

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 8-91

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Subj: Initial and Subsequent Inspection of Existing, Uncertificated Offshore Supply Vessels, Including Liftboats

1. **PURPOSE.** This Circular publishes guidance for the issuance of Certificates of Inspection to existing offshore supply vessels (OSV's), including liftboats, that were not previously inspected.
2. **DIRECTIVES AFFECTED.** NVIC 8-81 and Change 1 are canceled.
3. **BACKGROUND.**
  - a. Public Law 96-378 provides for the inspection and certification of all OSV's. Existing, uncertificated, conventional (i.e., shipshape, nonself-elevating hull) vessels were inspected and certificated under the guidance provided in NVIC 8-81. An existing, conventional offshore supply vessel is one that was operating as such on or before January 1, 1979 or, if not in service of any kind before that date, was contracted for on or before that date and entered service as such before October 6, 1980.
  - b. An OSV is defined in 46 U.S.C. 2101(19) as "a motor vessel of more than 15 gross tons but less than 500 gross tons that regularly carries goods, supplies, or equipment in support of exploration, exploitation, or production of offshore mineral or energy resources and is not a small passenger vessel." The application of this definition is not affected by the physical location of the vessel. The word "offshore," as it modifies "supply vessel" has no geographical significance. As long as the vessel in question fits the definition of an OSV, it is considered an OSV and must be inspected as such. "Offshore" is not defined by statute or regulation. Past administrative policy has been to define "offshore" as that water seaward of the coastline (as measured from the mean high water mark). A review of the legislative history of applicable statutes provides no congressional intent to create a regulation-free zone for OSV's when operating "inshore or inland."
  - c. Liftboats were originally uninspected vessels intended to provide a stable work platform for construction and maintenance of fixed structures in shallow, protected, or partially protected water. Over the years designs were modified for service in deeper waters, farther from shore. A review of liftboat casualties showed that these vessels had been routinely carrying goods, supplies, equipment, and offshore workers to offshore structures in addition to performing their traditional function as construction and maintenance support vessels. Accordingly, liftboats were reclassified as OSV's and brought under inspection. Change 1 to NVIC 8-81 provided guidance pertaining to initial certification of existing liftboats.

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- d. The effect of these policy determinations was to require a number of previously uninspected vessels to now be inspected and certificated. The Coast Guard has initiated a regulatory project (CGD 82-004 and CGD 86-074) to promulgate regulations specifically addressing OSV's and the unique design and operation of these vessels, including liftboats. These rules, once promulgated, will apply to new vessels. In the interim, this Circular replaces the guidance in NVIC 8-81 and Change 1.
4. DISCUSSION.
- a. This guidance is intended to apply to the initial inspection of existing, uncertificated OSV's. The guidance also applies to the subsequent inspections of OSV's (including liftboats), now certificated, that were brought under inspection under the previous guidance of NVIC 8-81 and/or Change 1.
  - b. In the case of existing, conventional vessels, the majority of initial inspections were completed using the provisions of NVIC 8-81. Subsequent inspections of conventional OSV's should be conducted in accordance with this Circular. Many provisions of the previous guidance have been incorporated into this Circular.
  - c. The initial inspection of many liftboats was conducted using the guidance of NVIC 8-81, Change 1, published in March 1988. The Coast Guard has since learned that a significant percentage of the liftboat fleet works in waters close to shore, either "Lakes, Bays, and Sounds," or within the Boundary Line. The Boundary Line in the Gulf of Mexico is twelve miles from a line which marks the seaward limits of the contiguous zone (46 CFR 7.105). Liftboats operating inside the Boundary Line need not meet standards as stringent as those intended for those operating beyond the Boundary Line because of their proximity to a safe harbor or other location where they can elevate to survive a severe storm.
  - d. Subsequent inspections of existing liftboats should be conducted in accordance with this Circular. This inspection guidance is derived from existing guidance, regulations in 46 CFR Subchapters I and T, and sections of Subchapter IA which address the unique characteristics of self-elevating units.
  - e. There may also be a number of small, conventional OSV's that work in "Lakes, Bays, and Sounds" or other "inshore or inland" waters that have never been inspected. Previously, they would not have been subject to inspection unless carrying "passengers or freight for hire." However, if routinely carrying goods, supplies, or equipment in support of exploration, exploitation, or production of offshore mineral or energy resources, these vessels are subject to inspection as OSV's. It is expected that these vessels are generally small, less than 100 gross tons. The basic provisions of this guide may be used to conduct the initial and subsequent inspections for certification in lieu of strict compliance with Subchapter I or T (as applicable).
5. GRANDFATHER PROVISIONS. Public Law 96-378 requires that on or after 1 January 1989, each existing OSV that is twenty years or older is subject to inspection the same as a new vessel. It is expected that most of these vessels will be voluntarily retired from service since the economic life of an OSV is generally considered to be about 15 years. Those remaining in service should be inspected by the Officer in Charge, Marine Inspection (OCMI), on a case-by-case basis, to determine the extent it complies with current regulations, recognizing that original plans for these old vessels may be difficult to provide. The vessel's service history should be

