizant of the dangers posed by severe storms. Weather forecasting technology has improved. And a post-Sept. 11 emphasis on emergency planning and evacuation procedures has made clearing a stadium a safer, easier choice for event organizers.

Harold Hansen, the director of life safety and security for the International Association of Venue Managers, said that the emergency procedures at many stadiums a decade ago were inadequate, if they existed at all. He jokingly described the mentality as “when something bad is happening, call 911 and run out the door.”

Hansen’s is one of several agencies that conduct planning seminars for arena and stadium managers. Tulsa Athletic Director Bubba Cunningham attended a similar program four years ago. The primary focus of these seminars is often anti-terrorism, but Cunningham found that the strategies could be extended to protect spectators from more mundane but equally dangerous threats.

“The chance of terrorism where we are located is somewhat remote,” Cunningham said. “But a tornado? That could strike at any time.”

A simple lightning storm can be very dangerous to a stadium full of fans, many of whom sit on metal bleachers. Twenty-five people have died because of lightning strikes in the United States in 2011, according to the National Oceanic and Atmospheric Administration. Most of the strikes occurred in open areas. Heavy wind led to a stage collapse at the Indiana State Fair in August. Seven people were killed and 40 were injured.

“If a storm is within 6 to 10 miles and heading for the stadium, they really need to evacuate,” said Andy Bailey of the National Weather Service, who consults with stadium operators about weather emergencies.

The N.C.A.A. revised its lightning policy in 2007: any lightning strike within six miles of an open-air site automatically triggers a 30-minute delay. The N.C.A.A. issued a reminder to universities this month to “create actionable weather service plans.” Most now have detailed procedures for delays and evacuations.

Those plans begin with early storm detection. The guidelines in the N.C.A.A. Sports Medicine Handbook still discuss darkening skies and distant rumbles, but most colleges now use hand-held lightning-detection devices, software and smart phone applications. Bailey recommends giving fans a 30-minute window to seek shelter; early-detection devices and modern storm-tracking software allow officials to implement plans well before severe weather arrives.

Referees stopped last Saturday’s game between Baylor and Stephen F. Austin in Waco, Tex., even though the rain was not heavy, and university officials enacted stage one of their emergency plan: announcements on scoreboards and loudspeakers advising spectators to take shelter. Stage two — evacuation — never became necessary.

“The weather wasn’t that bad during the first delay,” said Baylor’s assistant athletic director Heath Nielsen, noting that emergency personnel monitored the weather from an on-site trailer. The coaches of both teams agreed to skip halftime and shortened the third and fourth quarters by three minutes each, then declared the game, which Baylor led by 48-0, over when another storm threatened the stadium late in the third quarter.

At the same time, 350 miles to the north, Tulsa and Oklahoma State officials monitored a line of storms moving in from the west, hoping they would dissipate or move north. When the storms' course became apparent, the game was delayed just after the national anthem, and Cunningham's staff ordered a stadium evacuation, although no rain had fallen.

"It took us more time to convince people to leave than to get them out of the stadium," Cunningham said, though he noted that weather-savvy Oklahomans were quick to move once the wind shifted direction.

Cunningham's staff had reviewed its weather emergency plan during the week. Ushers and scoreboard messages directed spectators to the basketball arena, the intramural gymnasium, the enclosed concourses and — the safest place of all to wait out a thunderstorm — their cars. Once people got moving, the stadium was nearly empty in about 15 minutes, Cunningham said.

One Tulsa alumnus remained in his seat through what became a three-hour delay: a season-ticket holder and former Tulsa police officer named G. E. Beard. "I'm just a hardheaded old man," Beard told NewsOK.com. Hansen called holdouts like Beard "lookie-loos," and said that while ushers should be trained to "direct fans aggressively," it was hard to force people to make good decisions.

"You can't protect stupid," he said.

The Tulsa-Oklahoma State game was nearly canceled: both athletic directors felt it inappropriate to begin a game after midnight, **and with the 6-mile/30-minute rule in place**, that meant any lightning strike after 11:30 p.m. would doom the contest. The last strike occurred at 11:23 p.m. "We just got it in," Cunningham said. Both universities agreed to cancel the game if any other strikes were detected, but the weather cooperated, and Oklahoma State won, 59-33, in a contest that ended shortly after 3:30 a.m.

Athletic directors are reluctant to cancel a game outright, and not for the reasons many might suspect: Tulsa has game cancellation insurance and is reimbursed for lost ticket revenues. Canceled games affect national rankings, inconvenience fans and disappoint the athletes. "These kids prepare all year round for a 12-game season," Cunningham said. "Losing one game has a real impact."

Hansen said he did not believe that cancellation was always the best policy when a solid emergency plan was in place.

"If it is one of those storms that you know are likely to pass through, it's possibly feasible to delay," he said.

Some diehards may resent the delays and evacuations, which should become less frequent as cooler weather marks the end of thunderstorm season. Watching football in terrible conditions is seen by some as a rite of passage or bonding experience. Cunningham understands the appeal.

"I may take a personal risk to watch a game," he said. "But I cannot take a risk with 30,000 people."

Hansen also admits that he has run outside to watch a tornado while saner family members rushed to the basement. Harsh weather can be thrilling, but fans need to take a common-sense approach.

“If you get struck by lightning,” he said, “you won’t be able to enjoy the game.”

**Atlantic Coast Conference Manual 2012-2013**

[http://grfx.cstv.com/photos/schools/bc/genrel/auto\\_pdf/2012-13/misc\\_non\\_event/2012\\_13\\_ACC.pdf](http://grfx.cstv.com/photos/schools/bc/genrel/auto_pdf/2012-13/misc_non_event/2012_13_ACC.pdf)

No lightning policy.

**Official Baseball Rules – 2017 Edition**

**Major League Baseball**

[http://mlb.mlb.com/documents/0/4/0/224919040/2017\\_Official\\_Baseball\\_Rules\\_dbt69t59.pdf](http://mlb.mlb.com/documents/0/4/0/224919040/2017_Official_Baseball_Rules_dbt69t59.pdf)

No lightning policy.

**2017 Official Playing Rules of the National Football League**

<https://operations.nfl.com/media/2725/2017-playing-rules.pdf>

**ARTICLE 4. EMERGENCY SITUATIONS.** The NFL affirms the position that in most circumstances all regular-season and postseason games should be played to their conclusion. If, in the opinion of appropriate League authorities, it is impossible to begin or continue a game due to an emergency, or a game is deemed to be imminently threatened by any such emergency (e.g., severely inclement weather, lightning, flooding, power failure), the following procedures (Articles 5 through 11) will serve as guidelines for the Commissioner and/or his duly appointed representatives. The Commissioner has the authority to review the circumstances of each emergency and to adjust the following procedures in whatever manner he deems appropriate. If, in the Commissioner’s opinion, it is reasonable to project that the resumption of an interrupted game would not change its ultimate result or adversely affect any other inter-team competitive issue, he is empowered to terminate the game.