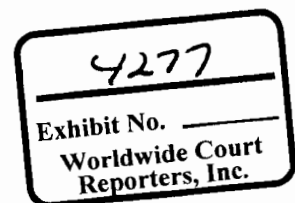


From: Erwin, Carter [/O=CCC/OU=CCC-CLY-BACK END/CN=RECIPIENTS/CN=ERWINC] 1/22/2009 2:35 PM
To: Boughton, Geoff (Houston)
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Subject: 20506009 TRANSOCEAN (MARK III MODEL 80).pdf - Adobe Acrobat Standard
Attachments: 20506009 TRANSOCEAN (MARK III MODEL 80).pdf

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MK III MODEL 80
MULTIPLEX BOP CONTROL POD
TRANCOEAN OFFHSORE DEEPWARTER

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Budgetary Quotation No.: 20506009

Date: January 21, 2009
Validity: February 21, 2009

Cameron Drilling Systems – Houston, Texas

Cameron Drilling Systems is pleased to provide Transocean Offshore Deepwater Drilling Inc. a quotation for Mark III Model 80 Spare System Pods. This quotation is based on the interchangeability for the Cameron Mark I POD Classification were used as a basis for this quotation with upgrades adhering to define quality measures increasing reliability and operational assurance.

Note: Pod designs will be such, to utilize upgrades without losing interchangeability and enhance features for individual ramlock control for each set of rams, as applicable. Philosophy for ramlock application shall have to discuss via design phase with customer. Quick dump valves will be put on lock/unlock line to help unlock chamber fluid to sea.

Note: This Quotation does not contain modifications considering the Control Panels (Drillers and Toolpushers), therefore, based on placement of PODs each rig panel modifications will be addressed accordingly, including software.

System Description

1. MARK III Model 80 MULTIPLEX SUBSEA BOP CONTROL PODS

The Mark III Model 80 Multiplex Subsea BOP Control Pods (POD) are enhanced versions of the Mark I/II pods. The multiplex package (MUX) and the modular control pod (MOD) interconnect to provide a system for controlling a BOP. The multiplex package is attached to the top of the modular control pod to form a complete POD. The POD is mounted on the lower marine riser package (LMRP) and interfaced to the LMRP and the BOP stack via hydraulic stingers. PODs may be provided as individually retrievable assemblies or assemblies to be retrieved with the LMRP.

The MUX package and the MOD package have been designed to incorporate improvements and features desired by Cameron and the users of the Mark I/II control pods. The pod/stack interface has been maintained to facilitate the utilization of the Mark III Model 80 pods on existing Mark I/II systems.

This new POD design utilizes only two one atmosphere containers: The SEM and the battery enclosure. All other enclosures are pressure compensated via a vented accumulator system and interconnected via pressure balanced hoses. These hoses are also utilized as wireways for the electrical interconnects.

The MUX and MOD frames are constructed of heavy duty welded stainless steel.

The design working depth of the Mark III Model 80 POD is 12,000 feet (3600m)

Multiplex Package (MUX)

The Multiplex Package (MUX) consists of a stainless steel frame containing the MUX subassemblies affixed to the top of the MOD section. The control interface between the MUX and Mod sections consist of a junction plate supplying hydraulic pilot signals to the control valves in the MOD section.

MUX Subassemblies:

Subsea Electronic Module (SEM): Consists of a cylindrical one atmosphere enclosure containing the electrical components to provide control and monitoring of the BOP. Power supplies, modems, dc converters, a cpu module with I/O interfaces, and an inclinometer are utilized to provide system functions. On systems containing the Deadman feature, a battery charger is included in this enclosure. Dual power, signal and cpu processors are utilized to provide redundant subsea circuits. The SEM communicates and obtains power from the surface via redundant circuits in the subsea umbilical. This subassembly is purged with Nitrogen to maintain a moisture free environment which is monitored by a moisture detector. A temperature controlled fan is utilized to enhance cooling. Electrical connections to the SEM are accomplished with pressure balanced oil-filled (PBOF) cables utilizing series subsea connectors. The SEM communicates with other subassemblies in the MUX via a CANbus data link. The SEM also contains a fault tolerant CANbus interface to a flowmeter located in the MOD section. This interface is accomplished via a PBOF cable.

Solenoid Valve Module: A solenoid valve module consists of a pressure compensated enclosure containing eight manifold-mounted solenoid valves and a solenoid driver module (SDM). The solenoid valves are of a pressure compensated, single coil design. The SDM provides the electrical drive for the solenoid valves and monitors the integrity of the solenoid valves electrical circuit. Communication with the SEM is via a CANbus data link. Current design provides for a maximum of ten solenoid valve modules, eighty (80) solenoid valves, in the Mark III POD and fifteen solenoid valve modules, one hundred and twenty (120) solenoid valves, in the Mark IV POD.

