



DP MODU TROPICAL STORM AVOIDANCE IN THE GULF OF AMERICA

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Disclaimer

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1	<u>GUIDANCE OVERVIEW</u>	3
2	<u>TOTAL TIME (T-TIME) CONSIDERATIONS</u>	4
2.1	VESSEL (MODU) CONSIDERATIONS	4
2.2	WELL CONSIDERATIONS	4
2.3	LOCATION PLANNING AND MONITORING	5
3	<u>DECISION MAKING</u>	7
4	<u>REGULATOR COMMUNICATIONS</u>	8
4.1	BSEE REPORTING INTERVALS	8
4.2	COMMON DP MODU STORM STATUS CODES	8
4.3	STATUS COMMENT FOR NEXT 24-HOURS	8
4.4	TERMINATION OF STATUS CODE UPDATES	9
5	<u>HISTORIC LESSONS LEARNED</u>	10
5.1	MITIGATING RISER HANGING RISK IN TROPICAL STORM CONDITIONS	10
5.2	UNABLE TO VERIFY WELL BARRIER INTEGRITY	10
5.3	RECENT LEARNINGS BETWEEN BSEE AND INDUSTRY	11



1 Guidance Overview

The objective of this guidance document is to capture more than a decade of lessons learned and good operational practice for Dynamically Positioned Mobile Offshore Drilling Units (DP MODU) Tropical Storm (Named Storm) Avoidance in the US Gulf of America. Furthermore, this guidance seeks to support considerations for establishing necessary Total Time (T-Time) intervals to allow MODUs to successfully avert undue risk from Tropical Storms (Named Storms) that occur in the US Gulf of America.

The guidance is intended to assist in minimizing the risk of:

- Personal injury
- Pollution from unplanned discharges
- Equipment damage
- Infrastructure damage
- Navigation obstructions

When robust efforts have been undertaken to develop and maintain T-times on a well location, a DP MODU should have adequate time to secure the well, recover the riser equipment and transit off location away from a Tropical Storm's (Named Storm's) path.

References:

- 30 CFR 250.713(e)
- 30 CFR 250.720 (a) (b)
- 33 CFR 146.140
- 33 CFR 146.210



2 Total Time (T-Time) Considerations

Each DP MODU has vessel-specific considerations with each well location necessitating well and site-specific considerations, which together produce a unique rig and well site-specific T-Time interval. T time intervals should be updated as often as necessary depending upon operational changes and changes in weather forecast patterns. The DP MODU and well specific T-Time interval is calculated based upon the starting point of a decision to commence Tropical Storm (Named Storm) abandonment activities throughout the timeline required for the DP MODU to be positioned in a safe location away from the Tropical Storm (Named Storm) event based on the parameters described in section 2.3 of this document. This timeline also accounts for the applicable BSEE District Manager notification and approval process. To safely and effectively perform the well and DP MODU evacuation activities within the defined T-Time interval, weather and current monitoring and clear alignment of the decision-making process between the Drilling Contractor and Operator (DP MODU operator and operator, respectively) are required prior to the start of the T-Time for the Tropical Storm (Named Storm) event.

The defined T-Time interval should include reasonable contingency time for potential delays in securing the well. Such delays might include rig equipment failures or difficulties verifying well barriers. In all cases, the key decision priorities in order of importance are identified in section 5.2.

T-Time interval calculations should begin on June 1st or at the time that a named storm or tropical system is tracked by the NOAA National Hurricane Center in the Southwest Atlantic or Caribbean Regions, whichever occurs first. T-Time intervals should be specific to the individual DP MODU and well activities, including historical operational performance of the MODU. For example, setting a sub-mudline barrier in a well that is experiencing challenging open hole conditions would take longer than setting the same barrier in a well without such difficulties or during completion / intervention mode. A broad or high-level T-time for each DP MODU should be established or updated at the beginning of Hurricane Season as a "baseline" for updating the well-specific T-Times as well operations progress.

2.1 Vessel (MODU) Considerations

Operators must be familiar with, and observant of, the MODU's station keeping and stability characteristics. T-Time intervals may be developed assuming optimum MODU performance as designed. However, such assumptions are considered a baseline from which further adjustments may be necessary depending on the unit's real-time operational capabilities. Equipment readiness should be considered to ensure that T-Times are based on the use of currently available equipment on the DP MODU.

