Annex H
(informative)

Regional information

H.1 General

This annex contains provisions for a limited number of regions; the content has been developed by ISO/TC 67 experts from the region or country concerned to supplement the provisions of this part of this International Standard. Each provision can be considered to constitute the additional information required for regional implementation for the particular region or country defined. The regional information may provide regional and national data that can include regional environmental conditions and local assessment and operating practices. The regulatory framework may be explained but neither regulatory requirements nor reference to specific legislation is included in this International Standard.

H.2 Norway

H.2.1 Description of region

The provisions in H.2 applies to areas under Norwegian jurisdiction.

H.2.2 Regulatory framework

The content of H.2 is laid down pursuant to the Norwegian Act 29, November 1996, No. 72, relating to petroleum activities.

H.2.3 Technical requirements

H.2 contains additional requirements for site-specific assessment of jack-ups in Norwegian waters. The following provisions are in addition to, or an alternative to, those specified in the appropriate referenced subclauses.

— 5.3 d) The site-specific risks, such as collision risk and geohazard, shall be evaluated. ALS actions shall be defined based on a site-specific risk analysis.

— 5.5.4 and 8.8 An action factor of 1,25 should be used for jack-ups in L1, in combination with environmental conditions with an annual probability of exceedance 10^{-2}. An action factor of 1,25 should be applied for jack-ups in L2 in manned conditions. An action factor of 1,15 can be used for evacuated jack-ups in L2, in combination with environmental conditions an annual probability of exceedance 10^{-2}.

— 6.4 100 year joint probability metocean data shall be used for extreme storm event assessments (ULS assessment) for jack-ups in Norwegian waters. If reliable 100 year site-specific joint probability data do not exist, a combination of 100 year waves, 100 year wind and 10 year current can be applied.

— 6.5 The relaxation “For sites where previous operations have been performed by jack-ups...” shall be applied only if the previous jack-up has been evaluated according to this part of ISO 19905 and has an equal or a more severe performance than the jack-up in question.

— 6.5 Soil investigations after installation are not considered good practice.

— 8.8.1 When checking the ULS, the SLS, the ALS and the FLS, the action factors shall be used according to Table H.2.3-1 for L1. For L2 the action factor 1,25 can be reduced to 1,15 for environmental actions.

Table H.2.3-1 — Partial action factor for the limit states controls for site-specific evaluations

Limit state	Load case	Action due to fixed load G_F	Action due to variable load G_v	Environmental action E[a]
SLS	—	1,0	1,0	1,0
ULS	a[b]	1,2[c]	1,3	0,7
ULS	b	1,0	1,0	1,25
ALS	Abnormal effects[d]	1,0	1,0	1,0
ALS	Damaged conditions[e]	1,0	1,0	1,0
FLS	—	1,0	1,0	1,0

[a] Earthquake shall be handled as environmental action within the limit state design for ULS and ALS.

[b] For fixed and/or variable loads, G_F and G_v, an action factor of 1,0 shall be used where this gives the most unfavourable action effect.

[c] If the actions do not have a well defined upper limit, e.g. uncertainty in the fixed loads, the coefficient 1,2 should be increased to 1,3.

[d] Actions with annual probability of exceedance of 10^{-4}.

[e] Environmental actions with annual probability of exceedance of 10^{0} (one year return period).

The ULS load case “a” and the FLS are normally covered by the RCS class certificates. If the facility is used for more than five years on the same location, a site-specific fatigue analysis shall be performed.

— 10.5.2 The SDOF-method can be used only when it is conservative.

— 10.7 An annual probability of exceedance of 10^{-2} in ULS and 10^{-4} in ALS shall be used for earthquakes.

— 13.6 For L1 platforms, the hull elevation shall be sufficient to clear the crest elevation of waves with an annual probability of exceedance 10^{-4}. Alternatively, it may be documented that the platform has sufficient strength to withstand metocean actions (for the ALS) with an annual probability of exceedance 10^{-4}.

