



South of Embley project

Expression of interest

LV Variable Speed Drives

Package Number: 25977-000-MRA-EVV1-00001

Package Title: LV Variable Speed Drives

General Description

Rio Tinto's proposed South of Embley project is located approximately 40 km south-west of Weipa in far North Queensland, Australia. The proposed SoE site will require Low Variable Speed Drives (LV VSD). The scope includes design, manufacture, testing and supply of LV VSD for operation with 415 Volt squirrel cage induction motors working in a three (3) phase, 50Hz, direct earth system, as well as providing technical support during construction and commissioning.

Specific Scope Requirements

The total number of LV VSDs required for this project is 57. The LV VSDs shall be used to control conveyors and pumps. The LV VSDs shall be standardised as far as possible and selected for applications ranging from 0.8kW to 355kW in size.

The LV VSDs shall be powered from a 3 phase, 415V AC $\pm 10\%$, 50Hz power supply from a Motor Control Centre (MCC). VSDs shall be installed indoors in an air-conditioned switchroom and are required to have a minimum ingress protection rating of IP42. The VSDs shall be capable of operating at 40°C in case of air conditioner failure.

All VSDs shall be variable voltage variable frequency, voltage source with Pulse-width Modulation (PWM) output and shall use flux vector motor control technology. VSDs shall be suitable for four quadrant operation, and be rated for continuous operation. The VSD shall have a galvanically isolated input to accept forward and reverse acting frequency/speed control by a 4-20 mA external signal, Ethernet link or manual operation. There may be some multi-drive applications in which the speed shall be controlled via a master/slave configuration. The VSD shall provide comprehensive motor protection by an electronic thermal model for all motors, backed up by standard motor thermistor input for motors sized 37 kW and above. The VSDs shall provide a safe-torque-off feature in order to comply with Safety Integrity Level (SIL) ratings. VSDs shall provide a serial communication link using EtherNet/IP.

The VSDs shall include suitably sized dV/dt, EMC and RFI filters to minimise harmonic and other disturbances being injected into the AC power supply and the motor feeder. The VSD enclosure

shall include all protection devices and filters to protect the motor and upstream feeder against harmonics and interference.

VSDs shall meet the following voltage and current harmonic distortion limits at the MCC, using the minimum fault current rating provided by Rio Tinto:

- Voltage Harmonics: All connected VSDs at each bus shall not exceed 3% total harmonic voltage distortion at the MCC
- Current Harmonics: Maximum allowable total harmonic current distortion limits for each VSD shall not exceed 5% at the MCC

The vendor shall be required to conduct a harmonic study to calculate the harmonic spectrum for current and voltage distortion for each MCC. If the calculated voltage distortion exceeds the nominated limits, harmonic mitigation equipment shall be included as part of the VSD offer.

All VSDs shall be completely assembled, pre-wired, and tested as a complete package prior to shipment.

The vendor may be required to provide technical assistance and on-site services as required by Rio Tinto for the setup, testing and/or commissioning of the VSDs in the switchrooms and/or on site.

Only designs and technology that have been proven in service for a minimum of five years in a mining environment shall be offered.

The electrical design, construction and installation shall conform to all applicable Laws and Australian Standards including, but not limited to:

- Electrical Safety Act 2002 (Qld)
- Electrical Safety Regulation 2013 (Qld)
- Work Health and Safety Act 2011 (Qld)
- Work Health and Safety Regulation 2011 (Qld)
- Mining and Quarrying Safety and Health Act 1999 (Qld)
- Mining and Quarrying Safety and Health Regulation 2001 (Qld)
- Workplace Health and Safety Queensland Code of Practice for Plant
- Workplace Health and Safety Queensland Code of Practice for Noise Management at Work
- AS 3000 – Wiring Rules
- AS 3007 - Electrical Equipment in Mines and Quarries – Surface Installations and Associated Processing Plant
- AS 4871 – Electrical equipment for mines and quarries - General requirements

Delivery Schedule

Forecast Award Date: 1Q, 2016

In 2015, Rio Tinto is undertaking a detailed feasibility study on the Project that will inform a final investment decision. A decision is expected to be received in the final quarter of 2015. Future procurement decisions are dependent on board approval.

Construction of associated mine infrastructure is anticipated to take 36 months once final board approval is granted.

Instructions to Tenderers

If your business possesses the capability and capacity to perform the stated scope of work, please submit a registration of interest via the ICN Gateway at www.southofembley.icn.org.au.

Please ensure that:

- Your company profile on ICN Gateway is complete, up-to-date and accurate
- You register your interest as a Full Scope or Partial Scope supplier (where applicable), and
- You respond to all project-specific questions via the ICN Gateway.

More Information

Please contact the Industry Capability Network Queensland on +61 (7) 3364 0676 should you have any enquiries regarding this scope of work.

More information about the South of Embley Project can be found on the Rio Tinto website www.riotinto.com.

Disclaimer

Scope of Work is indicative only and is intended to be used as a summary description of work which may be required by Rio Tinto and may be subject to change. Full scopes of work will be made available to parties that are invited to tender. There is no undertaking to contract or proceed to a competitive process implied by this form. Further contact with interested suppliers will be at Rio Tinto's discretion.