MFD Proposals for the 2016 MOTEMS

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PROPOSALS FOR DISCUSSION

- Sections for Discussion:
  - 3101F – Nafday & Oliver
  - 3102F – Oliver
  - 3109F, 3110F & 3111F – Edwards
  - 3112F (New) – Nafday
  - 3103F, 3104F & 3107F (Seismic only) – Goel
- Sections <u>not</u> Open for Discussion:
  - 3103F & 3105F (Berthing & Mooring)
  - 3106F (Geotechnical)
  - 3108F (Fire Protection)

GROUND RULES

- Presentations of Proposed Language (60 minutes)
  - Audience given time to read lengthy sections
  - Please hold all questions until Open Discussion
- Open Discussion (60 minutes)
  - Immediately after Presentations
  - Use handheld microphones when asking questions
  - Vocal recording (for transcribing purpose only)

OPEN DISCUSSION

- 3101F & 3102F – 15 minutes
- 3103F, 3104F & 3107F (Seismic only) – 20 minutes
- 3109F, 3110F & 3111F – 10 minutes
- 3112F (New LNG Section) – 15 minutes

DISCLAIMERS

- Proposed language presented herein is:
  - In draft form
  - Selective topics only
  - Based on industry comments and MFD experience
  - Being presented to receive industry feedback
- Proposed language <u>does not</u>:
  - Represent the presenters' personal opinion (Please don't shoot the messenger!)

HIGHLIGHTS OF PROPOSED CHANGES TO 3101F

3101F.1 GENERAL: Scope of MOTEMS

- Definition of "Oil": The Lempert-Keene-Seastrand act defines "oil" as any kind of petroleum, liquid hydrocarbons, or petroleum products or any fraction or residues thereof, including, but not limited to, crude oil, bunker fuel, gasoline, diesel fuel, aviation fuel, oil sludge, oil refuse, oil mixed with waste, and liquid distillates from unprocessed natural gas.
- Change to 3101F.1 General: *The provisions of this chapter regulate onshore and offshore ~~marine oil terminals~~ MOTs as defined under this act, including transfer of LNG at marine terminals.*

3101F.5 OIL SPILL PREVENTION - 1

- *Each MOT shall conduct a Risk and Hazards Analysis per 14 CCR 817.02(c)(1)(B) to identify the hazards associated with the operation of the MOT, including operator error, the use of the MOT by various types of vessels, equipment failure, and external events likely to cause an oil spill.*
- *This analysis shall be updated if there are changes made to MOT, or any new hazard is subsequently identified, with significant impact on the Risk and Hazards Analysis.*

3101F.5 OIL SPILL PREVENTION -2

- *Assessed magnitude of potential oil spill releases and consequences shall be considered in developing appropriate design, operational and administrative oil spill prevention measures.*
- Risk & Hazard Analysis from OSPR's Oil Spill Contingency Plans may be used.
- Additional Requirements:
  - Assessing consequences of potential oil spills
  - Develop Design, Operational or Administrative oil spill prevention measures

3101F.6 OIL SPILL EXPOSURE CLASSIFICATION

- MOT Classification: MOTs are categorized into High, Medium or Low Oil Spill Exposure Classification based in part on the potential 'exposed total volume of oil (V_T) during transfer'.
- V_T is equal to the sum of the stored and flowing volumes (V_s + V_F) <u>at the MOT</u>, prior to the emergency shutdown (ESD) system stopping the flow of oil.
- Closure Time = (ESD valve closure time) + <u>(time required to activate ESD valve)</u>
- Oil not from pipelines alone, closure time changed
- Classification moved from Division 4 to Division 1

3101F.6.1 QUALITY ASSURANCE: 2013 Peer Review Language

3101F.6.1 Quality assurance. *…*

…

~~*Peer review is required for nonlinear dynamic structural analyses and alternative lateral force procedures not prescribed herein. The peer review may be from an independent internal or external source. The peer reviewer shall be a California registered civil or structural engineer.*~~

3101F.X.X PEER REVIEW: Reasons for Change

- Define MFD's expectations for project-specific peer reviews
- Establish ground rules for owner/operator, engineer(s)-of-record, peer reviewer(s) and MFD interactions
- Provide guidelines to assure a thorough and orderly review process
- Specify uniform structure for the peer review reports
- Align MOTEMS with other CBC and engineering peer review standards and guidelines

3101F.8.2 PEER REVIEW: Proposed 2016 MOTEMS Language - 1

3101F.8.2 Peer review.

