

# International Association of Drilling Contractors



## **TROPICAL ROTATING STORMS GENERAL GUIDELINES FOR LAND RIG OPERATIONS**

*IADC SEVERE WEATHER GUIDLINES*  
***TROPICAL ROTATING STORM PREPAREDNESS PROCEDURES***

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**FORWARD:** This document contains guidelines from the IADC Health Safety and Environment Committee Task Group established to give the land drilling contractor a basis on which to build a Tropical Rotating Storm Preparedness Program.

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Suggested revisions to the guidance are invited and will be considered along with future changes to these recommendations. Suggestions should be submitted to the International Association of Drilling Contractors, 10370 Richmond Avenue, Suite 760, Houston, TX 77042.

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**1.0 INTRODUCTION:**

This document is a generic suggested severe weather guideline that companies may use as a basis to develop guidelines specific to their company and its operations. IADC does not attest that this guideline contains the only procedures that companies should use or consider. Rather contains suggestions that companies may or may not use in developing guidance appropriate to their company and its operations.

Preparation and response to severe weather situations requires pre-planning and organization. Severe weather can include, lightning storms, straight-line winds, tornados, and tropical rotating storms. Although tropical rotating storms are noted for causing the most damage they are the one severe weather condition that allows the most for pre-planning and movement of people out of harms way and is the easiest to accomplish. Lightning storms, straight-line winds and tornados can come up suddenly and at best allow only for a few hours preparation and movement of personnel to safety. That said pre-planning even for sudden storms can go a long way to protect equipment and most importantly personnel.

**2.0 METEOROLOGICAL DESCRIPTION OF STORMS**

**2.1 Tropical Rotating Storms**

Tropical Rotating Storms are large rotating storm systems that form in the Atlantic, Indian, and Pacific oceans. Those in the Atlantic and eastern Pacific are called tropical rotating storms. Those in the western Pacific are called typhoons and those in the Indian Ocean are called cyclones. For purposes of this document the term "Tropical Rotating Storm" will be used.

A tropical rotating storm is a well-defined low-pressure tropical disturbance that may contain very high winds and seas. The eye may range from an area as small as a couple of miles up to 20 – 30 miles (32 – 48 km) in diameter. Consideration of the entire "severe weather area", which can extend 200 – 300 miles (322 – 483 km), must be taken into account rather than just the position of the eye. This severe weather area will reduce the time allowed to safely evacuate the Drilling Unit and, therefore, must be allowed for in any plan of action. The direction and speed of tropical rotating storms can be very unpredictable and are controlled by steering currents in the upper atmosphere, high and low pressure areas, fronts, possibly sea water temperature and sea water currents.

Tropical rotating storms can contain a large amount of rain or they can be relatively dry. The storm/tidal surge, which does not include wave height, is produced by advancing winds on the right side of the eye and can be over 24 feet (7.3 m) in relatively shallow (20 – 40 foot) (6.1 – 12.2 m) water depths. Once tropical rotating storms travel inland, their strength dissipates rapidly due to the lack of fuel (no warm water) and increased wind friction on the land surface.

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Often when tropical rotating storms come ashore, tornados and lightning storms spin off of the storm and can develop far inland.

- 2.2 Tornados:** Cumulonimbus clouds, created when a cold front meets a mass of moist, warm air, are the breeding ground for tornadoes. These clouds, which form quickly, generate thunderstorms in which the warmer air rises rapidly, creating a powerful up-draught. In the upper part of the thunderstorm, strong crosswinds begin to turn the central area of up-draught into a swirling vortex. The rotating winds increase the speed of the up-draught, pulling more moisture into the storm. The vortex spirals in tighter circles, picking up speed and growing in height through the clouds. Finally, the funnel-shaped tornado descends from the bottom of the cloud and touches the ground with ferocious intensity.

The fierce winds destroy virtually everything in the tornado's path. In addition to picking up dust, which makes the tornado visible, the strong updraft can lift cars, roofs, and people high into the air. Objects sucked into the tornado, such as uprooted trees and wood debris, become deadly missiles. The path of the tornado can often be detected by the destruction left behind.

A tornado may be a few meters to about a kilometer wide where it touches the ground. It can move over land for short distances or for distances of many kilometers. The duration of a tornado is usually only a few minutes, but strong ones may last over an hour. A single thunderstorm system lasting hours may generate several tornadoes while covering large distances.

