CALENDAR ITEM
84

A Statewide 12/05/12
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S Statewide A. Nafday
D. Hermanson

CONSIDER APPROVAL OF PROPOSED REVISIONS TO THE MARINE OIL TERMINAL ENGINEERING AND MAINTENANCE STANDARDS (MOTEMS) FOR ADOPTION INTO THE 2013 CALIFORNIA BUILDING CODE

BACKGROUND:

Under the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990 (the Act), the California State Lands Commission (Commission) is mandated to adopt rules and regulations for the performance standards of marine oil terminals. In August 2004, the Commission approved the "Marine Oil Terminal Engineering and Maintenance Standards" (MOTEMS), which were adopted by the California Building Standards Commission (BSC) in January 2005, and became effective on February 6, 2006, as Chapter 31F of the California Building Code (Title 24, Part 2, Vol. 1). After this effective date, marine oil terminals throughout California must comply with all of the requirements of the MOTEMS. In October 2009, the Commission approved revisions to the MOTEMS which became effective on January 1, 2011 in the 2010 California Building Code.

The 31 existing marine oil terminals in California are presently working towards full compliance. To date, all terminals have submitted Initial Audits, which provide an assessment of the terminals' fitness-for-purpose based on engineering inspections and evaluations. All terminal operators are continuing to perform subsequent Audits and above water and underwater inspections, in addition to correcting all deficiencies identified during MOTEMS assessments. New marine oil terminals must be in full compliance prior to commencement of operations.

This proposal is to amend the existing MOTEMS, with general corrections and changes to specific performance standards. These proposed revisions have gone through two public comment periods, with the final comment period ending on November 20, 2012. Following the adoption of Chapter 31F in 2004, the Commission engineering staff has been in near constant interaction with the

regulated community and their contractor engineers regarding implementation of the Chapter. These proposed modifications are the result of input from those subject to the provision of Chapter 31F. The amendments correct some typographical and editing errors, update references, revise specific tables and figures, clarify some wording and add several sections to improve guidance to the regulated community. The majority of the 102 proposed amendments to Chapter 31F correct, update, streamline or make more precise the existing standards.

If approved by the Commission in December 2012 and the BSC by January 10, 2013, these proposed revisions will become effective on January 1, 2014 in the 2013 California Building Code. The final regulatory text is shown in Exhibit "A".

STATUTORY AND OTHER REGULATIONS:

A. P.R.C. sections 8750 through 8760.

OTHER PERTINENT INFORMATION:

1. Pursuant to the Commission's delegation of authority and the State CEQA Guidelines (14 Cal. Code Regs. § 15061), the Commission Staff has determined that this activity is exempt from the requirements of the CEQA because the activity is not a "project" as defined by the CEQA and the State CEQA Guidelines.

   Authority: P.R.C. section 21084 and 14 Cal. Code Regs. section 15300.

2. The proposed regulatory amendments do not affect small businesses as defined in Gov. Code section 11342.610, because all affected businesses are either petroleum refiners, as specified under Gov. Code section 11342, sub. (b)(9), or transportation and warehousing businesses having annual gross receipts of more than $1,500,000, as specified under Gov. Code section 11342.610, sub. (c)(7).

Exhibit:

A. Proposed Final Express Terms.

IT IS RECOMMENDED THAT THE COMMISSION:

1. Find that the activity is exempt from the requirements of CEQA pursuant to Title14, California Code of Regulations, section 15061 because the activity is not a project as defined by Public Resources Code section 21065 and Title 14, California Code of Regulations section 15378

2. Find that the regulatory amendments do not affect small businesses as defined in Gov. Code section 11342.610, because all affected businesses are either petroleum refiners, as specified under Gov. Code section 11342.610, or transportation and warehousing businesses having annual gross receipts of more than $1,500,000, as specified under Gov. Code section 1342.610(c)(7).

3. Find that the regulatory amendments will not have a significant impact on the creation or elimination of jobs or new or existing businesses within California, nor will they have an adverse economic impact on business, including the ability of California businesses to compete with businesses in other states.

4. Find that no alternative would be more effective in carrying out the purpose for which the regulation is proposed or would be as effective as and less burdensome to affected private persons than the proposed regulation.

5. Direct the Commission staff to take whatever action is necessary and appropriate to comply with provisions of the Government Code regarding adoption of regulations and amendments and to ensure that the regulations become effective.

6. Approve the proposed revisions to the MOTEMS standards for submission to the Building Standards Commission for adoption. These revisions are in the form set forth in Exhibit "A" which is on file at the office of the California State Lands Commission.

7. Authorize the Commission staff to make non-substantive modifications to the proposed revisions in response to recommendations by the California Building Standards Commission.

EXHIBIT A

FINAL EXPRESS TERMS
FOR
PROPOSED BUILDING STANDARDS
OF THE
CALIFORNIA STATE LANDS COMMISSION

REGARDING PROPOSED CHANGES TO THE 2010 CALIFORNIA BUILDING CODE, CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2

MARINE OIL TERMINALS, CHAPTER 31F

LEGEND FOR FINAL EXPRESS TERMS (combination of 45-day and 15-day changes)

1. For 45-day and 15-Day changes, existing California amendments or code language being modified appears in *italics*, with modified language underlined.
2. For 45-day and 15-Day changes, repealed text appears in ~~strikeout~~.

EXPRESS TERMS

1. ***3101F.2 Purpose.*** 3rd Paragraph.

~~*In special circumstances where certain requirements of these standards cannot be met, alternatives that provide an equal or better protection of the public health, safety and the environment shall be subject to Division approval.*~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code and Section 8670.2, Government Code.

2. ***3101F.4 Overview.*** 2nd & 7th Paragraphs.

…

Section 3102F defines minimum requirements for audit, inspection and evaluation of the structural, electrical and mechanical systems on a prescribed periodic basis, or following a significant, potentially damage-causing event.

…

Sections 3109F through 310~~1~~1F provide requirements for piping/pipelines, mechanical and electrical equipment and electrical systems.

…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code and Section 8670.2(m) Government Code.

3. ***3101F.6.2 Division review.*** *The following will be subject to review ~~and approval~~ for compliance with this code by the Division or its authorized ~~designated~~ representative(s) ~~for compliance with this Code~~:*

1. Any audit, inspection, analysis or evaluation of ~~existing~~ MOTs.
2. Any significant change, modification or re-design of a structural, mooring, fire, piping/pipelines, mechanical or electrical system at an ~~existing~~ MOT, prior to use or reuse.
3. Engineering analysis and design for any new MOT prior to construction. Also see Section 3102F.3.3.1.
4. Construction inspection team and the construction inspection report(s).

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

4. ***3101F.7 Alternatives.*** *In special circumstances where certain requirements of these standards cannot be met, alternatives that provide an equal or better protection of the public health, safety and the environment shall be subject to Division Chief approval with concurrence of the Division's lead engineer in responsible charge.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

5. ***3102F.1.2 Audit and inspections types.*** *…*

…

Each has a distinct purpose and is conducted either at a defined interval (see Table~~s~~ 31F-2-1 and Section 3102F.3.3.2~~31F-2-2~~), as a result of a significant, potentially damag~~inge~~-causing event or a significant change in operations. In the time between audits and inspections, operators are expected to conduct periodic walk-down examinations of the MOT to detect potentially unsafe conditions.

~~***TABLE 31F- 2-1***~~

~~***INITIAL AUDIT REPORT SUBMISSION DEADLINE FOR EXISTING BERTHING SYSTEMS***~~

~~***RISK CLASSIFICATION[1]***~~	~~***SUBMISSION DEADLINE[2]***~~
~~*High*~~	~~*30 Months*~~
~~*Medium*~~	~~*48 Months*~~
~~*Low*~~	~~*60 Months*~~

~~*1 As defined in Tables 31F-4-1*~~
~~*2 From the effective date of this Chapter (31F)*~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

6. ***Table 31F-2-~~2~~1***

TABLE 31F-2-~~2~~1
MAXIMUM INTERVAL BETWEEN UNDERWATER ~~AUDIT~~ INSPECTIONS (YEARS)[1]

INSPECTION CONDITION ASSESSMENT RATING (ICAR)[6] ~~CONDITION RATING FROM PREVIOUS INSPECTION~~	***CONSTRUCTION MATERIAL***				***CHANNEL BOTTOM OR MUDLINE - SCOUR[4]***	
	Unwrapped Timber or Unprotected Steel (no coating or cathodic protection)[4]		***Concrete, Wrapped Timber, Protected Steel or Composite Materials (FRP, plastic, etc.)[4]***			
	Benign[2] Environment	***Aggressive[3] Environment***	***Benign[2] Environment***	***Aggressive[3] Environment***	***Benign[2] Environment***	***Aggressive[3] Environment***
6 (Good)	*6*	*4*	*6*	*5*	*6*	*5*
5 (Satisfactory)	*6*	*4*	*6*	*5*	*6*	*5*
4 (Fair)	*5*	*3*	*5*	*4*	*6*	*5*
3 (Poor)	*4*	*3*	*5*	*4*	*6*	*5*
2 (Serious)	*2*	*1*	*2*	*2*	*2*	*2*
1 (Critical)	*N/A[5]*	*N/A[5]*	*N/A[5]*	*N/A[5]*	*N/A[5]*	*N/A[5]*

1. The maximum interval between Underwater ~~Audit~~ Inspections shall be ~~reduced~~ changed as appropriate, with the approval of the Division, based on the extent of deterioration observed on a structure, the rate of further anticipated deterioration, or other factors.
2. Benign environments include fresh water and maximum current velocities less than 1.5 knots for the majority of the days in a calendar year
3. Aggressive environments include brackish or salt water, polluted water, or waters with current velocities greater than 1.5 knots for the majority of the days in the calendar year.
4. For most structures, two maximum intervals will be shown in this table, one for the assessment of construction material (timber, concrete, steel, etc) and one for scour (last 2 columns). The shorter interval of the two should dictate the maximum interval used.
5. MOTs rated "Critical" will not be operational; and "Emergency Action" shall be required in accordance with Table 31F-2-~~7~~6.
***6.** ICARs shall be assigned in accordance with Table 31F-2-4.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

7. ***3102F.1.5 Baseline inspection****. If "as-built" or subsequent modification drawings are not available, incomplete, or inaccurate, ~~the Audit must include~~ a baseline inspection is required to gather data in sufficient detail for ~~to~~ adequate~~ly evaluate the MOT~~ evaluation.*

…
…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

8. ***3102F.3 Audits.***

Authority: Section 8755 and 8757, Public Resources Code

Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

9. ***3102F.3.1 Objective.*** *The objective of the audit is to review structural, mechanical and electrical systems on a prescribed periodic basis to verify that each berthing system is fit for its specific defined purpose. The audit includes ~~both~~ above water and underwater inspections, ~~as well as~~ engineering ~~analyses~~ evaluation, documentation and recommended follow-up actions.*

[Note: last sentence was originally underlined for emphasis]

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

10. **3*102F.3.2* *Overview.*** *The ~~initial~~ audit shall include above water and underwater ~~structural~~ inspections, and ~~mooring, berthing and~~ structural, ~~evaluations, and~~ electrical~~/~~, and mechanical systems evaluations, with supporting documentation, drawings and follow-up actions. Structural systems shall include seismic, operational, mooring, berthing and geotechnical considerations. Mechanical systems shall include fire, piping/pipelines and mechanical equipment considerations. The audit is performed by a multidisciplinary team of engineers, qualified inspectors and may include Division representatives.*

…

The underwater inspection involves an examination of all structural, mechanical and electrical components below the waterline. A rational and representative underwater sampling of piles may be acceptable with Division approval, for cases of limited visibility, heavy marine growth, restricted inspection times because of environmental factors (currents, water temperatures, etc.) or a very large number of piles.

Global operational structural assessment rating(s) (OSAR), global seismic structural assessment rating(s) (SSAR) and ~~A~~ global inspection condition assessment rating(s) (ICAR) shall be assigned to ~~above and underwater structural systems~~ each structure and overall berthing system, where appropriate (Table 31F-2-~~5~~4).

Remedial action priorities (RAP) shall be assigned for component deficiencies (Table 31F-2-~~6~~5). Recommendations for remediation and/or upgrading shall be prescribed as necessary.