— 13.11 An annual probability of exceedance 10^{-2} shall be used for temperature.

— Annex A Statements related to return periods and action factors are covered by the additional requirements above.

— A.6.4.2.2 A factor of 1,9 can be used between the individual extreme wave height (H_{max}) and the significant 100 year wave.

— A.7.3.1.1 If site-specific joint probability data does not exist, a combination of 100 year waves, 100 year wind and 10 year current can be applied.

— A.7.3.2.5 The marine growth should be in accordance with ISO 19901-1:2005, Table C.2, if the jack-up is on one location for a long time. The default value given in A.7.3.2.5 shall only be used when an effective antifouling system is in place or systematic cleaning is to be performed.

— A.10.5.2.2.2 and Table A.10.4-1 The damping should be based on measured values from the actual jack-up, or from jack-ups with similar spudcans, foundation and leg to hull connection system. If measurements do not exist, a damping of 2 % to 4 % should be used for FLS analysis. Specific evaluations can be needed to justify the values adopted.

— A.12.2.2 The maximum value of the yield strength used in the analyses should not be greater than the ultimate tensile strength divided by 1,2.

— A.12.5 and A.12.6 The partial resistance factors should be increased by a factor of at least 1,05.

— Annex B Several of the partial factors are replaced by the factors given above.

H.2.4 Technical commentary

The national body responsible for preparing Offshore Norway's regional annex is the Petroleum Safety Authority Norway. This organization is the contact point for any questions arising from the contents of this annex.

H.2.5 Additional national requirements

The regulations relating to health, environment and safety in the petroleum activities (the framework regulation), laid down by Royal Decree 31 August 2001 stipulates in § 3 that mobile facilities registered in a national register of shipping, and that follow a maritime operational concept, relevant technical requirements contained in rules and regulations of the Norwegian Maritime Directorate in the form following the 2007 regulations and later amendments, together with supplementary classification regulations issued by Det Norske Veritas, or international flag state rules with supplementary classification rules achieving the same level of safety, may be used as an alternative to technical requirements laid down in the facility regulation or pursuant to the Petroleum Act.

Facilities not using the option in the framework regulation § 3, shall comply with the Petroleum Safety Authority Norway: Regulations relating to design and outfitting of facilities, etc., in the petroleum activities (the facility regulation).

Independent of flag state, the technical requirements in the Norwegian Maritime Directorate: Regulations of 4 September 1987, no. 856, concerning construction of mobile offshore units are valid for facilities using the option in the framework regulation § 3. Units used in Norway shall also comply with the technical requirements of Det Norske Veritas standard DNV-OS-C104[A.11.3-1].

H.3 US Gulf of Mexico

H.3.1 Description of region

The geographical extent of the region are the waters of the Gulf of Mexico that fall within the United States exclusive economic zone (EEZ), which is generally the portion of the Gulf of Mexico north of 26° N, as shown on Figures H.3-1 and H.3-2, and which includes the shallow water lease blocks shown on Figures H.3-2.

