

Package Number	17																												
Package Name	MOORING LINE MONITORING SYSTEM (MLMS)																												
Scope of Work (* To be confirmed)	<p>This scope defines the minimum technical requirements for the supply of a mooring monitoring system based on Acoustic Inclometers for the Barossa FPSO project.</p> <p>A MLMS is designed for monitoring the angle of the mooring lines.</p> <p>The MLMS main objective is to detect failure of the mooring lines attached to the buoy connected to the FPSO.</p> <div data-bbox="472 620 975 902" data-label="Image"> </div> <p data-bbox="472 904 1015 936">Figure 1-1: FPSO turret and mooring system</p> <p data-bbox="376 1005 954 1037">1 RULES REGULATIONS AND STANDARDS</p> <p data-bbox="472 1059 1452 1124">The Mooring Line Monitoring System shall be designed, manufactured and tested in accordance with the following Rules and Requirements:</p> <p data-bbox="472 1167 724 1198">Table 1-1: Standards</p> <table border="1" data-bbox="472 1198 1452 1962"> <thead> <tr> <th data-bbox="472 1198 764 1240">Standard</th> <th data-bbox="764 1198 1452 1240">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="472 1240 764 1323">Class requirements</td> <td data-bbox="764 1240 1452 1323">Rules for Building and Classing Facilities on Offshore Installations</td> </tr> <tr> <td data-bbox="472 1323 764 1406">Regulatory requirements</td> <td data-bbox="764 1323 1452 1406">The principal regulatory authorities for any oil and gas operations in Australia</td> </tr> <tr> <td data-bbox="472 1406 764 1449">ATEX</td> <td data-bbox="764 1406 1452 1449">Directive 94/9/EC</td> </tr> <tr> <td data-bbox="472 1449 764 1532">BS EN 50018</td> <td data-bbox="764 1449 1452 1532">Electrical Apparatus for Potentially Explosive Atmosphere-Flame proof enclosure “d”</td> </tr> <tr> <td data-bbox="472 1532 764 1574">IEC 61000</td> <td data-bbox="764 1532 1452 1574">Electromagnetic compatibility</td> </tr> <tr> <td data-bbox="472 1574 764 1617">IEC 60092</td> <td data-bbox="764 1574 1452 1617">Electrical installation in ships</td> </tr> <tr> <td data-bbox="472 1617 764 1659">IEC 61892</td> <td data-bbox="764 1617 1452 1659">Mobile and fixed offshore units</td> </tr> <tr> <td data-bbox="472 1659 764 1702">IEC 60079</td> <td data-bbox="764 1659 1452 1702">Electrical apparatus for explosive gas atmospheres</td> </tr> <tr> <td data-bbox="472 1702 764 1744">IEC 60529</td> <td data-bbox="764 1702 1452 1744">IP Code</td> </tr> <tr> <td data-bbox="472 1744 764 1787">IEC 60255</td> <td data-bbox="764 1744 1452 1787">Electrical Relays</td> </tr> <tr> <td data-bbox="472 1787 764 1830">IEC 60269</td> <td data-bbox="764 1787 1452 1830">Low Voltage Fuses</td> </tr> <tr> <td data-bbox="472 1830 764 1872">IEC 60533</td> <td data-bbox="764 1830 1452 1872">Electrical and electronic installations in ships</td> </tr> <tr> <td data-bbox="472 1872 764 1962">IEC 60085</td> <td data-bbox="764 1872 1452 1962">Thermal Evaluation and Classification of Electrical Insulation</td> </tr> </tbody> </table>	Standard	Description	Class requirements	Rules for Building and Classing Facilities on Offshore Installations	Regulatory requirements	The principal regulatory authorities for any oil and gas operations in Australia	ATEX	Directive 94/9/EC	BS EN 50018	Electrical Apparatus for Potentially Explosive Atmosphere-Flame proof enclosure “d”	IEC 61000	Electromagnetic compatibility	IEC 60092	Electrical installation in ships	IEC 61892	Mobile and fixed offshore units	IEC 60079	Electrical apparatus for explosive gas atmospheres	IEC 60529	IP Code	IEC 60255	Electrical Relays	IEC 60269	Low Voltage Fuses	IEC 60533	Electrical and electronic installations in ships	IEC 60085	Thermal Evaluation and Classification of Electrical Insulation
Standard	Description																												
Class requirements	Rules for Building and Classing Facilities on Offshore Installations																												
Regulatory requirements	The principal regulatory authorities for any oil and gas operations in Australia																												
ATEX	Directive 94/9/EC																												
BS EN 50018	Electrical Apparatus for Potentially Explosive Atmosphere-Flame proof enclosure “d”																												
IEC 61000	Electromagnetic compatibility																												
IEC 60092	Electrical installation in ships																												
IEC 61892	Mobile and fixed offshore units																												
IEC 60079	Electrical apparatus for explosive gas atmospheres																												
IEC 60529	IP Code																												
IEC 60255	Electrical Relays																												
IEC 60269	Low Voltage Fuses																												
IEC 60533	Electrical and electronic installations in ships																												
IEC 60085	Thermal Evaluation and Classification of Electrical Insulation																												

