



**GUIDE FOR**

---

**LAY-UP AND REACTIVATION OF MOBILE OFFSHORE  
DRILLING UNITS**

**JUNE 2017**

**American Bureau of Shipping  
Incorporated by Act of Legislature of  
the State of New York 1862**

**© 2017 American Bureau of Shipping. All rights reserved.  
ABS Plaza  
16855 Northchase Drive  
Houston, TX 77060 USA**

## Foreword (1 June 2017)

This Guide has been prepared by the American Bureau of Shipping to provide Owners guidelines for the lay-up and reactivation of Mobile Offshore Drilling Units. These guidelines are of a general nature due to the wide variety of MODU configurations, geographic and metocean conditions of lay-up sites and degree of maintenance during lay-up.

This Guide expands the “Laid-up” status to provide more precise definitions regarding exact status of a stacked unit. This Guide provides the following five options for laid-up life cycle status for units classed with ABS:

- i) Laid-up **with no Record Comment**
- ii) **Laid-up with the following Record Comments:**
  - a) Laid-up Warm Stacked
  - b) Laid-up Cold Stacked
  - c) Enhanced Laid-up Warm Stacked
  - d) Enhanced Laid-up Cold Stacked

These conditions will be noted in the unit’s survey status and the *Record*. This Guide also introduces an “Enhanced” status for a laid up unit, which means that the unit has had its lay-up location and procedures reviewed and verified by ABS in accordance with this Guide. The goal of having a unit enrolled in Enhanced lay-up is to preserve the total asset value, potentially qualify for a reduced insurance premium while stacked, along with reducing the time and cost for reactivation.

This Guide becomes effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website [www.eagle.org](http://www.eagle.org) to verify that this version of this Guide is the most current.

*We welcome your feedback. Comments or suggestions can be sent electronically by email to [rsd@eagle.org](mailto:rsd@eagle.org).*



**GUIDE FOR**

**LAY-UP AND REACTIVATION OF MOBILE OFFSHORE DRILLING UNITS**

**CONTENTS**

---

<b>SECTION 1</b>	<b>General</b> .....	<b>1</b>
1	General .....	1
3	Definitions .....	1
3.1	Life Cycle Status “Laid-up” .....	1
3.3	Record Comment “Laid-up Warm Stacked” .....	1
3.5	Record Comment “Laid-up Cold Stacked” .....	2
3.7	“Enhanced” Record Comment.....	2
5	Lay-up Surveys .....	2
7	Maintenance of Record Comment .....	2
9	Lay-up Overview .....	3
<b>SECTION 2</b>	<b>Lay-up and Surveys of Laid-up Mobile Offshore Drilling Units</b> .....	<b>4</b>
1	Lay-up Procedure Requirements .....	4
3	Fire and Safety Requirements for all Laid-up Units .....	4
3.1	Fire and Safety Requirements for Units Laid-up Warm Stacked .....	6
3.3	Fire and Safety Requirements for Units Laid-up Cold Stacked .....	6
5	Preservation and Maintenance for all Units .....	6
5.1	General.....	6
5.3	Hull and Deck Equipment .....	7
5.5	Machinery Spaces and Machinery .....	8
5.7	Boilers .....	9
5.9	Boiler Stack Openings .....	9
5.11	Electrical Installation.....	9
5.13	Elevating and Skidding Systems .....	10
5.15	Control Systems .....	10
5.17	Drilling Equipment .....	10
5.19	Optional Lay-up Site and Station Keeping (Mooring) Arrangements.....	10
7	Surveys .....	12
7.1	Initial Lay-up Survey .....	12
7.3	Annual Surveys .....	12

<b>SECTION 3</b>	<b>Enhanced Lay-up</b>	<b>13</b>
1	Submittals	13
1.1	Overall Lay-up Procedure Describing the Following	13
1.3	Risk Assessment	13
1.5	Mooring	14
1.7	Manning	14
1.9	Security	15
1.11	Stability	15
1.13	Services	15
1.15	Port and Flag State Requirements	15
1.17	Procedures and Standards for Preservation	15
1.19	Safety Manual	15
1.21	Maintenance Plan	15
1.23	Remote Monitoring Systems	16
1.25	Repair and Maintenance Log	16
3	Surveys	16
3.1	Initial Lay-up Survey	16
3.3	Annual Surveys	16
<b>SECTION 4</b>	<b>Reactivation of Laid-up Mobile Offshore Drilling Units</b>	<b>17</b>
1	General	17
3	Reactivation Procedures for Units with “Enhanced” Record Comment	18
5	Hull and Outfit	18
5.1	Underwater Examination	18
5.3	Witnessing of Functional Testing or Verification of Fitness for Service	18
7	Machinery	19
9	Elevating Systems and Cantilever Hold Downs	19
11	Electrical	20
13	Drilling Equipment	20
15	Control Systems and Instrumentation	20
15.1	Software	20
15.3	Hardware	21
17	Cranes	21
19	Propulsion Trials and Sea Trials	21
21	Documentation and Certification	21



## SECTION 1 General (1 June 2017)

At the request of the owner and to assist in the maintenance of class, ABS will review, survey, and confirm by issuance of a factual Lay-up Report, the actions taken to preserve and protect a unit in lay-up. This Guide contains those precautions and procedures considered by ABS to accomplish this objective; alternative approaches to accomplish the same may be considered.

### 1 General

- i) Upon the owner's written notification to ABS of a unit's lay-up, it will be noted in the unit's survey status and the *Record* will be updated to reflect the change in status. Surveys falling due during lay-up are then to be held in abeyance until the unit reactivates, at which time they are to be brought up to date.
- ii) The Reactivation Survey requirements for the unit are subject to special considerations based on the survey status at the time of the commencement of lay-up, the length of the lay-up period, and the conditions under which the unit has been maintained during that period.
- iii) Where initial lay-up preparations and procedures are reviewed and surveyed by ABS, and also verified annually by survey, consideration may be given to deducting part or all of the time in lay-up from the progression of survey intervals, or to modifying the requirements for up-dating surveys at time of reactivation.
- iv) There are three conditions for a Unit with a Laid-up "Life Cycle State" in the *Record*, Laid-up with no Record Comment; Laid-up Warm Stacked with the corresponding Record Comment and Laid-up Cold Stacked with the corresponding Record Comment. The Record Comments "Laid-up Warm Stacked" and "Laid-up Cold Stacked" can also have the Enhanced modifier, to have Record Comments showing "Enhanced Laid-up Warm Stacked" and "Enhanced Laid-up Cold Stacked". These conditions are described in Subsection 1/3 below.

### 3 Definitions

#### 3.1 Life Cycle Status "Laid-up"

All laid-up units will have a Life Cycle Status of "Laid-up". When a unit has a "Laid-up" Life Cycle Status in the *Record* without any additional Record Comment, this means that the unit is out of service for an undetermined length of time. The owners have informed ABS that the unit is laid up, but no procedures for lay-up have been reviewed by ABS. While in laid up status, class surveys are held in abeyance and statutory surveys are maintained when required by the flag Administration. Prior to returning to service a Reactivation Survey in accordance with Section 4 of this Guide, including all due and overdue class and statutory surveys is to be carried out. An initial layup survey and annual surveys are not required for this Life Cycle Status and no attendant Record Comment.

Units with lay-up procedures, initial lay-ups surveys and periodic examinations verified by ABS will have additional Record Comments describing the type of lay-up as listed below.