…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

11. ***3102F.3.3.1 Initial audit.*** *~~Table 31F-2-1 provides the deadlines for the submission of the Initial Audit report. The MOT classification in Table 31F-2-1 is determined from the higher assigned risk classification obtained from Table 31F-4-1.~~*

For a new MOT or new berthing system(s), the initial audit of the "as-built" system(s) shall be performed ~~within three years of~~ prior to commencement of operations.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

12. ***3102F.3.3.2 Subsequent audits.*** *A~~n~~ subsequent ~~above water~~ audit report of each terminal ~~structural, mechanical and electrical systems~~ shall be completed at a maximum interval of 4 ~~3~~ years, and includes documentation of inspections. This interval may be reduced based on the recommendation of the audit team leader, and with the approval of the Division, depending on the extent and rate of deterioration or other factors.*

The maximum interval for above water inspections shall be 4 years. The maximum interval for underwater inspections ~~audits~~ is dependent upon the condition of the facility, the construction material type and/or the environment at the mudline, as shown in Table 31F-2-~~2~~1.

If there are no changes in the defined purpose (see Section 3102F.3.6.1) of the berthing system(s), then analyses from previous audits may be referenced. However, if there is a significant change in a berthing system(s), or when deterioration or damage must be considered, a new analysis may be required.

The Division may require an audit, inspection or supplemental evaluations to justify changes in the use of the ~~a~~ berthing system(s). ~~An example of such change would be in the berthing and mooring configuration of larger or smaller vessels relative to dolphin and fender spacing, and potential resultant modification to operational environmental limitations (e.g., wind speed).~~

~~Subsequent audits of the above water and underwater structures and mechanical and electrical systems may or may not be performed concurrently, depending upon the required inspection intervals based on the prior audit report.~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

13. ***3102F.3.4.4 ~~Seismic~~ sStructural analyst.*** *A California registered civil or structural engineer shall ~~perform~~ be in responsible charge of the ~~seismic~~ structural evaluations ~~required for the audit~~.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

14. ***3102F.3.4.6 Mechanical inspection team.*** *A registered engineer shall direct the on-site team performing the inspection and evaluation of piping/pipeline, mechanical and fire components and systems, except the Fire Protection Assessment in accordance with Section 3108F.2.2.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

15. ***3102F.3.4.7 Divisional representation.*** *The Division representative(s) may participate in any audit or inspection as observer(s) and may provide guidance.*

Authority: Section 8755 and 8757, Public Resources Code

Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

16. ***3102F.3.5 Scope of inspections.***

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

17. ***3102F.3.5.1 Above water structural inspection.*** *The above water inspection shall include all accessible components above +3 ft MLLW. Accessible components shall be defined as those components above and below deck that are reachable without the need for excavation or extensive removal of materials that may impair visual inspection. The above water inspection shall include, but not be limited to, the following:*

1. *Piles*
2. *Pile caps*
3. *Beams*
4. *Deck soffit*
5. *Bracing*
6. *Retaining walls and bulkheads*
7. *Connections*
8. *Seawalls*
9. *Slope protection*
10. *Deck topsides and curbing*
11. *Expansion joints*
12. *Fender system components*
13. *Dolphins and deadmen*
14. *Mooring points and hardware*
15. *Navigation aids*
16. *Platforms, ladders, stairs, handrails and gangways*
17. *Backfill (sinkholes/differential settlement)*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

18. ***TABLE 31F-2-~~3~~2.*** Renumbering of Table, and no change to table contents.

TABLE 31F-2-~~3~~2
UNDERWATER INSPECTION LEVELS OF EFFORT [2.2]

		DETECTABLE DEFECTS			
LEVEL	***PURPOSE***	***Steel***	***Concrete***	***Timber***	***Composite***
I	***General visual/tactile inspection to confirm as-built condition and detect severe damage***	***Extensive corrosion, holes*** ***Severe mechanical damage***	***Major spalling and cracking*** ***Severe reinforcement corrosion*** ***Broken piles***	***Major loss of section*** ***Broken piles and bracings*** ***Severe abrasion or marine borer attack***	***Permanent deformation*** ***Broken piles*** ***Major cracking or mechanical damage***
II	***To detect surface defects normally obscured by marine growth***	***Moderate mechanical damage*** ***Corrosion pitting and loss of section***	***Surface cracking and spalling*** ***Rust staining*** ***Exposed reinforcing steel and/or prestressing strands***	***External pile damage due to marine borers*** ***Splintered piles*** ***Loss of bolts and fasteners*** ***Rot or insect infestation***	***Cracking*** ***Delamination*** ***Material degradation***
III	***To detect hidden or interior damage, evaluate loss of cross-sectional area, or evaluate material homogeneity***	***Thickness of material*** ***Electrical potentials for cathodic protection***	***Location of reinforcing steel*** ***Beginning of corrosion of reinforcing steel*** ***Internal voids*** ***Change in material strength***	***Internal damage due to marine borers (internal voids)*** ***Decrease in material strength***	***N/A***

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

19. ***TABLE 31F-2-43.*** Renumbered and a typographical error; first word in right hand column “sloe” should be “slope”.

TABLE 31F-2-43

SCOPE OF UNDERWATER INSPECTIONS [2.2]

LEVEL		***SAMPLE SIZE AND METHODOLOGY*** [1]							
		Steel		***Concrete***		***Timber***		***Composite***	***Slope protection/ channel bottom or mudline-scour***
		Piles	***Bulkheads/ Retaining Walls***	***Piles***	***Bulkheads/ Retaining Walls***	***Piles***	***Bulkheads/ Retaining Walls***	***Piles***	
I	***Sample Size:*** ***Method:***	*100%* *Visual/Tactile*	*100%* *Visual/Tactile*	*100%* *Visual/Tactile*	*100%* *Visual/Tactile*	*100%* *Visual/Tactile*	*100%* *Visual/Tactile*	*100%* *Visual/Tactile*	*100%* *Visual/Tactile*
II	***Sample Size:*** ***Method:***	*10%* *Visual: Removal of marine growth in 3 bands*	*Every 100 LF* *Visual: Removal of marine growth in 1 SF areas*	*10%* *Visual: Removal of marine growth in 3 bands*	*Every 100 LF* *Visual: Removal of marine growth in 1 SF areas*	*10%* *Visual: Removal of marine growth on 3 bands Measurement: Remaining diameter*	*Every 50 LF* *Visual: Removal of marine growth in 1 SF areas*	*10%* *Visual: Removal of marine growth in 3 bands*	*0%*
III	***Sample Size:*** ***Method:***	*5%* *Remaining thickness measurement; electrical potential measurement; corrosion profiling as necessary*	*Every 200 LF* *Remaining thickness measurement; electrical potential measurement; corrosion profiling as necessary*	*0%* *N/A*	*0%* *N/A*	*5%* *Internal marine borer infestation evaluation*	*Every 100 LF* *Internal marine borer infestation evaluation*	*0%*	*0%*

1 The minimum inspection sampling size for small structures shall include at least two components.

LF = Linear Feet; SF = Square Feet; N/A = Not Applicable

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

20. ***3102F.3.5.2 Underwater structural inspection.*** *The underwater inspection shall include all accessible components from +3 ft MLLW to the mudline, including the slope and slope protection, in areas immediately surrounding the MOT. The water depth at the berth(s) shall be evaluated, verifying the maximum or loaded draft specified in the MOT's Operations Manual (2 CCR 2385 (d)) [2.1].*

The underwater structural inspection shall include the Level I, II and III inspection efforts, as shown in Tables 31F-2-~~3~~2 and 31F-2-~~4~~3. The underwater inspection levels of effort are described below, per [2.2]:

…

…

Level III – A detailed inspection typically involving nondestructive or partially-destructive testing, conducted to detect hidden or interior damage, or to evaluate material homogeneity. Level III testing is generally limited to key structural areas, areas which are suspect or areas which may be representative of the underwater structure.

~~*Typical inspection and testing techniques include the use of ultrasonics, coring or boring, physical material sampling and in-situ hardness testing. Level III testing is generally limited to key structural areas, areas which are suspect, or areas which may be representative of the underwater structure.*~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

21. ***3102F.3.5.4 Mechanical and electrical inspections ~~equipment~~.*** *The ~~inspection of~~ mechanical and electrical ~~equipment~~ inspections shall include but not be limited to the following ~~components and systems~~:*

…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

22. *Figure 31F-2-1*

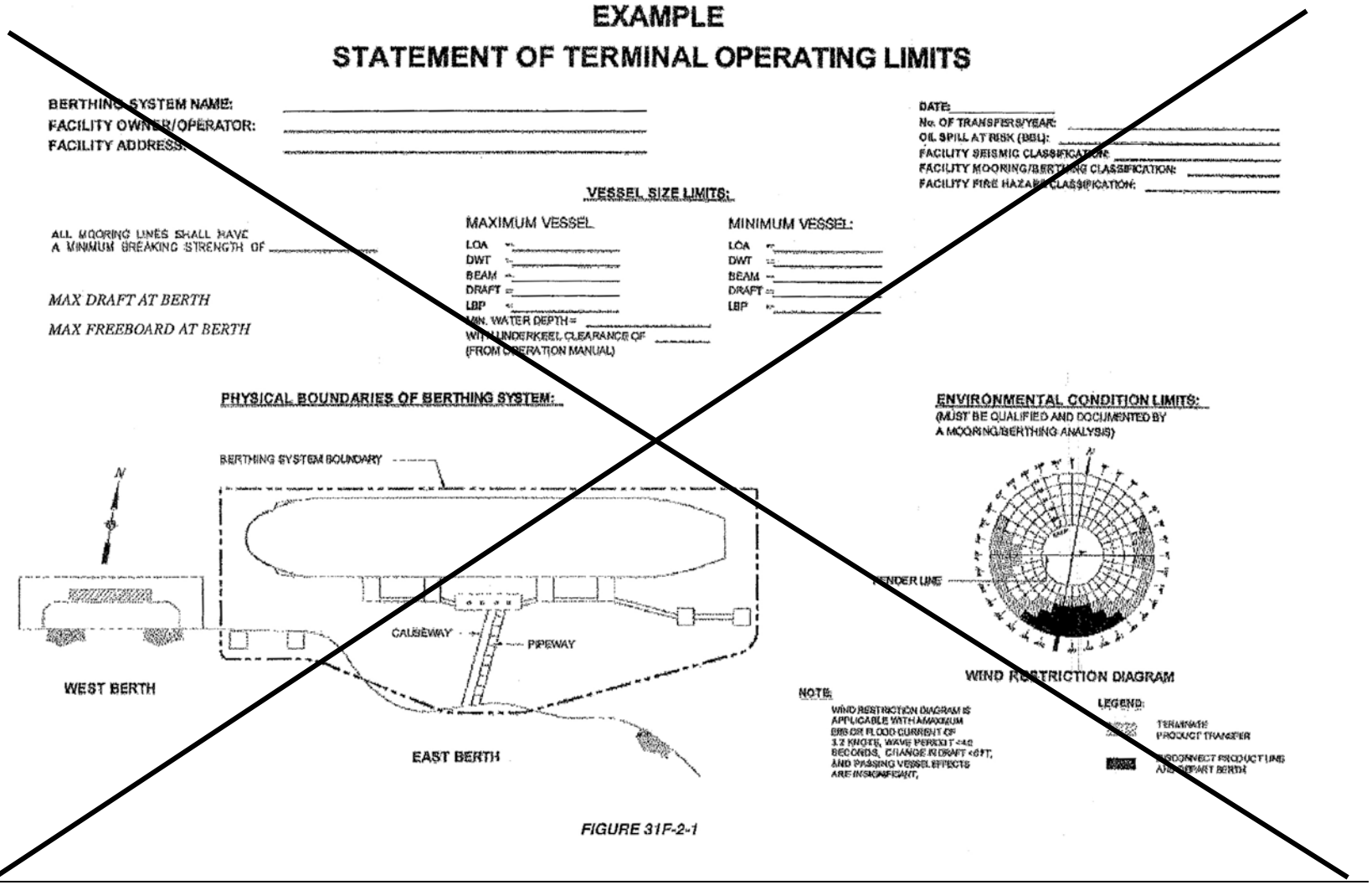


FIGURE 31F-2-1

EXAMPLE

STATEMENT OF TERMINAL OPERATING LIMITS

Terminal Name & Location

50 to 65 KDWT Vessel Starboard Side

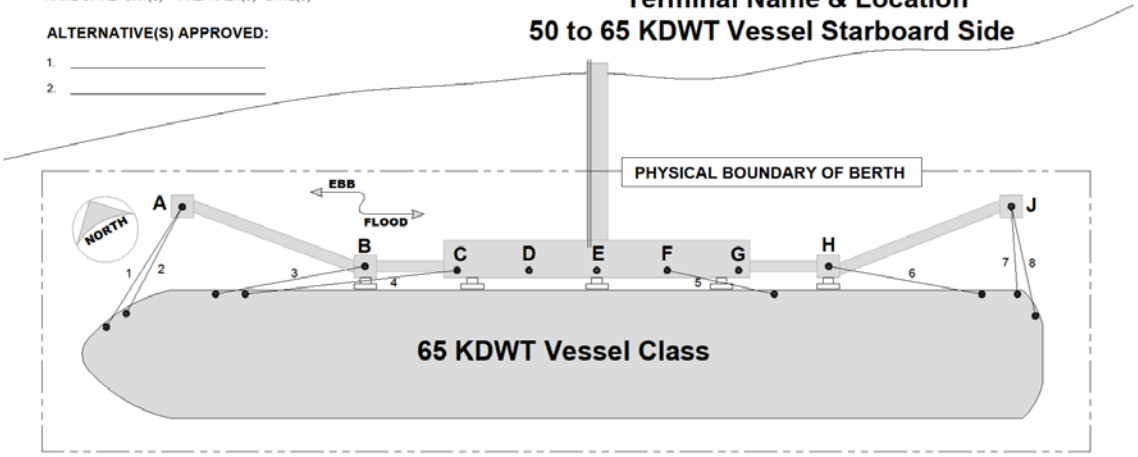
GENERAL INFORMATION

REFERENCE CALCULATION(S):