Most tornadoes spin anticlockwise in the northern hemisphere and clockwise in the southern, but occasional tornadoes reverse this behavior. Weaker sea-going tornadoes, called waterspouts, occur most frequently in tropical waters.

Tornadoes are most common and strongest in temperate latitudes, including the United States, Western Europe, Japan, India, South Africa, Argentina, and Australia. The most violent tornadoes occur in the central US, where they often form in the early spring.

- 2.3 Lightning:** Enormous electrical discharge is caused by an imbalance between positive and negative charges. During a storm, colliding particles of rain, ice, or snow increase this imbalance and often negatively charge the lower reaches of storm clouds. Objects on the ground, like steeples, trees, and the Earth itself, become positively charged—creating an imbalance that nature seeks to remedy by passing current between the two charges.

A step-like series of negative charges, called a stepped leader, works its way incrementally downward from the bottom of a storm cloud toward the Earth. Each of these segments is about 150 feet (46 meters) long. When the lowermost step comes within 150 feet (46 meters) of a positively charged object it is met by a climbing surge of positive electricity, called a streamer, which can rise up through a building, a tree, or even a person. The process forms a channel through which electricity is transferred as lightning.

Some types of lightning, including the most common types, never leave the clouds but travel between differently charged areas within or between clouds. Other rare forms can

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be sparked by extreme forest fires, volcanic eruptions, and snowstorms. Ball lightning, a small, charged sphere that floats, glows, and bounces along oblivious to the laws of gravity or physics, still puzzles scientists.

Lightning is extremely hot—a flash can heat the air around it to temperatures five times hotter than the sun's surface. This heat causes surrounding air to rapidly expand and vibrate, which creates the pealing thunder we hear a short time after seeing a lightning flash. Lightning is not only spectacular, it's dangerous. About 2,000 people are killed worldwide by lightning each year. Hundreds more survive strikes but suffer from a variety of lasting symptoms, including memory loss, dizziness, weakness, numbness, and other life-altering ailments.

**3.0 GENERAL PROCEDURE for TROPICAL ROTATING STORMS**

Tropical rotating storm preparedness is one of the most important responsibilities of the person in charge of a rig. That person is normally the duty Toolpusher (Rig Manager). Each tropical depression and storm should be considered as potentially dangerous.

Areas of responsibilities for rig evacuation may overlap since the operator may have direct control of the means of evacuation. To be effective, evacuation procedures must be initiated early. Delay in securing the rig and evacuating the rig may put personnel in danger of being caught on clogged highways with other coastal residents fleeing the storm. Adverse wind conditions typically arrive at a location in advance of the center of a storm system. An evacuation must be ordered before operational limits of the evacuation vehicles are reached. Often this will mean that an evacuation must be in process before the storm system has intensified to tropical rotating storm proportions.

Planning for a tropical rotating storm is complicated by the fact that no two-tropical rotating storms are the same and the operational situation on a rig will vary. Depending on how fast the storm is approaching and the particular activity being carried out on the rig, the time required to prepare the rig for evacuation will vary. The ready availability of transportation and the distance to secure locations or to support bases all enter into the amount of time needed to complete an evacuation. In general, only resources (equipment trucks, busses) owned or under contract by either the operator or the contractor can be counted on for evacuation. Remember that other contractors and their operators will also be gearing up for an evacuation from their rigs as well. This means trucks and busses (vans) will become in short supply very quickly.

The following information is on tropical rotating storm planning. It is obvious that the execution of the steps suggested involve the close cooperation of the Toolpushers (e.g. Rig Managers) and the senior company man representing the operator. A timely and successful evacuation will in large part depend on their cooperation. In that both individuals should have the safety of personnel as a primary objective, in most instances it is expected that there will be teamwork and a spirit of cooperation as emergency plans are formulated and carried out. If there is disagreement as to when precautionary measures should be taken, Toolpushers (e.g. Rig Managers) are reminded that they are ultimately responsible for the safety of the contractor's personnel. Disagreements should be immediately communicated to responsible off-site supervisory personnel.

