Package Number	15
Package Name	CONTROL SYSTEM
Scope of Work (* To be confirmed)	The STP Control system for connection/operation control will be type Allan Bradley control logix. The system can communicate with the FPSO system over modbus communication link. To get a clear overview of the control system and philosophy reference will be made to control topology drawing. The STP Control System will operate and monitor: • Pull-in winch rope tension • Buoy locking mechanisms • Open Drain Skid • STP Equipment HPU • ESD and valve HPU • Swivel barrier HPU • Swivel Barrier & Leak system • Swivel torque monitoring system • Starter cabinets • Close Drain skid • Mooring Line Monitoring System • Start/stop of ventilation Dedicated starters shall be delivered for STP HPU motors, ESD HPU motors, Swivel barrier HPU motors, Open drain motors, closed drain motors and ventilation motors. Starters will be stand alone units in Rittal or similar steel cabinets. The cabinets are to be installed indoor in non-hazardous area. The protections of the units are IP54. Design life for the starters and control cabinet shall be 25 years. **RULES & STANDARDS** The STP System shall be designed to meet applicable requirements for operations in Australian Shelf, specific statutory references have however until present not been specified. The STP System shall be designed, constructed and certified by the following classification society: • American Bureau of Shipping (ABS) The supplier shall therefore be responsible for submitting the necessary information to the classification society for approval. Rules and standards may include the following: ABS Guide for Building and Classing Floating Production Installations ABS Rules for Building and Classing Single Point Mooring. ABS Guide for Building and Classing for FPI, supplement ABS Guidance for FEM analysis of Tanker Structures

	ABS Guidance Notes on, Spectral-Based-Fatigue Analysis EN 50082- Electromagnetive compatibility - Generic emission standard. IEC 60092 Electrical installations in ships. IEC 61892 Mobile and fixed offshore units – Electrical installations, IEC 60079 Electrical Apparatus for Explosive Gas Atmospheres. IEC 60259 IP Code. IEC All relevant standards. **CERTIFICATION** The STP Control System shall be delivered with ABS certificate of inspection. The ABS scope of inspection required is: - Witness of final functional test - Certificate of Inspection **DESIGN REQUIREMENTS** **General** The STP control cabinet shall be installed inside electrical room classified as non-hazardous area. Minimum requirements for ingress protection (IP) shall be IP54. Design life is 25 years. The PLC cabinet and the electrical distribution system shall be delivered in separate cabinets. Requirements for electromagnetic compatibility (IEC61800-3) shall be taking into the design for separating the electrical starters and control equipment. The following equipment shall be delivered as separate units: • STP control cabinet • Starters **Power supply** • Power supply to starter units/cabinet 440 V, 3 phase, 3 wire, 60 Hz • Power supply to PLC 220 V AC, 1 phase, 60 Hz • Emergency distribution with UPS • Battery box for UPS **Short circuit level** The short circuit level at the FPSO distribution board is typically 10 000 kA/1s. The distance between the FPSO distribution board and APL distribution board is typically 200 meter. The vendor of the APL distribution board shall calculate the short circuit level at APL distribution board and use a safety factor of 2 for the design of APL distribution

board.

Cable installation/termination

Cables shall be in accordance with IEC 60331/60332.
See attached drawing for cable sizes.
Cable cross sections of core shall be minimum 1,5 mm^2 for instrument signals and minimum 2,5 for electrical.
All cores in cables shall be ferruled (including spares) and terminated into a terminal.

All terminals shall be of the screw compression type and clearly marked with the approved terminal number. Multi-tier or double deck terminals are not permitted.
Colour for trunking shall be blue for IS and grey for NON-IS.
All cable conductors shall be terminated by use of compression lugs or pin depending upon the type of termination. The compression pin should be the type where the conductor stands are inserted through the whole pin and reach the bottom of the terminal.

Separation between IS and NON-IS shall be 150 mm.
Separation between instrument (24VDC) and 220V shall be 300 mm.
Separation between instrument (24VDC) and 440V shall be 500 mm.

Earthing

Protective Earth (PE): Connection to installation earth of all electrical equipment through the cable braiding, for personnel safety. Each cabinet, marshalling unit, local panel or junction box shall have a separate earth bar connected to PE. PE bars and bonding shall be marked yellow/green,

Instrument Earth (IE): Cable screens shall be run continuously from instrument through junction box to instrument bar in the marshalling rack. Earth bar must be insulated from steel or any other earth system, and screen connected to earth must be at the instrument earth bar only. IE screens bar(non-IS) shall be marked yellow/green with a red mark.

Intrinsically Safe (IS) earth: Exclusively for Intrinsically Safe (Ex i) systems. Separate continuos screen earth as above, to a separate IS earth bar. Resistance between this earth point and the common earth shall be maximum 1 ohm. IS screen bars (IS) shall be marked with a blue mark.

Cabinet & Panels

Equipment enclosures shall comply with the regulations in relation to the location of where it is installed.
They shall be equipped with all necessary equipment components for hazardous area as required.

- Material: Painted steel.
- Ingress protection: IP54
- Size: Sufficient to contain all wiring and components.

All mounting and fastening nuts, bolts, screws, washers and like shall be 316SS.

	Terminals blocks and rails inside the cabinet & panels shall be rail mounted; end plates and stoppers shall be fitted. Switches, indicators, shall confirm the respective Eex rating. All wires shall be fire retardant sheath, flexible copper conductor. Insulation shall be rated at 250V minimum for instrument and 1000V for low voltage. All wires shall be marked with terminal/equipment. (i.e. zener barrier and fuses/breakers shall be marked with field equipment tag no./circuit no.) in accordance with the attached APL drawings using proprietary labelling method for wires, terminal blocks , terminal strips and components identification. Hand written labels are not accepted. Labels on cables entering the control cabinets & panels shall be made of steel. A minimum of 200mm free space shall be available between the lowest cable terminal and the bottom plate of the panel. Cable entry shall be via approved cable transits (Roxrech preffered) attached to the bottom of the panels. Suitable gaskets shall be supplied to ensure correct IP grade. Earthing lugs shall be installed on each gland plate and movable part and connected back to a central earthing lug on the main body of the cabinet & panels with minimum 6mm2 earthing wire. Cabinets & Panels shall be designed for wall mounting. Cabinets & Panels shall be mounted on fabricated stands with correctly sized vibration mounts installed between the panel and the stand. The cabinets shall be fitted with lifting points. Supplier shall ensure that the equipment are preserved in a satisfactorly way before it is shipped for assembly on the FPSO. <u>Schedule:</u> Estimated package Sub-Contract Award Q1 2022 Estimated Package Delivery Time: 6 months FCA factory

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.

BAROSSA PROJECT

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@icnnt.org.au*.

Project Website: Santos Australia