NAME OF REPORT(S) / PREPARER(S) / DATE(S)

ALTERNATIVE(S) APPROVED:

1. _____
2. _____



MOORING DEVICE INFORMATION

MOORING POINT	DEVICE TYPE	CAPACITY (KIPS)
A	DOUBLE HOOK	300 (150 PER HOOK)
B	DOUBLE HOOK	300 (150 PER HOOK)
C	BOLLARD	200
D	BOLLARD	OUT OF SERVICE
E	BOLLARD	200
F	BOLLARD	200
G	BOLLARD	OUT OF SERVICE
H	DOUBLE HOOK	300 (150 PER HOOK)
J	TRIPLE HOOK	450 (150 PER HOOK)

VESSEL DESCRIPTION:

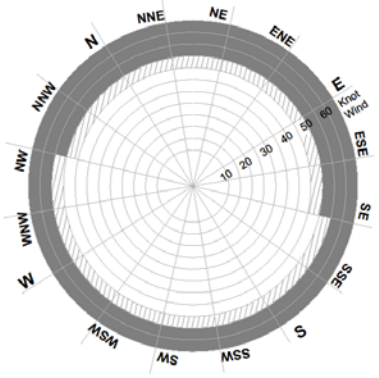
DWT	65,570 LT
MAXIMUM ARRIVAL DISPLACEMENT	45,500 LT
MAXIMUM DRAFT	60.0 FT
MAXIMUM ARRIVAL DRAFT	38.0 FT
MAXIMUM LOA	750.0 FT
MAXIMUM BEAM	105.0 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH	40.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE	2.0 FT

BERTHING NOTES:

1. MAXIMUM IMPACT VELOCITY = 0.33 FPS.
2. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 6 DEGREES.
3. NO BERTHING OPERATION WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN 38 KNOTS (43.7 MPH).



WIND RESTRICTION DIAGRAM

LEGEND:

OPERATIONAL CONDITION LIMIT:
TERMINATE PRODUCT TRANSFER

SURVIVAL CONDITION LIMIT:
DISCONNECT PRODUCT LINES & DEPART BERTH

ENVIRONMENTAL CONDITION LIMITS

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 3.9 KNOTS TOWARDS, 290 DEG TO 310 DEG FROM NORTH
   - MAXIMUM FLOOD CURRENT: 2.6 KNOTS TOWARDS, 110 DEG TO 130 DEG FROM NORTH
   - WAVE PERIOD: T < 4.0 SEC
2. TERMINATE PRODUCT TRANSFER AND DISCONNECT IF CURRENT EXCEEDS MAGNITUDE OR DIRECTION STATED IN NOTE 1.

MOORING NOTES:

1. PASSING VESSEL EFFECTS ARE CONSIDERED IN THE MOORING ANALYSIS.
2. MAXIMUM ALLOWED:
   SURGE : +/- 10 FT.
   SWAY : +/- 2.0 FT.
3. STOP OPERATIONS IF A PASSING VESSEL WITH LOA > 250 FT IS WITHIN 300 FT.
4. DO NOT EXCEED ONE LINE PER HOOK.

MOORING LINE DESCRIPTION :

MINIMUM NO. OF LINES	8
NO. OF HEAD LINES	0
NO. OF AFT LINES	0
NO. OF BREAST LINES	2 FORWARD, 2 AFT
NO. OF SPRING LINES	2 FORWARD, 2 AFT

MINIMUM BREAKING LOAD, MBL: 165 KIPS
ACTUAL LINE LOADS NOT TO EXCEED __% OF MBL

FIGURE 31F-2-1

REV. NO. & DATE

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

23. *TABLE 31F-2-~~5~~4*

~~TABLE 31F-2-5~~
~~CONDITION ASSESSMENT RATINGS (CAR) [2.2]~~

~~RATING~~		***~~DESCRIPTION OF STRUCTURAL SYSTEMS, ABOVE AND BELOW WATER LINE~~***
~~6~~	*~~Good~~*	*~~No problems or only minor problems noted. Structural elements may show very minor deterioration, but no overstressing observed. The capacity of the structure meets the requirements of this standard. The structure should be considered fit-for-purpose. No repairs or upgrades are required.~~*
~~5~~	*~~Satisfactory~~*	*~~Limited minor to moderate defects or deterioration observed, but no overstressing observed. The capacity of the structure meets the requirements of this standard.~~* *~~The structure should be considered fit-for-purpose. No repairs or upgrades are required.~~*
~~4~~	*~~Fair~~*	*~~All primary structural elements are sound; but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present, but do not significantly reduce the load bearing capacity of the structure. The capacity of the structure is no more than 15 percent below the structural requirements of this standard, as determined from an engineering evaluation.~~* *~~The structure should be considered as marginal. Repair and/or upgrade measures may be required to remain operational. Facility may remain operational provided a plan and schedule for remedial action is presented to and accepted by the Division.~~*
~~3~~	*~~Poor~~*	*~~Advanced deterioration or overstressing observed on widespread portions of the structure, but does not significantly reduce the load bearing capacity of the structure. The capacity of the structure is no more than 25 percent below the structural requirements of this standard, as determined from an engineering evaluation.~~* *~~The structure is not fit-for-purpose. Repair and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted or contingency basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.~~*
~~2~~	*~~Serious~~*	*~~Advanced deterioration, overstressing or breakage may have significantly affected the load bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. The capacity of the structure is more than 25 percent below than the structural requirements of this standard, as determined from an engineering evaluation.~~* *~~The structure is not fit-for-purpose. Repairs and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.~~*
~~1~~	*~~Critical~~*	*~~Very advanced deterioration, overstressing or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur and load restrictions should be implemented as necessary. The capacity of the structure is critically deficient relative to the structural requirements of this standard.~~* *~~The structure is not fit-for-purpose. The facility shall cease operations until deficiencies are corrected and accepted by the Division.~~*

TABLE 31F-2-4
ASSESSMENT RATINGS

RATING		*DESCRIPTION OF STRUCTURE(S) AND/OR SYSTEMS*[4]	
		OSAR[1] *and SSAR*[2]	*ICAR*[3]
6	*Good*	*The capacity of the structure or system meets the requirements of this standard. The structure or system should be considered fit-for-purpose. No repairs or upgrades are required.*	*No problems or only minor problems noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs or upgrades are required.*
5	*Satisfactory*	*The capacity of the structure or system meets the requirements of this standard. The structure or system should be considered fit-for-purpose. No repairs or upgrades are required.*	*Limited minor to moderate defects or deterioration observed, but no overstressing observed. No repairs or upgrades are required.*
4	*Fair*	*The capacity of the structure or system is no more than 15 percent below the requirements of this standard, as determined from an engineering evaluation. The structure or system should be considered as marginal. Repair and/or upgrade measures may be required to remain operational. Facility may remain operational provided a plan and schedule for remedial action is presented to and accepted by the Division.*	*All primary structural elements are sound, but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present, but do not significantly reduce the load bearing capacity of the structure. Repair and/or upgrade measures may be required to remain operational. Facility may remain operational provided a plan and schedule for remedial action is presented to and accepted by the Division.*
3	*Poor*	*The capacity of the structure or system is no more than 25 percent below the requirements of this standard, as determined from an engineering evaluation. The structure or system is not fit-for-purpose. Repair and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted or contingency basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.*	*Advanced deterioration or overstressing observed on widespread portions of the structure, but does not significantly reduce the load bearing capacity of the structure. Repair and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted or contingency basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.*
2	*Serious*	*The capacity of the structure or system is more than 25 percent below the requirements of this standard, as determined from an engineering evaluation. The structure or system is not fit-for-purpose. Repairs and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.*	*Advanced deterioration, overstressing or breakage may have significantly affected the load bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.*
1	*Critical*	*The capacity of the structure or system is critically deficient relative to the requirements of this standard. The structure or system is not fit-for-purpose. The facility shall cease operations until deficiencies are corrected and accepted by the Division.*	*Very advanced deterioration, overstressing or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur and load restrictions should be implemented as necessary. The facility shall cease operations until deficiencies are corrected and accepted by the Division.*

1 OSAR = Operational Structural Assessment Ratings
2 SSAR = Seismic Structural Assessment Ratings
3 ICAR = Inspection Condition Assessment Ratings [2.2]; Ratings shall be assigned comparing the observed condition to the original condition.
4 Structural, mooring or berthing systems

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

24. ***3102F.3.6.2 Mooring and berthing.*** *Mooring and berthing analyses shall be performed in accordance with Section 3105~~S~~F. The analyses shall be consistent with the terminal operating limits and the structural configuration of the wharf and/or dolphins and associated hardware.*

Based on inspection results, analyses and engineering judgment, mooring and berthing OSARs shall be assigned on a global basis, independently for each structure and overall berthing system. The OSARs defined in Table 31F-2-4 shall be used for this purpose. The mooring and berthing OSARs document the berthing system(s) fitness-for-purpose.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

25. ***3102F.3.6.3 Structure.*** *A structural evaluation, including a seismic analysis, shall be performed in accordance with Sections 3103F through 3107F. Such evaluation shall consider local or global reduction in capacity, as determined from the inspection.*

Based on inspection results, structural analyses and engineering judgment, OSARs (for operational loading) and SS~~C~~ARs shall be assigned on a global basis, independently for each ~~above and underwater~~ structure~~s~~, structural system(s) and berthing system(s), as appropriate. The OS~~C~~ARs and SSARs defined in Table 31F-2-~~ S4 shall be used for this purpose. The CAR,~~ and document~~s~~ the structural and/or berthing system(s) fitness-for-purpose.

Based on inspection results and engineering judgment, ICARs shall be assigned on a global basis, independently for each above and underwater structure, structural system and berthing system, as appropriate. The ICARs defined in Table 31F-2-4 shall be used for this purpose.

Structural component deficiencies ~~may be~~ assigned RAPs as per Table 31F-2-~~6~~5 shall be considered in the OSARs, SSARs and ICARs. The assigned ratings shall remain in effect until all the significant corrective action has been completed to the satisfaction of the D~~d~~ivision, or until completion of the next audit.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

26. ***Table 31F-2-~~6~~5*** Renumbering of Table, and no change to table contents. The underlined sentences/phrases below are underlined in the existing table for emphasis and have not been modified.