considered in identifying areas of noncompliance. Grandfathered lifesaving and fire fighting equipment, not previously replaced, must be replaced with Coast Guard approved equipment. Other equipment and systems should be addressed on a case-by-case basis.

6. MANNING. The manning of all OSV's should be in accordance with applicable standards as summarized in enclosure (1). The OCMI may consider other manning proposals based on statutory requirements and the vessel's route and conditions of operation. Inquiries on manning issues should be addressed to Commandant (G-MVP-4).
7. IMPLEMENTATION.
  - a. Owners/operators of uncertificated OSV's, including liftboats, should make application for inspection and certification to the cognizant OCMI in whose zone the vessel is operating.
  - b. Existing, conventional OSV's should have been initially inspected under NVIC 8-81. Self-elevating OSV's (liftboats) operating beyond the Boundary Line should have either been inspected or made application under NVIC 8-81, Change 1. Subsequent inspections may be accomplished as provided for in enclosures (2) & (3). This guidance is essentially the same for these vessels as provided in NVIC 8-81 or Change 1, as applicable.
  - c. Self-elevating OSV's operating inside the Boundary Line should be inspected in accordance with the applicable guidance in enclosures (2) & (3).
  - d. Conventional vessels, not previously inspected because they work in "Lakes, Bays, and Sounds" or other "inshore or inland" waters, must be inspected as required by P.L. 96-378. The guidance in enclosure (2) may be used for this purpose.



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- End:
- (1) Manning of Offshore Supply Vessels
  - (2) Guidance Pertaining to the Inspection and Certification of Existing Offshore Supply Vessels Including Liftboats
  - (3) Additional Guidance Pertaining to the Inspection and Certification of Existing Liftboats

MANNING OF OFFSHORE SUPPLY VESSELS

The following minimum manning examples reflect current statutory and regulatory requirements applicable to any vessel meeting the statutory definition of an offshore supply vessel.

Less Than 100 Gross Tons

1 Master           \* 2 Deckhands  
2 Mates

When the vessel is on a voyage of less than 600 miles, the crew may be reduced by 1 Mate.

If the vessel is away from a shoreside dock, or has persons in addition to the crew on board, or both, for not more than 12 hours in any 24 hour period, the crew may be reduced to:

1 Master           \* 2 Deckhands

When appropriate, and under conditions specified by the OCMI, an additional endorsement permitting a reduction from the 24 hour manning may be made on the Certificate of Inspection for a vessel of less than 100 gross tons which is moored to a safe offshore mooring buoy or elevated for 12 or more hours in any 24 hour period.

\*       Variable, at least one. Additional deckhands may be required as determined by the OCMI depending on the route. The OCMI should ensure that some member of the crew has appropriate levels of engineering training and experience. Such person(s) may be undocumented and one of the otherwise required crew members.