#### 3.3 Record Comment "Laid-up Warm Stacked"

When a unit has a "Laid-up Warm Stacked" Record Comment in the *Record*, this means the unit is not in operation, is positioned in a sheltered location and there is a crew onboard carrying out the maintenance and preservation activities described in the ABS agreed lay-up procedure. In this case, 1/1iii) is applicable. Class surveys are held in abeyance and statutory surveys are maintained when required by the flag Administration. However, annual lay-up surveys are required to be carried out. Prior to returning to service, a reactivation survey taking into account the degree of maintenance conducted while laid-up, including all due and overdue statutory surveys is to be carried out.

### 3.5 Record Comment “Laid-up Cold Stacked”

When a unit has a “Laid-up Cold Stacked” **Record Comment** in the *Record*, this means that the unit is not operating, is positioned in a sheltered location, is unmanned, and that the Lay-up procedures have been reviewed by ABS. In this case, 1/1iii) is applicable. All class and statutory surveys are held in abeyance. However, annual lay-up surveys are required to be carried out. Prior to returning to service, a reactivation survey taking into account the degree of maintenance conducted while laid-up, including all due and overdue statutory surveys, are to be carried out.

### 3.7 “Enhanced” Record Comment

The goal of having a unit enrolled in the Enhanced Lay-up program is to manage the lifecycle and asset value by minimizing risk exposure, along with reducing the time and cost for reactivation. In addition to the requirements of Laid-up Warm Stacked or Laid-up Cold Stacked, when a unit has an “Enhanced Lay-up” **Record Comment** in the *Record*, this means that the unit has had its lay-up location and procedures reviewed and verified in accordance with Section 2 of this Guide. For this **Record Comment**, a review of the proposed lay-up procedure, including the location chosen, the moorings, a risk analysis of the location, and the capability of emergency response is required.

The **Record Comment** will show in the *Record* as follows:

Enhanced Laid-up Cold Stacked

Enhanced Laid-up Warm Stacked

## 5 Lay-up Surveys

When a unit is laid-up with a “Laid-up Warm Stacked”, “Laid-up Cold Stacked”, or “Enhanced” **Record Comment** in the *Record*, an Initial **Lay-up Survey** is required. After being laid up, the unit will also be subjected to periodic surveys. The scope of such surveys will consist of verification of all items on the ABS agreed lay-up procedure.

In the case of “Cold Stacked” units, in addition to the verification detailed in Subsection 2/7 of this Guide, the equivalent to an Annual Hull Survey is to be carried out. In the case of “Warm Stacked” units, in addition to the verification listed in Subsection 2/7 of this Guide, the equivalent to an Annual Hull Survey and an Annual Machinery Survey is to be carried out. **Units** with “Enhanced Lay-up” will have verification requirements in accordance with Subsection 3/3 of this Guide in addition to those in Subsection 2/7.

## 7 Maintenance of Record Comment

When the **unit** has a **Record Comment** of “Laid-up Warm Stacked”, “Laid-up Cold Stacked”, or “Enhanced”, **consideration may be given to deducting part or all of the time in lay-up from the progression of survey intervals, or to modifying the requirements for updating surveys at the time of reactivation.**

The **unit** will not be eligible for deduction of any time in lay-up from the survey cycle in any of the following circumstances:

- i) If the periodical surveys required for maintenance of the **Record Comment** are not carried out by their due dates and no extension has been granted
- ii) If recommendations issued by the Surveyor regarding degree of compliance with the lay-up procedure are not carried out by their due dates and no extension has been granted
- iii) If any damage, failure, or repair has not been completed as recommended

9 Lay-up Overview

<i>Record Comment</i>	<i>None</i>	<i>Laid-up Cold Stacked*</i>	<i>Laid-up Warm Stacked*</i>	<i>Enhanced Laid-up Cold Stacked</i>	<i>Enhanced Laid-up Warm Stacked</i>
Owner sends notification to ABS <b>that unit is Laid-up</b>	X	X	X	X	X
Lay-up Procedure Reviewed		X	X	X	X
Engineering Review of Mooring design		*	*	X	X
Survey of Mooring		*	*	X	X
Initial <b>Lay-up</b> Survey		X	X	X	X
Annual Hull Survey equivalent		X	X	X	X
Annual Machinery Survey Equivalent			X		X
Underwater Examination of mooring system every 3 years		*	*	X	X
Surveys held in abeyance	X	X	X	X	X
Deduction of time in lay-up		X	X	X	X
Reactivation Survey	X	X	X	X	X
Reactivation Survey considers Lay-up Procedure		X	X	X	X
Reactivation follows submitted Reactivation Procedure				X	X

Key:

X Required

\* Can be conducted at Owner's request



## SECTION 2 Lay-up and Surveys of Laid-up Mobile Offshore Drilling Units

*(1 June 2017)* This Section applies to **units** requesting a **Record Comment** of Laid-up Warm Stacked, Laid-up Cold Stacked, and **units** with the Enhanced **modifier**.

### 1 Lay-up Procedure Requirements *(1 June 2017)*

Lay-up procedures submitted to ABS are to contain the following information for each unit:

- i)* General description of the lay-up plan
  - a)* Location of the unit while laid-up
  - b)* Description of the mooring
  - c)* Number of personnel expected to be on board
  - d)* Status of cranes during lay-up
  - e)* Description of any external verification such as security personnel or unit patrols
- ii)* List of systems active while laid-up
- iii)* List of systems partially active while laid-up
- iv)* List of systems shut down and preserved while laid-up
- v)* Procedures for preserving each system that is shut down
- vi)* Procedures for tracking overdue maintenance or parts required for reactivation
- vii)* Procedures for periodic maintenance of preservation while laid up
- viii)* Procedures for backup and storage of software necessary for operation of the unit
- ix)* Units with “Enhanced” Record Comment modifier also need to submit items listed in Section 3

### 3 Fire and Safety Requirements for all Laid-up Units *(1 June 2017)*

- i)* All the unit’s fire safety equipment including emergency fire pump are to be proved in good order immediately prior to lay-up and maintained ready for immediate use thereafter.
- ii)* The unit’s fire extinguishing piping is to be proven in good condition. If the piping is drained, drains are to be kept only sufficiently open to allow drainage of condensate. Alternatively, the fire main lines may be filled with inhibited fresh water, including anti-freeze if necessary, or left in service. The International Shore connection, where provided, is to be loosely installed and its location prominently marked. Fire line valve stems are to be freed up and lubricated.
- iii)* All ventilators and air intake or exhaust openings **for spaces not active** are to be adequately covered. Supply and exhaust openings for necessary emergency diesel generator or fire pump engines are to be arranged for immediate or automatic opening.