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**4.0 TROPICAL ROTATING STORM PLANNING**

In preparing tropical rotating storm plans, a review of all company operations should be carried out. Then an integrated plan that includes all types of weather conditions should be established. The following should be covered by severe weather plan(s):

- 4.1 Assess the risk: Risk of severe weather events varies significantly both by location and season.
- 4.2 Priority Schedule - Remember that the safety of personnel is always the first priority.
  - a. Protect the life of the personnel;
  - b. Secure the well;
  - c. Make arrangements to secure or move out equipment. When making arrangements to move out equipment, consideration has to be given to the fact that the trucking company will need adequate time to secure/protect their equipment and personnel as well.
  - d. Undertake post-event assessment for feasibility of returning to operation.
  - e. Return to normal work as soon as safely possible to do so.
  - f. An assessment team made up of a limited number of qualified personnel should visit the site and assess risks that were created due to the storm and/or storm surge.
  - g. Hold on site meeting to discuss hazards discovered and potential hazards that may be encountered.
- 4.3 Lines of responsibility for company management, operator, and emergency response agencies. No matter what type of weather condition can be anticipated, all personnel should know well in advance who is in charge on the rig site as well as up the chain of command. Duties and authority of each of these severe weather representatives must be established and understood by all Operator and Contractor representatives.
  - a. Corporate office severe weather person in charge (Operations Vice President);
  - b. Division office severe weather person in charge (e.g. Drilling Superintendent);
  - c. Rig site severe weather person in charge (e.g. Toolpusher [Rig Manager]);
  - d. Well Site Operator Representative severe weather person in charge;
  - e. Operator regional office severe weather person in charge (e.g. Drilling Engineer);
  - f. A list of emergency response agencies should be established;
    - i. Medical Personnel;
    - ii. Rescue Personnel;
    - iii. Medical Centers;
    - iv. Law Enforcement;
  - g. These designated individuals should be trained in their duties. The plan should designate an on-site emergency commander and indicate the job title(s) of emergency response personnel. A list of emergency contacts and their contact information should be posted on the rig;

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- 4.4 A communications system, with alternative methods should be established for all the lines of responsibility listed in “4.3” above. Procedures for communicating with response contractors, or regulatory authorities should be included taking into consideration that communications infrastructure may also be damaged by the severe weather event.
- 4.5 The severe weather action plan should include procedures that are to be followed by employees:
  - a. Performing emergency duties;
  - b. Who remains to operate critical rig operations before they evacuate;
  - c. Who are on site but do not have emergency duties.
- 4.6 Procedures for emergency evacuation (egress), including method of evacuation from the rig and evacuation route(s) should be established. Designated evacuation shelters should be determined. These routes and evacuation shelters should be revised as necessary when the rig moves.
- 4.7 Procedures to account for all employees after evacuation, along with means to contact them after the storm should be established.
- 4.8 Each rig should have and maintain an alarm system. The alarm system should use a distinctive signal for each type of emergency.
- 4.9 The severe weather action plan should include the job title (name) of the employee who may be contacted by employees who need more information about the plan or an explanation of their duties under the plan.
- 4.10 Means to track weather conditions should be established and communicated to the rig site severe weather person in charge.
- 4.11 Severe weather action plans should be reviewed with each employee covered by the plan:
  - a. When the plan is developed or the employee is assigned initially to a job;
  - b. When the employee's responsibilities under the plan change; and
  - c. When the plan is changed.
- 4.12 Severe weather action plans should be reviewed at least annually or more often should the rig move to a different operational area and the plan should be updated as needed.

#### **5.0 PRE – TROPICAL ROTATING STORM SEASON PREPARATIONS**

General Preparation for tropical rotating storm season. Prior to tropical rotating storm season all basic preparations should be concluded such as:

- 5.1 The chain of command and communications is established and known by all.

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- 5.2 Verifying proper operation of all emergency equipment.
- 5.3 Verifying derrick wind load rating;
- 5.4 Defining and ordering additional inventory items deemed necessary to ensure adequate supplies and equipment.
- 5.5 Checking and verifying inventory of start-up supplies required after a potential evacuation.
- 5.6 Preparing/reviewing the detailed rotating storm plan
  - a. What equipment is likely to be moved;
  - b. What trucking resources will be required;
  - c. Primary and alternate evacuation routes (including permitting contacts if applicable);
  - d. What transportation is available for evacuating crews from the storm area;
  - e. Safe locations to evacuate crews to. Alternate locations should be established in case the storm changes direction of travel.
- 5.7 Repairs & Modifications - Any needed repairs or modification to the rig should be made to ensure maximum resistance to wind damage.
- 5.8 Surplus Material - All excess or surplus material should be removed from rig site (empty drums, oxygen bottles, boxes, etc.).
- 5.9 Seldom used equipment - material that is needed, but seldom used, should be secured (extra rotary hoses, other equipment).
- 5.10 Communicate – Review and discuss Tropical rotating storm Preparedness Procedure with Operator, third-party personnel and all others involved in the drilling program.
- 5.11 The Toolpusher (e.g. Rig Manager) should maintain a list of all personnel at the rig site and if personnel accommodations are provided at or near the rig site a list of personnel off duty should be maintained by the camp boss or Toolpusher (e.g. Rig Manager). This list is to include the individual's name, company name, and position filled by the individual. This list is to be transmitted daily to the operations office whenever there is tropical disturbance is approaching the drilling location.
- 5.12 A priority equipment list should be established for removal of the equipment. For example:
  - a. Engine Package (4 loads)
  - b. SCR House (1 load)
  - c. Crew Houses (3 loads)
  - d. Toolpusher house (1 load)

