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Homeland Security

United States
Coast Guard



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CG-xxx Policy Letter
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From: COMDT (CG-xxx)

To: Distribution

Subj: Dynamically Positioned (DP) Mobile Offshore Drilling Unit (MODU) Critical Systems,
Personnel and Training

- Ref:
- (a) International Maritime Organization (IMO) MODU Code (as amended)
 - (b) IMO Maritime Safety Committee (MSC) Circ. 645, "Guidelines for vessels with dynamic positioning systems"
 - (c) IMO MSC Circ. 738 rev. 1, "Guidance for dynamic position system (DPS) operator training"
 - (d) Code of Federal Regulations, Chapter 30, Part 250, "Oil and gas and sulphur operations in the Outer Continental Shelf"
 - (e) API RP Standard 53, "Blowout Prevention Equipment Systems for Drilling Wells"
 - (f) Coast Guard (COMDT CG-0941) Letter dated 11 February 2011, "Potential Legal Issues Associated with Vessels Employing Dynamic Positioning Systems"

DISCLAIMER: This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is intended to provide operational guidance for Coast Guard personnel and is not intended to nor does it impose legally-binding requirements on any party outside the Coast Guard. It represents the Coast Guard's current thinking on this topic and may assist industry, mariners, the general public, and the Coast Guard, as well as other federal and state regulators, in applying statutory and regulatory requirements. You can use an alternative approach for compliance if the approach satisfies the requirements of the applicable statutes and regulations. If you want to discuss an alternative approach (you are not required to do so), you may contact CG-xxx.

1. PURPOSE. The Dynamic position system (DPS), emergency disconnect system (EDS), blowout preventer (BOP) and related training and emergency procedures are critical to the safety of a MODU actively engaged in drilling. Operators, technicians, and inspectors should view these integrated systems holistically, but the myriad of requirements imposed by multiple oversight entities makes this exceedingly difficult. For example, these systems are subject to international guidelines, Coast Guard and Bureau of Safety and Environmental Enforcement (BSEE) regulations, industry standards and Flag State requirements." References (a) to (e) and the Flag State requirements discussed in reference (f) contain requirements for these critical systems which nearly all DP MODUs operating on the U.S. Outer Continental Shelf (OCS) must comply. This policy letter gives guidance on how to view these various requirements in a holistic way and encourages a marine inspector, on behalf of the Officer in Charge Marine Inspection (OCMI) to witness the related drills and equipment tests a MODU typically performs when arriving at a new well location. OCMI's should request operators and MODU contractors provide the opportunity for Coast Guard (CG) personnel to witness these drills and equipment tests. To avoid unnecessary oil exploration delays it is

critical that the marine inspector establish early communication with the Operator, MODU contractor and BSEE personnel due to the variety of DPS, EDS and BOP systems and the need for CG personnel to witness these items in operation. The marine inspector should make every effort to coordinate with BSEE personnel, including joint visits when BSEE personnel are witnessing BOP stump tests under 30 CFR 250.442.

Enclosure (1) is provided to assist marine inspectors with this critical communication and planning phase.

2. ACTION. OCMI's should ensure industry is aware of this guidance and that MODU inspectors approach operators, MODU contractors and BSEE personnel to request arrangements for CG personnel to witness the drills and equipment tests that incorporate the relevant regulations, flag state requirements, industry standards and international guidelines in paragraph 5.

3. DIRECTIVES AFFECTED. None

4. BACKGROUND. Failures of a DPS or the Automatic Power Management systems (APM) the DPS relies upon can cause a MODU to drive or drift off location unless the operator takes immediate emergency response actions, which can include deployment of the EDS. Should the EDS fail, damage to subsea equipment is likely and a subsea spill may result. If well control fails, successful deployment of the EDS is an even more critical secondary line of defense because if the EDS fails or cannot be deployed rapidly, not only are fire and/or loss of life possible, but an uncontrolled subsea spill may also result. The "deadman," as defined in 30 CFR 250.442, is the absolute last line of defense for the MODU's crew; for example if all well control fails and an explosion destroys communication with the BOP before the crew can use the EDS, the deadman must shut in the well to prevent an uncontrolled fuel source from feeding a fire on the MODU.