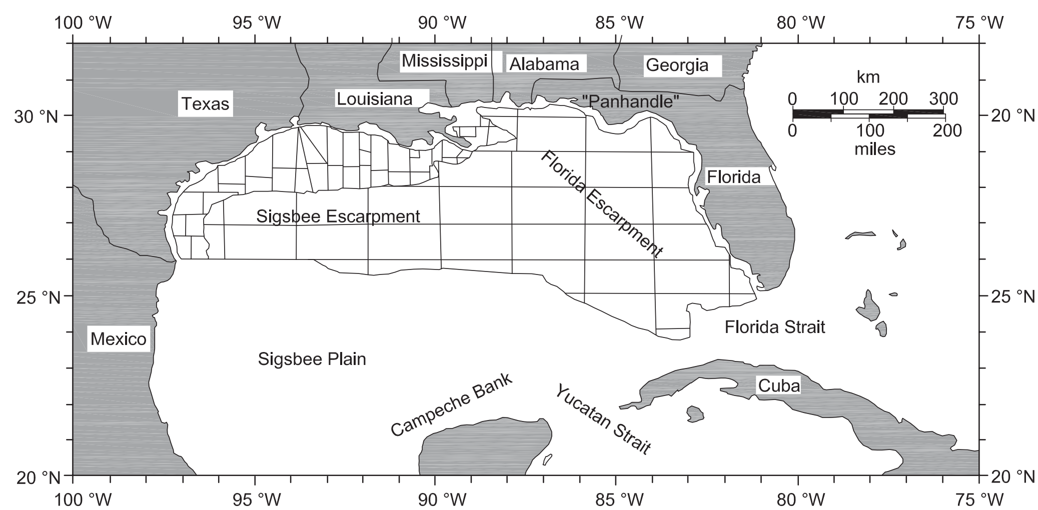
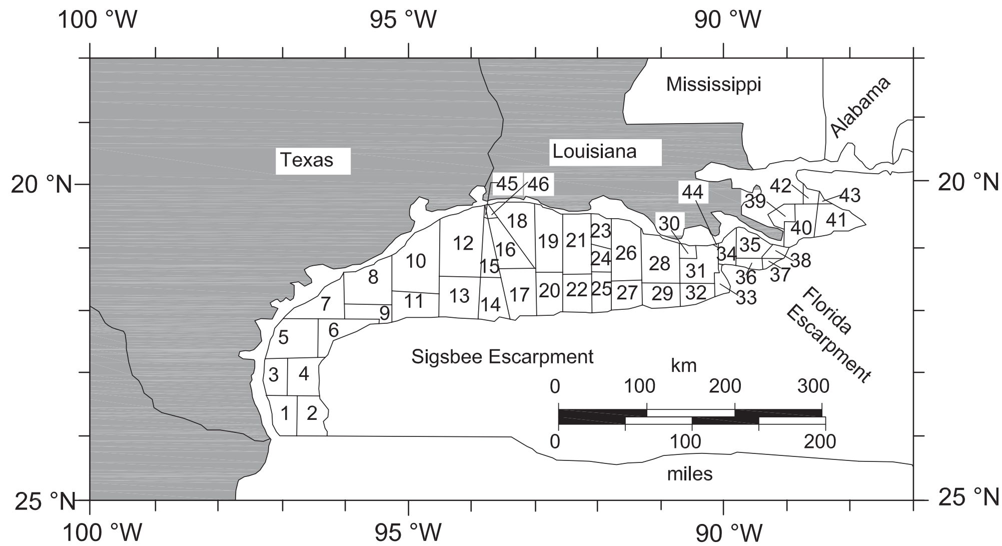


Figure H.3-1 — Northern Gulf of Mexico — Outer continental-shelf and deep water US lease areas[H.3-1]



Key

1 South Padre Island
2 South Padre Island East
3 North Padre Island
4 North Padre Island East
5 Mustang Island
6 Mustang Island East
7 Matagorda Island
8 Brazos
9 Brazos South
10 Galveston
11 Galveston South
12 High Island
13 High Island South
14 High Island East South
15 High Island East
16 West Cameron West
17 West Cameron South
18 West Cameron
19 East Cameron
20 East Cameron South
21 Vermilion
22 Vermilion South
23 South Marsh Island North
24 South Marsh Island
25 South Marsh Island South
26 Eugene Island
27 Eugene Island South
28 Ship Shoal
29 Ship Shoal South
30 South Pelto
31 South Timbalier
32 South Timbalier South
33 Grand Isle
34 Grand Isle
35 West Delta
36 West Delta South
37 South Pass South & East
38 South Pass
39 Breton Sound
40 Main Pass
41 Main Pass South & East
42 Chandeleur
43 Chandeleur East
44 Bay Marchand
45 Sabine Pass (TX)
46 Sabine Pass (LA)