The Division may require peer review of engineering analyses and designs (e.g. nonlinear dynamic structural analyses, alternative lateral force procedures, geotechnical evaluations, subsea pipeline analyses and design, fatigue analyses, etc.). Peer review shall be performed by an external independent source to maintain the integrity of the process.

The peer reviewer(s) shall have no other involvement in the project, except in a review capacity. The peer reviewer(s) shall be California registered engineer(s) familiar with regulations governing the work and have technical expertise in the subject matter to a degree of at least that needed for the original work. The peer reviewer(s)' credentials shall be presented to the Division for approval prior to commencement of the review.

3101F.8.2 PEER REVIEW: Proposed 2016 MOTEMS Language - 2

3101F.8.2 Peer review. **(Continued)**

Upon completion of the review process, the peer reviewer(s) shall submit a written report directly to the Division that covers all aspects of the review process, including, but not limited to:

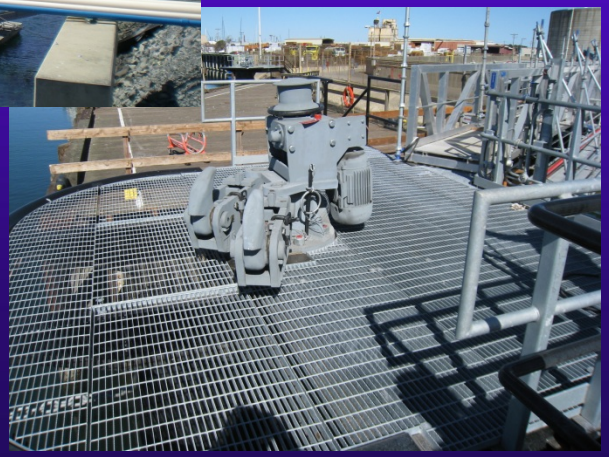
1. *Scope, extent and limitations of the review.*
2. *Status of the documents reviewed at each stage (i.e. revision number and date).*
3. *Findings.*
4. *Recommended corrective actions and resolutions, if necessary.*
5. *Conclusions.*
6. *Certification by the peer reviewer(s) (i.e. as to whether or not the final work meets the requirements of this code).*
7. *Formal documentation of peer review correspondence, such as requests for information, written responses, telephone and meeting logs, etc.*

3101F.8.2 PEER REVIEW: Proposed 2016 MOTEMS Language - 3

3101F.8.2 Peer review. **(Continued)**

Throughout the peer review process, the peer reviewer(s) and engineer(s)-of-record shall correspond directly, and report findings to the owner and operator. The owner and operator shall cooperate in the peer review process. If the original work required modification after completion of the peer review, the final analyses and designs shall be submitted to the Division.

HIGHLIGHTS OF PROPOSED CHANGES TO 3102F



3102F.3.3.2 SUBSEQUENT AUDITS: 2013 MOTEMS Audit & Inspection Timing

3102F.3.3.2 Subsequent audits. *A subsequent audit report of each terminal shall be completed at a maximum interval of 4 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 is dependent upon the condition of the facility, the construction material type and/or the environment at the mudline, as shown in Table 31F-2-1. ...

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

INSPECTION CONDITION ASSESSMENT RATING (ICAR)[6]	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 Inspections shall be 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-2-6.
6. ICARs shall be assigned in accordance with Table 31F-2-4.