TABLE 31F-2-~~6~~5

COMPONENT DEFICIENCY REMEDIAL ACTION PRIORITIES (RAP)

REMEDIAL PRIORITIES	***DESCRIPTION AND REMEDIAL ACTIONS***
P1	*Specified whenever a condition that poses an immediate threat to public health, safety or the environment is observed. Emergency Actions may consist of barricading or closing all or portions of the berthing system, evacuating product lines and ceasing transfer operations.* *The berthing system is not fit-for-purpose. Immediate remedial actions are required prior to the continuance of normal operations.*
P2	*Specified whenever defects or deficiencies pose a potential threat to public health, safety and the environment. Actions may consist of limiting or restricting operations until remedial measures have been completed.* *The berthing system is not fit-for-purpose. This priority requires investigation, evaluation and urgent action.*
P3	*Specified whenever systems require upgrading in order to comply with the requirement of these standards or current applicable Codes. These deficiencies do not require emergency or urgent actions.* *The MOT may have limitations placed on its operational status.*
P4	*Specified whenever damage or defects requiring repair are observed.* *The berthing system is fit-for-purpose. Repair can be performed during normal maintenance cycles, but not to exceed one year.*
R	*Recommended action is a good engineering/maintenance practice, but not required by these standards.* *The berthing system is fit-for-purpose.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

27. *Table 31F-2-~~7~~6*

TABLE 31F-2-~~7~~6
~~STRUCTURAL~~ FOLLOW-UP ACTIONS [2.2]

FOLLOW-UP ACTION	*DESCRIPTION*
Emergency Action	*Specified whenever a condition which poses an immediate threat to public health, safety or the environment is observed. Emergency Actions may consist of barricading or closing all or portions of the berthing system, limiting vessel size, placing load restrictions, evacuating product lines, ceasing transfer operations, etc.*
Engineering Evaluation	*Specified whenever ~~structural~~ damage or deficiencies are observed which require further investigation or evaluation, to determine appropriate follow-up actions.*
Repair Design Inspection	*Specified whenever damage or defects requiring repair are observed. The repair design inspection is performed to the level of detail necessary to prepare appropriate repair plans, specifications and estimates.*
Upgrade Design and Implementation	*Specified whenever the ~~structural~~ system requires upgrading in order to comply with the requirements of these standards and current applicable Codes.*
Special Inspection	*Typically specified to determine the cause or significance of non-typical deterioration, usually prior to designing repairs. Special testing, laboratory analysis, monitoring or investigation using non-standard equipment or techniques are typically required.*
Develop and Implement Repair Plans	*Specified when the Repair Design Inspection and required Special Inspections have been completed. Indicates that the structure is ready to have repair plans prepared and implemented.*
No Action	*Specified when no further action is necessary until the next scheduled audit or inspection.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

28. Deletion of Example ES-1 Table, add Tables 31F-2-7A, Table 31F-2-7B and 31F-2-7C.

~~*Example*~~	~~*EXECUTIVE SUMMARY TABLE (ES-1)*~~ ~~*GLOBAL STRUCTURAL CONDITION ASSESSMENT RATINGS (CAR)*~~						
~~*BERTHING SYSTEM*~~	~~*SYSTEM*~~	~~*CONDITION ASSESSMENT RATING*~~	~~*FROM THIS AUDIT*~~[1]	~~*FROM PREVIOUS AUDIT*~~[1]	~~*NEXT AUDIT DUE (MO/YR)*~~	~~*ASSIGNED FOLLOW-UP ACTIONS*~~	~~*FIT-FOR-PURPOSE?*~~
~~*North Wharf*~~	~~*Above Water Structure*~~	~~*4 (Fair)*~~	~~*4 (date)*~~		~~*6/2004*~~	~~*Upgrade Design and Implementation*~~	~~*No*~~
	~~*Underwater Structure*~~	~~*5 (Satisfactory)*~~		~~*4 (date)*~~	~~*10/2006*~~		~~*Yes*~~
~~*South Wharf*~~	~~*Above Water Structure*~~	~~*4 (Fair*~~	~~*4 (date)*~~		~~*6/2004*~~	~~*Repair Design Inspection*~~	~~*No*~~
	~~*Underwater Structure*~~	~~*3 (Poor)*~~		~~*4 (date)*~~	~~*10/2006*~~	~~*Special Inspection; Repair Design Inspection*~~	~~*No*~~
~~*Dolphin, Trestle, etc.*~~							

~~[1]*Place check mark and date of respective audit in proper column to indicate for each structural system, whether the system was included in the current audit or the results are summarized from a previous audit.*~~

TABLE 31F-2-7A

Example	***EXECUTIVE SUMMARY TABLE (ES-1A)*** ***GLOBAL OPERATIONAL STRUCTURAL ASSESSMENT RATINGS (OSAR)***									***REV. #*** ***MM/YYYY***
BERTHING SYSTEM	***BERTH(S)*** [1]	***STRUCTURE(S)*** [1]	***TYPE OF ANALYSIS*** [2]	***OSAR RATING*** [4]	***LAST AUDIT DATE (MM/YYYY)***	***NEXT AUDIT DUE DATE (MM/YYYY)***	***LAST ANALYSIS DATE (MM/YYYY)*** [5]	***REPAIR / REPLACEMENT DUE DATE (MM/YYYY)*** [6]	***FIT-FOR-PURPOSE (Y/N)***	***DESCRIPTION OR COMMENTS*** [7]
North Wharf	*Berth 1*	*Wharfhead*	*O*	*5*	*08/2008*	*08/2011*	*02/2008*	*N/A*	*Y*	*None*
North Wharf	*Berth 1*	*Mooring Dolphin*	*M*	*2*	*08/2008*	*08/2011*	*05/2008*	*12/2008*	*N*	*Hook capacity inadequate*
North Wharf	*Berth 1*	*Breasting Dolphin*	*B*	*3*	*08/2008*	*08/2011*	*06/2008*	*02/2010*	*Y*	*Berthing velocity restrictions required. Velocity monitoring system operational. Fender system to be upgraded. See Terminal Operating Limits.*
North Wharf	*Berth 1*	*Overall*	*O*	*4*	*08/2008*	*08/2011*	*02/2008*	*N/A*	*Y*	*None*
North Wharf	*Berth 1*	*Dolphins, Trestles, Catwalks, Bulkhead walls, etc.*			*08/2008*	*08/2011*				
South Wharf	*Berth 2*				*08/2008*	*08/2011*				

TABLE 31F-2-7B

Example	***EXECUTIVE SUMMARY TABLE (ES-1B)*** ***GLOBAL SEISMIC STRUCTURAL ASSESSMENT RATINGS (SSAR)***								***REV. #*** ***MM/YYYY***
BERTHING SYSTEM	***BERTH(S)*** [1]	***STRUCTURE(S)*** [1]	***SSAR RATING*** [4]	***LAST AUDIT DATE (MM/YYYY)***	***NEXT AUDIT DUE DATE (MM/YYYY)***	***LAST ANALYSIS DATE (MM/YYYY)*** [5]	***REPAIR / REPLACEMENT DUE DATE (MM/YYYY)*** [6]	***FIT-FOR-PURPOSE (Y/N)***	***DESCRIPTION OR COMMENTS*** [7]
North Wharf	*Berth 1*	*Wharfhead*	*2*	*08/2008*	*08/2011*	*05/2008*	*02/2010*	*N*	*Level 1 – OK; SAP2000 Pushover Analysis* *Level 2 – NG; SAP2000 Pushover Analysis displacements too large and liquefaction*
North Wharf	*Berth 1*	*Trestle*	*5*	*08/2008*	*08/2011*	*05/2008*	*N/A*	*Y*	*Level 1 – OK; SAP2000 Linear Analysis* *Level 2 – OK; SAP2000 Linear Analysis*
North Wharf	*Berth 1*	*30" Crude Line*	*5*	*08/2008*	*08/2011*	*05/2008*	*N/A*	*Y*	*Level 1 – N/A* *Level 2 – OK; CAESAR Analysis*
North Wharf	*Overall*	*Overall*							
North Wharf	*Berth 1*	*Dolphin, Pipeline Trestle, Bulkhead walls, etc.*							
South Wharf	*Berth 2*								

TABLE 31F-2-7C

Example	EXECUTIVE SUMMARY TABLE (ES-1C) GLOBAL INSPECTION CONDITION ASSESSMENT RATINGS (ICAR)[8]							REV. # MM/YYYY
BERTHING SYSTEM	BERTH(S)[1]	STRUCTURE(S)[1]	TYPE OF INSPECTION[3]	ICAR RATING[4, 9]	LAST INSPECTION DATE (MM/YYYY)[10]	INSPECTION INTERVAL (YRS.)	NEXT INSPECTION DUE DATE (MM/YYYY)[10]	DESCRIPTION OR COMMENTS[7]
North Wharf	Berth 1	Wharfhead	AW	5	02/2008	3	02/2011	General satisfactory condition. See RAPs in Table ES-2 for details.
North Wharf	Berth 1	Wharfhead	UW	4	02/2008	5	02/2013	Pile damage: 10 severe, 15 minor. See RAPs in Table ES-2 for details.
North Wharf	Berth 1	Breasting Dolphin BD-1	AW	6	02/2008	3	02/2011	See RAPs in Table ES-2
North Wharf	Berth 1	Breasting Dolphin BD-1	UW	5	02/2008	5	02/2013	See RAPs in Table ES-2
North Wharf	Berth 1	Dolphins, Trestles, Catwalks, Bulkhead walls, etc.						
South Wharf	Berth 2							

These notes apply to Table 31F-2-7A through7C:

1. *The term "Overall" shall be input in this field when the assessment ratings are summarized for a berth.*
2. *"Types of Analyses": "O" = Operational Loading Analysis, "M" = Mooring Analysis, "B" = Berthing Analysis*
3. *"Types of Inspections": "AW" = Above Water Inspection, "UW" = Underwater Inspection*
4. *All assessment ratings shall be assigned in accordance with Table 31F-2-4.*
5. *The "Analysis Dates" are defined by the month and year in which the final design package is submitted to the Division.*
6. *The "Repair/Replacement Dates" are defined by the month and year in which the repair/replacement is to be completed and operational.*
7. *The "Description or Comments" shall reference all MOT operating limits. For OSARs, this includes berthing velocity restrictions, load limits, etc. For SSARs, this includes a brief list of the findings for each Seismic Performance Level.*
8. *Inspection findings may trigger a structural reassessment (see Tables 31F-2-7A and 31F-2-7B).*
9. *Ratings shall be assigned comparing the observed condition to the original condition.*
10. *The "Inspection Dates" are defined by the month and year in which the last day of formal field inspection is conducted.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

29. Delete Example Executive Table (ES-2) and add Table 31F-2-8 (ES-2)

~~*Example*~~	~~*EXECUTIVE SUMMARY TABLE (ES-2)*~~ ~~*COMPONENT DEFICENCY REMEDIAL ACTION PRIORITIES (RAP)*~~						
~~*BERTHING SYSTEM*~~	~~*DEFICIENCY*~~	~~*REMEDIAL ACTION PRIORITY (RAP) (P1-P4)*~~	~~*FROM THIS AUDIT*~~	~~*FROM PREVIOUS AUDIT*~~	~~*NEXT AUDIT DUE (MO/YR)*~~	~~*DESCRIPTION OF PLANNED REMEDIAL ACTION*~~	~~*FIT-FOR-PURPOSE?*~~
~~*North Wharf*~~	~~*Fire main leaking*~~	~~*P3*~~		~~*4 (date)*~~	~~*6/2004*~~	~~*Repair*~~	~~*No*~~
	~~*Pipeline badly corroded*~~	~~*P2*~~	~~*4 (date)*~~			~~*Investigate; urgent action required*~~	
	~~*Electrical (Class 1, Div 2 violation)*~~	~~*P1*~~	~~*4 (date)*~~			~~*Immediate remedial action required*~~	

TABLE 31F-2-8

Example	EXECUTIVE SUMMARY TABLE (ES-2) COMPONENT DEFICIENCY REMEDIAL ACTION PRIORITIES (RAP)[1]											REV. # MM/YYYY
BERTHING SYSTEM	BERTH(S)	STRUCTURE(S) OR LOCATION(S)	DEFICIENCY ITEM LABEL[2]	COMPONENT: DEFICIENCY DESCRIPTION	REMEDIAL ACTION PRIORITY (RAP)[3]	CBC SECTION REFERENCE	AUDIT CHECKLIST REFERENCE (OPTIONAL)	DESCRIPTION OF PLANNED REMEDIAL ACTION	P.E. REVIEW REQUIRED? (Y/N)[4]	REPAIR / REPLACEMENT DUE DATE (MM/YYYY)	COMPLETION DATE (MM/YYYY)	DESCRIPTION OF COMPLETED ACTIONS
North Wharf	Berth 1	Wharfhead	02.0001.001	**Piles:** 10 piles have severe damage; 15 piles have minor damage.	P2	3102F.3.5.2		Replace 10 severe piles. Monitor 15 minor piles.	Y	05/2008	04/2008	10 piles replaced
North Wharf	Berth 1	Mooring Dolphin MD-1	02.0001.002	**Curb:** Spalling of concrete curb w/o exposed reinforcement.	R	3102F.3.5.2		Repair concrete curbs.	N	02/2009		
North Wharf	Berth 1	Wharfhead	08.0001.002	**International Shore Fire Connection:** Connections available, but not connected.	P3	3108F.6.3.4	8.6.22	Install International Shore Fire Connections.	N	10/2008		
North Wharf	Berth 1	Wharfhead	11.0001.001	**Conduit Seals near Manifold:** Conduit seals inadequate for Class 1, Division 1 location.	P1	3111F.2		Replace conduit seals with seals adequate for Class 1, Division 1 location within 30 days.	Y	04/2008	04/2008	Seals replaced.
North Wharf	Berth 1	Wharfhead	11.0002.001	**Pressurized Instrumentation Panel near Shelter:** Pressure gauge reads "low" and will not hold pressure in Class 1, Division 2 location.	P2	3111F.2	3111.4.5	Repair pressurized instrumentation panel in Class 1, Division 2 location within 60 days.	Y	05/2008	05/2008	Pressurized instrumentation panel could not be repaired, and was replaced.