- iv)* A source of power for providing emergency lighting, fire extinguishing water, and bilge pumping throughout the unit is to be immediately available.
- Where the emergency source of power is a portable diesel generator set mounted on deck, adequate arrangements are to be made to install and secure the equipment, including fire safety of the fuel and exhaust systems, fire extinguishing arrangements, weather protection, proper electrical installation, and electrical protective devices for the unit.
- An ABS approved/certified generator is not specifically required. The proposed engine is to be suitable for marine use by compliance with the following:
- a)* The engine is fitted in the longitudinal direction.
  - b)* Fuel oil and lube oil strainers are to be capable of being cleaned while the engine is operating, as per Section 4-6-5 of the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*.
  - c)* A low-lube-oil-pressure alarm is to be fitted as per Section 4-6-5 of the *Steel Vessel Rules*.
  - d)* Crankcase explosion relief valves are to be provided in compliance with Section 4-2-1 of the *Steel Vessel Rules*.
  - e)* Warning notices are to be fitted as per Section 4-2-1 of the *Steel Vessel Rules*.
  - f)* An operating governor conforming to the requirements of 4-2-1/7.5 of the *Steel Vessel Rules* is to be fitted as practical.
  - g)* Water jacketed or insulated exhaust manifolds are to be provided as per Section 4-6-5 of the *Steel Vessel Rules*.
  - h)* Shielding of High Pressure Fuel Lines as per Section 4-6-5 of the *Steel Vessel Rules*.
  - i)* Insulation of Hot Surfaces (over 220°C) as per Section 4-2-1 of the *Steel Vessel Rules*.
- v)* All loose flammable materials such as debris, oily rags, cotton waste, chemicals, additives, corrosives, old pyrotechnics, matches, unsealed painting oils and dregs, garbage, etc., are to be removed from the unit including from unused lifesaving equipment and lifeboats. Arrangements are to be made for safe containment and frequent removal of garbage produced by watch personnel. All bedding, curtains, towels, and cloths of any nature are to be removed from the accommodation spaces.
- vi)* All mud and cement storage, mixing and other tanks together with associated piping are to be clean and gas-free.
- vii)* Hazardous drains, drain tanks, spaces, and piping systems containing drilling hydrocarbons are to be flushed, cleaned, and gas-free as applicable.
- viii)* Machinery space bilges are to be dry and cleaned of all debris, oil, or other flammable products.
- ix)* On floating units, the anchor windlass is to be proven to be in good order prior to lay-up, and anchors, chains, or mooring cables checked. Where used as part of the lay-up mooring arrangements, the chains or mooring cable are to be regularly checked for twists and chafing and shifted or padded as necessary. If not required for the mooring, one anchor is to be prepared for emergency release.
- x)* Hot work (i.e., welding or burning) is not to be permitted during lay-up except under specially supervised safety control. No unshielded or open-flame devices such as portable heaters are to be permitted on board. Safe smoking areas, if required, are to be clearly marked.
- xi)* The unit is to be readily accessible and approachable for shore-based or floating firefighting and other emergency equipment at all times and tides.
- xii)* **Floating units are to have a towing pendant available in case** an emergency tow from lay-up while in deactivated condition **is required**. If the unit is self-propelled, the propeller shaft(s) are to be blocked from turning by some positive means. The turning gear is not to be used for this and is only to be engaged when in use. Rudders, if fitted, are to also be hydraulically locked or otherwise locked amidships.

### 3.1 Fire and Safety Requirements for Units Laid-up Warm Stacked

- i) On units with “Laid-up Warm Stacked” Record Comment in the *Record*, there is to be a sufficient number of qualified personnel available onboard in order to maintain full-time fire, leakage, moorings and security watch of the unit as required by the flag Administration. The watchmen are to be capable of operating the emergency communications equipment and taking emergency action pending arrival of outside assistance for fire extinguishing, leakage pumping, mooring adjustment or release, and general security. This includes the operation of the necessary emergency power sources, pumping units and any active fixed fire control apparatus.
- ii) Self-Contained breathing apparatus and flotation escape equipment are to be provided and maintained immediately available for the watchmen or lay-up crews.
- iii) Effective and reliable means of communication, such as an independently-powered radiotelephone, are to be provided for contact with firefighting, tug and rescue facilities, or central security base. A secondary communication system is to be provided in the event of failure or damage to the primary means.

### 3.3 Fire and Safety Requirements for Units Laid-up Cold Stacked

- i) On units with “Laid-up Cold Stacked” Record Comment in the *Record*, there is to be an alarm system fitted for fire, bilge flooding, loss of power, loss of station, and any other items deemed appropriate. The alarm is to be visible remotely or have the capability to notify personnel by other means, such as internet or telephone. Personnel are to be available to take action in the case the alarm is activated. The availability of competent and trained personnel for taking emergency action in hurricane, cyclone, or typhoon areas is to be considered.
- ii) Fuel and lube oil tanks are to be wired or locked closed at the tank valve except where required for the emergency power supply engine.
- iii) All valves to or from the sea on floating units are to be wired or locked closed except those actually required for use during lay-up in connection with emergency ballasting, fire extinguishing, pumping out, or watch personnel service. In order to prevent excessive fouling and choking, the sea suction openings, except for emergency fire pump, are to be covered over externally and/or protected with a slow acting biocide.
- iv) All fire dampers are to be freed-up and then secured in closed position. All fire division doors are to be closed and appropriate signs to be posted or painted on the doors to confirm the doors are kept closed during the lay-up period. If the doors are to be kept open for ease of dehumidification, a risk assessment is to be submitted, considering factors mitigating fire risk.

## 5 Preservation and Maintenance for all Units

### 5.1 General

While the contents of this Guide cover the requirements associated with supporting the continued classification of a MODU during its lay-up, Owners and Operators are directed to the regulations/laws of the local port authorities concerned with the positioning of a laid-up MODU in waters under their jurisdiction. Nothing in this Guide should be considered as reducing the responsibility and obligation of complying with the local **authority's** regulations/laws. In the event that there are conflicts between the Class Rules, this Guide, and local regulations and laws they are to be brought to the attention of ABS for evaluation and consideration.

Where this Guide requires the installation of a particular fitting, material, appliance to be carried on the MODU, or any other particular provision, ABS may accept any other fitting, material, appliance, or any other provision to be made, provided that ABS is satisfied that such a fitting, material, appliance, or other provision has been determined by ABS to be at least as effective as that required by this Guide.

Any equipment degradation and deferred maintenance is to be mapped and recorded in the unit's records.

### 5.3 Hull and Deck Equipment

The primary objective of lay-up is to protect the hull and deck equipment against corrosion, weathering damage and freezing.

- i) The unit's external coating systems are to be in good condition prior to lay-up. Consideration is to be given to supplemental sacrificial anodes on submerged areas; (e.g., externally along the side shell, on lower hulls or pontoons, columns and bracing members, legs, mats, spud cans, and in ballasted areas).
- ii) Impressed-current cathodic hull protection systems where fitted, are to be maintained in operation if a continuous power source is available and readings logged weekly by watch personnel who are to be advised of proper procedures in case of abnormal readings. If the unit is moored to another unit or shore power is used, the system may need to be modified or secured due to possible electrolytic interaction. This is to be taken up with the system manufacturer.
- iii) Deck machinery is to be thoroughly lubricated and operated in all modes before securing. Also refer to Machinery and Electrical Installation paragraphs of this Guide.
- iv) The accommodation spaces, deck, and other hull water, steam, and air piping are to be drained and blown clear and with dry air. Alternatively, they may be completely filled with chemically inert antifreeze liquids compatible with the piping or tubing material. The latter is to be carried out under the guidance of a chemical specialist. Salt water lines, including tank washing apparatus, are to be flushed out with fresh water, drained, and blown dry. (Note that this will require a good supply of fresh water on arrival at the lay-up site.)
- v) The drill floor, derrick, substructure, topdrive and rotary table are to be cleaned of all mud and grease. Drill floor and substructure drain holes and drain wells are to be cleared to insure proper draining of rain water. All fluids are to be disposed of in accordance with unit procedures and statutory requirements.
- vi) Air vents for water tanks and fuel oil may be left open. Flame arrestor arrangements on fuel tanks and adjacent cofferdams are to be in good order.
- vii) Empty tanks are to be ventilated as much as possible and condensate regularly removed or inhibited. Supplemental anodes and inhibitors are to be considered for ballast tanks containing water.
- viii) All doors and side scuttles are to be kept closed and deadcovers in place, except where in regular use by watch personnel. Machinery casing top openings and skylights are to be kept closed and weathertight. Appropriate signs are to be posted or painted on the doors and other closing devices to confirm that they are kept closed during the lay-up period.
- ix) Hull hydraulic systems are to be kept completely full of fluid. All hydraulic cylinders and ram assemblies are to be actuated periodically to verify the capability for proper operation.
- x) Wire radio antennae are to be lowered and secured except for emergency communications antenna.
- xi) All loose items on deck are to be properly secured against movement by wind or other external forces.
- xii) All exposed navigation equipment, drillers' consoles, derrickman's console, and any other exposed gauge and meter panels are to be protected with weathertight covers.
- xiii) Galley exhaust grease collection apparatus are to be cleaned. If in use by watch personnel, it is to be re-cleaned monthly.
- xiv) Potable water tanks not in use by watch personnel are to be drained and left open for free ventilation. Alternatively, they may be left completely filled if not subject to freezing.
- xv) All deck electrical receptacles are to be closed up weathertight. Deck mounted electrical or hydraulic controls are to be protected by a weathertight cover.
- xvi) Crane booms are to be down and secured. Exposed wire rope such as for cranes, derrick falls, riser tensioner wire, lifeboat falls, and mooring wires are to be coated with preservative grease, and where possible, removed from the blocks and stowed out of the weather. Fibrous ropes and other cordage not in use are to be stowed off the deck and out of the sun and weather.
- xvii) Exposed deck fittings liable to corrosion seizing, such as hinges, clips, screw-dogs, roller fairleads, boom fittings, and valve stems are to be coated or injected with preservative grease.

