



Section A - HSSE

7.0 Weather Conditions

Issued: 03/16 Updated: 03/16

[Manual Navigation Link](#)

7.1 Policy

7.2 General



Figure 7-1 Lightning Strikes

The terminal will establish criteria for suspending transfer operations, disconnecting hoses/arms, and evacuating the berth on the onset or forecast of imminent exceptional weather conditions. During periods of still air, tank vessels loading operations involving volatile products may have to be suspended if cargo vapors accumulate either on deck or ashore.

Transfer operations, and the ballasting of non-gas free cargo tanks, will be halted on the near approach of an electrical storm, regardless of whether or not an inert gas system and/or vapor control system is fitted and in use. All tank openings and vents shall be closed and the cargo system secured.

KEY DEFINITIONS

Severe Weather – weather accompanied by thunderstorms which can bring heavy rains, high winds and lightning.



7.1 Lightning

Lightning – originates around 15,000 to 25,000 feet above sea level when rain drops are carried upward until some of them convert to ice. For reasons that are not widely agreed upon, a cloud to ground lightning flash originates in this mixed water and ice region. The charge then moves downward in 50 yard sections called “step leaders.” It keeps moving towards the ground in these steps and produces a channel along which a charge is deposited. Eventually, it encounters something on the ground that is a good connection. The circuit is complete at that time, and the charge is lowered from cloud to ground. The return stroke is a flow of charge (current) which produces luminosity much brighter than the part that came down. This entire event usually takes less than half a second. Lightning has been known to strike more than ten (10) miles from the storm in an area of clear sky above.

7.2 Thunder

Thunder – is caused by lightning. The bright light of the lightning flash caused by the return stroke mentioned above represents a great deal of energy. This energy heats the air in the channel to above 50,000oF in only a few millionths of a second. The air is now heated to such a high temperature that it has no time to expand, so it is now at a very high pressure. The high pressure air then expands outwards into the surrounding air compressing it and causing a disturbance that propagates in all directions away from the stroke. The disturbance is a shock wave for the first ten (10) yards, after which it becomes an ordinary sound wave, or thunder. Thunder can seem like it goes on and on because each point along the channel produces a shock wave and a sound wave.



Cloud to ground lightning can kill or injure people by direct or indirect means.

7.3 Responsibilities

Employees - understand, implement, comply, and support the Electrical Storm Emergencies procedure expectations.

Local terminal employees, Local Supervision, Terminal Operations – understand, implement, comply, and enforce the Electrical Storm Response Procedure and respond to issues in a timely manner.

Region Managers, Terminal Operations - understand, implement, comply, and support the enforcement of the Electrical Storm Response Procedure.

Directors, Terminal Operations - understand, implement, and support the enforcement of the Electrical Storm Response Procedure.



Safety Department, Terminal Operations – create, revise when necessary, monitor the implementation, comply, and mentor the enforcement of the Electrical Storm Procedure.

7.4 Precautions

If an individual is caught out in the open during a thunderstorm, then he/she should do the following:

- Proceed to a shelter as quickly as possible.
- Avoid tall structures.
- Do not carry/use metal tools or other metal items.

If you feel your hair “stand on end,” then squat down with your feet as close together as possible AND place your head between your knees because a lightning strike is imminent. Do Not Lie Flat!

7.5 Preparation

When severe weather conditions are indicated, the Terminal Superintendent/Dispatcher will observe weather patterns via the internet, weather instrumentations and ground observations.

7.6 Wind Speed

If sustained wind speed is in excess of thirty (30) miles per hour (as indicated by monitoring equipment or local weather reports), the Terminal Superintendent and/or Dockwatch will stop all outdoor elevated work. All crane work, tower work, and any other work being conducted at twenty (20) feet or more above ground level, including storage tank gauging and sampling will be stopped in excess wind speeds of (20) miles per hour (as indicated by monitoring equipment or local weather reports).