These notes apply to Table 31F-2-8:

1. *After a deficiency is corrected/completed, the row of text corresponding to that deficiency may be grayed out in subsequent ES-2 tables, and removed entirely in the subsequent audit.*
2. *The "Deficiency Item Labels" shall be assigned in the format shown above with the first series of numbers representing the Code Division/Section number ("XX"), a period (".") for separation, the second series of numbers representing the deficiency item number ("XXXX"), a period (".") for separation, and the third series of numbers representing the ES-2 table revision number ("XXX") in which the deficiency was first reported. Note that the deficiency item numbering will start from "0001" for the first deficiency in each Section of the Audit, and will increase consecutively in all future ES-2 tables.*
3. *RAPs shall be assigned in accordance with Table 31F-2-5.*
4. *Professional Engineering review required in accordance with Section 3102F.3.8 under "Follow-up Actions*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

30. ***Table 31F-2-~~8~~9***

TABLE 31F-2-~~8~~9
POST-EVENT RATINGS AND REMEDIAL ACTIONS [2.2]

RATING	*SUMMARY OF DAMAGE*	*REMEDIAL ACTIONS*
A	*No significant event-induced damage observed.*	*No further action required. The berthing system may continue operations.*
B	*Minor to moderate event-induced damage observed but all primary structural elements and electrical/mechanical systems are sound.*	*Repairs or mitigation may be required to remain operational. The berthing system may continue operations.*
C	*Moderate to major event-induced damage observed which may have significantly affected the load bearing capacity of primary structural elements or the functionality of key electrical/mechanical systems.*	*Repairs or mitigation may be necessary to resume or remain operational. The berthing system may be allowed to resume limited operations.*
D	*Major event-induced damage has resulted in localized or widespread failure of primary structural components; or the functionality of key electrical/mechanical systems has been significantly affected. Additional failures are possible or likely to occur.*	*The berthing system may not resume operations until the deficiencies are corrected.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

31. ***3102F.3.6.4 Mechanical and electrical systems.*** *An evaluation of all mechanical and electrical systems and components shall be performed in accordance with Sections 3108F through 3111F of these standards. If a pipeline stress analysis is required (see Section 3109F.3), forces and imposed seismic displacements resulting from the structural analysis shall be considered. Mechanical and electrical component deficiencies shall be assigned ratings from Table 31F-2-~~6~~5.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

32. ***3102F.3.7 Follow-up actions.*** *~~Structural~~F ~~f~~ollow-up actions as described in Table 31F-2-~~7~~6 shall be prescribed. Multiple follow-up actions may be assigned; however, guidance ~~should~~ shall be provided as to the order in which the follow-up actions should be carried out.*

If an assessment rating ~~CAR~~ of "1", "2" or "3" (Table 31F-2-~~5~~4) or a RAP of "P1" or "P2" (Table 31F-2-~~6~~5) or "Emergency Action" using Table 31F-2-~~7~~6, is assigned to a structure, berthing system or critical component, the Division shall be notified immediately. The Executive Summary Table ES-2 (see Example Table 31F-2-8) ~~audit report~~ shall include implementation schedules for all follow-up and remedial actions. Follow-up and remedial actions and implementation schedules are subject to Division approval. ~~Follow-up actions shall also state the maximum interval before the next audit.~~ Executive Summary Tables shall be maintained and updated by the MOT, and shall be submitted in the audit and/or upon Division request. For action plan implementation, see Section 3102F.3.9.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

33. ***3102F.3.8 Documentation and reporting.*** *The audit reports shall be signed and stamped by the audit team leader. The inspection and other reports and drawings shall be signed and stamped by the engineers in responsible charge.*

Each audit and inspection, whether partial or complete, shall be adequately documented. Partial ~~audits~~ inspections cover only specific systems or equipment examined. The resulting reports shall summarize and reference relevant previous ratings and deficiencies. Inspection reports shall be included in subsequent audits.

The contents of the audit and inspection reports for each berthing system shall, at a minimum, include the following as appropriate:

Executive summary – *a concise narrative ~~summary~~ of the audit or inspection results and analyses conclusions. It shall include summary information for each berthing system, including an overview of the assigned follow-up actions ~~(See Example Tables ES-1 and ES-2)~~. The Executive Summary Tables shall also be included (see Example Tables 31F-2-7A through 31F-2-7C and 31F-2-8).*

Table of contents

~~Body of report~~

Introduction – *a brief description of the purpose and scope of the audit or inspection, as well as a description of the inspection/evaluation methodology used ~~for the audit~~.*

Existing conditions – *a ~~brief~~ description, along with a summary, of the observed conditions. Subsections ~~should~~ shall be used to describe the above water structure, underwater structure, fire, piping/pipeline, ~~and~~ mechanical and electrical systems, to the extent each are included in the scope of the audit. Photos, plan views and sketches shall be utilized as appropriate to describe the structure and the observed conditions. Details of the inspection results such as test data, measurements data, etc., shall be documented in an appendix.*

Evaluation and assessment – *assessment ratings ~~a CAR~~ shall be assigned to all structures and/or berthing ~~structural~~ systems~~(above and under water)~~. Also, see Section 3102F.3.6. ~~Mooring~~*

*~~and berthing analyses, structural analysis results, and a~~A**ll supporting calculations, as-built drawings and documentation** shall be included in appendices as appropriate to substantiate the ratings. However, the results and recommendations of the engineering analyses shall be included in this section. Component deficiencies ~~should~~ **shall** be described and a corresponding RAP assigned.*

***Follow-up actions –** Specific ~~structural~~ follow-up actions **(Table 31F-2-6)** shall be documented (Table 31F-2-~~7~~**8**), and remedial schedules included, for each audited system. Audit team leaders shall specify which follow-up actions require a California registered engineer to certify that the completion is acceptable.*

***Appendices –** When appropriate, the following appendices shall be included:*

1. *Background data on the terminal – description of the service environment (wind/waves/currents), extent and type of marine growth, unusual environmental conditions, etc.*
2. *Inspection/testing data*
3. *Mooring and berthing analyses*
4. *Structural and seismic analyses and calculations*
5. *Geotechnical report*
6. *MOT Fire **Protection Assessment** ~~Plan~~*
7. *Pipeline stress and displacement analyses*
8. *Mechanical and electrical system documentation*
9. ***Corrosion assessment***
10. ***~~9.~~ Photographs, ~~and/or~~ sketches and supporting data shall be included to document typical conditions and referenced deficiencies, and to justify the assessment ratings ~~CARs~~ and the remedial action priorities (RAPs) assigned.***

~~*10. Condition assessment rating (CAR) report and supporting data*~~

~~*11. Remedial action priorities (RAP) report and supporting data*~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

34. ***3102F.3.9 Action plan implementation report.** ~~Within 90 days of completion~~ **After implementation** of ~~the~~ remedial measures ~~(for serious deficiencies, such as P1, P2 or any structural CAR less than 5) specified in the follow-up action plan(s)~~, a report shall be submitted to the Division and shall include:*

1. *A description of each action taken*
2. *Updated ~~RAPs and CARs~~ **Executive Summary Tables***
3. *Supporting documentation with calculations and/or relevant data*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

35. ***3102F.4.4 Post-Event ratings.*** *A post-event rating [2.2] shall be assigned to each berthing system upon completion of the inspection (see Table 31F-2-~~8~~9). All observations of the above and under water structure, mechanical and electrical components and systems shall be considered in assigning a post-event rating.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

36. ***3102F.4.5 Follow-up actions.*** *Follow-up actions shall be assigned upon completion of the post-event inspection of each berthing system. Table 31F-2-~~6~~5 specifies remedial action priorities ~~and actions~~ for ~~mechanical and electrical~~ deficiencies. Table 31F-2-~~7~~6 specifies various follow-up actions ~~options for structural systems~~. Multiple follow-up actions may be assigned; however, guidance should be provided as to the order in which the follow-up actions should be carried-out. Follow-up actions shall be subject to Division approval.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

37. ***3103F.5.2.1.2 Survival condition.*** Paragraph 3, 6th sentence.

…~~Once these wind speeds are established for each increment, the highest wind speed shall be used to determine the mooring/berthing risk classification, from Table 31F-5-1.~~ …

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

37a. ***3103F.5.2.3 Static wind loads on vessels.*** *The ~~"Prediction of Wind and Current Loads on VLCC's"~~ "Mooring Equipment Guidelines (MEG3)" [3.13] or the "British Standard Code of Practice for Maritime Structures" [3.14] shall be used to determine the wind loads for all tank vessels.*

…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

38. *3103F.6.1 General.*

Berthing loads are quantified in terms of transfer of kinetic energy of the vessel into potential energy dissipated by the fender(s). The terms and equations below are based on those in UFC 4-152-01, "Piers and Wharves" [3.26]~~. An alternate procedure is presented in~~ and PIANC [3.27].

…

The following correction factors shall be used to modify the actual energy to be absorbed by the fender system for berthing operations:

$$E_{fender} = F_A \bullet C_b \bullet C_m \bullet E_{vessel} \qquad (3\text{-}16)$$

where:

E_{fender} *= Energy to be absorbed by the fender system*

F_A *= Accidental factor accounting for abnormal conditions such as human error, malfunction, adverse environmental conditions or a combination of these factors. For existing berthing systems, F_A may be taken as 1.0. For new berthing systems, F_A shall be determined in accordance with UFC Section 4-152-01 [3.26] or PIANC Section 4.2.8 [3.27].*

C_b *= Berthing Coefficient*

C_m *= Effective mass or virtual mass coefficient (see Section 3103F.6.6)*

…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

39. ***3103F.6.7 Berthing velocity and angle.***

…

The berthing velocity, normal to berth, shall be in accordance with Table 31F-3-9~~, for existing berths~~. Site condition is determined from Table 31F-3-10.~~ For new berths, the berthing velocity, V_n, is established according to Table 4.2.1 of the PIANC guidelines [3.27].~~

Subject to Division approval, if an existing MOT can demonstrate lower velocities by utilizing velocity monitoring equipment, then such a velocity may be used temporarily until the berthing system is compliant with this Code.

…

TABLE 31F-3-9

BERTHING VELOCITY V_n (NORMAL TO BERTH)[1]

VESSEL SIZE (~~dwt~~DWT)	***TUG BOAT ASSISTANCE***	***SITE CONDITIONS***		
		Unfavorable	***Moderate***	***Favorable***
≤~~<~~ 10,000[1]	*No*	*1.31 ft/sec*	*0.98 ft/sec*	*0.53 ft/sec*
≤ 10,000~~-50,000~~	*Yes*	*0.78 ft/sec*	*0.66 ft/sec*	*0.33 ft/sec*
50,000~~— 100,000~~	*Yes*	*0.53 ft/sec*	*0.39 ft/sec*	*0.26 ft/sec*
≥~~>~~ 100,000	*Yes*	*0.39 ft/sec*	*0.33 ft/sec*	*0.26 ft/sec*

1 For vessel sizes not shown, interpolation between velocities may be used.

~~1. If tug boat is used for vessel size smaller than 10,000 DWT the berthing velocity may be reduced by 20%.~~

…

TABLE 31F-3-11

~~MAXIMUM~~ BERTHING ANGLE

VESSEL SIZE (DWT)	***ANGLE [degrees]***
Barge	*15*
<10,000	*10*
10,000-50,000	*8*
> 50,000	*6*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

40. ***3103F.8.7 Berthing load (B_e).*** *Berthing is a frequent occurrence, and shall be considered as a normal operating load. No increase in allowable stresses shall be applied for ASD~~, and a load factor of 1.7 shall be applied for the LRFD approach~~.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

41. ***3103F.8.8 Earthquake loads (E).*** *~~In LRFD or performance based design, use a load factor of 1.0; for ASD use 0.7. A load factor of 1.0 shall be assigned to the earthquake loads.~~ Performance based seismic analysis methodology requires that the actual~~force~~ displacement demand be limited to defined strains in concrete, steel and timber. For the deck and pile evaluation, two cases of dead load (upper and lower bound) shall be considered in combination with the seismic load.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

42. ***Table 31F-3-14.*** The Table reference citation only is being amended.