Figure H.3-2 — Northern Gulf of Mexico: Inner continental-shelf US lease areas[H.3-1]

H.3.2 Regulatory framework

The U.S. Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE), formerly the U.S. Mineral Management Service, has jurisdiction over the operations of MOUs on the U.S. Outer Continental Shelf. Supplementing its regulations, BOEMRE has issued requirements for the operation of jack-ups, including site assessments, in its “Notice to Leaseholders” (NTLs). The current BOEMRE regulations and NTLs for site assessment should be consulted when applying this part of ISO 19905, including this clause.

H.3.3 Metocean conditions

H.3.3.1 General

As described in ISO 19901-1, the climate in the northern Gulf of Mexico ranges from tropical to temperate. Summer wind and wave conditions are generally benign, with warm temperatures and high relative humidity. There are occasional light squalls and thunderstorms. The extreme wind and wave climate in the Gulf is dominated by hurricanes in the summer season and the passage of non-tropical frontal systems in the winter season. Swell is not a major factor except when associated with a hurricane. Waves tend to be correlated with winds (either hurricane or winter storm) and temporarily strong currents can be associated with storm systems, although there are also prevailing circulation currents even in the shallow Gulf.

The hurricane season officially runs from the beginning of June to the end of November, and on average three tropical storms can be expected to form in or enter the region each year. These storms can originate in the Gulf of Mexico, the Caribbean Sea or in the North Atlantic Ocean.

The National Hurricane Center monitors the gestation and development of all tropical disturbances in the Atlantic region. After tropical storm development they fly hurricane hunter aircraft into the storms to gather data. Information is released to the public on the formation, development, the expected track and speed and wind speeds. Other public and private organizations develop forecast metocean conditions from these data. Government bodies, operators and jack-up owners can use these data to plan for the evacuation of offshore personnel. This also allows the operators and owners time to prepare jack-ups for the storm event prior to evacuation. The standard practice is to evacuate all personnel prior to the arrival of severe weather.

The exception to this situation is when a sudden TRS forms within the Gulf (sudden hurricane). In this case, it might not be possible to evacuate personnel; however, historical metocean data indicates that tropical storms or hurricanes that develop within the Gulf are much less severe than the major hurricanes that develop in the Atlantic basin and migrate into the Gulf. Even in the case of a sudden hurricane, there is sufficient time to make safe the well and prepare the jack-up for severe weather.

H.3.3.2 Metocean conditions and their assessment

H.3.3.2.1 General

An L1 jack-up shall be assessed to metocean data applicable to the season of operation using either the 50 year extreme with a partial action factor of 1,15 or the 100 year joint probability metocean data with a partial action factor of 1,25.

An L2 jack-up shall be assessed for the situation that can be reached prior to evacuation being effected. This assessment shall be to L1 criteria using the 50 year independent extremes or 100 year joint probability data for hurricanes that can reach the site prior to evacuation being effected. This annex provides 50 year 48 hour notice sudden hurricane data for the northern Gulf of Mexico. Relevant data and criteria are given in H.3.3.2.2 and H.3.3.2.3. This annex also includes additional requirements for L2 jack-ups; see H.3.3.2.4. OTC 17879[H.3-2] gives the background and derivation of these data.