	<p>2 CERTIFICATION</p> <p>2.1 General</p> <p>Field Instrument shall be certified ATEX Ex'i' and suitable for installation in a Zone 1, Group IIB, Class T3 Hazardous area.</p> <p>2.2 Equipment for use in Hazardous areas.</p> <p>The agreed scope of supply shall be delivered with the following certificates and statement of compliance where required:</p> <ol style="list-style-type: none"> 1. Design approval, review of drawings, specifications and calculations. 2. Traceability of materials and review of material certificates. 3. Certificate of Conformity stating that the equipment is in compliance with the requirements. 4. ATEX Certificate. <p>2.3 Certificate of Conformity</p> <p>The Supplier shall submit a certificate of conformity with the standards specified in the Purchase Order documents.</p> <p>2.4 EX Certification</p> <p>Electrical components shall be certified to Hazardous Area Zone 1.</p> <p>All Ex equipment shall be marked with Ex certificate and approved for Equipment Group IIB and temperature class T3.</p> <p>3 GENERAL REQUIREMENTS</p> <p>3.1 General</p> <p>The agreed scope of supply, assembly and materials shall have a design life of 25 years.</p> <p>All units in documents, drawings, instruments shall be SI units metric.</p> <p>Signal receivers will run through 2 pipes through the FPSO Mating Cone. There will be detailed discussion with regards to inclinometers fastening to the mooring line connecting link.</p> <p>The Acoustic Receivers are to be installed in a I-Tube with a length of approximately 20 meters. Inner diameter will be determined by the MLMS supplier recommendation to fit the acoustic receiver.</p>
--	---

The acoustic receiver shall be retrievable through the I-Tube for maintenance. It is the MLMS suppliers responsibility to make a design that allows the acoustic receiver and cable to be retrieved through top of the I-Tube for maintenance and inspection. The MLMS supplier shall also prepare a top flange design for the I-Tube with cable transit to a junction box for the acoustic receiver cable.

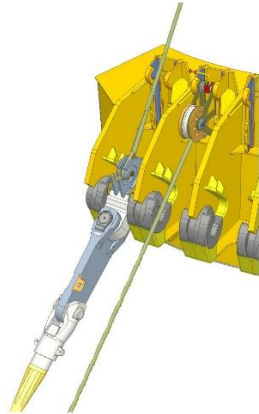


Figure 3-2: Connector Link

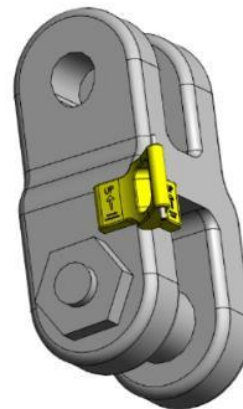


Figure 3-1 Example of Magnetic bracket

The Acoustic Transmitters (inclinometers) are to be installed on the connecting links for the mooring lines under the buoy. The MLMS supplier shall prepare a ROV operated magnetic bracket with a locking pin design for installing the acoustic transmitters on the connecting links.

3.2 Acoustic Receivers

The acoustic receivers shall send data to an Allen Bradley 1756 ControlLogix PLC in a APL delivered control system. Preferred communication protocol is RS485 Modbus RTU. The supplier shall prepare a Modbus configuration document that describe the interface and addressing of signals.

The acoustic receivers shall be delivered with a subsea cable with enough length to run through the I-tube and terminate into ta JB. Estimated length of I-tube is 20m (to be confirmed). Additional 10 meter of cable shall be added for stress relief and cable termination. The cable shall have a connector to the acoustic receiver. The cable construction shall be checked with requirements for cables and connectors as found rules & regulations.

Acoustic receivers shall be designed to be retrievable from top of the I-tube for regular maintenance purpose.

3.3 Acoustic Transmitters

The acoustic transmitters shall be configured with transmit interval prox. Every 10th minute for optimum battery lifetime (5-7 years). The mounting brackets shall be designed in such a way that divers and ROV are able to replace the acoustic

	<p>transmitters when needed.</p> <p>Detail drawings of the connecting links, where the acoustic transmitters are to be installed, will be provided by APL.</p> <p>3.4 I-Tube and Top Flange</p> <p>The I-Tube is to be designed by APL with input from the MLMS supplier regarding inner diameter, hang off for acoustic receiver at the I-Tube exit and the flange connection on top of the I-Tube.</p> <p>The Top flange is to be designed and delivered by the MLMS supplier. The top flange shall be designed to fit the I-Tube flange connection. The Receivers cable will run through the flange and to an Exe JB for cable interface to the STP Control System.</p> <p>4 SCOPE OF SUPPLY</p> <p>Supplier’s scope to propose and deliver the best components for this project:</p> <ul style="list-style-type: none"> • 2 off Acoustic Receivers with connectors and 25-meter subsea cable • 18 off Acoustic Transmitters • 3 off I-Tube top flanges for cable transit on top of I-tube • Design of retrieval functionality for acoustic receivers through I-tube • Design of ROV installation brackets for acoustic transmitters • Documentation and drawings • Software description for implementing into an Allen Bradley 1756 ControlLogix PLC • Acoustic Transmitter Test Unit with software • Factory acceptance test • Other Supplier recommended items for use. <p><u>Schedule:</u> Estimated package Sub-Contract Award Q4 2021 Estimated Package Delivery Time: 7 months FCA factory</p>
--	--

Project Registration

Santos is committed to ensuring Australian Industry the opportunity to participate in the Barossa Project. Expressions of Interest are invited from contractors and suppliers with the relevant capability and capacity to undertake the scope of work.

This is a request for specific expressions of interest. Contractors and suppliers will be considered for prequalification and tender if suitably qualified against this package.

Note that an important part of the project registration process is to register an Expression of Interest at the correct Scope level.

Scope level definition:

Full scope: Able to produce / supply all the package.

Partial scope: Able to produce / supply one or more of the sub-packages.

All registrations are to be completed via ICN Gateway BarossaOffshore.icn.org.au. Please contact the ICNNT if registration assistance is required. Contact details: (08) 8922 9422 or resources@icnt.org.au.

Project Website: Santos Australia