OIL & GAS DEVELOPMENT COMPANY LIMITED
PROCUREMENT DEPARTMENT, ISLAMABAD
FOREIGN SECTION-E

(To be completed, filled in, signed and stamped by the principal)

ANNEXURE 'A'

Material SKID MOUNTED RCM/BATCH MIXING/PUMPING UNIT
Tender Enquiry No PROC–FE/CB/CMT–4378/2019
Due Date
Evaluation Criteria FULL

SCHEDULE OF REQUIREMENT

Sr No	Description	Unit	Quantity	Unit Price (FOB)	Total Price (FOB)	Unit Price C & F BY SEA	Total Price C & F BY SEA	Deviated From Tender Spec. If Any
1	SKID MOUNTED RCM/BATCH MIXING/PUMPING UNIT. DETAILED SPECIFICATIONS ARE ATTACHED AT ANNEXURE "A" FROM PAGE 1 TO 8.	Number	3					

Note:

NOTE:

1. **Bid bond**; - Pursuant to tender clause # 2.2, 11.4, 13 & 35.3.2, bid bond amounting USD 35,000/- (United States Dollar Thirty Five Thousand only) or equivalent in Pak Rupees should be submitted with the technical bid.
2. **Foreign Procurement Payment Terms (also available at OGDCL website (Tenders Tab)**

   Tender value less than or equal to US$ 200,000:

   Payment to the Contractor/ bidder in foreign currency shall be made by establishing in favor of the Contractor an irrevocable Letter of Credit (hereinafter called the L/C). 70 % Payment (s) under the L/C will be made for the FOB/ CFR / CPT (as the case may be) price of material of each shipment upon submission of the shipping documents. Balance 30% Payment will be released after receipt, inspection and acceptance of material.

   Tender value more than US$ 200,000:

   Payment to the Contractor/ bidder in foreign currency shall be made by establishing in favor of the Contractor an irrevocable Letter of Credit (hereinafter called the L/C). 80 % Payment (s) under the L/C will be made for the FOB/ CFR / CPT (as the case may be) price of material of each shipment upon submission of the shipping documents. Balance 20% Payment will be released after receipt, inspection (in addition of pre-shipment inspection) and acceptance of material.
3. **Evaluation Criteria**: - FULL CONSIGNMENT WISE ON C&F BY SEA KARACHI BASIS. Bidder to quote following in **FINANCIAL BID ONLY**:
   i. UNIT PRICE and quantity of each recommended spare part. Unpriced list to be provided with Technical Bid. Spare parts shall not be part of financial evaluation.
   ii. INSPECTION (Clause 05 of attached detailed Specifications): Cost of 02 nos. OGDCL officials' visit to be provided separately and confirmation in technical bid. The cost will be part of Financial Evaluation.
4. **Shipment from ACU member Countries**:- In case of shipment from ACU member countries, the LC beneficiary should be of that particular country from where the consignment is being shipped.
5. **Terms and conditions**:-Bidders are advised to carefully read all the terms and conditions of the Tender Document available at OGDCL website in the master tender document and attached technical Terms & Conditions.
6. **Delivery Period:** 40 weeks

Oil & Gas Development Company Ltd. Islamabad- Pakistan
Title: Specifications for Skid Mounted RCM/Batch Mixing/Pumping Unit

SKID MOUNTED RCM/BATCH MIXING/PUMPING UNIT

1. DESCRIPTION

Diesel engine/hydraulically powered, heavy-duty skid mounted RCM/Batch Mixing/Pumping Unit designed for following functions:-

i. To mix, pump and squeeze cement slurry into wells.
ii. To continuous mix and pump cement slurry, up to 20 PPG, to high pressure cement pumping units.

All components and systems should be assembled in a manner to provide easy access for maintenance and quick movement from one location to another.

The unit should be capable of operating during prolonged mixing/pumping operations in arduous rough terrain environment of Pakistan, with ambient temperature ranges of up to +55 Deg. C.