7.6.1. Gusting Winds

Winds gusting at or above 35 MPH (30 knots) – Supervisor’s approval and assist tugs (at vessel owner’s expense) are required for transfer operations to continue. To avoid shut down tugs must be called in advance of wind gusts reaching 35 MPH. Without assist tugs all transfers must be shut down and all valves closed.

7.6.2. Sustained Winds Over 35 MPH

Sustained winds over 35 MPH (30 knots) – In addition to the precautions taken above, shut down all transfer operations and close all valves.



7.6.3. Sustained Winds Over 40 MPH

Sustained winds over 40 MPH (35 knots) – In addition to the precautions taken above drain and disconnect all hoses/arms then lower them to the stored position.

7.7 Lightning Utilizing Lightning Strike Instrumentation

If lightning strikes within a zero (0) to three (3) mile range (as indicated by monitoring equipment/human observation), the Terminal Superintendent and/ or Dockwatch will stop all work above ground level including tank gauging/sampling and vessel cargo transfer operations.

If lightning strikes within a three (3) to eight (8) mile range (as indicated by monitoring equipment and / or human observation), he will then stop all work being conducted twenty (20) feet above ground level including crane work, tank gauging and sampling. **GROUND LEVEL WORK MAY CONTINUE IF ALL SUPERVISION AND EMPLOYEES DEEM IT TO BE SAFE.**

7.8 Lightning Utilizing the 30-30 Rule

When lightning strikes are observed, the Terminal Superintendent, Dockwatch, and Dispatch should immediately count the time thunder is heard, if the time is thirty (30) seconds or less, the thunderstorm may be within six (6) miles of you and is considered dangerous:

- a) Commence communication to Terminal employees, contractors, and visitors
- b) Shut down cargo transfer operations, rack transfers, crane work, tank gauging/sampling and all work above ground level.
- c) Shut down rotating equipment in case of power failure. Kick-back or unintentional start up could occur when power is resumed.
- d) Check emergency lighting for operability before power failure occurs.

When lightning strikes, stop all outside work, immediately seek shelter in a safe location (i.e. a large fully enclosed substantially constructed building, a vehicle with a solid metal roof and solid metal sides is a reasonable second choice) until the electrical storm passes or your shelter becomes compromised from a safety standpoint.

The loading rack canopy and the internal configuration of storage tanks are NOT considered adequate shelter per lightning strike protection.

NOTICE

Avoid higher elevations, wide open areas, tall structures, tall isolated objects, water related activities and open vehicles. Avoid unprotected open structures, RAIN SHELTERS and bus stops.



7.9 Resumption of Work

Work will resume when no lightning is detected at the eight (8) to twenty (20) miles range or fifteen (15) minutes have elapsed. Once the lightning is detected, it must be monitored until there is no lightning detected in any range for thirty (30) minutes (as indicated by lightning detection equipment).

The Terminal Superintendent, Dockwatch, and Dispatcher should closely monitor weather patterns and ground observation to assist in determining the resumption of work.

Wait at least thirty (30) minutes after the last clasp of thunder before leaving protective shelter to resume work.

7.10 In/Out Bound Vessel During Severe Weather

If a vessel is in/out bound during severe weather and/or lightning/thunder, and instructions are given to shut down operations, the Port Captain is to instruct the Marine/Terminal Pilot to have the tug boats hold the vessel alongside the dock until the all clear is given to resume work.

7.11 Training

Training must be conducted initially and refresher training conducted as needed due to changes in the workplace, procedures, and/or inadequacies in the employees' knowledge of the procedure or lack of compliance.

7.12 Performance Verification

Each Terminal will be assessed for compliance to this procedure periodically by the Terminal Operations Safety Department or its representatives.

7.13 Review and Improve

This procedure will be reviewed annually. Identified deficiencies in this procedure will be corrected by the Terminal Operations Safety Department.

Non-compliance issues will be addressed per the periodic Performance Verification by the Region Managers / Director of Terminal Operations.