## 5.5 Machinery Spaces and Machinery

The machinery and related engine room equipment are to be protected against corrosion, seizing, and freezing. This normally requires the use of stabilized or preservative lubricants, prevention of acid concentrations, and regularly scheduled rotation or movement of machinery parts to shift contact surfaces. There is to be a source of power for lighting and for turning over machinery. Continuous heating for all machinery spaces is to be provided to maintain a temperature a few degrees above atmospheric; or alternatively, complete dehumidification at 35% to 45% relative humidity is normally required to prevent sweating or humidity corrosion damage. Periodic readings are to be taken to verify effectiveness of the equipment.

- i) Thrusters and all rotating machinery in the machinery spaces and in the pump rooms are to be turned over and stopped at a new position at least once a month. Where fitted, pressure lubrication systems are to be actuated and cylinder lubricators manually operated prior to turning over the machinery. The steering gear, where applicable, on floating units is to be operated and moved full travel at the same intervals. Deck machinery is to be turned over at least quarterly.
- ii) Items of machinery may be preserved in accordance with specific original equipment manufacturer recommendations.
- iii) Lube oil in engines is to be thoroughly treated prior to shutting down, after which the oil is to be periodically analyzed to confirm stability and the absence of harmful acidity. Any lube oil reservoir or sump vents to the exposed atmosphere are to be closed off and opened only to a dry space. Where lube oil tanks are contiguous with the hull plating, means of coping with accumulation of condensation are to be provided for.
- iv) All other machinery is to be thoroughly lubricated with a stable grease or oil before securing and at least annually thereafter. For reciprocating machinery this is to include also some form of non-contaminating protection in the cylinders.
- v) The bilges in machinery spaces are to be dewatered and thoroughly cleaned. If the unit has a water-lubricated stern bearing, the stern glands are to be tightened up just sufficiently to stop leakage, and warning notice to this effect posted at propulsion control station.
- vi) The seawater side of heat exchangers are to be thoroughly cleaned of all sea growth or other organic products, washed through with fresh water, then drained, dried and closed up, or left open to a dehumidified space. Drains may be left partly open but are to be clearly marked to this effect and connecting valves to the sea wired-closed. Alternatively, these heat exchangers may be kept completely filled with chemically inert liquid. This latter approach is to be carried out under the guidance of a chemical specialist.
- vii) All water system heat exchangers, reservoirs, and piping are to be drained and blown dry. Alternatively, these may be protected by filling with a non-contaminating, chemically inert liquid or dry inert gas. This process is to be carried out under the guidance of a chemical specialist.
- viii) Air reservoirs are to be fully charged, water drained, and air outlet valve closed off at the tank. Alternatively, they may be opened, cleaned, dried, and left open for free ventilation.
- ix) The unit's air conditioning and refrigeration systems are to be pumped down and secured. Inert Gas systems are to be completely drained, dried out, and secured with means for air circulation or dehumidification. Acidic areas may be required to be neutralized.
- x) The items in the setback area are to be minimized, and all items and equipment in the derrick are to be secured against movement.
- xi) Software versions of dynamic positioning systems, machinery automation systems, loading computers, and other critical computerized systems is to be recorded and backed up in a secure location as discussed in the lay-up procedure.

## 5.7 Boilers

- i) The fire-side of a boiler to be laid-up is to be thoroughly cleaned in order to minimize external acidic corrosion from the absorption of atmospheric moisture by the products of combustion. Usual soot accumulation areas, such as where tubes enter headers or water drum and around floor tubes, require special attention. If water washing is resorted to for cleaning, the boiler is to then be fired for about 12 hours to dry the residual moisture from the insulation and brickwork. Where feasible, alkaline wash water is to be used. Final cleaning by dry method is recommended, after which the furnace openings are to be left open for free ventilation.
- ii) The water-steam side of a boiler may be preserved by a wet method or a dry method. In either case the water-steam side of the entire boiler, including superheater and economizer, are to be first washed clean of all residue and existing chemical concentrates.

If the dry method is employed, after thoroughly heat drying, the water-steam side of the boiler is to be either charged with trays of desiccant and resealed, or left open top and bottom including a hand hole in each header for free ventilation to a dehumidified space or with a continuous source of heating inside the water drum. If desiccant is used, this is to be renewed or re-dried at least monthly or changed on the basis of a moisture indicator. A third alternative is to keep the boiler empty, sealed, and slightly pressurized with a dry inert gas.

If the wet system is employed, the entire boiler is to be kept full under a slight head with chemically inert distilled water. The initial charging and occasional rechecks are to be carried out under the guidance of a chemical specialist. If the wet system is employed, external space heating or dehumidification may be required to control sweating and consequent poulitice corrosion under insulation.

## 5.9 Boiler Stack Openings

After securing the boiler and engines, all stack outlets are to be provided with weathertight covers. If not in use, the galley stack is also to be covered weathertight.

## 5.11 Electrical Installation

The electrical system is to be protected against insulation deterioration, primarily from atmospheric moisture absorption or water ingress, and the rotating elements protected against corrosion damage in the bearings.