At least 100 Gross Tons But Less Than 200 Gross Tons \*\*

1 Master	2 Able Seaman
2 Mates	1 Ordinary Seaman
***Licensed Engineer( s)	***Oiler(s)

200 Gross Tons or More \*\*

1 Master	2 Able Seaman
2 Mates	1 Ordinary Seaman
1 Licensed Engineer	***Oiler( s)

\*\*       When the vessel is on a voyage of less than 600 miles, the crew may be reduced by one mate and one able seaman.

\*\*\*    Variables

ENGINEERING DUTIES: In general, vessels should not be operated unless some member(s) of the crew has certain levels of engineering training and expertise. Those individuals must have a good working knowledge of the operation and use of the main and auxiliary machinery, steering systems, alarms, fueling techniques, and emergency procedures. The OCMI should ensure that the owner/operator crew the vessel with individuals having these qualifications.

The engineering manning is controlled by the statutes 46 U.S.C. 8101, 8104, 8301, and 8304. On vessels of 200 gross tons or more, 46 U.S.C. 8301 requires at least a licensed engineer, irrespective of the

degree of automation. It should be noted that 46 U.S.C. 8304 requires that on seagoing vessels over 200 gross tons, anyone serving in an engineering officer capacity must hold the appropriate license. Other assistant engineer(s) and/or QMED's may also be required by the OCM I under the provisions of 46 U.S.C. 8101, if necessary, to enable the vessel to safely operate. In general, OSV's are normally automated to such a degree that a licensed engineer or QMED's will not be required on those vessels in the less than 200 gross ton category, and additional engineers or QMED's will not be required on those of 200 gross tons and above. As discussed above, the OCM I should consider the level of engineering skills required by the crew.

GUIDANCE PERTAINING TO THE INSPECTION AND CERTIFICATION OF  
EXISTING OFFSHORE SUPPLY VESSELS INCLUDING LIFTBOATS

The items listed below indicate the scope of subsequent inspections for certification for vessels initially inspected under the provisions of NVIC 8-81 and Change 1. Small vessels, not previously inspected, should comply with inspection requirements, as appropriate, if they are determined to be OSV's. Such vessels are likely to be under 100 gross tons and the basic provisions of this guide and, Subchapter I or T (as applicable) may be used to conduct the initial and subsequent inspections for certification. Liftboats should also use these general provisions and applicable sections of enclosure (3).

**Drydocking:** All OSV's should, be drydocked, or, otherwise suitably presented for hull inspection, in the presence, of a Coast Guard marine inspector, as part of the initial inspection for certification and at such intervals as are required by the applicable regulations. The scope of the initial and subsequent drydock examinations should be to assure the satisfactory condition of the hull, tailshafts, sea valves, and rudders. Existing OSV's should be in satisfactory condition and free from - any especially hazardous conditions prior to initial certification.

**Stability:** The stability of an existing OSY will be considered adequate if a U.S. Coast Guard Stability Letter or Stability Statement has been issued for the vessel provided the vessel has not been subsequently altered. The vessel owner/operator should certify in writing to the OCMI that the vessel has not been altered or modified in a manner that adversely affects its stability characteristics. If the vessel has been materially altered, or if the 'stability has not been determined, then a stability evaluation, satisfactory to the cognizant OCMI, should be performed. Based on this stability evaluation, a Stability Letter will be issued.

**Lifesaving Equipment and Fire Fighting Equipment:** Lifesaving and fire fighting equipment should be in satisfactory working condition and in sufficient quantities to provide adequate protection for the vessel and all personnel the vessel is certified to carry. Lifesaving equipment should be Coast Guard approved. Required semi-portable and portable fire extinguishers, fire hoses, fire axes, nozzles, etc. should be of an approved type (either UL marine or USCG). Existing, unapproved fixed fire fighting systems that are found to provide an adequate degree of protection, as determined by the cognizant OCMI, may be accepted. Replacement of unapproved fixed fire fighting equipment should be with Coast Guard approved equipment, if the system is required by regulations. Excess, unapproved equipment may be installed, provided it does not present a hazard and is, at a minimum, listed and labeled by a recognized testing laboratory.