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**6.0 TROPICAL ROTATING STORM SEASON PREPARATIONS**

At all times, and in particular during tropical rotating storm season, the Toolpusher (e.g. Rig Manager) is to avail himself of daily weather forecasts from a reliable source to insure the presence of tropical depressions, storms or tropical rotating storms is known.

**6.1 Severe Weather Reporting Services:**

- 1) In the United States the National Hurricane Center provides Watches and Warnings. This can be found at <http://www.nhc.noaa.gov>
  - A Hurricane Watch is issued for specific coastal areas when tropical rotating storm conditions are possible within 36 hours.
  - A Hurricane Warning is issued whenever tropical rotating storm force winds (74 mph or greater) are expected in a specified coastal area in 24 hours or less. A warning can remain in effect when dangerously high water or a combination of dangerously high water and exceptionally high waves continue, even though winds have diminished.
- 2) Rigs operations in other parts of the world need to determine the national (local) weather reporting agency and how they issue warnings and watches or make use of commercial providers. For example:  
<http://www.wunderground.com/tropical> or  
<http://www.crownweather.com/tropical.html>
- a. As soon as learning of a tropical depression or storm, planning should immediately begin between the Toolpusher (e.g. Rig Manager) and the well site Operator's Representative. This is particularly important when a tropical disturbance is known to be forming nearby. A good "first step", is for the Toolpusher (e.g. Rig Manager) and the Operator Representative to review tropical rotating storm procedures, particularly if the Toolpusher (e.g. Rig Manager) and the Operator Representative have not had occasion to prepare a rig for severe storm together. Initial questions which should be considered are:
  - 1) What is the soonest time the rig might be facing severe storm conditions? If a tropical depression is forming nearby and deepening quickly, it is possible that it is already "late" to begin tropical rotating storm preparations. Conversely, the rig may have several days to watch and prepare for an approaching storm.
  - 2) Is it wise to continue the operational procedures that are currently planned? Depending on the proximity of the storm, its intensity, directions and rate of travel, it may be wise to postpone an operational procedure, such as reentering the hole. This may save valuable time in securing the rig for a severe storm.
  - 3) Does everyone understand their responsibilities? Hold meetings with key personnel to discuss what the Toolpusher (e.g. Rig Manager) and Operator's Representative expect in securing the well and preparing the rig for a severe

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storm. Also hold meetings with the rig crews to inform them of the pending storm and their responsibilities.

- b. The Toolpusher, in cooperation with the Operator's Representative, should maintain an awareness of the availability of needed trucks and other transportation; i.e. how many are on contract, or available, and where they are located. This may be well ahead of the rig being ready to complete its evacuation.

**7.0 PHASED RESPONSE TO POTENTIAL TROPICAL ROTATING STORM STRIKES**

Tropical rotating storm preparedness involves graduated levels or "phases" of action as necessitated by the storm's intensity and path.

**7.1 Phase 1** –Tropical rotating storm present within 1000 nautical miles of a company rig location, office or yard.

- 1) Set up twenty – four (24) hour radio and weather watch to be maintained until the storm passes;
- 2) Monitor and record storm position, speed of advance and intensity;
- 3) Based on well conditions, determine with the Operator detailed plans for securing the well.
- 4) Determine whether the drilling unit will be moved or stay on location. This decision will be made by the senior operations personnel in consultation with the Operator. This decision is to be communicated to the Toolpusher (Rig Manager) of the drilling unit.
- 5) Contact the trucking contractor to discuss plans and coordinate trucking requirements;

If the decision is made to move off location, rig down activities should commence at this time due to the unlikely availability of trucks, permits and allowable travel routes to move rig equipment to safety.