- i) Before securing, electrical motors and generators are to be cleaned of carbon or other hygroscopic foreign matter as far as practicable, heat dried so as to obtain acceptable insulation resistance readings, and the bearings lubricated with a stable grease or oil. Any carbon brushes are to be lifted to prevent spot corrosion on the commutator or slip rings. Insulation readings are to be taken and recorded at least monthly thereafter, and where found abnormal, immediately corrected by heating, drying, or cleaning.
- ii) All electrical apparatus are to be maintained internally a few degrees above atmospheric by means of built-in heaters, if fitted, or by other means, such as a strip heaters or heat lamps. Alternatively, the humidity control may be maintained by opening the unit to the effects of a dehumidifier or by sealing the unit with desiccant inside. This latter approach would require replacement of the desiccant and re-sealing at least monthly or based on a moisture indicator.
- iii) Electrical junction boxes are to be covered with either protective coatings or protective tape.
- iv) Switchboards, distribution panels, SCR panels, and explosion-proof motors are to be protected against moisture absorption by use of heaters, heat lamps, dehumidifier, or by sealing with desiccant inside.
- v) Jacking, skidding and deck machinery motor enclosures are to be checked for watertightness and suitable driers placed inside or internal heaters provided.
- vi) Crane controls and motors are to be provided with heaters or desiccant.
- vii) The gyrocompass, radar, loran, radio, and automation electronic apparatus are to be maintained heated and/or dehumidified in the same manner as above. The manufacturer is to be consulted regarding the maintenance during lay-up of computer systems. Such equipment may be required to be operated periodically.

- viii) All liquid-filled storage batteries are to be fully charged, and if possible, maintained on trickle charge under weekly inspection.
- ix) All electrical switches for circuits not in regular use are to be kept in open or disconnect position.

### 5.13 Elevating and Skidding Systems

- i) Jacking units, skidding apparatus, cantilever hold down and push up structures, and raw water tower jacking gear assemblies are to be cleaned and unprotected surfaces coated with a protective coating.
- ii) Gearboxes are to be preserved by filling with preservative, oil, inert gas, or other suitable method. Acidity of oil to be checked if deemed necessary by the manufacturer.
- iii) Brakes are to be verified within manufacturer's tolerances.
- iv) Cantilever and drill floor skidding tie downs are to be lubricated and installed.
- v) Jacking control systems are to be cleaned and preserved.
- vi) Rack chocks (fixation systems) are to be locked in place and unprotected surfaces coated with a protective coating.

### 5.15 Control Systems

- i) Computer based control systems are to have software backed up and versions of all software recorded.
- ii) **Units** with Class Notation **ISQM** are to follow requirements of the *ABS Guide for Integrated Software Quality Management (ISQM Guide)* operation and maintenance phase.
- iii) **Units** without **ISQM** having computer-based control systems, interfacing systems, and any protocol conversion systems can be documented before lay-up as part of a Functional Description Document (FDD) with diagrams and asset lists included. The FDD, which is also described in the *ISQM Guide*, is key for completeness checks, and to ease of reactivation in the future. The *ISQM Guide* has additional information about the operation and maintenance of software, including discussion about a **unit** software registry, a configuration and management plan, and the change control process.
- iv) Control systems are to be maintained under physical security restrictions to provide proof against, or evidence of, tampering. Individual actuation systems (programmable logic controllers (PLCs) and specific controller interface equipment (within the supervisory control and data acquisition (SCADA) architecture) are to be provided with covers, seals or other methods to indicate potential tampering.
- v) Deactivated control systems are to be preserved in accordance with manufacturer's recommendations.

### 5.17 Drilling Equipment

When classed, drilling equipment may be properly stowed, secured, and preserved in accordance with specific original equipment manufacturer recommendations, or other proposed standards meeting a similar level of protection.

### 5.19 Optional Lay-up Site and Station Keeping (Mooring) Arrangements

The following portions of the lay-up arrangements are normally subject to approval of the local port authorities and the underwriters. However, they may be surveyed and included in the ABS report at the option of the unit's Owner.

#### 5.19.1 Lay-up Site Considerations

- i) Protection from open seas and surge
- ii) Sufficient year-round water depth
- iii) Good holding ground for anchors, clear of wrecks, cables, or other bottom debris
- iv) Clear of known hurricane, cyclone, or typhoon zones and tidal wave lee shore
- v) Clear of open roadstead anchorages or shipping channels

- vi)* Clear of high-velocity or turbulent tidal currents
- vii)* Clear of significant amounts of moving ice
- viii)* Clear of hazardous infrastructure such as shore facilities and pipelines
- ix)* Clear of detrimental industrial waste discharges
- x)* Clear of freezing or excess humidity
- xi)* Suitable soil conditions for self-elevating units and submersible column stabilized units, considering type of support, whether spud cans or mats

**5.19.2 Considerations for Mooring Arrangements**

- i)* Good holding ground, non-foul bottom, and ample anchor chain scope. “Ample” scope is generally considered to be seven times the depth of the water as a minimum.
- ii)* Unless secured to a permanent mooring buoy, elevated or submerged in shallow water, the unit is to be moored to prevent rotating with wind or tide changes, with the stem or head toward the usual most severe of winds or currents. The chains are not allowed to be subjected to cross-contact, twisting or the anchors to tripping. For ship-type units, supplemental stern mooring or anchoring arrangements are normally to be provided to the ship basic anchoring equipment. Where mooring by a single anchor is necessary, provisions are to be made for periodically clearing the chain of twists.
- iii)* The chains or mooring wire **are to** be led and protected so as to avoid chafing against the unit. If the unit is subject to wave movement or surge, the chain is to be regularly shifted in or out a short distance to move the point of wear. When initially paying out, the locking arrangement of each connecting link on the anchor chains are to be verified.
- iv)* Where ship or barge type units are moored in groups or as a part of a group, the following additional items are to be considered:
  - a)* The size and number of units including the total windage and current drag areas of the group and the external forces to be expected are to be compatible with the capacity of the mooring arrangements.
  - b)* Adjacent units are to be similar in size to avoid differential surging motion, and at similar freeboards to enable direct lead for breast lines.
  - c)* Ship-type units are to be moored in alternate directions bow to stern in even numbers in order to provide equal anchor holding power at both ends of the group and to prevent swinging. The fore-and-aft direction is to be parallel to the usual most severe winds.
  - d)* All unit-to-unit or unit-to-vessel (breast) mooring lines are to be material of similar stretch characteristics.
- v)* Ample size fenders or camels are to be provided alongside at areas of possible or actual contact with other units, vessels, or fixed structures.
- vi)* Day and night compass bearings and/or line-up markers are to be clearly established and regularly checked by the watch personnel for signs of the mooring shifting or anchor dragging, or alternatively, alarmed GPS readings or other means of electronic position indicating may be used.
- vii)* Anchor lights, aircraft warning lights, and fog signals are to be in good order. Supplemental deck lighting is to be used if near shipping lanes.
- viii)* A tug or supply vessel with pumping-out equipment and firefighting assistance is to be available within reasonable distance and time.
- ix)* Ship- or barge-type units are to be ballasted to reduce windage, rolling, and surge (30% or more of the load line draft is suggested) with due regard for similar freeboards where moored to other units or vessels. Hull stresses and salvage potential are also to be established.

Clearly visible reference marks are to be painted at bow and stern just above the waterline as external means of checking for leakage.

- x) Column-stabilized units are to be ballasted to a suitable draft, considering the environmental conditions at the lay-up site. In the case where a Column-stabilized unit is placed on the seabed, the structure is to be evaluated for the necessary strength required for this operation.
- xi) Jack-up units are to be elevated to provide sufficient air gap and preloaded for anticipated storm conditions. Units are to be maintained in a balanced loading condition.
- xii) Emergency towing pendants are to be secured to bitts at bow and stern of each unit and arranged for easy access from a tug.
- xiii) Means are to be provided for the watch personnel to release the anchors or moorings if necessary in an emergency. The anchor windlass and any necessary mooring winches are to be fitted with an emergency source of power for their operation.

## **7 Surveys (1 June 2017)**

Once the lay-up procedure has been accepted by ABS, the Owner is to schedule an ABS Surveyor to attend the unit to carry out an Initial Lay-up Survey to implement the Warm Stacked or Cold Stacked Record Comments. To maintain unit's Record Comment, the Owner is to also schedule an ABS Surveyor to attend the unit every year for an Annual Survey.