Transducer Module: A transducer module consists of a pressure compensated enclosure containing a maximum of twenty (20) pressure transducers. Communication with the SEM is via the CANbus data link. Current design provides for one module, twenty (20) transducers, in a Mark III POD and two modules, forty (40) transducers, in the Mark III Model 80 POD.

Battery Enclosure: A one atmosphere enclosure containing the rechargeable batteries required to power the AMF/Deadman circuits when this option is implemented. This enclosure is interfaced to the SEM via a PBOF cable to supply power to the AMF/Deadman circuits and receive recharge current from the charger located in the SEM.

Accumulators:

Accumulator banks are installed to provide pilot pressures for the MOD pressure regulators. Each accumulator pilot line contains five (5) small accumulators, installed in a removable frame inside the MUX frame.

Pilot pressure is supplied by one accumulator and regulator located in the lower portion of the MUX.

The hydraulic filtration system for the solenoid valve supply fluid contains a downstream, in-line filtration unit with a filter element rated at the specific system hydraulic working pressure.

Modular Control Pod (MOD)

The lower section of the POD consists of a stainless steel frame with side plates containing valves, regulators, and other hydraulic components required to interface the MUX to the LMRP and the BOP stack. Piloted valves and regulators are provided to operate the various stack functions. Cameron Premium Deepwater Valves in sizes 1/4", 1/2", 3/4", 1" and 1 1/2" and Premium Deepwater Regulators in 3/4" and 1 1/2" are available. Where applicable they are utilized in this application.

All control valves and pressure regulators are designed for easy access and replacement. All normal maintenance processes are done without disturbing any hydraulic hose or tubing fittings. All valves and regulators are constructed of stainless steel or other corrosion resistant materials for extra long service life. The pilot ports of all valves are equipped with purge fittings so that air and stagnant fluid can be flushed without disconnecting tubing or hoses

All Cameron valves and pressure regulators use sliding metal-to-metal, shear type seals for high reliability and durability with control fluids which can easily become contaminated with particles in the offshore drilling environment

All hydraulic supply and outlet connections are made through two, male, multiport connectors extending from the bottom of the MOD. One is for all of the BOP-Stack functions, and the other is for the LMRP functions and supply connections. The two connectors may be independently extended and retracted via pilot signals from the MUX. The connectors are typically retracted during pod installation, retrieval and pod leak testing. The primary reason for retracting these connectors is to protect them from damage during running and retrieval operations. The individual port seals on the male stabs are easily replaceable.

NOTE: Pod leak testing can be accomplished subsea without having to retrieve the Multiplex Subsea BOP Control Pod to the surface.

Engineering Specifications

QP-00160-01 Control Systems Assembled Equipment: All Pressure, All Temperature Ratings, All Locations

SK-122108-XX-XX: Modular Control Pod Assembly Amethyst Rig

SK-122108-XX-XX: Flow Diagram, Modular Control Pod Amethyst Rig

SK-122140-XX-XX: Flow Diagram, Multiplex Package Amethyst Rig

SK-122178-XX: Subsea Electronic Module Multiplex

SK-122178-XX: Subsea Electronic Module Multiplex Control Pod

X-200220-XX: Factory Acceptance Test Procedure for Multiplex Subsea Pod

Pricing Summary:

Item	QTY	Description	Unit Price	Total Price
1	2	Spare Transocean Subsea BOP Control Pod (Mark III Model 80) 2020708-XX	2,356,068	4,712,136
2	1	Engineering: Include Mechanical, Electrical, Software and Design for POD's Only		170,400
3	1	Boxing and Inland Freight		3,000
TOTAL QUOTATION VALUE				4,885,536

QUOTE VALIDITY: 30 DAYS

Delivery: Ex-works Houston, Texas. Applicable date shall be determined base on purchase order acceptance. Considering Engineering and Manufacturing Capacity at present estimates delivery to be 48/50 Weeks.

- **THIRD PARTY CHARGES, WILL BE ACCESS AT COST + 15%**
- **STANDARD TERMS AND CONDITION SHALL APPLY, COPY UPON REQUESTED CAN BE SUPPLIED.**

*PROGRESS PAYMENT
35% DOWNPAYMENT
55% 25 WEEKS AFTER RECEIPT OF ORDER
10% ON SHIPPMENT*

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