

APPENDIX F. OFFSHORE FACILITIES- SPECIFICATIONS

F.1 Class and Rules

The offshore facilities of the marine terminal, consisting of the subsea pipeline, Floating Storage and Offloading (FSO) vessel and its single point mooring (SPM) system as well as the multi-purpose marine support vessel, will be subjected to the classification requirements of a reputable Classification Society. Classification provides an independent means to provide confirmation of fitness for service, due diligence, and proper maintenance.

The Classification Society to be selected will be one of the following: American Bureau of Shipping (ABS), Bureau Veritas (BV), Det Norske Veritas (DnV) or Lloyds Register of Shipping (LR). Each society maintains its own set of Rules that specifically apply to the building and classing of FSO's, moorings and offshore pipelines. All four societies are members of IACS (International Association of Classification Societies) which ensures a minimum standard in class requirements. Requirements that vary between the Rules of each Society generally reflect national requirements.

For the Chad Export Project, it is planned that the Classification Society selection will be finalized during the bidding period of the offshore facilities contract. The scope of Classification Society involvement will include, but is not necessarily limited to:

- Design appraisal and approval for detailed design
- Survey of materials and equipment at source
- Survey and inspection during fabrication and construction
- Survey of transportation, installation and commissioning
- Preparation of the necessary survey reports and certificates indicating compliance with the applicable rules of the Classification Society

In addition to the Classification Society requirements, the offshore facilities will satisfy the applicable conventions and codes of the International Maritime Organization (IMO). The IMO is the United Nations agency responsible for framing international rules covering maritime safety and environmental pollution of the oceans. The Republic of Cameroon is a member of IMO and a signatory to several IMO conventions, including the first two conventions listed in the next paragraph. The project will comply with applicable conventions regardless of the signatory status.

Requirements for safety and pollution prevention are specified primarily through three international conventions. They are listed below and summarized in subsequent paragraphs.

- The International Convention on Load Lines (ICLL)
- The International Convention for the Safety of Life at Sea (SOLAS)
- The International Convention for the Prevention of Pollution from Ships (MARPOL).

The ICLL establishes the deepest draft to which a vessel can be safely loaded. The objective of the "loadline" limit is to assure that the vessel is not so overloaded as to run undue risk of sinking, or to create unsafe working conditions.

SOLAS is the principal body of rules, framed by IMO, to govern vessel safety. SOLAS specifies the minimum requirements relating to: (1) vessel construction and strength; (2) subdivision and stability; (3) safety equipment; (4) fire protection; and (5) communications and navigation equipment. Included under SOLAS is the IMO's International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code). The ISM Code is a recent addition under Chapter IX of SOLAS that has been in force since January 1999. A fundamental requirement of the Code is that the operator shall put in place a Safety Management System (SMS) that includes:

- Safety and environmental protection policy
- Instructions and procedures to ensure operational safety and environmental protection
- Levels of authority and lines of communication between and amongst shore and ship personnel
- Procedures for reporting accidents and non-conformities
- Procedures to prepare for and respond to emergency situations
- Procedures for internal audits and management reviews

Both ICLL and SOLAS have the indirect effect of preventing oil spills and consequent marine pollution. The MARPOL convention seeks to prevent pollution directly, both from normal operational discharges and accidents. MARPOL specifies design, equipment and procedural requirements to prevent pollution of the sea from oil, chemicals, harmful substances, garbage, sewage and air emissions. Each of these six sources of pollution is addressed in regulations set out in an annex to MARPOL.

The following certificates, typically issued by the Classification Society on behalf of the governing authority, must be maintained and renewed at specified intervals to assure compliance with the above regulations:

- International Load Line Certificate
- Safety Construction Certificate
- Safety Equipment Certificate
- International Oil Pollution Prevention Certificate
- International Air Pollution Prevention Certificate

F.1.1 Multi-Purpose Marine Support Vessel

As described in the EA Supporting Documentation (Ref. *Alternatives Analysis*, Section 5.4), the COTCO Offshore Facilities will have a dedicated multi-purpose marine support vessel (MSV) in attendance at all times. Among its duties, the MSV will provide mooring and berthing assistance, area surveillance and monitoring of third party vessels, and emergency response capabilities including rapid response in case of an oil spill.