TABLE 31F-3-14
SAFETY FACTORS FOR ROPES*

Steel Wire Rope	*1.82*
Nylon	*2.2*
Synthetic	*2.0*
Polyester Tail	*2.3*
Nylon Tail	*2.5*

** From Mooring Equipment Guidelines, OCIMF [3.2730]*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

43. ***3103F.10 Mooring hardware (N/E).*** *~~Marine~~ Mooring hardware ~~consists of~~ shall include but not be limited to bollards, quick release hooks, other mooring fittings and base bolts. All mooring fittings shall be clearly marked with their safe working loads [3.13] (N). The certificate issued by the manufacturer normally defines the ~~allowable~~ safe working loads of this hardware.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

44. ***3103F.10.1 Quick release hooks.*** *For new MOTs or ~~B~~berthing ~~S~~systems, a minimum of three quick-release hooks are required for each breasting line location for tankers ~~larger~~ greater than or equal to 50,000 DWT. At least two hooks at each location shall be provided for breasting lines for tankers less than 50,000 DWT. Remote release may be considered for emergency situations.*

All hooks and supporting structures shall withstand *the minimum breaking load (MBL) of the strongest line with a safety factor of 1.2 or greater. Only one mooring line shall be placed on each quick release hook (N/E).*

For multiple quick release hooks, the minimum horizontal load for the design of the tie-down shall be:

$$F_d = 1.2x\ MBL\ x\ [1+0.75\ (n-1)] \qquad (3\text{-}21)$$

F_d = Minimum factored demand for assembly tie-down.
n = Number of hooks on the assembly.

The capacity of the supporting structures must be larger than F_d (See Section 3107F.4.3).

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

44a. ***3103F.12 Symbols.***

…

F_a, F_v = Site coefficients from Tables 31F-3-5 and 31F-3-6
F_A = Accidental factor accounting for abnormal conditions
…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

44b. ***3103F.13 References.***

…

~~[3.13] Oil Companies International Marine Forum (OCIMF), 1977, "Prediction of Wind and Current Loads on VLCCs," London, England.~~

[3.13] Oil Companies International Marine Forum (OCIMF), 2008, "Mooring Equipment Guidelines (MEG3)," 3rd ed., London, England.

…

~~[3.30] Oil Companies International Marine Forum (OCIMF), 1997, "Mooring equipment Guidelines," 2nd ed., London, England.~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

45. **WITHDRAWN –** The originally proposed revisions to Section 3104F.2.1 "Design earthquake motions" have been withdrawn. See FSOR for additional information.

46. ***3104F.5 Nonstructural components.*** *This section covers nonstructural components having a significant mass and/or a critical importance to the operability and safety of the MOT. The weight of nonstructural components shall be included in the dead load of the structure, per Section 3103F.2.* ~~*Nonstructural components including, but not limited to pipelines, loading arms, raised platforms, control rooms and vapor control equipment may affect the global structural response. In such cases, the seismic characteristics (mass and/or stiffness) of the nonstructural components shall be considered in the structural analysis.*~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

47. ***3104F.5.1*** ~~***Mass c***~~***Contribution to global response.*** *Nonstructural components including, but not limited to pipelines, loading arms, raised platforms, control rooms and vapor control equipment, may affect the global structural response. In such cases, the seismic characteristics (mass and/or stiffness) of the nonstructural components shall be considered. If the seismic response of nonstructural components is out of phase with the global structural response, then the mass contribution can be neglected in the seismic structural analysis.*
~~*The weight of permanently attached nonstructural components shall be included in the dead load of the structure, per Section 3103F.2. An exception is an MOT pipeline that is allowed to slide between anchor points and hence the pipeline response is typically out of phase with the structural response. Thus, the pipeline may be subjected to a different acceleration than the substructure, even if the pipeline cannot slide between anchor points. In such cases, the pipeline mass shall not be included directly in the seismic mass of the structure.*~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

48. ***3104F.5.2 Seismic loads.*** *In general, for nonstructural components, the evaluation procedures of Section 3110F.8 are adequate.*

For pipelines, the seismic analysis shall be performed in accordance with Section 3109F.3, in lieu of Section 3110F.8. If a~~*n*~~ *pipeline analysis has been performed and support reactions are available, they may be used to determine the forces on the support structure.*
…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

49. ***3104F.6<u>5.3</u> Nonstructural critical systems assessment.*** *A seismic assessment of the survivability and continued operation during a Level 2 earthquake (see Table 31F-4-2) shall be performed for critical systems such as fire protection, emergency shutdown and electrical power systems. The assessment shall consider the adequacy and condition of anchorage, flexibility and seismically-induced interaction. <u>For existing systems, seismic adequacy may be assessed per [4.5].</u>~~The results shall be included in the Audit.~~*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

50. ***3104F.~~7~~<u>6</u> Symbols.***

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

51. ***3104F.~~8~~<u>7</u> References.***

…

<u>[4.5] CalARP Program Seismic Guidance Committee, September 2009, "Guidance for California Accidental Release Prevention (CalARP) Program Seismic Assessments," Sacramento, CA.</u>

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

52. ***3105F.1.3 Mooring/berthing requirements ~~risk classification~~.*** *~~Each MOT shall be assigned a mooring/berthing risk classification of high, medium or low, as determined from Table 31F-5-1, based on the following site-specific parameters:~~*

1. *~~Wind~~*
2. *~~Current~~*
3. *~~Hydrodynamic effects of passing vessels~~*
4. *~~Change in vessel draft~~*

~~Exceedance of any of the defined condition thresholds in Table 31F-5-1 places the MOT in the appropriate mooring/berthing risk classification.~~

~~The maximum wind, V_{w}, (corrected for duration, height and over water) and maximum current, V_{c}, shall be obtained (see Section 3103F.5).~~

~~In order to determine if there are significant potential passing vessel effects on moored vessels at an MOT, see Section 3105F.3.2.~~

~~The range of vessel draft shall be based on the local tidal variation and the operational limits of the vessels berthing at the MOT.~~

Multiple berth MOTs shall use the same conditions for each berth unless it can be demonstrated that there are significant differences.

MOTs ~~with high mooring/berthing risk classifications (Table 31F-5-1)~~ shall have the following equipment in operation:

1. *A~~a~~n anemometer (N/E),*

2. *A~~a~~ current meter in high velocity current (>1.5 knots) areas (N/E) ~~(may be omitted if safety factor according to Section 3103F.5.3.1 is applied to current) and~~*

3. *R~~r~~emote reading tension load devices in high velocity current (>1.5 knots) areas and/or with passing vessel effects ~~(N)~~ for new MOTs*

4. *Mooring hardware in accordance with Section 3103F.10 (N/E)*

Berthing systems shall be in accordance with Section 3105F.4 (N/E)

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

53.

~~***TABLE 31F-5-1***~~

~~***MOORING/BERTHING RISK CLASSIFICATION***~~

~~***RISK CLASSIFICATION***~~	~~***WIND, (V_W) (knots)***~~	~~***CURRENT, (V_c (knots)***~~	~~***PASSING VESSEL EFFECTS***~~	~~***CHANGE IN DRAFT (ft)***~~
~~*High*~~	~~*>50*~~	~~*>1.5*~~	~~*Yes*~~	~~*>8*~~
~~*Medium*~~	~~*30 to 50*~~	~~*1.0 to 1.5*~~	~~*No*~~	~~*6 to 8*~~
~~*Low*~~	~~*<30*~~	~~*<1.0*~~	~~*No*~~	~~*<6*~~

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

54. ***3105F.1.4 New MOTs.*** *Quick release hooks are required at all new MOTs, except for spring line fittings. Quick release hooks shall be sized~~, within normal allowable stresses, for the safe working load of the largest size mooring line and configuration~~ in accordance with Section 3103F.10. To avoid accidental release, the freeing mechanism shall be activated by a two-step process. Quick release hooks shall be insulated electrically from the mooring structure, and ~~should~~ shall be supported so as not to contact the deck.*

Section 3105F.5 and the OCIMF guidelines [5.4] shall be used in designing the mooring layout.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code, Sections 8670.2 and 8670.2(m), Government Code

55. **WITHDRAWN –** The originally proposed revisions to Section 3105F.1.5 “Analysis and design of mooring components” have been withdrawn. See FSOR for additional information.

56. ***3105F.2 Mooring analyses.*** 2nd paragraph

Two procedures, manual and numerical are available for performing mooring analyses. These procedures shall conform to either the OCIMF document~~s~~, “Mooring Equipment Guidelines (MEG3)” [5.4]~~ and “Prediction of Wind and Current Loads on VLCCs” [5.5]~~ or the Department of Defense “Moorings” document [5.~~6~~5]. The manual procedure (Section 3105F.2.1) may be used for barges.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

57. ***3105F.2.1 Manual procedure.*** *~~For MOTs classified as Low risk (Table 31F-5-1)~~, S~~s~~implified calculations may be used to determine the mooring forces for barges with Favorable site conditions (see Table 31F-3-10) and no passing vessel effects (see Section 3105F.3.2), except if any of the following conditions exist (Figures 31F-5-2 and 31F-5-3, below).*

...

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

58. ***3105F.2.2 Numerical procedure.*** *A numerical procedure is required to obtain mooring forces for MOTs that cannot use manual procedure ~~classified as Medium or High (See Table 31F-5-1) and for those that do not satisfy the requirements for using simplified calculations~~. Computer program(s) shall be based on mooring analysis procedures that consider the characteristics of the mooring system, calculate the environmental loads and provide resulting mooring line forces and vessel motions (surge and sway).*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

59. ***3105F.3.2 Passing vessels.*** 4th and 5th Paragraphs.

When such conditions (1, 2 and 3 above) exist, the surge and sway forces and the yaw moment acting on the moored vessel shall, as a minimum, be established in accordance with Section 3103F.5.5 or by dynamic analysis. ~~If the demands from such evaluation are greater than 75 percent of the mooring system capacity (breaking strength of mooring lines), then a more sophisticated dynamic analysis is required.~~

For MOTs located in ports, the passing distance, L, may be established based on channel width and vessel traffic patterns. The guidelines established in the Department of Defense UFC 4-150-06, Figure 5-17 [5.~~7~~6] for interior channels may be used. The "vertical bank" in Figure 5-17 of [5.~~7~~6] shall be replaced by the side of the moored vessel when establishing the distance, "L".

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

60. ***3105F.3.3 Seiche.*** 2nd Paragraph and Items 1 & 3 in the 3rd Paragraph.

The standing wave system or seiche is characterized by a series of "nodes" and "antinodes". Seiche typically has wave periods ranging from 20 seconds up to several hours, with wave heights in the range of 0.1 to 0.4 ft [5.~~7~~6].

…

1. *Calculate the natural period of oscillation of the basin. The basin may be idealized as rectangular, closed or open at the seaward end. Use Chapter 2 of UFC 4-150-06 [5.~~7~~6], to calculate the wave period and length for different modes. The first three modes shall be considered in the analysis.*

…

3. *Determine the natural period of the vessel and mooring system. The calculation shall be based on the total mass of the system and the stiffness of the mooring lines in surge. The surge motion of the moored vessel is estimated by analyzing the vessel motion as a harmonically forced linear single degree of freedom spring mass system. Methods outlined in a paper by F.A. Kilner [5.~~8~~7] can be used to calculate the vessel motion.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

61. ***3105F.4 Berthing analysis and design****. ~~In general and for new MOTs, the fender system alone shall be designed to absorb the berthing energy. For existing MOTs, the berthing analysis may include the fender and structure.~~*

The analysis and design of berthing components shall be based on the loading combinations and safety factors defined in Sections 3103F.8 and 3103F.9 and in accordance with ACI 318 [5.1], AISC [5.2], and ANSI/AF&PA NDS [5.3], as applicable.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

62. ***3105F.4.3.1 Continuous fender system.***

…

$$L_c = 2r \sin \alpha \qquad (5\text{-}2)$$

…

In lieu of detailed analysis to determine the contact length, Table 31F-5-~~2~~21 may be used. The contact length for a vessel within the range listed in the table can be obtained by interpolation.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

63. ***Table 31F-5-~~2~~1.*** Renumbering of Table, and correction of “dwt” to “DWT”.