Reference (a) states that where a DPS is used as the sole method of station keeping it should provide a level of safety equivalent to that provided for anchoring arrangements.¹ This paragraph refers to references (b) and (c)² of this policy letter. The Coast Guard currently interprets "level of safety equivalent to that provided for anchoring arrangements" to require a minimum standard of "equipment class 2" as defined in reference (b) and personnel trained to meet the requirements of reference (c). MODUs that meet DP rules aligned with reference (b) under a classification society recognized to issue MODU Code certificates under 46 CFR 8 satisfy the "equipment class 2" standard. These currently include Det Norske Veritas (DNV) "AUTR", American Bureau of Shipping (ABS) "DPS-2" and Lloyd's Register DP (AA) notations. Failures of DPS and well control systems on MODUs operating in the Gulf of Mexico highlight the need for increased understanding and oversight of these systems. These incidents include:

- a catastrophic blowout following complex and interlinked failures of human judgments, operational procedure implementation and equipment related to well control;
- a position reference system failure combined with inadequate Dynamic Position Officer (DPO) response leading to the MODU "driving off" location, and forcing an emergency disconnect after substantial damage had occurred to subsea gear; and

¹ Paragraph 4.13 of the 2009 MODU Code, 4.12 of the 1989 MODU Code (as amended). 33 C.F.R §§ 142.207(c) and 146.205(c) references the IMO MODU Code as a compliance option for MODUs engaged in OCS activities.

² Reference (c) is only referred to in the 2009 MODU Code. However, industry practice is to train personnel to the most current requirement even if a MODU was constructed under a previous edition of the Code.

- loss of power and position keeping capability while servicing a subsea well, forcing an emergency disconnect and causing the MODU to drift off location until power was successfully restored.

5. **DISCUSSION.** This policy establishes procedures to witness holistic drills and DPS, EDS, and BOP emergency well shut in function tests that incorporate applicable sections of references (a) - (f) for dynamically positioned MODUs operating on the U.S. OCS.

- a. **Relevant requirements.** Table (1) provides a summary of relevant regulations, flag state requirements, industry standards and international guidelines.

Table (1): Relevant Regulations, Requirements, Standards and Guidelines

Description	Summary	Agency	Regulation, Requirement, Standard or Guideline
Marine Casualties	Significant casualties reported to OCMCI	CG	IMO MODU Code Par. 1.6.6
Dynamic Position (DP) Equipment Class 2	Single failure of a DPS or APM component will not cause loss of position	CG	33 CFR 143.207(c); IMO MSC Circ.645 Par 3.2.3
DP Failure Modes and Effects Analysis (FMEA) Proving Trials Report	Proving trial should be onboard, approved by the flag state and recognized organization after successful tests. Proving trial report should be updated as needed.	CG	33 CFR 143.207(c); IMO MSC Circ.645 Par 4.4, 5.1
Position Reference Systems (PRS)	At least 3 redundant PRSs of at least 2 different types	CG	IMO MSC Circ.645 Par 3.4.3
Master and DPO Training	Have appropriate training for DPS duties	CG	IMO MODU Code Par. 4.13, 14.8; IMO MSC Circ.738
Power Management	Automatic restart after power loss	CG	IMO MODU Code Par. 5.1.1.2, 5.3 8.7.2
Loss of position	Alarms and other indications of MODU loss of position	CG/BSEE	IMO MODU Code Par. 14.1
EDS	Personnel can properly recognize when to deploy the EDS	CG/BSEE	IMO MODU Code Par. 14.1.4, API S53 Table 7
Primary/Secondary Well Control Training	Appropriate personnel have well control/ BOP knowledge & training	BSEE	30 CFR 250.442
“Autoshear”/ “deadman”	Capability included in BOP	BSEE	30 CFR 250.442
“Autoshear”/ “deadman	Function test required before new well	BSEE	30 CFR 250.449
Lower Marine Riser Package (LMRP) disconnect function	Operational or physical barriers to prevent accidental disconnect	BSEE	30 CFR 250.442

b. Definitions:

1. Loss of position: A MODU has experienced a loss of position when the MODU is outside its pre-determined operational watch circle whose center is a geographic point on the water surface, causing riser strain by exceeding a design maximum riser angle with zero angle reference when the MODU is directly positioned over the well. It also occurs when a MODU's heading angle varies from its desired heading beyond a pre-defined limit, causing riser strain by twisting it beyond design torsion limits. The MODU's operations manual should document these design characteristics.
2. Degraded DP capability: a failure of equipment in the DP or APM system (e.g. thruster, switchboard) that has either:
 - A. expanded the DP footprint and reduced the maximum environmental conditions under which the MODU can maintain station; or
 - B. reduced the redundancy of the DP system to the extent that it no longer meets Equipment Class 2 or 3 standards.
3. Operator: Company with the approved lease to explore for oil on the OCS.
4. MODU contractor: Company that is contracted by the operator to provide a MODU and drilling services.