**Fire Control/Safety Plan:** A fire control and safety plan should be presented to the attending U.S. Coast Guard Marine Inspector at the time of the initial inspection for certification. The attending inspector should review the plan for adequacy. Upon acceptance of the plan, it should be stamped "Examined" and posted under glass in a public space on board the vessel.

**Electrical:** Emergency lighting and alarm systems should be adequate and be in good operating order. Arrangements deemed to be equivalent to the applicable regulations may be accepted by the cognizant OCMI. Electrical wiring, fixtures and equipment should be in good condition.

**Pressure Vessels:** Pressure vessels should be subjected to the appropriate periodic tests and inspections as required by the applicable regulations prior to acceptance at the initial inspection for certification and at subsequent inspections. Pressure vessels should be fitted with adequate relieving devices.

All pressure vessels which are in good condition and can be identified as built to the ASME Code or other equivalent standards may be continued in service at the initial inspection for certification.

Class II and Class III pressure vessels which are in good condition but cannot be identified as built to the ASME Code or other equivalent standards may be continued in service if they successfully pass a 1-1/2 MAWP hydrostatic test.

**Combustible and Flammable Liquids Piping and Venting:** Tank vents and piping carrying combustible or flammable liquids should be inspected to identify potential failure points and associated fire hazards. Particular attention should be given to supports, materials, spray shields, and flexible hoses in locations where a source of ignition could be expected to present a fire hazard. Discrepancies that present a fire hazard should be corrected prior to issuance of the initial Certificate of Inspection.

**Bilge System:** The bilge system should be inspected for coverage, operation, and material condition only. An audible, automatic bilge alarm should be provided for all unmanned machinery spaces and should sound in the vessel's pilothouse.

**Steering Systems:** Steering systems should be checked for material condition and satisfactory operation.

**Marine Sanitation Device:** An approved Type I, II, or III Marine Sanitation Device, should be installed. A device certified for uninspected vessels is suitable at the time of the initial inspection and at subsequent inspections for certification, provided it is properly maintained in good working condition.

**Oil pollution Prevention:** Vessels 400 gross tons or over should comply with the oil pollution regulations in 33 CFR part 155 and obtain a "Form A" attachment to an IOPP certificate as evidence of compliance. OSV's of lesser tonnage need only comply with 33 CFR 155.320, 155.330 and 155.350, as applicable.

**Especially Hazardous Conditions:** All especially hazardous conditions such as fire and explosion hazards, unguarded machinery and electrical shock hazards, should be corrected prior to the issuance of the initial Certificate of Inspection.

**Persons Allowed:** 46 U.S.C. 3501(e) states that an offshore supply vessel may not carry passengers except in an emergency. 46 U.S.C. 2101(21)(C) defines nine categories of personnel who are not passengers. Their carriage does not cause an offshore supply vessel to become a passenger vessel on domestic voyages. In addition to the crew, 16 such persons are permitted to be carried on, domestic voyages as specified by 46 U.S.C. 3304. Arrangements on board a vessel for these persons should be to the satisfaction of the cognizant OCMI. On international voyages, "Passenger" and "Passenger Ship" are as defined in SOLAS 74. When carrying more than 12 passengers (as defined by SOLAS) these vessels must have valid SOLAS Passenger Ship Safety Certificates. This has the effect of limiting offshore supply vessels to the carriage of 12 persons in addition to the crew when on an international voyage, since they typically do not meet the design requirements for passenger vessels.

ADDITIONAL GUIDANCE PERTAINING TO THE INSPECTION AND CERTIFICATION OF  
EXISTING LIFTBOATS

This enclosure is organized into three sections: The first applies to all liftboats, the second applies to liftboats operating inside the Boundary Line, and the third applies to liftboats operating beyond the Boundary Line.

A. REQUIREMENTS FOR ALL LIFTBOATS

Liftboats should meet the general provisions for inspection of OSV's as outlined in enclosure (2). In addition, the following items should be given specific attention during initial and subsequent inspections

**Drydocking and Structural Examination:** The inspection of liftboat hull should include focus on the legs, and the jacking and support structures that are unique to liftboats. Liftboats are weight critical, therefore, the legs are often designed to minimum, optimal scantlings to reduce weight and limit rise in the center of gravity (KG) when the vessel is afloat and the legs are retracted.