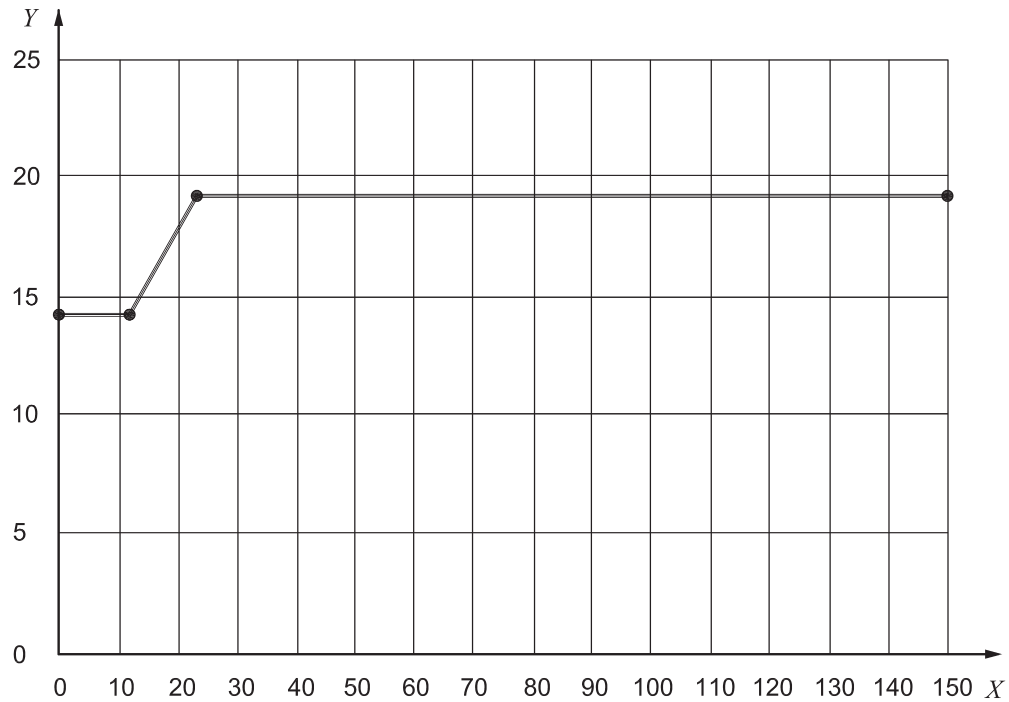
An L2 jack-up shall also be assessed as an unmanned unit for the post evacuation case (see H.3.3.2.5).

Other requirements for hurricane season are given in H.3.3.3.

An L3 jack-up shall be assessed to criteria agreed between the jack-up owner and the operator.

H.3.3.2.2 Hull elevation during hurricane season

With reference to 5.4.5 and 13.6, the assessor shall consider the possibility of wave impingement on the hull. The hull elevation considered in the site-assessment shall be appropriate for the water depth, spring tide, and the expected maximum wave crest height and storm surge due to the 100 year return period hurricane. The hull elevation shall also include an allowance for any settlement predicted by the post evacuation assessment. In the absence of a site-specific hull elevation assessment, the curve given in Figure H.3-3 may be used.



Key

X water depth, expressed in metres

Y minimum recommended hull elevation above LAT, expressed in metres

Figure H.3-3 — Recommended hull elevation above LAT for hurricane season

H.3.3.2.3 Assessment case

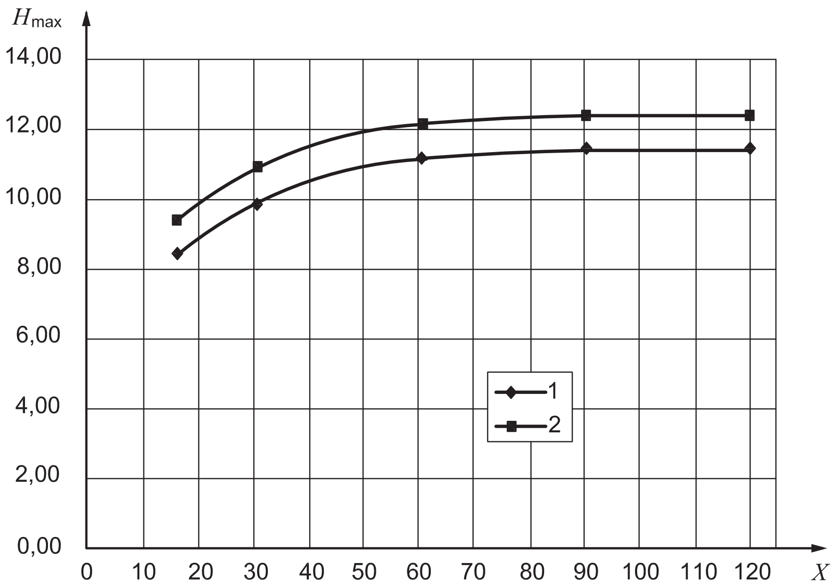
When it can be demonstrated that the jack-up can be placed in storm survival mode and evacuation effected within 48 hours (see 5.5.1, 5.5.2, 5.5.4, A.6.4.1), the jack-up shall be assessed to the 50 year return period 48 hour sudden hurricane conditions using the action and resistance factors given in this part of ISO 19905, as summarized in Annex B. When an effective evacuation cannot be accomplished within 48 h, site-specific metocean data shall be used for the necessary longer evacuation time. Similarly, when it can be demonstrated that a lesser evacuation time can be assured, a reduced time may be used to determine the revised metocean data.