- 6) If the decision is made to remain on location, prepare a detailed plan for securing the drilling unit. Include a time estimate for each operation. The operator will have the final authority on procedures for securing the well.
- 7) If there is a disagreement between rig personnel and the well site operator representative, the senior operations personnel should be contacted.

**7.2 Phase 2** – Tropical Rotating Storm Watch is issued for area containing drilling unit or facility. Tropical rotating storm force winds of 74 mph or greater are expected within 48 hours or less. If a tropical storm moves within 200 nautical miles of the rig or a tropical depression moves within 100 nautical miles of the rig. **(Companies need to establish the**

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time needed to secure their rigs and the amount of time (48 hours) adjusted up or down as needed.)

- 1) Contact the trucking coordinator to arrange trucking as required.
- 2) Contact service company personnel who may have equipment on location and inform them that the rig is being prepared for possible evacuation so they can make arrangements to remove or secure their equipment.
- 3) Contact mud chemical company and arrange for them to remove their chemicals off location. Empty bulk tanks should also be removed from the location.
- 4) If evacuation of the rig will affect or occur during the time of the rig's crew change date and times, contact all relief personnel. Notify them of the current situation on the rig. Let them know that they will be kept in contact with and notified when to return to the rig. Make sure that an accurate crew phone list is kept up. It may be necessary to alternate phone contact information in case the storm passes through their area. (Some companies have found that it is better to set up their cell phone accounts in areas away from the coast. During recent storms they found that cell phones with accounts set up in coastal areas would not work, but those that were set up away from the coast would work in the coastal area.)
- 5) Securing the drilling unit and the well should commence according to the severe weather plan. Some tasks can be carried out concurrently with others depending on the crews and trucks available.
  - i. Lay down drill pipe until the bottom of the drill string is inside the deepest string of casing. The operator may choose to set a bridge plug near the casing shoe. Alternately, hang off the drill pipe below the hang off tool if available.
  - ii. Ensure that the hole is full of drilling fluid.
  - iii. Set the slips and attach the drill collar clamp to the pipe.
  - iv. Install the drill pipe safety valve and close it.
  - v. Close BOP pipe rams and lock down with manual stem locks.
  - vi. Secure the drill pipe that is laid down on the pipe racks.
  - vii. Clear the rig floor of all tongs, elevators or other loose tools. Place them in the junk rack or on the catwalk.
  - viii. Lower the mast onto the mast stand and chain down as appropriate. Set the appropriate tension (amount of tension depends on rig design and should be determined by an engineering assessment) on the mast and secure it to the lay down rack with chains and binders. Tong lines and counterweights are to be secured as well.
  - ix. If the storm is too close there may not be time to lay down the derrick, in that case the following should be done.

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- a. The derrick should be stripped of tongs and other equipment as much as possible, which should be properly secured or moved for storage inside metal buildings.
  - b. Secure the block hang off line to the top of the blocks.
  - c. Using the rig up line or other means apply tension to the blocks and set the brake handle with the chain and spring tie downs.
  - d. To prevent the drilling line from whipping back and forth, wrap the rig floor hoist line(s) around the drilling line and pull tight and set the winch brake.
  - e. Wrap tong lines and other lines hanging in the derrick around the drill line dead line and secure in place.
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- x. To reduce the possibility of mud tank overflow due to heavy rain, backload oil-based mud to frac tanks and remove from location. Coordinate with the operator representative and mud company the permits that may be required and safe location to send the tanks to ride out the storm.
  - xi. Unplug and secure all electrical connections (water proof if possible).
  - xii. Raise the generator and/or SCR unit on floats that are 48" high and securely chain down and/or remove from location. Obtain permits if necessary for moving the loads.
  - xiii. Close all valves in diesel tanks, water tanks and mud circulating system.
  - xiv. If empty bulk tanks are on location and cannot be removed prior to the storm, the valves should open and the tanks chained to prevent them from floating away.
  - xv. Store all other loose equipment inside metal buildings.
  - xvi. Lower mud pit shed tops and secure.
  - xvii. Build air receiver(s) pressure to cut off pressure and close all valves.
  - xviii. Shut down all engines and close engine house doors and secure.
  - xix. Prepare all electrical equipment to be moved of location or to an area of higher elevation.
  - xx. Close and secure doors on all sheds and houses left on location.

6) Evacuate personnel.