The MSV will be outfitted to properly maneuver and handle a floating disabled tanker, loose barges and other floating objects that could potentially create a hazard for the COTCO Offshore Facilities. In developing the specifications for the MSV, the following criteria will be applied to establish its emergency towing capability:

- Sufficient bollard pull to control the direction of a drifting and fully laden offtake tanker
- Remotely operated towing pins and sharks-jaw

- Sufficient power and maneuverability to keep station close to a ship in bad weather
- Well located winches (and tugger winches) of sufficient power to allow rapid recovery of the tow assembly pick-up wires and ease of connection to the towing point (Note: the offtake tanker will be required to be outfitted with emergency stern towing apparatus in accordance with IMO regulations as a condition of acceptance by the terminal)

In addition, the MSV will be outfitted with emergency response equipment to perform the following functions:

- Firefighting assistance to the FSO
- Personnel evacuation in the event of an emergency aboard the FSO
- Rapid response to an oil spill, including capability to deploy oil spill containment booms, application of dispersants and operation of skimmers

In view of the planned operations, as well as operating experience at other similar installations, it is anticipated that the dedicated mooring/stand-by vessel will be approximately 165 feet long and equipped with a 4,000 to 5,000 HP propulsion system designed to deliver maximum thrust at low vessel speeds.

The MSV will meet the same requirements as the FSO, namely:

- (1) Classified by a Classification Society that is a member of the International Association of Classification Societies (IACS), and
- (2) Certificated per IMO regulations. Key regulations in this regard include:
 - International Convention for the Prevention of Pollution from Ships (MARPOL)
 - International Convention for the Safety of Life at Sea (SOLAS)
 - International Convention on Standard of Training, Certification and Watchkeeping (STCW)
 - International Safety Management Code (ISM)
- (3) Follow industry guidelines, including those produced by the Oil Companies International Marine Forum (OCIMF) that include:
 - International Safety Guide for Oil Tankers and Terminals (ISGOTT)
 - Offshore Loading Safety Guidelines (OLSG)

F.2 Codes and Standards

The following is a summary list of applicable codes and standards to be included in the offshore facilities design specifications. This list was included in COTCO's application to Cameroon for an Authorization for Transportation by Pipeline (ATP). The list is provided "for reference only" as the final list will depend upon the Classification Society selected (Listed in alphabetical order by Organization).

F.2.1 American Bureau of Shipping (ABS)

- ABS Publication 8 - Rules for Building and Classing Single Point Moorings
- ABS Publication 15 - Guide for Burning Crude Oil and Slops in Main and Auxiliary Boilers
- ABS Publication 19 - Guide for Underwater Inspection in Lieu of Drydocking Survey
- ABS Publication 24 - Guidance Manual for Material Selection and Inspection of Inert Gas Systems
- ABS Publication 29 - Rules for Building and Classing Offshore Installations
- ABS Publication 35 - Guide for Survey Based on Preventative Maintenance Techniques
- ABS Publication 39 - Guide for the Certification of Offshore Mooring Chain
- ABS Publication 64 - Guide for Building and Classing Undersea Pipeline Systems and Risers
- ABS Publication 82 - Guide for Building and Classing Floating Production, Storage and Offloading Systems

F.2.2 American Concrete Institute (ACI)

- ACI 318 - Building Code Requirements for Reinforced Concrete

F.2.3 American Petroleum Institute (API)

- API Recommended Practice, RP2A-WSD - Planning, Designing, and Constructing Fixed Offshore Platforms - Working Stress Design
- API Recommended Practice, RP2L - Planning, Designing, and Constructing Heliports for Fixed Offshore Platforms
- API Recommended Practice, RP2FP1 - Design, Analysis, and Maintenance of Moorings for Floating Production Systems
- API Recommended Practice, RP5LW - Transportation of Line Pipe on Barges and Marine Vessels
- API Recommended Practice, RP 520 Parts 1 & 2 - Sizing, Selection and Installation of Pressure-Relieving Devices
- API Recommended Practice, RP 1110 - Pressure Testing of Liquid Petroleum Pipelines
- API Recommended Practice, RP 1111 - Design, Construction, Operation and Maintenance of Offshore Hydrocarbon Pipelines
- API Specification 5L - Specification for Line Pipe
- API Specification 6D - Specification for Pipeline Valves
- API Standard 610 - Centrifugal Pumps for General Refinery Service
- API Standard 1104 - Welding of Pipelines and Related Facilities

F.2.4 American Society of Civil Engineers (ASCE)

- ASCE 7-95 - Minimum Design Loads for Buildings and Other Structures

F.2.5 American Society of Mechanical Engineers (ASME)

- ASME B 31.4 - Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols
- ASME B 16.5 - Pipe Flanges and Flanged Fittings
- ASME B 16.34 - Valves - Flanged, Threaded and Welding End
- Boiler and Pressure Vessel Code, Section IX, - Welding and Brazing Qualifications

F.2.6 American Welding Society (AWS)

- Structural Welding Code – Steel

F.2.7 National Association of Corrosion Engineers (NACE)

- Recommended Practice - RP0169 - Cathodic Protection Criteria
- Recommended Practice - RP0675 - Control of External Corrosion on Offshore Steel Pipelines