Legs should be closely examined for deflections. Significant creases and dents in the leg structures should be repaired. Even relatively minor deformations and deflections over the length of the leg can significantly reduce its overall strength. Rack and pinion assemblies should be examined for tears, fractures, and broken teeth. Footings and connections to legs should be closely examined. In many cases, use of NDT for leg inspection is recommended, particularly in high stress areas opposite the rack on single rack systems and at footing connections.

The hull should be examined for previous repairs and unacceptable repairs marked for repair by insert. Doublers or plug patches should be closely examined for acceptability. If the plate or patch appears to have been in place for a long period without deleterious effects, it should be noted for later examination at subsequent inspections, but allowed to remain. Use of jet rod should be noted as to location and condition for later evaluation and potential removal, if in critical areas. New repairs to the hull should employ acceptable techniques and welding procedures.

On vessels less than 100 gross tons, tailshafts need not be pulled for examination, unless necessary to determine the condition of the shaft bearings.

**Stability:** Stability instructions should provide simple guidance to the operator on how to operate the vessel safely. To this end, vessel owners/operators may choose either of two methods of presenting stability information: to provide simple loading instructions that can be included in the vessel's stability letter or to provide stability guidance as part of the operating manual. This decision will impact the information that must be provided in the operating manual, as discussed later.

.1. "Simple" Stability Instructions.

If operating constraints can be presented clearly in words or in the form of a simple loading diagram, then a "simplified" stability letter may be issued, and it will not be necessary for the operating manual to address stability. If this simplified approach is taken, only the operating guidance, discussed later, must be addressed in the operating manual.

2. Stability Instructions as Part of the Operating Manual.



If the complexity of the vessel's operation makes the simplified approach inappropriate or does not provide the desired flexibility in loading, the stability letter should refer to stability instructions in an approved operating manual. In this case, the operating manual should be organized into two sections; stability and operating guidance.

Stability instructions should be prepared in a manner which allow calculations to be easily understood. Step by step examples and blank work sheets should be included in the instructions along with other information necessary to complete stability calculations such as:

- a. Lightship data;
- b. Hydrostatic curves or tables;
- c. Tank sounding curves or tables showing vertical, longitudinal, transverse centers of gravity and free surface data on each tank; and
- d. Information on the maximum allowable height of the center of gravity (KG) in relation to draft or displacement.

The owner/operator should refer to NVIC 3-89 (Guidance for the Presentation of Stability Instructions for Operating Personnel) and is responsible to ensure that all information incorporated into the operating manual is accurate and represents the current condition of the vessel.

3. Approval.

Initial submission of stability calculations should be to the OCMI, who will coordinate the approval procedure along with approval of the operating manual. The owner/operator should identify which approach to stability will be taken at the time of this initial submission.

The MSC will review stability calculations and any stability information contained in the operating manual. Regardless of the approach to stability taken, calculations should be submitted which demonstrate compliance with the specific stability criteria of parts "B" or "C" of this enclosure, as appropriate for the vessel's area of operation. Upon completion of the stability review., the MSC will forward a stability letter to the OCMI with the stability portion of the operating manual (if any) stamped approved.

**Operating Manual:** In addition to a stability letter, each unit should be provided with an operating manual which is easily used by vessel personnel. Regardless of the stability approach taken, the operating manual should contain a section on operating guidance. In order to be: effective, instructions and operating restrictions found in the operating manual must be as simple as possible. '

1. Operating Guidance.

Operating guidance should be in all operating manuals and include/address the following:

- a. A table of contents and general index.
- b. A general description of the vessel including major dimensions, tonnages, variable load capacities, hook load capacity, and helicopter deck loading information.