**7.3 Phase 3 – Evacuation of personnel**

The decision to evacuate the rig/facility is normally a mutual one between the contractor and the Operator. This plan presupposes that the contractor and the operator maintain close communication and consultation from the earliest indication of a storm threat and that both companies will make timely and positive recommendations to the appropriate level of management. In the unlikely event of irresolvable differences of opinion on the necessity for evacuation, it may become necessary for either company to take unilateral action to insure the safety of the rig/facility and its personnel.

To be effective, evacuation must be ordered early enough to permit the safe transportation of personnel to a secure location. A suddenly developing storm or other circumstances may make the transportation of personnel hazardous. In such situations

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the Toolpusher (Rig Manager) in consultation with the Operator Representative should determine if evacuation should be carried out or have personnel remain at the rig site.

- 1) Normally, one of the following criteria would indicate that evacuation is appropriate:
  - i. A tropical rotating storm is forecast to pass within 50 miles (80 km) of one of the company's rigs/facilities.
  - ii. A tropical rotating storm develops or moves within 200 miles (322 km) of one of the company's rigs/facilities.
  - iii. A tropical storm develops or moves within 100 miles (161 km) of one of the company's rigs and is forecast to intensify to a tropical rotating storm and to pass within 50 miles (80 km) of a company rig/facility.
  
- 2) Once the decision is made to evacuate personnel from the rig/facility the following steps should be addressed.
  - i. Double check to ensure all equipment is properly secured.
  - ii. Evacuate all personnel to a safe location as per evacuation plan. It is the intent of to evacuate personnel from rigs and other facilities in sufficient time to insure that they are not endangered either on the rig/facility or while in transit to a secure location. While safety of personnel is the prime consideration, due consideration must be made for safely resuming operations when the threat of the storm has passed.
  - iii. Although a contactor will need a start up crew readily available after the storm has passed, if it is safe for personnel to travel home those whose homes are in the path of the storm may need to return home to care for their family and homes. Personnel who are planning to return home should contact their families to let them know that they are on their way home and when they should be expected. When personnel arrive home they should notify their immediate supervisor that they have arrived safely. Contact information should be provided to their supervisor. It his the employees responsibility to maintain communication with the immediate supervisor.
  - i. Under the actual rig evacuation, the following actions in this Evacuation List will be accomplished:
    - a. Notice to shut-in the well and evacuate the rig will be transmitted through the Drilling Superintendent.
    - b. The Toolpusher (Rig Manager) will ensure that all steps in securing the rig have been carried out to the degree they can be done safely.
    - c. The Toolpusher (Rig Manager) is to determine if the crews are to be allowed to return to their home or to the pre-arranged secure location.
    - d. If evacuation transportation is provided by bus or other commercial means of transport, the Toolpusher (Rig Manager) will advise the Drilling Superintendent of crew evacuation and the secure location they are being transported to. If the crews have their own transportation, they are to leave the rig site as soon as their critical jobs are completed and

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authorized to do so by the Toolpusher (Rig Manager) and proceed to the pre-determined secure location.

- e. The Toolpusher (Rig Manager) is to notify the Drilling Superintendent when the evacuation procedures have been completed and the crews leave the rig site.
- f. Once at the pre-determined secure site, the Toolpusher (Rig Manager) is to check the crew list against the personnel at the secure site and notify the Drilling Superintendent of their arrival.
- g. The Toolpusher (Rig Manager) will monitor weather conditions and standby for orders to return to work.

**8.0 SPECIAL PROVISIONS FOR TRUCKING YARDS AND ROLLING STOCK:**

If a decision is made to evacuate a Trucking or Maintenance Yard:

- 1) All units are to be fueled prior to parking.
- 2) All tractors, cranes, forklifts, ditch witches, cars and pickup trucks are to be parked with windshields facing away from the expected direction of the storm. If possible, it is preferred to park equipment inside a shop building.
  - i. All wheels on large units are to be chocked.
  - ii. All loose equipment, chains, blocks hooks, etc. are to be secured in tool boxes.
- 3) Park all trailers close together, side by side with king pins (front of trailer) facing away from the expected direction of the storm. Ensure that the deck of each trailer is clear of wood blocks, chains, etc. that could be moved by strong winds.
- 4) The keys for each unit are to be left with the appropriate supervisory person in a central location.
- 5) The emergency generator is to be fueled. It should be started and run to ensure readiness after the storm has passed. It may be advisable to elevate the generator to protect it from flooding.
- 6) The yard fuel tank(s) to be topped off and all valves closed.