



ENGINEERING SAFETY CONSULTANTS

The Global Provider of Functional Safety Expertise and Technical Consultancy

Certificate of Conformity to IEC 61508 Safety Integrity Level (SIL) 3

Functional Safety of Safety-Related Programmable Electronic Systems

The **Petronash FZE, Abu Dhabi National Oil Company (ADNOC) Bu Hasa High Integrity Pressure Protection System (HIPPS) on Dual Completion Wells** has been assessed and is considered capable for use in a low demand Safety Function up to SIL 3, with regard to random hardware failure and architectural constraints.

The assessment was based on the assumptions, data provided, and recommendations given in:

- **ESC Ltd Report: K068_SV001 rev. 3.**

The product was assessed against the following failure modes:

- Upon detection of high high pressure via PT-05A/B/C (2oo3) at STR1 Well, STR1 SSV-1 and STR1 SSV-2 (1oo2) will close via a hydraulic panel (trip amplifier, safety relay, SOV, quick exhaust valve).
- Upon detection of high high pressure via PT-06A/B/C (2oo3) at STR2 Well, STR2 SSV-1 and STR2 SSV-2 (1oo2) will close via a hydraulic panel (trip amplifier, safety relay, SOV, quick exhaust valve).

The assessment was carried out to determine compliance with IEC 61508 with regards to:

- Random Hardware Failure (Predicted PFD: $4.1E-04$) with a Mean Repair Time (MRT) of 72 hours, a Proof Test Interval (PTI) of one year (8760 hours), a Proof Test Coverage (PTC) of 95% and Mission Time of 10 years;
- Architectural Constraint (comprising of Type A components with a SFF >60% and Type B components with a SFF > 90%) (subsystems with a HFT = 1).

IMPORTANT: It should be noted that this assessment does not include confirmation of the response time of the device. For response times (along with any relevant assumptions) reference should be made to the Safety Manual of each device and the total SIF response time **MUST** be compared against the process safety time for the specific application.

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Member of the IEC 61508 committee
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