2.2 Well Considerations

Well-specific characteristics should be considered when developing and maintaining adequate T-Time intervals on a location. Well-specific construction complexity and / or operational difficulties may require additional time to properly secure a well before disconnecting the riser. The presence of exposed hydrocarbons in a well is a major consideration for any additional steps that may be needed to ensure proper barrier management before disconnecting the riser. The type of operation, such as Managed Pressure Drilling (MPD), may also require additional time to secure the well prior to disconnecting the riser.



Contingency plans should be developed by the onsite team to account for failures in barrier management procedures required to secure the well and resulting changes to MODU operations as may be necessary due to approaching storm conditions and other relevant Metocean conditions. In cases where some equipment is not operational, T-Time intervals shall be updated to account for use of the currently available equipment on the MODU. Temporary abandonment requirements are covered by references: 30 CFR 250.720, 250.1721, and 250.420 (B) (3).

When developing T-Times, current operating limitations, historic operational performance, and all of the above considerations should be used to ensure the T-Time is adequate and relevant considerations have been accounted for.

2.3 Location Planning and Monitoring

Metocean data in compliance with the latest edition of API RP 2MET should be obtained to develop the well location riser management plan that includes site-specific Watch Circles clearly outlining the MODU's DP capability and riser angle limitations. A reliable means of sensing current throughout the water column and for monitoring riser angles during the operations should be considered when planning for, or making adjustments to, Watch Circles. Site-specific bathymetry and infrastructure maps should be obtained and utilized in the planning stage to clearly identify any restrictions the site may have in drift directions for riser recovery. Consideration of these location characteristics should enable:

- Clear understanding of where the current operation fits within the DP and riser system limits.
- Clear understanding of which drift directions are available if currents prohibit riser recovery at the standoff location.

Forecasting plays a vital role in the development of T-time intervals and should provide a key indicator for how anticipated conditions may impact the MODU. Forecasting based on meteorological resources' most conservative forecasts should substantially contribute to provisioning necessary T-Time intervals. In cases of sudden storms (Tropical Storm / Named Storm development within 24-hours), reasonable measures should be taken to prioritize operational measures that should be exercised as dependent upon the T-time interval and the MODU's proximity to the tropical system's development area. In locations where the loop and eddy currents may delay the MODU's ability to retrieve the riser, consideration of both factors should be undertaken to reassess the previously established T-Time interval and drift directions as Tropical Storm (Named Storm) conditions ensue.

Adequate T-Time should enable the following:

- Ability to install a sub-mudline barrier on MODU for Tropical Storm (Named Storm) conditions, inclusive of sudden storms
- Ability to secure the well and displace the riser before heavy weather conditions arrive
- Ability to disconnect and retrieve the Lower Marine Riser Package (LMRP) and the riser before arrival of weather conditions that would prohibit riser retrieval
- Ability to allow for some level of operational contingency time in T-Time evaluation
- Ability for adequate travel time that maintains safe marine state conditions within the specific DP MODU operational envelope

Adequate T-Time should avoid the following situations:



- Inability to install a sub-mudline barrier prior to disconnection
- Inability to install a single barrier below the BOP stack
- Inability to safely disconnect from the well
- Disconnecting in Metocean conditions under which the riser cannot be retrieved
- Hanging riser in danger of buckling

Additionally, planning should also include the following considerations:

- Communication Equipment Plan to maintain communications with onshore (Operator and Drilling Contractor) personnel, regardless of DP MODU location
- Operator should understand time and logistics required to evacuate non-essential personnel from the DP MODU for storm evacuation
- MODU supply requirements – Fuel, food, and water for extended period of time (+ / - 30 days as shore bases could be down for extended time frame)
- Identifying contingency operational bases for post-Hurricane / Tropical Storm (Named Storm) operations
- Personnel safety plan during Hurricane Avoidance operations, i.e., staying inside of living quarters, crew change management, etc.
- Due to the possibility of reduced manning in anticipation of tropical storm conditions, factors contributing to the fatigue of personnel remaining onboard will need to be taken into account when establishing reasonable T-Time objectives
- Preparatory drills and tabletop exercises are encouraged as the storm season approaches

BSEE T-Time Status Requests

- BSEE personnel will ask for T-Times of all DP MODUs within an approaching Tropical Cyclone or potential Tropical Cyclone cone of uncertainty. This T-Time, as stated in section 2 includes the time to transit to a safe location. BSEE personnel may ask what the assumed transit speed is.
- BSEE personnel may ask for a subsection of the T-Time that includes all tasks required to safe out the well. This may provide BSEE personnel with better understanding of current operational status.
- BSEE personnel may ask for a subsection of the T-Time that includes all tasks required to be capable of full transit speed (safe out the well and recover the riser). This may provide BSEE personnel with better understanding of current operational status.