### **7.1 Initial Lay-up Survey**

An initial lay-up survey is to be carried out to verify that the unit is in compliance with the submitted lay-up procedure. This lay-up survey is to include survey of the following:

- i) General examination of the unit's stacked condition
- ii) Verification of initial lay-up procedures
- iii) Verification that any scheduled maintenance has been completed
- iv) Equivalent of an Annual Hull Survey of all accessible spaces
- v) For units laid up with the Record Comment of Warm Stacked, the equivalent of an Annual Machinery Survey of all operating machinery
- vi) When any of the drilling systems are Classed, the survey is to include the portions of the drilling system that are included in Class.

### **7.3 Annual Surveys**

Annual Surveys are to be carried out to verify that the unit remain in compliance with the submitted lay-up procedure. For units with "Laid-up Cold Stacked" record comment, the attending Surveyor is to be accompanied by at least one additional person at all times. The attendance may be done within three months of the annual anniversary due date, and is to include survey of the following items:

- i) General examination of the unit's stacked condition
- ii) Verification that any scheduled maintenance has been completed in accordance with the submitted lay-up procedure
  - If any maintenance has been deferred, the Surveyor is to examine and advise the Owner if additional measures need to be taken to preserve or maintain the equipment
- iii) Equivalent of an Annual Hull Survey of all accessible spaces
- iv) For units laid up with the Record Comment of Warm Stacked, the equivalent of an Annual Machinery Survey of all operating machinery, including examination of pressure relief valves
- v) When any of the drilling systems are Classed, the survey is to include the portions of the drilling system that are included in Class.





## SECTION 3 Enhanced Lay-up

*(1 June 2017)* For units stacked with the “Enhanced” **Record Comment** in the *Record*, a review of the proposed lay-up procedure, including the location chosen, the mooring arrangements, a risk analysis of the location, and the capability of emergency response is required. The lay-up procedure will be reviewed to industry standards for preservation, along with any other relevant factors identified. Subsequent paragraphs of this Section describe submittals to be reviewed and surveys to be carried out.

### 1 Submittals

*(1 June 2017)* The following items are to be submitted in order for the **Record Comment modifier** of Enhanced to be assigned to the unit:

#### 1.1 Overall Lay-up Procedure Describing the Following

- i) Stacking strategy
- ii) Reactivation proposal in accordance with Subsection 4/3
- iii) Agreements with original equipment manufacturers regarding effective time in service during lay-up

#### 1.3 Risk Assessment

A risk assessment for the lay-up location is to be conducted, accounting for at least the following:

- i) Expected time frame for unit to be in lay-up
- ii) Proximity to shipping lanes
- iii) Stability of local laws and regulations, including extortion of the unit’s Owner
- iv) Possible issues with the Port State, including civil unrest, terrorism, and sabotage
- v) Public perception and industry image  
*Note:* If mooring area is in a scenic area, the tourism industry may suffer
- vi) Possible impact on marine environment
- vii) Simultaneous operations
- viii) Fire, flood, collision, mooring failure
- ix) Weather damage
- x) Safety, including response time for personnel injuries and availability of local medical care
- xi) Suitability of planned response teams
- xii) Capability of onboard computer systems to be able to restart and function after shutdown
- xiii) Damage from nearby vessel mooring failures

## 1.5 Mooring

The unit's mooring plans are to be submitted:

### 1.5.1 Pier Mooring

**Pier Mooring** plans are to consider:

- i) Weather conditions expected and loads placed on the unit and moorings
- ii) Protection offered by breakwaters and local geography
- iii) Likelihood of weather bypassing existing protection
- iv) Fendering and backup structure
- v) Access for personnel
- vi) Adequacy of mooring points on the unit
- vii) Time required to mobilize the unit to move in advance of severe weather exceeding capabilities of protection
- viii) Locations available for the unit to mobilize to in case of severe weather
- ix) Multiple **unit** rafting loads
- x) Suitability of pier bollards

### 1.5.2 Offshore Stationkeeping (Mooring)

Offshore Stationkeeping (Mooring) is to include:

- i) Stationkeeping to be in accordance with Section 6-1-1 of the *ABS Rules for Building and Classing Floating Production Installations (FPI Rules)* and designed for a 100 year storm. For moorings designed for a duration of less than five years, API 2SK or ISO 19901-7 may be used. Fatigue analysis will need to be submitted only for moorings in place longer than 5 years. Non-redundant Mooring Systems may follow the requirements in the *ABS Guide for Building and Classing Floating Offshore Wind Turbine Installations*.
- ii) Self-elevating unit site assessment to be in accordance with SNAME 5-5A, ISO 19905-1 or other recognized standard.
- iii) Mooring components to be in accordance with 6-1-1/13 of the *FPI Rules*
- iv) Evaluation of mooring attachments to the unit
- v) Location monitoring
- vi) Measures to prevent formation of ice on the unit's hull

## 1.7 Manning

Plans detailing the following are to be submitted:

- i) *Emergency Response*. Plans detailing the availability of personnel to respond to emergencies on the unit, along with expected response times.
- ii) *Mobilization Time*. Plans detailing expected time required for crew mobilization in case the unit has to move to avoid weather or other conditions that could endanger the **unit**. Plans are to include logistics required for **unit** mobilization including fuel, pilots, cranes, food, mooring disconnection, etc.
- iii) Testing of manning plan to confirm that mobilization and emergency response times are maintained
- iv) Listing of personnel expected to be on board with duties and responsibilities

### 1.9 Security

The security procedures for the unit are to be submitted to include provisions for boarders, workers, security of remote electronic monitoring and control systems, and periodic testing of unit Security Alert System when fitted.

### 1.11 Stability

Stability cases for expected conditions, which may include transit while moving away from a storm, stationed at the dock/quay, or anchored.

### 1.13 Services

Plans detailing the following are to be submitted:

- i) Capability of available services that would be available to the unit for repairs, fuel, food, water, communication, back up communication, and transportation of parts and personnel
- ii) Status of unit's equipment including but not limited to: cranes, radios, engines, emergency power, propulsion, accommodations, and mooring equipment
- iii) Oil spill response equipment

### 1.15 Port and Flag State Requirements

- i) Information is to be provided detailing compliance with local Port State requirements, including at least the following:
  - a) Mooring location
  - b) Unit discharges including: sewage, oil, deck drains, and exhaust emissions, including disposal methods
  - c) Local Coastal State requirements
- ii) Documentation is to be provided showing compliance with flag State requirements for units that are laid-up, and detail any periodic inspection requirements.
  - a) If the unit is warm stacked, the documentation is to include the minimum safe manning certificate and crewing plan.

### 1.17 Procedures and Standards for Preservation

Procedures and Standards for Preservation are to be submitted for review against available industry standards or manufacturer's recommendations.