- c. Limiting design data for each mode of operation, including draft, air gap, wave height, wave period, wind, current, temperatures, and other environmental factors.
  - d. The maximum allowable deck loadings.
  - e. Information concerning the use of any special cross flooding fittings and location of valves that may require closure to prevent progressive flooding.
  - f. Guidance for preparing the unit for a severe storm and what to do when bad weather conditions are forecast, including when critical events or decisions should be accomplished, such as when to leave the area and head for safe refuge, or evacuate the vessel.
  - g. Guidance for operating the vessel while changing mode, preparing the vessel to make a move, and information on how to avoid structural damage during heavy weather from shifting loads.
  - h. Guidance should include information on inherent operational limitations for each mode of operation and for changing modes, including preloading instructions and how to check buoyant legs for flooding, precautionary information of the stability effects of flooded legs, and information on what to do if flooded legs are found or suspected.
  - i. A description, diagram, operating guidance for the bilge system, and alternate dewatering methods.
  - j. A general arrangement diagram showing the location of: watertight and weathertight compartments; openings in the hull and structure; vents and closures; mechanical, ventilating, and electrical emergency shutdowns; flooding and level alarms, fire and gas detectors; and access to different compartments and decks.
  - k. A list of emergency shutdowns and guidance on restarting mechanical, ventilating, and electrical equipment after activation of the emergency shutdown.
  - l. A diagram of the hazardous locations (if required, such as on vessels with work over units).
  - m. A diagram of the emergency power system.
2. Approval.

Initial submission of operating manuals should be to the OCMI who will coordinate the approval with the approval of the stability information. The owner/operator should identify which approach to stability will be taken at the time of this initial submission.

The operating guidance portion of the operating manual will be reviewed by the OCMI. The stability letter will be issued to the vessel upon approval of the operating guidance found in the operating manual.

Until approval is obtained, existing operating manuals will be accepted if the OCMI is satisfied that the following information is provided:

- a. A description of the vessel.
- b. Limiting design data (i.e., minimum air gap, maximum wave height in which the vessel can be safely elevated up or down, maximum operating depths, etc.).
- c. Guidance concerning jacking operations, including preloading capability and explanation of "how to" preload.
- d. Guidance on what to do when bad weather conditions are forecast, including when critical events or decisions should be accomplished, such as when to leave the area and head for safe refuge.
- e. Guidance on how to attain "survival condition" along with certain precautions necessary as a result of actions taken.
- f. Cargo loading capacities and criteria including crane information.
- g. Responsibilities of individual crew members.
- h. Emergency procedures, including evacuation and shutdowns.
- i. Safety procedures, including a requirement that crew should be up and wearing PFD's when the vessel is either being elevated or lowered.

**Lifesaving Equipment:** Primary lifesaving equipment meeting the requirements of 46 CFR 94 or 46 CFR 180 , as applicable, should be provided based on vessel tonnage and operating route. Inflatable liferafts or lifefloats may be substituted for lifeboats as allowed for OSV<sup>1</sup>s under 94.10-20 or 94.10-55. Davit launched liferafts will not be required provided the OCMI is satisfied that a secondary means of escape is provided for those situations where abandonment to an adjacent structure is not possible in the elevated condition.

Generally, substitution of liferafts or lifefloats requires the use of a rescue boat. Liftboats normally cannot serve as their own rescue boat. While elevated, they may be precluded from readily jacking down due to ongoing activities. Additionally, once afloat, bottom penetration of legs/pads may affect getting underway. The liftboat's hull form and limited propulsion power could limit maneuverability except in relatively calm seas. Finally, environmental conditions could be such that jacking down would be impossible. The rescue boat should be able to be readily launched. Launching arrangements could utilize the vessel's crane or other means acceptable to the OCMI. Where launching of the rescue boat is not by davits, which would allow lowering of the boat and crew to the water, alternative means of egress and embarkation should be provided.

The OCMI may consider, on a case-by-case basis, alternatives to the requirement for a rescue boat where limited routes and reduced manning are the normal mode of operation.