3 Decision Making

The decision making required to secure a well and successfully avoid a Tropical Storm (Named Storm) involves both the operator and the DP MODU operator. Both the operator and DP MODU operator have a vested interest in ensuring an adequate T-Time interval.

Coast Guard regulations require the leaseholder (or operator / permit holder) to assign primary responsibility for DP MODU evacuation activities as stated in the Emergency Evacuation Plan (EEP) to the Master or person in charge of the DP MODU (33 CFR 146.210)

The Master's decision to move the DP MODU off the well to a location safely out of the path of a Tropical Storm (Named Storm) is undertaken with support from, and in direct communication with, the DP MODU operator and the lease holder. Additional information may be provided by other relevant weather and offshore information sources. The Master, operator / permit holder, and DP MODU operator should establish clear communications and explicitly acknowledge agreement of the T-Time interval that adequately provides for necessary storm preparation measures.

In accordance with U.S. maritime navigational safety requirements, the Master has ultimate authority for the safety of personnel, environment, and property onboard the MODU and operations within the vessel's 500-meter zone.

For questions or challenges with approval, implementation, or reporting requirements for EEPs, see the following Coast Guard guidance documents and websites for appropriate contact information:

- **Coast Guard District Eight (D8) OCS Emergency Evacuation Plan (EEP)**
Approvals: D8 Policy Letter D8 01-2015:
 - <https://www.atlanticarea.uscg.mil/Portals/7/Eighth%20District/docs/OCS/Current%20Policy/EEP%20Reviews.pdf?ver=2018-06-01-103929-913>
- **Hurricane Season Reporting Requirements: Coast Guard D8 OCS Marine Safety Information Bulletin (MSIB) 21-02:**
 - https://www.dco.uscg.mil/Portals/9/OCSNCOE/References/MSIBs/D8/D8ocs-MSIB-21-02.pdf?ver=zzPdwe0q9Mg8_06Nzm3H4Q%3d%3d
- **Coast Guard Regulatory Guidance / Active Policy Websites:**
 - <https://www.dco.uscg.mil/OCSNCOE/MODU/Regulatory-Guidance/>
 - <https://www.atlanticarea.uscg.mil/Our-Organization/District-8/District-Divisions/OCS/Active-Policy/>



4 Regulator Communications

Clear communication between the operator and the regulators is important, especially during tropical storm threats. To enable clearer communications during tropical storm threats, a common status code should be used. Table 1 contains the Common DP MODU Storm Status Codes.

4.1 BSEE Reporting Intervals

All status updates between DP MODUs within the cone of uncertainty of a Tropical Cyclone or potential Tropical Cyclone and BSEE personnel should be provided every 12-hours. BSEE personnel request to receive these DP MODU status updates on a set schedule of 7:00am Central Standard Time (CST) and 7:00pm CST to aid in consistent reporting and understanding across the fleet.

Operators should coordinate in advance with BSEE personnel in the district your DP MODU is operating in to ask for appropriate email contacts for status updates. BSEE Districts will notify DP MODUs when Status Updates should commence within their Districts, and this may include DP MODUs outside of a published cone of uncertainty.

4.2 Common DP MODU Storm Status Codes

Any DP MODU in the Gulf of America within the forecasted path of Tropical Storm (Named Storm) force winds should assess their Storm Status Code as per Table 1. This Storm Status Code should be used to clearly communicate the MODU's status to the regulators (BSEE or US Coast Guard).

Table 1 Common DP MODU Hurricane Status Codes

H#W# <i>Status Code for DP MODUs within projected Tropical Storm Force Winds</i>	W3 Barrier not set as per W2, W1 or W0 pursuant to 30CFR250.720(a) or 30CFR250.141	W2 Hydrocarbons Exposed: 1st sub-mudline mechanical barrier set & tested pursuant to 30CFR250.720(b)	W1 No Exposed Hydrocarbons, one mechanical barrier set (sub-mudline barrier)	W0 All required barriers in place, Well Secure 30 CFR 30CFR250.720(a)(b) or 30CFR250.141
H3: Connected				
H2: Riser Hanging	N/A			
H1: Recovering Riser	N/A			
H0: Ready to Transit	N/A			

4.3 Status Comment for Next 24-hours

DP MODUs within the cone of uncertainty of a Tropical Cyclone or potential Tropical Cyclone should also provide a comment along with the Storm Status Code that briefly describes the plan for the next 24-hours. Examples of insightful status comments are provided below.