48 hour sudden hurricane metocean data for the assessment case are given in Figures H.3-4 and H.3-5 and Tables H.3-1 and H.3-3. The significant wave height should be taken as $H_{max}/1,75$. The wave periods given in the Table H.3-3 should be considered with a ±0,5 sec range unless a more detailed study indicates otherwise.

H.3.3.2.4 Contingency case

Additionally, the jack-up shall be assessed for a contingency case, using sudden hurricane conditions for a period 24 hours longer than that used for the assessment case, a metocean action factor $\gamma_{f,E}$ of 1,0 and the resistance factors given in this part of ISO 19905.

72 hour sudden hurricane metocean data for the contingency case are given in Figures H.3-4 and H.3-5 and Tables H.3-2 and H.3-4. The significant wave height should be taken as $H_{max}/1,75$. The wave periods given in the Table H.3-4 should be considered with a ±0,5 second range unless a more detailed study indicates otherwise.



Key

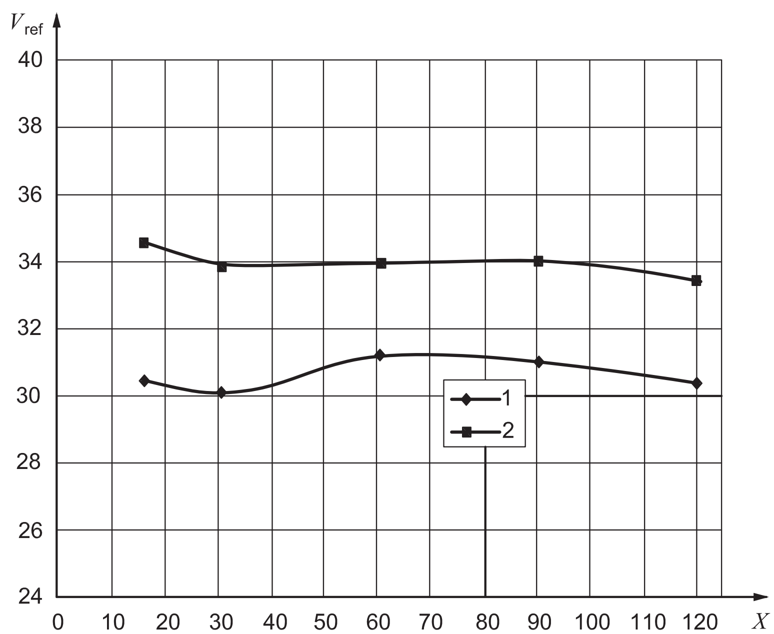
X water depth (including surge), expressed in metres