**Persons Allowed:** While elevated at an offshore site, liftboats may serve as work platforms for "offshore workers" similar to industrial personnel on MODU's. Consequently, in order to permit flexibility in the number of persons carried, liftboats, while elevated, may be certificated to carry other personnel permitted by 46 U.S.C. 2101(21)(C)(viii), in addition to the authorized number of persons in addition to the crew. The total number of persons carried should be based on adequate berthing arrangements and installation of sufficient lifesaving equipment on board. Carriage of additional personnel when the vessel is elevated should be recognized by an endorsement on the Certificate of Inspection.

**Fire Fighting Equipment:** Liftboats should be equipped with a firemain system meeting the requirements of 46 CFR 95.10 or 46 CFR 181.15, as applicable.

**Machinery Piping Systems:** Firemain, bilge, and ballast systems should be capable of operation at all times, including the elevated mode. A portable suction system employing a submersible pump and flexible hose may be employed provided system pressure and volume is satisfactory.

**Hydraulic Systems:** Hydraulic jacking systems and other miscellaneous systems should substantially comply with the provisions of 46 CFR 58.30. Jacking systems should be demonstrated to be "fail-safe." A failure of the jacking system should sound an audible and visual alarm to alert vessel personnel.

**Cranes:** Plan approval will not normally be required of any crane which conforms to the specifications of the manufacturer as originally installed. A rated load test as described in 46 CFR 107.260 (MODU regulations) should be required unless the crane has been load tested while under certification by an approved certifying authority as provided for in 46 CFR 107.258. Prior to the rated load test, the crane should be identified by manufacturer and model number to determine that the correct load rating chart is being used. The owner or operator should submit to the OCMI details and calculations of any alterations to a crane which were accomplished without manufacturer's documentation in order to verify the rated load of the crane.

**Level Alarm:** Vessels should be fitted with a level indicator to indicate level height and distinct alarm to warn of uneven leg sinkage when elevated.

**Vessel Operations:** Vessel operations should comply with the requirements of 46 CFR 97 or 109 as applicable.

#### ADDITIONAL REQUIREMENTS FOR LIFTBOATS OPERATING INSIDE THE BOUNDARY LINE

**Strength:** Except for leg strength, existing units operating inside the Boundary Line will not be subject to rules or standards for major structural requirements unless compliance is necessary in order to remove an especially hazardous condition. Leg strength calculations should be submitted that show the legs can withstand a 50 knot wind load at maximum depth. The calculations should be the same as for vessels operating beyond the Boundary Line. The vessel's hull should be closely examined while on drydock and necessary repairs required to bring the hull into compliance with good marine practice. If possible, the vessel's casualty history should be reviewed to determine if hull strength was a factor in any previous casualties. The vessel's operating manual should indicate what standards, if any, were used during the design of the vessel and appropriate limitations and operational precautions necessary to avoid overloading the hull and supporting structure.

**Freeboard:** Vessels not required to meet load line regulations should maintain a minimum freeboard amidships equivalent to the vessel's depth divided by 4 (D/4).

**Stability:** The stability calculations referred to in section "A" of this enclosure should indicate compliance with the following criteria. Lightship values may be obtained from an inclining experiment or a deadweight survey, witnessed by the Coast Guard.

1. **RESTRICTED Operations Inside the Boundary Line:** Vessels capable of meeting the following provisions, should be restricted to operation inside the Boundary Line, within eight (8) hours of a harbor of safe refuge or location where the vessel may elevate to survive 100 knots of wind. A description of the

elevated survival condition should be provided in the operating manual (i.e., water depth, air gap, preload, etc.).

The vessel's vertical center of gravity (KG) for all loading conditions should not exceed the maximum KG when the wind heeling moment curve is superimposed over the vessel's righting moment curve for a 50 knot wind. In addition, the following criteria should be met:

An area ratio of 1.4 should be maintained when performing the calculations stated in 46 CFR 174.045 and 174.055.

A 10 degree range of positive stability and at least 5 foot degrees of residual righting energy should be maintained between the first intercept and second intercept angle, or the angle of heel at which down boding occurs, whichever is less.

The minimum metacentric height (GM) is to be 1 foot for all leg positions including the full range of leg positions encountered while jacking.