- i) Continuous heating for all accommodation spaces is to be provided to maintain a temperature a few degrees above atmospheric, or alternatively, complete dehumidification at 35% to 45% relative humidity is normally required to prevent sweating or humidity corrosion damage
- ii) Piping preservation including systems preserved and extent of preservation for each system

### 1.19 Safety Manual

Safety Manual, including but not limited to unit transfer procedures, confined space entry, hot work on board, and general maintenance

### 1.21 Maintenance Plan

Plan for maintenance of active safety equipment for personnel evacuation

### 1.23 Remote Monitoring Systems

Remote monitoring systems details are to be submitted. For each monitoring system, a description of the overall objective and plan **is to** be provided. This **is to** include a description of the application, the parameters to be monitored, the data range and sampling, and the system analysis and display. A description of the hardware **is to** include the sensors, installation, testing, calibration, and operation and maintenance. The monitoring systems may include the following:

- i) Mooring position monitoring including proximity monitoring
- ii) Mooring line tension monitoring
- iii) Maintenance monitoring
- iv) Fire, flood, or damage monitoring
- v) **Unit's** machinery monitoring
- vi) Humidity monitoring
- vii) Power generation

### 1.25 Repair and Maintenance Log

Log listing any repairs, maintenance, or commissioning that is incomplete, or planned not to be done, along with a complete list of items which have been dismantled or removed from the **unit**.

## 3 Surveys

*(1 June 2017)* To implement the Enhanced Warm Stacked or Enhanced Cold Stacked **Record Comment**, the Owner is to schedule an ABS Surveyor to attend the unit to carry out an Initial **Lay-up** Survey. To maintain the unit's Enhanced **Record Comment**, the Owner is to also schedule an ABS Surveyor to attend the unit every year.

### 3.1 Initial **Lay-up** Survey *(1 June 2017)*

The initial **lay-up** survey is to be carried out to verify that the unit is in compliance with the submitted lay-up procedure. This **lay-up** is to include the surveys listed under 2/7.1 of this Guide, as well as the following:

- i) Jackup site assessment
- ii) Mooring installation
- iii) Mooring equipment
- iv) Verification of services

### 3.3 Annual Surveys

Annual Surveys are to be carried out to verify that the unit is in compliance with the submitted lay-up procedures. This verification is to include the surveys listed under 2/7.3 of this Guide, as well as the following:

- i) Review of records for:
  - a) Manning, along with results of drills conducted and results of mobilization and emergencies
  - b) Metocean conditions, forecasting capabilities, individual weather events, including any mobilizations required
  - c) Mooring, to verify unit location has been maintained within expected limits
  - d) Humidity and corrosion protection within limits specified by ABS agreed procedure
- ii) If records of drills are found not **to** be in accordance with the original lay-up procedure, it is to be updated and resubmitted as required above.
- iii) Periodical examination of mooring system located below waterline in accordance with the *FPI Rules* when mooring time exceeds 3 years



## SECTION 4 Reactivation of Laid-up Mobile Offshore Drilling Units

The primary objective of the Reactivation Survey is to verify that the unit is fit, within the scope of classification, to transit to its operating site and resume duties as “In-Operation”.

For units returning to service from lay-up, regardless of whether ABS has been informed that the unit has been in lay-up or whether lay-up preparations have been reviewed by ABS, a Reactivation Survey is required. The Divisional ABS Offshore Survey Department Office is to be contacted for details of the requirements.

Reactivation is to address all equipment degradation and deferred maintenance that was recorded in the unit’s records.

### 1 General (1 June 2017)

- i) In order to restore a laid-up unit to active Class status, a Reactivation Survey is to be carried out including a corresponding point-by-point coverage of the original lay-up steps. The extent of the Reactivation Survey will be determined by the ABS Divisional Survey Office and is generally dependent **whether the unit has a Laid-up Record Comment** and time in lay-up as noted below. The reactivation survey will consist of at least the equivalent of an Annual Survey for all Class items, updating any due surveys, and compliance with any outstanding recommendations.
  - a) **Units** laid-up without ABS review of the lay-up procedure and periodical **lay-up** surveys:
    - All due and overdue surveys will need to be completed
    - Depending on the time in lay-up and condition of the **unit**, additional surveys may be required
  - b) **Units** with a **Record Comment** of Laid-up Cold Stacked:
    - Machinery will need to be re-commissioned
    - Depending on the maintenance conducted while laid-up and the time in lay-up, the extent of due surveys will be reduced accordingly
  - c) **Units** laid up with a **Record Comment** of Laid-up Warm Stacked:
    - Systems laid-up will need to be re-commissioned
    - Depending on the maintenance conducted while laid-up and the time in lay-up, the extent of due surveys will be reduced accordingly
  - d) **Units** with Enhanced Lay-up:
    - In accordance with the reactivation proposal considering the stacking procedure, equipment operational status, time in lay-up, and survey findings
- ii) Applicable items of the Reactivation Survey may be credited to a forthcoming Special Survey, provided that the entire Special Survey is completed within a period of approximately fifteen months, or the Special Survey is on continuous basis.
- iii) Witnessing of functional testing or verification of fitness for service of the items listed in the following section is normally to be included in the reactivation surveys.
  - a) Consideration is to be given to accepting the items based on adherence to the ABS agreed maintenance plan.
  - b) For **units** with Enhanced **Record Comment**, the agreed reactivation plan is to be followed so long as the Surveyor is satisfied with the results of commissioning.

### 3 Reactivation Procedures for Units with “Enhanced” Record Comment

If the Owner chooses to submit a Reactivation Procedure at the time of lay-up, ABS will examine and advise if it can be considered when reactivating the unit.

To be considered, the Reactivation Procedure is to be based on the Lay-up Procedure, and is to include the recommissioning requirements for the equipment laid-up.

The Reactivation Procedure is to be written with the goal of ensuring the unit is ready for service and in compliance with the Rules. The Procedure is to take into account:

- The time in lay-up
- Extreme events the unit encountered while laid-up
- The degree the Lay-up Procedure was followed
- Equipment found to be inoperable at commissioning
- Corrosion while in lay-up

## 5 Hull and Outfit

### 5.1 Underwater Examination

The extent of the examination will be dependent on the time in lay-up and any environmental events experienced while in lay-up. Units that have experienced extreme events while laid-up will require NDT of the underwater critical connections in accordance with the requirements for the previous Special Survey.

Underwater Inspection of the unit will be required for units that have been laid-up beyond their normally scheduled Drydock due date. Cleaning of the unit’s underwater body, including sea suctions, will normally be required to enable meaningful underwater examination. Where it is intended to proceed from the lay-up site to another location for completion of reactivation work, an underwater inspection may be required prior to departing lay-up site.

Units that have not been laid-up beyond their normally scheduled Drydock due date may require underwater examination if the Surveyor suspects damage or obstructed sea suctions.

Column stabilized units that have been laid-up while resting on the ocean floor are to have an underwater examination.

### 5.3 Witnessing of Functional Testing or Verification of Fitness for Service

- i) Anchors and chain cables or mooring cable, chain stoppers, and chain locker pumping arrangements
- ii) Anchor windlass, mooring winches, and roller fairleads
- iii) Drill floor and machinery-space drain wells together with bilge pumping arrangements and hull penetrations
- iv) Random ballast or preload tanks, pump rooms, ballast piping, and associated ballast control system and pumping arrangements
- v) Watertight and weathertight doors, machinery room skylights (where fitted), fire dampers, ventilators, portlights, and hatch covers and their respective closing devices
- vi) General examination of the mud and cement storage and mixing tank. Examination and random testing of the associated piping as deemed necessary by the attending Surveyor
- vii) Internal examination of cofferdams and void spaces together with their pumping out arrangements
- viii) Cleaning and flushing of potable water tanks
- ix) General examination and testing of whistle, internal communications systems, engine-order telegraph, steering arrangements and controls (if applicable), alarm systems, rudder angle indicator and navigational or warning lights

- x)* Helideck arrangements
- xi)* Fire extinguishing arrangements
- xii)* Tank venting arrangements including screens and closing devices
- xiii)* Units that have experienced extreme events while laid-up may require NDT of the critical connections above water in accordance with the requirements for the previous Special Survey.