TABLE 31F-5-~~2~~1
CONTACT LENGTH

VESSEL SIZE (~~dwt~~DWT)	***CONTACT LENGTH***
330	*25 ft*
1,000 to 2,500	*35 ft*
5,000 to 26,000	*40 ft*
35,000 to 50,000	*50 ft*
65,000	*60 ft*
100,000 to 125,000	*70 ft*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

64. ***3105F.4.4 Longitudinal and vertical berthing forces.*** *The longitudinal and vertical components of the horizontal berthing force shall be calculated using appropriate coefficients of friction between the vessel and the fender. In lieu of as-built data, the values in Table 31F-5-~~3~~2 may be used for typical fender/vessel materials:*
…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

65. ***Table 31F-5-~~3~~2.*** Renumbering of Table, and no changes to table content.

TABLE 31F-5-~~3~~2
COEFFICIENT OF FRICTION

CONTACT MATERIALS	***FRICTION COEFFICIENT***
Timber to Steel	*0.4 to 0.6*
Urethane to Steel	*0.4 to 0.6*
Steel to Steel	*0.25*
Rubber to Steel	*0.6 to 0.7*
UHMW to Steel*	*0.1 to 0.2*

**Ultra-high molecular weight plastic rubbing strips.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

66. ***3105F.4.5 Design and selection of new fender systems.*** *For guidelines on new fender designs, refer to the Department of Defense "Piers and Wharves" document (UFC 4-152-01) [5.~~9~~8] and the PIANC Guidelines for the Design of Fender~~s~~ Systems: 2002 [5.~~10~~9]. Also see Section 3103F.6.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

67. ***3105F.5 Layout of new MOTs.*** 4th Paragraph

For a preliminary layout, the guidelines in the British Standards, Part 4, Section 2 [5.~~11~~10], may be used in conjunction with the guidelines below.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

68. ***3105F.7 References***

[5.1] American Concrete Institute, ACI 318-05, 2005, "Building Code Requirements for Structural Concrete (318-05) and Commentary (318R-05)," Farmington Hills, Michigan.

[5.2] American Institute of Steel Construction Inc. (AISC), 2005, "Steel Construction Manual," Thirteenth Edition, Chicago, IL.

[5.3] American Forest & Paper Association, 2005, "National Design Specification for Wood Construction," ANSI/AF&PA NDS-2005, Washington, D.C.

[5.4] Oil Companies International Marine Forum (OCIMF), ~~1997~~ 2008, "Mooring Equipment Guidelines (MEG3)", ~~2~~ 3rd Ed., London, England.

~~*[5.5] Oil Companies International Marine Forum (OCIMF), 1977, "Prediction of Wind and Current Loads on VLCCs," London, England.*~~

[5.~~6~~5] Department of Defense, 3 October 2005, "Moorings," Unified Facilities Criteria (UFC) 4-152-03, Washington D.C., USA.

[5.~~7~~6] Department of Defense, 12 December 2001, "Military Harbors and Coastal Facilities," Unified Facilities Criteria (UFC) 4-150-06, Washington D.C., USA.

[5.~~8~~7] Kilner F.A., 1961, "Model Tests on the Motion of Moored Ships Placed on Long Waves." Proceedings of 7th Conference on Coastal Engineering, August 1960, The Hague, Netherlands, published by the Council on Wave Research - The Engineering Foundation.

[5.~~9~~8] Department of Defense, 28 July 2005, "Piers and Wharves," Unified Facilities Criteria (UFC), 4-152-01, Washington D.C., USA.

[5.~~10~~9] Permanent International Association of Navigation Congresses (PIANC), 2002, "Guidelines for the Design of Fender Systems: 2002," Brussels.

[5.~~11~~10] British Standards Institution, 1994, "British Standard Code of Practice for Maritime Structures - Part 4. Code of Practice for Design of Fendering and Mooring Systems," BS6349, London, England.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

69. ***3106F.5 Soil structure interaction.*** *Two separate loading conditions for the piles shall be considered: (1) Inertial loading under seismic conditions, and (2) Kinematic loading from lateral ground spreading. Inertial loading is associated with earthquake-induced lateral loading on a structure, while kinematic loading refers to loading on foundation piles from earthquake induced lateral deformations of the slope/embankment/dike system. Simultaneous application of these loading conditions shall be evaluated with due consideration of the phasing and locations of these loads on foundation elements. The foundation design shall meet the structural performance requirements of this Code, when subjected to both inertial and kinematic loadings.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

70. ***3107F.2.1.2 Knowledge factor (k).*** Last Paragraph.

The knowledge factor, k, is 1.0 when comprehensive knowledge as specified above is utilized. Otherwise, the knowledge factor shall be 0.75~~. Further guidance on the determination of the appropriate k value can be found in~~ (see Table 2-1 of FEMA 356 [7.3]).

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

71. ***3107F.2.5.4 Plastic rotation.*** Equation (7-8)

$$\theta_p = L_p \, \phi_p = L_p \, (\phi_m - \phi_y) \qquad (7\text{-}8)$$

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

72. ***3107F.2.5.7 Shear design.*** Equation (7-17)

$$V_c = k\sqrt{f'_c \, A_e} \, A_c \qquad (7\text{-}17)$$

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

73. ***3108F.2.2 Fire ~~plan~~ Protection Assessment (N/E).*** *A site-specific ~~fire plan~~ Fire Protection Assessment shall be prepared by a registered engineer or a competent fire protection professional. The ~~plan~~ assessment shall consider the hazards and risks identified per Section 3108F.2.1 and shall include, but not be limited to, the elements of prefire planning as discussed in Section 9 of [8.1] and Chapter 3 of [8.2]. The ~~fire plan~~ Fire Protection Assessment shall include goals, resources, organization, strategy and tactics, including the following:*
…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

74. ***3108F.3.2 Emergency shutdown systems.*** *An essential measure of fire prevention is communications in conjunction with the emergency shutdown. The ESD and isolation system shall conform to 2 CCR 2380 (h) [8.3] and 33 CFR 154.550 [8.6]. An ESD system shall include or provide:*

1. *An ESD valve, located near the dock manifold connection or loading arm (N/E).*
2. *ESD valves, with "Local" and "Remote" actuation capabilities (N).*
3. *Remote actuation stations strategically located, so that ESD valve(s) may be shut within required times (N).*
4. *Multiple actuation stations installed at strategic locations, so that one such station is located more than 100 f~~ee~~t from areas classified as Class I, Group D, Division 1 or 2 [8.7]. Actuation stations shall be wired in parallel to achieve redundancy and arranged so that fire damage to one station will not disable the ESD system (N).*
5. *Communications or control circuits to synchronize simultaneous closure of the shore isolation valves (SIVs) with the shutdown of loading pumps (N).*
6. *A manual reset to restore the ESD system to an operational state after each initiation (N).*
7. *An alarm to indicate failure of the primary power source (N).*
8. *A secondary (emergency) power source (N).*
9. *Periodic testing of the system (N/E).*
10. *Fire proofing of motors and control-cables that are installed in areas classified as Class I, Group D, Division 1 or 2 [8.7]. Fire proofing shall, at a minimum, comply with the recommendations of API Publication 2218 (see Section 6 of [8.8]) (N).*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

75. ***Table 31F-8-2.*** Removal of the 5th row of data.

TABLE 31F-8-2
FIRE HAZARD CLASSIFICATIONS

	STORED VOLUME (bbl)			***FLOWING VOLUME (bbl)***		
CLASS	***Stripped***	***V_{SL}***	***V_{SH}***	***V_{FL}***	***V_{FH}***	***CRITERIA (bbls)****
LOW	*y*	*n*	*n*	*y*	*y*	*$V_{FL} \geq V_{FH}$ and $V_T \leq 1200$*
LOW	*n*	*y*	*n*	*y*	*n*	*$V_{SL} + V_{FL} \leq 1200$*
MEDIUM	*n*	*n*	*y*	*n*	*y*	*$V_{SH} + V_{FH} \leq 1200$*
MEDIUM	*y*	*n*	*n*	*y*	*y*	*$V_{FH} > V_{FL}$ and $V_T \leq 1200$*
~~*HIGH*~~	~~*n*~~	~~*n*~~	~~*y*~~	~~*n*~~	~~*y*~~	~~*$V_{SH} + V_{FH} > 1200$*~~
HIGH	*y*	*n*	*n*	*y*	*y*	*$V_T > 1200$*
HIGH	*n*	*y*	*y*	*y*	*y*	*$V_T > 1200$*
HIGH	*n*	*y*	*n*	*y*	*n*	*$V_{SL} + V_{FL} > 1200$*
HIGH	*n*	*n*	*y*	*n*	*y*	*$V_{SH} + V_{FH} > 1200$*

y = yes
n = no
Stripped = product purged from pipeline following product transfer event
V_{SL} = stored volume of low-hazard class product
V_{SH} = stored volume of high-hazard class product
V_{FL} = volume of low-hazard class product flowing through transfer line during 30 – 60 secs. ESD.
V_{FH} = volume of high-hazard class product flowing through transfer line during 30 – 60 secs. ESD.
$V_T = V_{SL} + V_{SH} + V_{FL} + V_{FH}$ = Total Volume (stored and flowing)
** Quantities are based on maximum flow rate, including simultaneous transfers.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

76. ***3108F.4 Fire detection.*** *An MOT shall have a permanently installed automated fire detection or sensing system (N).*

Fire detection systems shall be tested and maintained per the manufacturer or the local enforcing agency requirements. Specifications shall be retained. The latest testing and maintenance records shall be readily accessible to the Division (N/E).

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

77. ***3108F.5 Fire alarms.*** Add a third paragraph**.**
…
…

Fire alarms shall be tested and maintained in accordance with NFPA-72 [8.9] or the local enforcing agency requirements. Specifications shall be retained. The latest testing and maintenance records shall be readily accessible to the Division (N/E).

Authority: Section 8755 and 8757, Public Resources Code

Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

78. ***3108F.6 Fire suppression.*** *Table 31F-8-3 gives the minimum provisions for fire-water flow rates and fire extinguishers. The table includes consideration of the fire hazard classification (Low, Medium or High), the cargo liquid hazard class (Low or High) and the vessel or barge size. The minimum provisions may have to be augmented for multi-berth terminals or those conducting simultaneous transfers, in accordance with the risks identified in the Fire ~~Plan~~ Protection Assessment.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

79. ***3108F.6.2 Fire hydrants.*** *Hydrants shall be located not greater than 150 ft apart, along the wharf and not more than 300 ft apart on the approach trestle [8.4] (N).*

Additional hose connections shall be provided at the base of fixed monitors and upstream of the water and foam isolation valves. Connections shall be accessible to fire trucks or mutual aid equipment as identified in the ~~Fire Plan~~ Fire Protection Assessment (N/E).

…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

80. ***3108F.6.3 Fire water.*** *The source of fire water ~~should~~ shall be reliable and provide sufficient capacity as determined in the ~~fire plan~~ Fire Protection Assessment. Water-based fire protection systems shall be tested and maintained per NFPA 25 [8.10], as adopted and amended by the State Fire Marshal, or the local enforcing agency requirements. Specifications shall be retained. The latest testing and maintenance records shall be readily accessible to the Division (N/E).*

…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

81. ***3108F.6.6 Supplemental ~~F~~fire ~~S~~suppression ~~S~~systems (E).*** *A supplemental system is an external waterborne or land-based source providing suppressant and equipment. Supplemental systems may not provide more than one-quarter of the total water requirements specified in the ~~fire plan~~ Fire Protection Assessment.*

Additionally, supplementary systems shall not be considered in a ~~fire plan~~ Fire Protection Assessment, unless available within 20 minutes following the initiation of a fire alarm. Mutual aid may be considered as part of the supplemental system.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

82. ***3108F.7 Critical systems seismic assessment (N/E).*** *Fire detection and protection systems, and emergency shutdown systems shall have a seismic assessment per Section 3104F.5.3. For equipment anchorages and supports, see Section 3110F.8.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

83. ***3108F.~~7~~8 References.***

…

[8.9] National Fire Protection Association, 2010, NFPA 72, "National Fire Alarm and Signaling Code," Quincy, MA.

[8.10] National Fire Protection Association, 2011, NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," Quincy, MA.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

84. ***3109F.3 Pipeline stress analysis (N/E).*** Edit and addition to 2nd paragraph.

…

~~Piping~~ Pipeline stress analysis shall be performed in accordance with ASME B31.4 [9.3], considering all relevant loads and corresponding displacements determined from the structural analysis described in Section 3104F. Seismic loading of above-grade pipelines may be analyzed in accordance with ASME B31.E [9.5].

…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

85. ***3109F.4 Anchors and supports.*** *Anchors and supports shall conform to ASME B31.3 [9.2], ASME B31.4 [9.3], API Standard 2610 [9.1] and the ASCE Guidelines [9.~~5~~6](N).*

A seismic assessment shall be performed for existing anchors and supports using recommendations in Section 7 of CalARP [9.~~6~~7] or Chapter 11 of FEMA 356 [9.~~7~~8], as appropriate (E).