Vessels are not permitted to lower legs to meet the afloat, 50 knot wind condition.

On bottom stability calculations will not be required at the maximum working depth; however, on bottom stability calculations should show the vessel can withstand a 100 knot wind when elevated in a safe location, if this location is other than the harbor of safe refuge.

2. For vessels unable to meet these stability criteria, further restrictions on their area of operation will be considered on a case-by-case basis. OCMI's will consider additional route restrictions based on the specific operating area and conditions proposed by the owner or operator.

#### ADDITIONAL REQUIREMENTS FOR LIFTBOATS OPERATING BEYOND THE BOUNDARY LINE

**Strength:** Units operating beyond the Boundary Line should be analyzed for strength using the guidelines of the American Bureau of Shipping (ABS) Rules for Building and Classing Mobile Offshore Drilling Units (1985), Section 4. Except as noted below, the K (effective length) factor which accounts for the support conditions at the ends of the unsupported length of column should be no less than 2. The primary supporting structure should be analyzed using the loading conditions stipulated by the ABS Rules, sections 3.5 and 3.9, and take into consideration the allowable stresses of the effective structural elements outlined in section 3.11. The stress calculations should consider the most adverse combinations of loading. K (effective length) factors less than 2 will be considered on a case-by -case basis provided the analysis shows an equivalent level of safety. Rules of other classification societies may be used as a basis for analysis upon approval of Commandant (G-MTH).

**Freeboard:** Vessels required to have a load line should comply with the provisions of 46 CFR, Subchapter E. Vessels not required to meet load line regulations should maintain a minimum freeboard based on similar calculations for vessels of 79 feet in length. In the absence of calculations similar to load line requirements, 2 feet amidships should be used as the minimum.

**Stability:** The stability calculations referred to in section "A" of this enclosure should indicate compliance with one of the following criteria. Lightship values may be obtained from an inclining experiment or a deadweight survey, witnessed by the Coast Guard.

1. **UNRESTRICTED Operation:** A vessel will be permitted an unrestricted area of operation if all the provisions of 46 CFR 174, Subpart C are met, within the full range of leg positions encountered while jacking.
2. **RESTRICTED Operation Beyond the Boundary Line:** Vessels unable to meet the criteria for unrestricted operation, but capable of meeting the following provisions, should be restricted to operation within twelve (12) hours of a harbor of safe refuge or location where the vessel may elevate to survive 100 knots of wind. A description of the elevated survival condition should be provided in the operating manual (i.e., water depth, air gap, preload, etc.).

The loading condition center of gravity (KG) for all loading conditions should not exceed the maximum KG when the wind heeling moment curve is superimposed over the vessel's righting moment curve for:

- a. A 70 knot wind heeling moment criteria for the storm condition; and
- b. A 60 knot wind heeling moment criteria for the normal operating condition.

An area ratio of 1.4 should be maintained when performing the calculations stated in 46 CFR 174.045 and 174.055.

A 10 degree range of positive stability and at least 5 foot degrees of residual righting energy should be maintained between the first intercept and second intercept angle, or the angle of heel at which downflooding occurs, whichever is less.

The minimum metacentric height (GM) is to be 1 foot for all leg positions including the full range of leg positions encountered while jacking.

Vessels may be permitted to lower legs to meet the afloat, 70 knot, storm condition.

Vessels are not permitted to lower legs to meet the afloat, 60 knot, normal operating condition.

On bottom stability calculations will not be required at the maximum working depth. However, the leg strength calculation should show that the legs can withstand at least a 50 knot wind load at maximum depth.

When only 50 knot winds are used in the leg strength calculation, this design limitation should be highlighted in the operating manual. The manual should contain precautionary guidance to operators to avoid jacking down in marginal conditions and what to do when bad weather conditions are forecast including: when critical events or decisions should be accomplished (such as allowing sufficient time to move to a safe location before the waves build beyond the safe jacking limitation), and procedures for evacuation of personnel in extreme cases.

On bottom stability calculations should show the vessel can withstand a 100 knot wind when elevated in a safe location, if this location is other than the harbor of safe refuge.