H_{max} maximum wave height, expressed in metres

1 assessment case

2 contingency case

Figure H.3-4 — Maximum wave height for US Gulf of Mexico site assessments



Key

X water depth (including surge), expressed in metres

V_{ref} 1 min sustained wind speed, expressed in metres per second

1 assessment case

2 contingency case

Figure H.3-5 — Maximum wind speed for US Gulf of Mexico site assessments

Table H.3-1 — Assessment case current profiles

Water depth m	Current at surface m/s	Current at mid-depth[a] m/s	Current at bottom of profile m/s	Elevation of bottom of profile above mudline m
15	1,22	1,13	1,04	3
30	1,03	0,93	0,86	4
60	0,78	0,73	0,68	5
90	0,72	0,67	0,63	25
120	0,64	0,60	0,56	55

[a] Mid-point between surface and bottom of profile.

Table H.3-2 — Contingency case current profiles

Water depth m	Current at surface m/s	Current at mid-depth[a] m/s	Current at bottom of profile m/s	Elevation of bottom of profile above mudline m
15	1,43	1,32	1,22	3
30	1,23	1,10	0,98	4
60	0,86	0,80	0,75	5
90	0,77	0,72	0,68	25
120	0,68	0,64	0,60	55

[a] Mid-point between surface and bottom of profile.

NOTE 1 The current profiles in the above tables are defined from the surface to the bottom of profile elevation above the mudline defined in the right-most column. The current profile then decays linearly to the mudline.

NOTE 2 For water depths not defined, interpolate between values given.

Table H.3-3 — Assessment case wave periods

Water depth m	$T_{p,i}$ s	T_{ass} s
15	10,1	9,4
30	10,3	9,6
60	10,7	9,9
90	10,8	10,1
120	10,9	10,1

Table H.3-4 — Contingency case wave periods

Water depth m	$T_{p,i}$ s	T_{ass} s
15	11,0	10,2
30	10,9	10,1
60	11,0	10,3
90	11,1	10,4
120	11,1	10,3

H.3.3.2.5 Unmanned post-evacuation case

In accordance with 5.5.4, the jack-up shall also be considered for the unmanned post-evacuation case using criteria agreed upon between the jack-up owner and the operator. A typical assessment can proceed using one of the following approaches.

a) Elastic analysis: Perform an assessment to the ULS requirements of this part of ISO 19905, but with the action and resistance factors set to 1,0.

b) Plastic collapse (pushover) analysis: Create load cases for the environmental conditions selected for the post evacuation assessment using the calculation methodology in this part of ISO 19905. The component strength checks are replaced by a system strength check based on plastic collapse techniques; see 10.9. The effect of additional settlement should be included to assess the potential for collapse.

For both types of post evacuation analyses described above, the added P-Δ effect due to leg settlement shall be considered and a Step 3 displacement check shall be performed for the foundations.

H.3.3.3 Other requirements

H.3.3.3.1 Preloading

The maximum feasible preload reaction should normally be applied. This can require individual leg preloading, which is, in general, recommended. The preload shall be applied and held for a reasonable period after penetration has ceased. Frequently the holding period is from one hour to two hours for a typical Gulf of Mexico location. This guidance should be tempered with knowledge of the soils at the location. For instance, where punch-through potential exists, holding times should be increased.

H.3.3.3.2 Storm preparation

Sufficient time shall be allocated within the evacuation plan to place the jack-up in survival mode prior to evacuation, as described in the Marine Operations Manual (MOM).

Where possible, the lower-guide should be located at an optimal position.

Where required by the marine operations manual, the drill package shall be skidded to a storm position.

Consideration should be given to increasing the hull elevation to avoid wave impingement on the hull, or to reducing the hull elevation to lower the dynamic effect, or changing the hull elevation to reduce the potential for impingement on adjacent structures (see 5.4.7 and 13.10).

The conductor support requirements should not normally impede the placing of the jack-up into survival mode when this is prescribed by the MOM or other site-specific requirements. However, if the operator requires that the conductor is to remain supported during a storm, the resulting loads shall be considered in the assessment (see 8.8.7).