## 7 Machinery

- i)* Stack and ventilation covers to be removed or opened up.
- ii)* Boilers, heat exchangers, piping systems and other equipment to be drained and cleaned of preservatives or inhibitors, inspected and closed up in good order, and afterwards tested under operating conditions.
- iii)* Engine lubricating oil, stern bearing oil, and steering system hydraulic fluids to be analyzed for contamination or chemical degradation and if found unserviceable, the system is to be drained, flushed, sterilized if bacterial deteriorations is present, and refilled with new oil or fluid of the proper grade.
- iv)* Thruster units and reduction and reverse gearing to be examined as accessible via inspection openings including lubrication arrangements. Gear casing and foundations to be examined and reversing and braking arrangements operationally tested as necessary.
- v)* Thrust bearings, line shaft bearings, and their respective lubrication arrangements to be checked.
- vi)* Diesel engines and their accessory gear to be selectively opened out and examined for corrosion, excess wear, damage, proper tensioning, and torque. Low-speed engine crankshaft deflections (Drillships) to be taken and recorded. Protective trips and alarms are to be verified.
- vii)* All essential auxiliary machinery and equipment to be operationally tested and protective devices verified.
- viii)* All essential piping systems to be examined under pressure, checked for leaks, and over-pressure relieving arrangements verified. All connections to the sea and their respective valves and non-metallic expansion pieces to be examined.
- ix)* All required fire extinguishing arrangements to be examined, including fire pumps, and operationally tested as necessary.
- x)* The condition of hazardous-areas doors and closures in boundary bulkheads are to be checked.
- xi)* Loss of ventilation or pressure differential alarms are to be verified to be in working order. Traps fitted in way of drains connecting hazardous and safe areas are to be verified to be in working order.
- xii)* Proper functioning of the mud level alarms is to be verified.

## 9 Elevating Systems and Cantilever Hold Downs

- i)* Examinations prior to movement:
  - a)* Visual examination of elevating and skidding systems for damage and missing components
  - b)* Confirm condition of support structure including jack cases, hold downs, gear foundations, and guides
  - c)* Renew lubricants as required
  - d)* Confirm integrity of electrical power systems as listed in Subsection 4/11
  - e)* Examine braking mechanisms for moisture damage
  - f)* Confirm integrity and operation of jacking and skidding sensors and control systems, including any computer controlled systems and associated software

- g) Visual examination of leg fixation systems and secondary locking devices, including rams, chocks, and other locking mechanisms
- h) Verify operation of hydraulic power units
- i) Confirm individual operation of brake release mechanisms and that gear trains move freely
- ii) Function testing:
  - a) Confirm operation of leg fixation systems and secondary locking devices
  - b) Operate jacking and skidding systems in both directions

## 11 Electrical

- i) Insulation resistance of all power and lighting circuits together with generators, motors and switchgear, to be tested, results evaluated, and low-reading components dealt with as necessary. Maintenance records reviewed for any recorded deficiencies.
- ii) Generators to be tested under operating conditions, and switches, circuit breakers, and electrical protective devices verified.
- iii) Electrical lighting, electrical fixtures, and instrumentation in hazardous areas to be verified in satisfactory condition.

## 13 Drilling Equipment

- i) When any drilling systems are classed, the reactivation survey is to include the portions of the drilling systems that are included in Class.
- ii) BOP stack control system, derrick skidding system, braking system, heave compensation and riser tensioning hydraulic fluids are to be analyzed for contamination or chemical degradation and if found unserviceable, the system is to be drained, sterilized if bacterial deterioration is present, and refilled with new oil or fluid of the proper grade.

If the system was drained at the time of lay-up, the preservatives are to be flushed out and the system refilled with new fluid of the proper specification and air purged as necessary.
- iii) The drilling and well-control equipment is to be examined prior to re-installation, function tested as considered necessary and verified in proper working condition.
- iv) Tensioner system and heave compensators are to be examined, trial actuated to full stroke, and re-conditioned as necessary.

## 15 Control Systems and Instrumentation

Computer controlled systems are to be booted, updated as necessary, software verified to be operational, and function tested. All essential control systems, monitoring instrumentation, limit alarms and emergency shutoffs to be verified in working order.

### 15.1 Software (1 June 2017)

- i) Units with **ISQM** Notation are to follow requirements of the *ISQM Guide* operation and maintenance phase.
- ii) Units without **ISQM** that are required to have the Software Operation and Maintenance Plan in 4-9-3/9.3.5 of the *Steel Vessel Rules* are to follow the maintenance, modification and upgrade requirements contained in the plan.
  - The *ISQM Guide* has additional information about the operation and maintenance of software, including discussion about updating hardware and software, testing, and configuration management.



Any updates to the software are to be identified by the equipment manufacturer. The manufacturer **is to** identify the configuration expected to be controlled by that software, and the version(s) of the software. No updated software **is to** be loaded into the control systems prior to functional testing being conducted, preferably by the owner in a test environment.

Integrated control systems are to be verified operational, with random function checks to confirm communication with all required components. Software-intensive systems are to be tested at activation, upon reintegration, and after software updates to confirm complete functionality and safety in all operations.

**Any software update to the DP system will require full FMEA testing to be carried out as part of the reactivation survey.**

### **15.3 Hardware**

If computer system hardware upgrades or replacements are required to reactivate the **unit**, the new hardware is to be tested for compatibility with the software and tested to verify all functions are operating correctly. Section 4-9-3 of the *Steel Vessel Rules* is to be followed where computer based systems are used for control, monitoring, and safety systems.

## **17 Cranes**

- i) Cranes included in the ABS Register of Lifting Appliances are to have the following items carried out:
  - a) All overdue maintenance and replacement of wire rope as conditions require
  - b) Completion of all overdue surveys
  - c) Load Testing in accordance with the *ABS Guide for Certification of Lifting Appliances*
  - d) Rocking tests for cranes with slew bearings
- ii) Cranes required to be examined by the flag Administration:
  - a) All overdue maintenance and replacement of wire rope as conditions require
  - b) Testing in accordance with a standard acceptable to the administration such as API RP 2D

## **19 Propulsion Trials and Sea Trials (1 June 2017)**

In addition to the operational tests of individual units of machinery, for self-propelled units, a propulsion machinery trial and subsequent sea trial, if deemed necessary or applicable, are to be carried out to the satisfaction of the attending Surveyor. For Dynamically Positioned Units, a survey equivalent to an Annual DP survey will be required and depending on the time in lay-up a full Special Survey, including DP FMEA testing may be required. **Units** laid up with the Enhanced **Record Comment** will be subject to special consideration.

## **21 Documentation and Certification (1 June 2017)**

- i) The validity of the various statutory or operating documents such as the Register of Lifting Appliances, IMO MODU Code, MARPOL, Load Line and any applicable SOLAS Certificates are to be checked and updated or renewal surveys carried out as necessary.
- ii) Statutory certificates issued by ABS that are still valid at the time of the Reactivation Survey will require at least a general examination of the covered items to confirm continued validity.
- iii) **Statutory certificates typically require a renewal survey at intervals of no more than 5 years. If time in lay-up has been deducted from the Class survey cycle, statutory surveys may require renewals at time of reactivation to remain harmonized with the Class Certificate.**
- iv) Possible changes or revisions in international convention requirements since the time of lay-up or in the interpretations of same by the flag Administration are to be investigated.