Appendix A – Lightning Safety Guidelines

Each year across the United States, thunderstorms produce an estimated 25 million cloud-to-ground flashes of lightning – each one of those flashes is a potential killer. According to the National Weather Service, an average of 73 people are killed by lightning each year and hundreds more are injured, some suffering devastating neurological injuries that persist for the rest of their lives. A growing percentage of those struck are involved in outside recreational activities.

Officials responsible for sports events often lack adequate knowledge of thunderstorms and lightning to make educated decisions on when to seek safety. Without knowledge, officials base their decisions on personal experience and, sometimes, on the desire to complete the activity. Due to the nature of lightning, personal experience can be misleading.

While many people routinely put their lives in jeopardy when thunderstorms are nearby, few are actually struck by lightning. This results in a false sense of safety. Unfortunately, this false sense of safety has resulted in numerous lightning deaths and injuries during the past several decades because people made decisions that unknowingly put their lives or the lives of others at risk.

For organized outdoor activities, the National Weather Service recommends those in charge have a lightning safety plan, and that they follow the plan without exception. The plan should give clear and specific safety guidelines in order to eliminate errors in judgment. Prior to an activity or event, organizers should listen to the latest forecast to determine the likelihood of thunderstorms. NOAA Weather Radio is a good source of up-to-date weather information. Once people start to arrive, the guidelines in your league's lightning safety plan should be followed.

A thunderstorm is approaching or nearby. Are conditions safe, or is it time to head for safety? Not wanting to appear overly cautious, many people wait far too long before reacting to this potentially deadly weather threat. The safety recommendations outlined here based on lightning research and the lessons learned from the unfortunate experiences of thousands of lightning strike victims.

Thunderstorms produce two types of lightning flashes, 'negative' and 'positive.' While both types are deadly, the characteristics of the two are quite different. Negative flashes occur more frequently, usually under or near the base of the thunderstorm where rain is falling. In contrast, positive flashes generally occur away from the center of the storm, often in areas where rain is not falling. There is no place outside that is safe in or near a thunderstorm. Consequently, people need to stop what they are doing and get

to a safe place immediately. Small outdoor buildings including dugouts, rain shelters, sheds, etc., are NOT SAFE. Substantial buildings with wiring and plumbing provide the greatest amount of protection. Office buildings, schools, and homes are examples of buildings that would offer protection. Once inside, stay away from windows and doors and anything that conducts electricity such as corded phones, wiring, plumbing, and anything connected to these. In the absence of a substantial building, a hard-topped metal vehicle with the windows closed provides good protection. Occupants should avoid contact with metal in the vehicle and, to the extent possible, move away from windows.

Who should monitor the weather and who is responsible for making the decision to stop activities?

Lightning safety plans should specify that someone be designated to monitor the weather for lightning. The 'lightning monitor' should not include the coaches, umpires, or referees, as they are not able to devote the attention needed to adequately monitor conditions. The 'lightning monitor' must know the plan's guidelines and be empowered to assure that those guidelines are followed.

When should activities be stopped?

The sooner activities are stopped and people get to a safe place, the greater the level of safety. In general, a significant lightning threat extends outward from the base of a thunderstorm cloud about 6 to 10 miles. Therefore, people should move to a safe place when a thunderstorm is 6 to 10 miles away. Also, the plan's guidelines should account for the time it will take for everyone to get to a safe place. Here are some criteria that could be used to halt activities.

1. If lightning is observed. 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.

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

3. If the time between lightning and corresponding thunder is 30 seconds or less. This would indicate that the thunderstorm is 6 miles away or less. As with the previous two criteria, obstructions, weather, noise, and other factors may limit the ability to use this criterion. In addition, a designated person must diligently

monitor any lightning. In addition to any of the above criteria, activities should be halted if the sky looks 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 passed, experts agree that people should wait at least 30 minutes after the storm before resuming activities.

What should be done if someone is struck by lightning?

Most lightning strike victims can survive a lightning strike; however, medical attention may be needed immediately – have someone call for medical help. Victims do not carry an electrical charge and should be attended to at once. In many cases, the victim's heart and/or breathing may have stopped and CPR may be needed to revive them. The victim should continue to be monitored until medical help arrives; heart and/or respiratory problems could persist, or the victim could go into shock. If possible, move the victim to a safer place away from the threat of another lightning strike.