Certificate no.:
TAD00001MS

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Mud and Cementing Equipment

with type designation(s)
Automated Metering Pumping (AMP)

issued to
Halliburton Manufacturing & Leasing Company, LLC
Duncan, OK, USA

is found to comply with
DNV-OS-E101 – Drilling facilities, Edition July 2021
DNV statutory interpretations DNV-SI-0166 – Verification for compliance with Norwegian shelf regulations, Edition July 2021

Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Issued at **Houston** on **2024-04-17**
This Certificate is valid until **2029-04-16**.
DNV local unit: **Houston**

for **DNV**

Approval Engineer: **Pasquale Macri / Bo Cui**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description
Automated Metering & Pumping (AMP) skid assembly which contains one control system that can operate up to 8 skid mounted pumps.
Controls Module No. 102134774
Small Pump Module No. 102137876, Large Pump Module No. 102137877
Pumps can be of type small pump (10 gpm) or large pump (50 gpm) with one PLC control system which can be mounted in 7 different configurations:

4 pump, 4 x 1	4 pumps, 1 control module, horizontal
4 pump, 2 x 2	4 pumps, 1 control module, 2 pumps stacked on 2, controls mounted on end
5 pump, 5 x 1	5 pumps, 1 control module, horizontal
5 pump, 3 x 2	5 pumps, 1 control module, 2 pumps stacked on 3, controls mounted on end
6 pump, 6 x 1	6 pumps, 1 control module, horizontal
6 pump, 3 x 2	6 pumps, 1 control module, 3 pumps stacked on the other 3, controls mounted on end
8 pump, 4 x 2	8 pumps, 1 control module, 4 pumps stacked on the other 4, controls mounted on end

Application/Limitation

Max Internal Working Pressure	: 150 psi	: 1.03 MPa
Min Design Temperature	: -4 °F	: -20 °C
Max Design Temperature	: 113 °F	: 45 °C
Maximum Gross Weight, Pump	: 1,200 lbm	: 545 kg
Maximum Gross Weight, Controls	: 1,000 lbm	: 454 kg
Maximum Gross Weight, 4P + 1C	: 5,800 lbm	: 2,633 kg
Maximum Gross Weight, 5P + 1C	: 7,000 lbm	: 3,178 kg
Maximum Gross Weight, 6P + 1C	: 8,200 lbm	: 3,723 kg
Maximum Gross Weight, 8P + 1C	: 10,600 lbm	: 4,812 kg

Type Approval documentation

Fabrication Procedures
Procedures related to testing, welding, NDT, etc. are to be reviewed/approved by DNV's local Surveyor

Prototype Testing
AMP Skid Test Procedure D00670884 Rev.A

Marking of product
For Tracebility the following markings is to be carried out on each product:

1. Serial No.
2. Manufacturer's Name or trademark
3. Additional marking at the manufacturer's discretion

Certificate Retention Survey
For retention of the Type Approval, DNV's surveyor shall perform periodical assessment after 2 years (+/- 90 days) and after 3.5 years (+/- 90 days) in accordance with DNV's Class Program DNV-CP-338, Section 4.

Other conditions/comments

- The electrical and controls installation was reviewed in accordance with DNV Offshore Standards, DNV-OS-D201, Ed. July 2022, Ch.2 Sec.10 and Sec. 11 and DNV-OS-D202, Ed. July 2023 and referenced standards therein.
- The electrical and controls equipment contained in certified enclosures is suitable for operation in a Zone 2, Gas Group IIB hazardous location with a temperature rating of T3.
- The electrical and controls installation (for each module) shall undergo a visual inspection and functional test by the DNV surveyor prior to the final acceptance of each installation.
- Each product is to be surveyed during fabrication in accordance with the requirements for equipment of Category I as defined in DNV's Offshore Standard DNV-OS-E101 Drilling facilities, Ed. July 2021, followed by issuance of a Product Certificate. If the intended installation is DNV classed, then this automatically means DNV product certificate. Fabrication records are to be maintained in accordance with DNV-OS-E101 Ch.3 Sec.3, 2.1.
- DNV Ref. Project No. A1366022

END OF CERTIFICATE