2. EQUIPMENT SPECIFICATIONS

The unit is required to be consisting of the following:

2.1 Skid.
2.2 Power system.
2.3 High Pressure Pumping System.
2.4 Fluid Handling System.
2.4 Centrifugal Pumps.
2.5 Control Panel.
2.6 Unitization and Completion.

2.1 SKID

The skid should have the following specifications:

i. Approximate Skid Dimensions: 30ft x 08ft x 11ft.
ii. A battery system should be installed on the skid, including two heavy-duty 12 volt batteries connected in series, enclosure, battery disconnect switch and electrical connections to the engine alternator.
iii. 80 US Gallon minimum capacity fuel tank. This fuel tank should be equipped with a fuel level gauge, a breather, fill and drain connections together with complete fuel distribution system including filters, strainers, suction and return connections.
iv. Bare frame should be prime coated before installation of components.

2.2 POWER SYSTEM

a. DIESEL ENGINE

Installed on the skid should be a "Detroit" or "Caterpillar" (OR EQUIVALENT) Diesel Engine rated at minimum of 525 BHP at 2100 RPM. This engine will be used to drive the unit hydraulic system via a multi output hydraulic drive.

This engine should be equipped as follows:

i. Radiator with fan blade, fan guard.
ii. Electric Starter.
iii. Turbocharger.
iv. Low Life-cycle cost.
v. Electronic control system with safety shutdown for low oil pressure, high water temperature, low coolant level and over speed.
vi. Air Compressor

b. HYDRAULIC SYSTEM

Powered from the diesel engine crankshaft pulley and transmission PTO should be a Hydraulic Commercial pump assembly. This pump system will power via control panel mounted hydraulic Control valves, the following hydraulic Denison motors (OR EQUIVALENT):

i. Three (03) centrifugal pumps hydraulic drive motors (note: centrifugal pumps hydraulic motor speed is variable).
ii. Three (03) mixing paddle motors (note! paddle speed is variable).
Other main components of hydraulic system should include:
iii. Carbon steel hydraulic tank (should be installed on the engine side).
iv. All hydraulic gauges.
v. Hydraulic filters.
vi. Hydraulic oil cooler.
vii. Necessary relief and check valves to prevent over pressuring and flow reversals in the hydraulic oil circuit.
viii. Hydraulic hoses.
ix. Pump Inlet Suction Strainer.
x. Oil level sight glass.
xi. Access hatch.
xii. Baffle protection.
xiii. Drainage slope with connection and valve.

c. POWER SHIFT TRANSMISSION

Automatic transmission installed on the rear of diesel engine should be Allison transmission 4700 OFS (OR EQUIVALENT) to drive triplex pump. Transmission should be equipped as follows:-

a) Power shift with manual gear selector.
b) Fill tube and dipstick
c) Torque converter cooling.
d) Transmission neutral start system.
e) External Transmission Filter.

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d. **DRIVELINES**

Engine/transmission combination shall drive a triplex pump via a heavy-duty universal joint drive shaft. The drive angle should not exceed permeable limits. Drivelines are to be guarded using removable metal guards with grease holes.

2.3 HIGH PRESSURE PUMPING SYSTEM

(i) TRIPLEX PUMP

Mounted on the rear of the unit should be "National Oil-Well W-600-S" or "SPM TWS-600S" or "Serva TPD600" (OR EQUIVALENT) single acting horizontal positive displacement triplex pump. Triplex pump will have the following technical specifications:

a) Short length design for back to back mounting and side input/output.

b) Forged alloy steel mono-block fluid end with removable suction and discharge covers.

c) Fabricated steel suction manifold.

d) Fabricated steel discharge connections with (Fig. 1502) rating plunger dia 4" and length of stroke 6".

e) Hard coated plungers

f) Replaceable alloy steel wing guided valves.

g) Replaceable alloy steel valve seats.

h) Bronze packing followers.

i) Oil pressure gauge.

j) 4.6:1 gear ratio.

k) Pump half flanged drive coupling.

l) Crankcase breather.

m) Pressure lubricated crankshaft, cross head sleeves and wrist pin bearings.

n) Gauge connection for the mounting of a Martin Decker (OR EQUIVALENT) type gauge protector.