- Example 1: H3W3: Finishing current cement job then setting sub-mudline barrier
- Example 2: H3W1: Will set additional barrier and begin pulling riser
- Example 3: H2W0: Will complete pulling riser and begin transit west



4.4 Termination of Status Code Updates

DP MODUs can cease providing the BSEE personnel of status updates once the DP MODU is:

- 1) Disconnected and transiting off location without restrictions (no riser hanging).
- 2) No longer in the cone of uncertainty of a Tropical Cyclone or potential Tropical Cyclone.

The operator should provide one final status update stating the DP MODU is transiting off location without restrictions, or that their understanding is that they are no longer in a Tropical Cyclone cone of uncertainty.



5 Historic Lessons Learned

These historic lessons learned should be considered when attempting to manage risk where adequate T-Time was not achieved. The following scenarios were discussed between industry and regulator subject matter experts with a focus on providing additional insight associated with emergency situations which may occur.

5.1 Mitigating Riser Hanging Risk in Tropical Storm Conditions

The following considerations may mitigate the risk when the marine riser is hanging in Tropical Storm (Named Storm) Conditions.

- If having difficulty setting and testing of temporary abandonment plug(s) in the well, the operation of last resort may be to remove or disconnect the drillstring or workstring and closing subsea BOP blind shear rams as the primary single pressure barrier to mitigate the risk to personnel and MODU.
- Determine the safest depth of the Lower Marine Riser Package (LMRP) and / or subsea BOP via riser analysis for the DP MODU.
- Properly support the marine riser with gimbaled spider and shared load path (hook / tensioners or hook / substructure).
- Use of a landing joint (when possible) to increase the annulus around the riser in the diverter housing and prevent damage to the buoyancy and peripheral lines.

5.2 Unable to Verify Well Barrier Integrity

Operators and Regulators have determined the priorities for decision making in difficult situations are as follows:

1. **Primary Directive – Protection of Personnel:** If possible, field personnel should be reduced to essential personnel required to secure the well and operate the MODU. Hazardous work should be planned and executed with caution when access to medivacs is impaired. Essential personnel should remain on the MODU during storm evasion and the Offshore Installation Manager OIM should make plans to return to the wellsite as soon as practical after the storm has passed.
2. **Secondary Directive – Protection of the Environment:** Protection of the environment should not come at the expense of loss of life. OIMs and Operators must continuously make decisions to ensure the MODU can disconnect, recover riser and transit away from an approaching storm to ensure human lives are not unnecessarily exposed to storm conditions which are a threat to the stability of the MODU. This may require critical decisions which reduce barrier requirements mandated by regulatory authorities or an imperfect displacement of riser fluids prior to disconnection of the riser.
3. **Tertiary Directive – Protection of Property:** Disconnecting from the well upon making it secure is a prerequisite to the protection of life, therefore, personnel on the MODU must be prepared to disconnect in unfavorable metocean conditions and begin transit while recovering riser.

Note: Due to the reduced manning of non-essential personnel, factors contributing to the fatigue of essential personnel may likely need to be taken into account when establishing reasonable T-



Time objectives. The OIM must remain mindful that at least some portion of storm preparation activities are likely to be carried out with reduced normal crew complement onboard. Drills and tabletop exercises are encouraged as storm season approaches.

5.3 Recent Learnings Between BSEE and Industry

Since the first publication of this guidance document in 2022, BSEE and Industry have learned the following items, which should inform current DP MODU operations during Tropical Cyclone season.

- A. Duration of DP MODUs on location when a tropical storm is relatively close is a concern for BSEE. BSEE will increase communications with those instances where a DP MODU seems to be close to an approaching or developing storm.
- B. Reported T-Times that are greater than the forecasted Tropical Cyclone arrivals to a DP MODU location will raise BSEE concern. BSEE may ask for time to safe out well and time to transit to better understand the risk to the DP MODU.
- C. Increasing T-Times will raise concern and should have good comments that cover reasons for unanticipated delays and adjustment in plans to manage risks.
- D. BSEE requires a sub mudline barrier to be installed in the well (one mechanical barrier) and the second mechanical barrier is the Blind Shear Ram on the BOP. BSEE does not allow for both barriers to be BOP rams unless it is an emergency situation (such as sudden storm situations).
- E. For tropical depressions with the reasonable potential to produce sudden storms (Development to Tropical Cyclone within 24-hours), DP MODU operators should be in communication with the District Manager early to communicate plans and timing.