AUDIT & INSPECTION TIMING: Reasons for Change (Cycle Alignment)

QUESTION:

Should any or all of the following cycles align?

1. Above Water & Underwater Structural Inspections
   (i.e. eliminating the +3 ft MLLW delineation)

2. All Above Water Inspections
   (i.e. structural, electrical & mechanical)

3. Audits & Inspections

   In this case…

AUDIT & INSPECTION TIMING: Reasons for Change (Interval)

For one aligned Audit and Inspections cycle, should the interval between cycles be based on:

1. Underwater Inspection Condition Assessment Ratings (i.e. Table 31F-2-1)
2. Fixed 4-year Interval (i.e. existing Audit interval)
3. Other ?

TABLE 31F-2-1
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6. ICARs shall be assigned in accordance with Table 31F-2-4.

AUDIT & INSPECTION TIMING: Example 2016 MOTEMS Language

FOR EXAMPLE – If all Audit and Inspections aligned, based on the Underwater Inspection Condition Assessment Ratings, then the 2016 MOTEMS would state:

3102F.3.3.2 Subsequent audits. *A subsequent audit report of each terminal, including above water and underwater inspections, shall be completed at a maximum interval ~~of 4 years, and includes documentation of inspections.~~ as defined in per Table 31F-2-1, which depends upon the condition of the facility, the construction material type and/or the environment at the mudline. ~~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 is dependent upon the condition of the facility, the construction material type and/or the environment at the mudline, as shown in Table 31F-2-1.~~

…

2013 MOTEMS Table 31F-2-1

TABLE 31F-2-1
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6. ICARs shall be assigned in accordance with Table 31F-2-4.

HIGHLIGHTS OF PROPOSED CHANGES TO 3109F - 3111F

3109F.2 OIL PIPING AND PIPELINE SYSTEMS

3109F.2 Oil piping and pipeline systems. *…*

…

- *13. If a pipeline is "out-of-service" for 3 or more years, it will require a valid and certified API 570 inspection [9.4] and Static Liquid Pressure Test (SLPT) [9.4] ~~Division approval~~ prior to Division approval for re-use (E).*
- *14. Piping and pipeline systems require a valid and certified Static Liquid Pressure Test (SLPT) [9.4] prior to Division approval for use (N).*

Note: [9.4] 2CCR2560-2571 (Title 2 California Code of Regulations)

3109F.7 FIRE PIPING AND PIPELINE SYSTEMS

3109F.7 Fire piping and pipeline systems. *Firewater and foam piping and fittings shall meet the following requirements:*

- *1. Conform to NFPA-11 [9.15], NFPA-24 [9.16], and ASME B16.5 [9.17] (N)*
- *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 and appurtenances shall be color-coded per local jurisdiction requirements or per ASME A13.1 [9.18] (N/E)*
- *5. Pipeline stress analysis shall be performed for new firewater pipelines (N).*
- *6. Shall have external visual inspections, similar to that defined in Section 10.1 of API 574 [9.16] (N/E).*

Note:
[9.15] NFPA-11, Standard for Low-, Medium-, and High-Expansion Foam
[9.16] NFPA-24, Standard for Installation of Private Fire Service Mains ….
[9.17] ASME B16.5 , Pipe Flanges and Flange Fittings
[9.18] ASME A13.1, Scheme for Identification of Pipeline Systems

3110F.2 MARINE LOADING ARMS

3110F.2.1 General criteria. *Marine loading arms and ancillary systems …….*

- *Each loading arm shall have its maximum allowable lateral movement envelope limits conspicuously marked on the terminal at the position of the loading arm. The maximum allowable extension limits of the loading arm shall also be indicated visibly.*

- *Loading arms shall be qualified using seismic performance criteria defined in accordance with Section 3104F.X (N).*

3110F.5 SHORE-TO-VESSEL ACCESS

3110F.5 Shore-to-vessel access for personnel. *….*

….