Pump should have following performance parameters:

Maximum Squeeze / stall pressure, : 12,000 PSI (82.74 MPA)
Maximum Working pressure : 7,960 PSI (54.88 MPA)
Maximum Pump Displacement Rate: 441 GPM (1,669 LPM)
at crank RPM 450/pinion RPM 2070.

The pump should be suitable for pumping inhibited acids, cement slurries, sand laden fluids, crude oil, drilling mud and a variety of other oil well servicing fluids.

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(ii) TRIPLEX PUMP LUBRICATION SYSTEM

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Triplex pump should use an air over oil packing lube system, with a lube oil storage tank, equipped with high pressure check valve, flow

controls and hoses to triplex pump packing assembly i.e. the system for lubrication of packing of oil well pump plungers

2.4 FLUID HANDLING SYSTEM

(i) CEMENT MIXING SYSTEM

The mixing system is a high energy re-circulating slurry mixer type. It consists of high energy jet mixer, diffuser, 10 BBL mixing tank, 20 BBL averaging tank, 20 BBL displacement tank, agitators, re-circulating pump, pressurizer pump and mix water pump. The mixer design maximizes wetting of all cement by forcing the dry bulk cement into and between the fresh water and the re-circulating slurry. The mix water centrifugal pump and the re-circulating centrifugal pump provide most of the high energy. The diffuser aids in removing air entrainment from the bulk cement and eliminates dust in the mix tank. A hydraulic driven paddle tank agitator provides improved mixing and more homogeneous slurry. The mixing system can be operated in a manual or automatic mode. In manual mode the operator uses a manually operated hydraulic control valve to control the cement metering valve. In the automatic mode, an electro-hydraulic control operates the cement metering valve. The electro-hydraulic system is controlled by an industrial process controller/computer. Automatic density & tub level control mixing system should be an advanced automatic mixing system which helps the operator to maintain the desired density and preset tub level during the cementing job. This system should have the following features.

i. Proportional electro-hydraulic control valves (water and cement flow control).
ii. Hydraulically driven paddle type mixing agitators.
iii. 4" Butterfly valve drain/clean out outlet.
iv. Cement & water metering valves.
v. Tank calibration markers (In both metric and barrel measurements).
vi. Microprocessor.
vii. Micro motion non-radioactive densitometer with display.
viii. Water flow meter.
ix. Radar type tub level transducers.

NOTE: All piping should be schedule 40 and be equipped with sufficient number of victaulic fittings that should allow easy & quick disassembly and cleaning of the piping in the case of blocked lines. Also necessary butterfly valves should be pneumatically operated for ease of operation.

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LOW PRESSURE SUCTION MANIFOLDING

The unit should be equipped with a complete set of low pressure manifold as follows.

a) Triplex pump suction manifold from mixing/recirculating/displacement tanks.
b) Triplex pump suction from outside source.
c) Suction and discharge manifold for mixing centrifugal pump including external connection for emergency mixing.

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d) Suction and discharge manifold for re-circulating centrifugal pump.
e) Triplex pump release line of 2" and mud fill lines of 2" should be low pressure section of manifold. These both can be discharged to displacement tank.
f) The low pressure manifold includes butterfly valves for fluid flow and control.
g) This manifold should allow suction of fluid from mixing tank or external supply directly to the mixing water centrifugal pump.

(iii) **LOW PRESSURE LOAD MANIFOLD**

This manifold consists of various butterfly valves, victaulic couplings, flanged connections, pipe and pipefitting etc.
This manifold is designed to take fluid from external sources via 4" Fig. 100 union connections, with removable caps and chains, on the suction manifold of the mixing centrifugal pump to mixing tank or the suction manifold of the triplex pump.