6. PROCEDURES. Marine inspectors should use the below guidance when witnessing drills and equipment testing on a dynamically positioned MODU. This guidance links the requirements in Table (1) to typical holistic tests a Coast Guard Marine Inspector should witness and provides other related background.

- a. General. Marine inspectors should witness APMs, DPS, EDS and BOP "autoshear" and "deadman" function tests when a MODU is not drilling, because this is when they can be safely conducted. The ideal time to witness these tests is when the MODU first arrives at its new well location, because that is when BSEE typically conducts the tests required by its regulations. The marine inspector should provide sufficient advance notice to the operator, contractor, and BSSE, of his or her intent to witness these tests to maximize the opportunity for CG personnel to be onboard during these exams and tests, Frequent and effective communication between all involved parties will minimize any delay to drilling operations and facilitate the presence of technical specialists. Where BSEE personnel intend to witness BOP stump testing required by their regulations, every reasonable effort should be made to coordinate with them.
- b. Manning. Per reference (f), vessels operating with a DPS are considered: (1) "self-propelled motor vessels,"³ (2) "underway,"⁴ and (3) not "on location"⁵, which means a licensed master should be on board at all times. Marine inspectors should verify whether the safe manning document issued by the

³ See 46 U.S.C. 2101(16); 46 CFR 10.107 (although this section of the CFR applies to licensing and credentialing of merchant mariners, it is useful in a general context).

⁴ See 46 CFR 10.107.

⁵ See 46 U.S.C. 8301(c); 46 CFR 10.107.

MODU's Flag Administration indicates that the MODU is "self-propelled" (as opposed to "on location") and a licensed master is required.

- c. Documentation of emergency procedures. Marine inspectors should assess whether emergency procedures are adequately documented in the operations manual required by Chapter 14.1.4 of the MODU Code, the vessel's Safety Management System procedures, or other relevant documentation. Key areas that should be noted include:
1. Master's and Offshore Installation Manager's (OIM) authority to initiate emergency disconnect, including summary of key conditions and indications where emergency disconnect should be initiated, even if drill pipe must be sheared to do so. Examples of key conditions and indications include detection of gas in the riser or on the MODU, a "kick" that cannot be controlled through use of annulars, pipe rams and choke or kill lines.
 2. DPO loss of position procedures, conditions when position keeping has been degraded, indications of when those conditions exist, and required DPO actions and communications to Master and OIM in the event of those conditions. What constitutes a loss of position should be clearly defined and the method of communication to the master and OIM should be described. DP MODUs typically use a "traffic light" signal to communicate DPS status with green = normal, yellow = caution, red = disconnect. Where this method is used, it should function when the main source of electrical power is not available. "Caution" may involve special procedures, such as additional generator spinning reserves, split plant operation, etc. Example of what may constitute "caution" status includes consequence analyzer notification that failure will cause unacceptable footprint/ the loss of position in current environmental conditions or a critical well control situation such as use of BOP annulars or pipe rams and choke and kill lines.
- d. Personnel training documentation. Marine inspectors should note if key personnel have appropriate training documentation for their respective DP or emergency disconnect duties. The Master and each DPO should hold a valid Dynamic Position Officer Certificate (DPOC) under reference (c) issued by a DP training center accredited by the Nautical Institute. The accepted practice across the industry for a DPOC is successful completion of the Nautical Institute DPO Basic and DPO Advanced courses as well as completing the minimum time requirements as a DPS operator. This is validated by the DPO presenting the certificates and by presenting an official Nautical Institute DPO's log book.
- e. Drills. Marine inspectors should witness drills to note personnel training and familiarity with critical equipment. Drills should be part of a more extensive program required by the MODU contractor that includes a variety of realistic drill and training scenarios on a more frequent basis than witnessed by the Coast Guard or BSEE. Drills should be as realistic as possible, which may require involvement of equipment/system technical representatives. Marine inspectors should obtain a description of the drill performed from MODU contractor's program and scan it into the marine information for Safety and Law Enforcement (MISLE) inspection case. During drills, the Marine inspector should note whether key personnel are familiar with emergency response procedures described in paragraph (6)(b). Where operators and MODU contractors have assessment programs for this, assessment personnel should be encouraged to attend. Examples of critical scenarios that should be included in a contractor's program include:

1. DPS drive off (Software generated actual drive off from a simulated well location.);
 2. consequence analyzer alarm evaluation and response action;
 3. actual “dead ship” (blackout recovery inhibited) prolonged “zero-thrust” leading to emergency disconnect, where (if fitted) the DPS Alert “traffic light system” is utilized in blackout condition. The marine inspector should note whether the method of communication is effective when the main source of electrical power has been lost.;
 4. loss of communication with OIM/ drill floor/simulated explosions; and
 5. multiple gas detections coupled with span gas testing of critical gas detectors described in paragraph (e)(1) of this letter⁶.
- f. Equipment testing – Marine inspectors should witness equipment testing and encourage MODU contractors and operators to integrate the testing into drills in a realistic manner. Due to the variety of DPS, EDS and BOP systems it is critical that the marine inspector ensures prior planning and communication with the operator, MODU contractor and BSEE as applicable. Enclosure (1) is provided to assist marine inspectors with this critical planning; marine inspectors should use this checklist to obtain and understand the test procedures specific to the equipment to be tested. Existing industry documents such as the classification society-approved DP FMEA Proving Trials Report, and the operator/MODU contractor approved emergency disconnect and “autoshear” and “deadman” testing procedures should include the following basic tests:
1. span gas testing of critical gas detectors;
 2. blackout recovery;
 3. any APM or DPS failure mode identified by the approved FMEA or a third party assessment that may cause the MODU to lose power or position;
 4. initiation of EDS with BOP on the stump;
 5. “autoshear” with BOP on the stump; and
 6. “deadman” with BOP on the stump.

These tests should not be “simulated” (e.g. test button through separate circuit, injection of electrical signals into subsea electronic modules or solenoids). The EDS should include confirmation that the LMRP has physically released/unlatched. BOPs with clear indicator mechanisms may use these for confirmation; BOPs without clear indicator mechanisms should use other methods. The deadman actuation should be initiated via actual loss of electric and/or hydraulic control signals as applicable. Clear indication that the blind shear rams have closed via method accepted by BSEE should be included.

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Enclosure: (1) DPS and EDS/BOP Stump Test Witness Planning Check list

⁶ Marine inspectors should ask which gas detectors are most critical and if any programmed shutdowns are associated with that specific detector. In general, shutdowns are not expected to affect position keeping of emergency power but are expected to affect industrial non emergency equipment especially in proximity to the drill floor.

Enclosure (1) – Pre-Planning Checklist for MODU Critical System Test Witness

- Call the BSEE Regional office to determine upcoming MODU well completions. Ask if BSEE is witnessing stump testing, and if so obtain their anticipated arrival date and request a joint visit. If a joint visit is planned, obtain estimated well completion date(s) for specific MODU(s) and ask BSEE to notify the operator that the CG will join them during stump test.

Note: BSEE is in regular communication with operators about MODU moves to new well locations as part of the permitting process. Because of this CG inspectors should work through BSEE regional offices to avoid redundant requests for information and to enhance coordination. By regulation operators are required to contact BSEE 72 hours prior to well completion.

- For a specific MODU identified for joint inspection contact the BSEE regional office and request EDS, deadman and autoshear test procedures reviewed by the BSEE regional office. Forward EDS test procedures to the MSC and request they perform an “optional” plan review to see if the test procedure would meet [46 CFR 61.40-10](#). Ensure potential CG witnesses have required training (e.g., “dunker” or emergency egress training, as applicable) for helicopter flight operations.
- Contact MODU contractor; verify they are aware of the joint BSEE/CG visit and request approved DP Proving test procedures. Ask if any other tests are planned that may interfere. Send the DP Proving test procedures to the MSC if technical support needed.
- Call BSEE personnel to obtain revised MODU transit information, if applicable.
- Contact the MODU contractor and ensure berthing for total number of CG test witnesses on MODU is available if necessary; determine if additional third party contractors/representatives will be present. Ensure a helicopter flight is arranged for CG witnesses.