- *8. Under no circumstances shall the operating inclination of the walkway exceed ~~60~~ 30 degrees from the horizontal or the maximum angle recommended by the manufacturer, whichever is less (N/E).*

3111F.10 CORROSION PROTECTION: Proposed Changes

2013 Corrosion Protection Section to be reorganized & renamed.

- Inspection and Assessment Requirements to 3102F
- Cathodic Protection System requirements remain in 3111F , see next slide for code language

3111F.10 CATHODIC PROTECTION SYSTEMS

3111F.10 Cathodic ~~Corrosion p~~Protection Systems (CPS) (N/E).

- *CPS operating and maintenance criteria for underwater structures shall conform to UFC 3-570-02N [11.15]. CPS operating and maintenance criteria for buried or submerged pipelines shall conform to API 570 [11.16].*

……..

- *CPS design criteria and location of anodes, electrical leads and rectifiers shall be documented and retained. Periodic CPS measurements, test data and inspection findings shall be retained.*

Note: [11.15] UFC-570-02N, Electrical Engineering Cathodic Protection

HIGHLIGHTS OF PROPOSED LNG SECTION 3112F

3112F.1 LNG TRANSFER AT MARINE TERMINALS - 1

- *…defines minimum engineering, inspection and maintenance criteria for the structural, mechanical and electrical components and systems associated with LNG transfer at onshore marine terminals.*
- *LNG specific provisions from existing codes, industry standards, recommended practices, regulations and guideline are incorporated in this Section, either directly or through reference*
- *Additionally, provisions from Section 3102F through 3111F may be applied, as appropriate.*

3112F.1 LNG TRANSFER AT MARINE TERMINALS - 2

- *LNG transfer at offshore marine terminals is subject to a case-by-case review and approval by the Division.*
- *Section 3112F does not apply to systems on-board vessels (FSRU, LNG tank vessels, tugs, etc.), onshore LNG tanks or processing facilities.*
- Draft LNGTEMS used in developing Section 3112F

3112F.3 HAZARD & RISK ANALYSES -1

- *Detailed hazards identification exercise shall be carried out to isolate potential internal and external events (natural, accidental or intentional) that may cause a spill and/or impact to public health, safety and the environment.*
- *Hazards analysis shall consider every component, part of a structure, equipment item, or system whose failure could cause a major accident, result in unacceptable incident escalation beyond the design basis, or adversely affect the potential of the passive and active systems to control or shutdown the facility.*

3112F.3 HAZARD & RISK ANALYSES -2

- *Consequence models shall develop radiant heat zones from jet and pool fires for the following thermal endpoints: 27.5 kW/m^2, 25 kW/m^2, 12.5 kW/m^2, 5 kW/m^2 and 1.6 kW/m^2.*
- *A Cryogenic Exposure Analysis (CEA) shall be conducted to identify equipment and structures susceptible to cryogenic spray and pool exposure.*
- *Safety Critical Components/Systems shall be identified and a Facility Essential Systems Survivability Assessment (ESSA) shall be conducted.*

3112F.4 STRUCTURAL AND SEISMIC DESIGN

- *The Federal Energy Regulatory Commission (FERC) has the primary approval authority for siting, design and construction of LNG facilities in the United States under the regulations codified in 18 CFR 153.*
- *For marine terminals transferring LNG in California, seismic demand and performance levels shall be in accordance with the FERC requirements.*
- *Structural and seismic designs shall satisfy Sections 3103F, 3104F and 3107F of this code, as appropriate.*

3112F.5 BERTHING & MOORING

- *Generally, LNG vessels shall satisfy the minimum design requirements for berthing and mooring in Sections 3103F, 3105F and 3107F of this code*
- *Wind force and moment coefficients for LNG vessels shall be in accordance with SIGTTO.*
- *The limiting criteria at which the LNG carrier may safely remain berthed at terminal shall be determined using dynamic mooring analysis.*
- *Real time monitoring and recording of environmental conditions is required.*