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

86. ***3109F.5.1 Valves and fittings.*** *Valves and fittings shall meet the following requirements:*

1. *Conform to ASME B31.3 [9.2], ASME B 31.4 [9.3], API Standard 609 [9.~~8~~9], and ASME B16.34 [9.~~9~~10], as appropriate, based on their service (N).*
2. *Conform to Section 8 of [9.1] (N/E).*
3. *Stems shall be oriented in a way not to pose a hazard in operation or maintenance (N/E).*
4. *Non-ductile iron, cast iron, and low-melting temperature metals shall not be used in any hydrocarbon service, fire water, or foam service (N/E).*
5. *Double-block and bleed valves shall be used for manifold valves. (N/E).*
6. *Isolation valves shall be fire-safe, in accordance with API Standard 607 [9.~~10~~11] (N).*
7. *Swing check valves shall not be installed in vertical down-flow piping (N/E).*
8. *Pressure relief devices shall be used in any closed piping system that has the possibility of being over pressurized due to temperature increase (thermal relief valves) or surging (N/E).*
9. *Pressure relief devices shall be sized in accordance with API RP 520 [9.~~11~~12] (N). Set pressures and accumulating pressures shall be in accordance with [9.~~11~~12] (N/E).*
10. *Discharge from pressure relief valves shall be directed into lower pressure piping for recycling or proper disposal. Discharge shall never be directed into the open environment, unless secondary containment is provided (N/E).*
11. *Threaded, socket-welded, flanged and welded fittings shall conform to Section 8 of [9.1] (N/E).*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

87. ***3109F.6 Utility and auxiliary piping systems.*** *Utility and auxiliary piping includes service for:*

…

Vapor return lines and VOC vapor inerting and enriching (natural gas) piping shall conform to 33 CFR 154.808 [9.~~12~~13], and API RP 1124 [9.~~13~~14] (N/E).

Firewater and foam piping and fittings shall meet the following requirements:

1. *Conform to ASME B 16.5 [9.~~14~~15]*
2. *Fire mains shall be carbon steel pipe (N/E)*
3. *High density polyethylene (HDPE) piping may be used for buried pipelines (N/E)*
4. *Piping shall be color-Coded (N/E)*

Compressed air, venting and nitrogen piping and fittings shall conform to ASME B31.3 [9.2] (N). Utility and auxiliary piping shall have external visual inspections, similar to that defined in Section 10.1 of API 574 [9.16] (N/E).

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

88. ***3109F.7 References.***

[9.1] American Petroleum Institute (API), ~~1994~~ 2005, API Standard 2610, "Design, Construction, Operation, Maintenance, and Inspection of Terminal and Tank Facilities," ~~ANSI/API STD 2610-1994, 1st~~ 2nd ed., Washington, D.C.

[9.2] American Society of Mechanical Engineers (ASME), ~~1998~~ 2010, ASME B31.3, "Process Piping," New York.

[9.3] American Society of Mechanical Engineers (ASME), ~~1998~~ 2009, ASME B31.4, "Pipeline Transportation Systems For Liquid Hydrocarbons And Other Liquids," New York.

[9.4] 2 CCR ~~2550 - 2556,~~ 2560 - 2571 (Title 2, California Code of Regulations (CCR), Sections ~~2550-2556,~~ 2560-2571).

[9.5] American Society of Mechanical Engineers (ASME), 2008, B31.E, "Standard for the Seismic Design and Retrofit of Above-Ground Piping Systems," New York.

[9.~~5~~6] American Society of Civil Engineers, ~~1997~~ 2011, "Guidelines for Seismic Evaluation and Design of Petrochemical Facilities," 2nd ed., New York.

[9.~~6~~7] CalARP Program Seismic Guidance Committee, ~~January 2004~~ September 2009, "Guidance for California Accidental Release Prevention (CalARP) Program Seismic Assessments", Sacramento, CA.

[9.~~7~~8] Federal Emergency Management Agency, Nov. 2000, FEMA 356, "Prestandard and Commentary for the Seismic Rehabilitation of Buildings", Washington, D.C.

[9.~~8~~9] American Petroleum Institute (API), 1997, API Standard 609, "Butterfly Valves: Double Flanged, Lug- and Wafer-Type," 5th ed., Washington, D.C.

[9.~~9~~10] American Society of Mechanical Engineers (ASME), 1996, ASME B16.34, "Valves Flanged Threaded And Welding End," New York.

[9.~~10~~11] American Petroleum Institute (API), 1996, API Standard 607, "Fire Test for Soft-Seated Quarter-Turn Valves," 4th ed., 1993 (reaffirmed 4/1996), Washington, D.C.

[9.~~11~~12] American Petroleum Institute (API), 2000, API RP 520, "Sizing, Selection, and Installation of Pressure-relieving Devices in Refineries, Part I – Sizing and Selection, 7th ed., and Part II – Installation, 2003, 5th ed., Washington, D.C.

[9.~~12~~13] 33 CFR 1-54.808 – Vapor Control Systems, General (Title 33, Code of Federal Regulations (CFR), Section 1-54.808).

[9.~~13~~14] American Petroleum Institute (API), 1991, Recommended Practice 1124 (API RP 1124), "Ship, Barge, and Terminal Hydrocarbon Vapor Collection Manifolds," 1st ed., Washington, D.C.

[9.~~14~~15] American Society of Mechanical Engineers (ASME), 1996, ASME B16.5," Pipe Flanges and Flanged Fittings," New York.

[9.16] American Petroleum Institute (API), 2009, API RP 574, "Inspection Practices for Piping System Components," 3rd ed., Washington, D.C.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

89. ***3110F.9 Equipment & systems maintenance (N/E).*** *Mechanical and electrical equipment critical to oil spill prevention, such as, but not limited to: mooring line quick release and loading arm quick disconnect systems, shall be maintained and tested as per the manufacturer's recommendations (N/E). The latest records shall be readily accessible to the Division (N/E).*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

90. ***3110F.10 Pumps (N/E).*** *Specification information for all MOT pumps providing oil and fire water service to wharf pipeline systems shall be retained. Information shall include, but not be limited to pump make and model, motor make and model, flow rate, pressure rating, and pump performance curves.*

Hydrocarbon pumps that serve the oil transfer operations at the berthing system must be maintained per API 2610 [10.25]. Firewater pumps providing the wharf fire protection shall be maintained per NFPA 25 [10.30], as adopted and amended by the State Fire Marshal, or local enforcing agency requirements.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

91. ***3110F.11 Critical systems seismic assessment (N/E).*** *Critical mechanical and electrical equipment related to personnel safety, oil spill prevention or response, shall have a seismic assessment per Section 3104F.5.3. For equipment anchorages and supports, see Section 3110F.8.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

92. ***3110F.~~9~~12 References.***

…

[10.25] *American Petroleum Institute (API), ~~1994~~2005, API Standard 2610, "Design, Construction, Operation, Maintenance, and Inspection of Terminal and Tank Facilities," ~~ANSI/API STD 2610-1994, 1~~st 2nd ed., Washington, D.C.*
...

[10.27] CalARP Program Seismic Guidance Committee, ~~January 2004~~ September 2009, "Guidance for California Accidental Release Prevention (CalARP) Program Seismic Assessments", Sacramento, CA.
...

[10.30] National Fire Protection Association, 2011, NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, Quincy, MA.
…

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

93. ***3111F.5.1 Emergency power systems.*** *Emergency power systems shall be installed (N) and maintained (N/E) per NFPA-110 [11.6]. This does not include stored energy systems. Stored energy emergency power systems (SEEPS) shall be installed (N) when necessary to maintain continuous uninterruptable power to critical systems. SEEPS shall be installed (N) and maintained (N/E) per NFPA-111 [11.7].*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

94. ***3111F.8 Illumination (N/E).*** *Lighting shall conform to 2 CCR 2365 [11.~~6~~8] and 33 CFR 154.570 (d) [11.~~7~~9].*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

95. ***3111F.9 Communications, ~~and~~ control, and monitoring systems.***

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

96. ***3111F.9.1 Communication systems (N/E).*** *Communications systems shall comply with 2 CCR 2370 [11.~~8~~10], and conform to Section 6 of [11.~~9~~11].*

Authority: Section 8755 and 8757, Public Resources Code

Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

97. ***3111F.9.2 Overfill monitoring and controls (N/E).*** *Overfill protection systems shall conform to Appendix C of API RP 2350 [11.~~10~~12]. These systems shall be tested before each transfer operation or monthly, whichever is less frequent. Where vessel or barge overfill sensors and alarms are provided, they shall comply with 33 CFR 154.812 [11.~~11~~13].*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

98. ***3111F.9.3 Monitoring systems (N/E).*** *All monitoring systems and instrumentation such as, but not limited to: velocity monitoring systems, tension monitoring systems, anemometers, and current meters, shall be installed, maintained and calibrated per the manufacturer's recommendations. Specifications shall be retained. The latest records shall be readily accessible to the Division.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

99. ***3111F.10.1 Corrosion assessment (N/E).*** *An assessment shall be performed to determine the existing and potential corrosion. This assessment ~~should~~ shall include all steel or metallic components, including the structure, pipelines, supports or other ancillary equipment, with drawings and specifications for corrosion prevention/protection. The assessment shall be performed by a licensed professional engineer, using the methods and criteria prescribed in [11.~~12~~14].*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

100. ***3111F.10.2 Inspection, testing and records (N/E).*** *For sacrificial anode systems, periodic underwater inspections shall be performed and observations recorded. For impressed current systems, monthly rectifier readings and annual potential readings of the protected components shall be taken. If potential readings for steel structures are outside of acceptable limits (between –0.85 [11.~~13~~15] and –1.10 Volts), corrective actions shall be taken. Voltage drops other than across the structure-to-electrolyte boundary must be considered for valid interpretations of potential measurement. Consideration is understood to mean the application of sound engineering practice in determining the significance of voltage drops by methods such as:*

…
…

The cathodic protection inspection for buried or submerged pipelines shall conform to API 570 [11.~~14~~16].
Insulating and isolating arrangements for protection against static, stray and impressed currents shall be tested in accordance with 2 CCR 2341(d) and 2380 [11.~~15~~17].

Authority: Section 8755 and 8757, Public Resources Code

Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

101. ***3111F.11 Critical systems seismic assessment (N/E).*** *Electrical power systems shall have a seismic assessment per Section 3104F.5.3. For equipment anchorages and supports, see Section 3110F.8.*

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code

102. ***3111F.11~~1~~2 References.***

…

[11.6] National Fire Protection Association, 2010, NFPA 110, "Standard for Emergency and Standby Power Systems," Quincy, MA.

[11.7] National Fire Protection association, 2011, NFPA 111, "Standard on Stored Electrical Energy Emergency and Standby Power Systems," Quincy, MA.

[11.6~~8~~] 2 CCR 2365, Title 2 California Code of Regulations, Section 2365.

[11.7~~9~~] 33 CFR 154.570(d), Title 33 Code of Federal Regulations Section 154.570(d).

[11.8~~10~~] 2 CCR 2370, Title 2 California Code of Regulations, Section 2370.

[11.9~~11~~] Oil Companies International Marine Forum (OCIMF), 1987, "Guide on Marine Terminal Fire Protection and Emergency Evacuation," 1st ed., Witherby, London.

[11.~~10~~12] American Petroleum Institute, 1996, API Recommended Practice 2350 (API RP 2350), "Overfill Protection for Storage Tanks," 2nd ed., Washington, D.C.

[11.~~11~~13] 33 CFR 1–54.812, Title 33, Code of Federal Regulations, Section 1–54.812 - Facility Requirements for Vessel Liquid Overfill Protection.

[11.~~12~~14] National Association of Corrosion Engineers (NACE), Standard Recommended Practice, 1994, RP01–76-1–994 "Corrosion Control of Steel Fixed Offshore Platforms Associated with Petroleum Production," Houston, TX.

[11.~~13~~15] Department of Defense, 31 January 1990, Military Handbook, "Electrical Engineering Cathodic Protection,"MIL-HDBK-1004/10, Washington, D.C.

[11.~~14~~16] American Petroleum Institute, 2002, API 570, "Piping Inspection Code", 2nd ed., October 1998 (February 2000 Addendum 1), Washington, D.C.

[11.~~15~~17] 2 CCR 2341(d) and 2380, Title 2, California Code of Regulations, Sections 2341(d) and 2380.

Authority: Section 8755 and 8757, Public Resources Code
Reference(s): Section 8750, 8751, 8755 and 8757, Public Resources Code