(iv) **RETURN MANIFOLD (HIGH PRESSURE BLEED OFF)**

This manifolding consists of 2" x 1" rated 15,000 Psi Plug Valve (should be from M/S FMC) (OR EQUIVALENT) with Fig. 1502 hammer union connections should be installed on back delivery 2" lines of triplex pump with fig-1502 connection facing to displacement tank.

(v) **HIGH PRESSURE DISCHARGE MANIFOLD**

Triplex pump should be connected with 15000 Psi working pressure release manifold consisting of Plug Valve (should be from M/S FMC) (OR EQUIVALENT) and fittings with 1502 hammer unions arranged in a manner to allow the discharge (cement slurry, mud and water) by the triplex pump.

2.5 CENTRIFUGAL PUMPS

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a) **MIXING CENTRIFUGAL PUMP**

Installed on the unit should be a hydraulically driven Mission (OR EQUIVALENT) 4" x 3" centrifugal mix water pump that has capability of pumping pressure 100 Psi and flow rate 420 GPM approximately.

b) **RECIRCULATING CENTRIFUGAL PUMP**

Installed on the unit should be a re-circulating centrifugal Mission (OR EQUIVALENT) pump, connected to the discharge of the re-circulating cement slurry tub should be a hydraulically driven mission 6" x 5" re-circulating centrifugal pump capable of pumping at pressure 50 Psi and flow rate up to 1000 GPM (3.8 cum/min). This pump should take cement slurry from the re-

circulating cement slurry tub and feed it to the cement slurry jet type mixer via a micro motion non-radio active type density meter connected to the digital data acquisition system. All required control valves should be installed on the suction/discharge lines of this re-circulating centrifugal pump. This pump should be equipped with external suction/discharge connection.

c) PRESSURIZER CENTRIFUGAL PUMP

The dedicated Mission (or equivalent) 6" x 5" pressurizer pump should be capable of receiving fluid from the averaging, the displacement tank or an outside source. The pressurizer pump will discharge into the suction manifolds of the triplex pumps with a pressure of 60 Psi.

2.6 CONTROL PANEL

Installed on the unit should be an elevated platform. Installed on this platform should be a unit control panel with hinged protective cover and permanently engraved labeling in English. Control Panel with pneumatic hydraulic and electric devices allow operator to change engine speed and gear selection, start and stop pumps, engines. Cover shed of the appropriate material must be included for protection of the operator and equipment. This panel should contain the following controls and instrumentation:

i. Cement mixing system panel & controls.
ii. 6" Dial dual needle 0-12000 PSI pressure gauge Martin Decker (OR EQUIVALENT).
iii. Engine tachometer/hour meter.
iv. Transmission Shifter for the engine.
v. Engine oil pressure gauge.
vi. Engine temperature gauge.
vii. Engine normal stop/start.
viii. Engine emergency kill.
ix. Engine throttle control.
x. Hydraulic pressure/temperature gauge.
xi. Centrifugal pumps hydraulic controls.
xii. Mixing paddles speed control.
xiii. Electronic control system with safety shut down for low oil pressure, High water temperature and over speed.
xiv. Pneumatic system air pressure gauge.
xv. Pneumatic butterfly valves controls.
xvi. Work light switches.

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2.7 UNITIZATION AND COMPLETION

The above unit should be fully assembled ready for utilization and completed to the specifications. This shall include the following items (If these items are already detailed above, they shall not be duplicated).

i. Hose racks.

ii. Fittings/Tool Box.
iii. Fire extinguisher.
iv. Installation of lights for 24hour use.
v. Installation of all other electrical systems.
vi. Installation of all pneumatic/hydraulic systems.
vii. All oils, coolants and other operating fluids.
viii. All steel and misc. fittings to complete the unit.
ix. General workmanship should be of good quality and appearance.
x. Mig Wire Welding should be used for structural welding.
xi. All bolt holes must be drilled. No flame cutting is allowed.
xii. All hoses should be well supported with support type clamps.
xiii. All hoses should be protected by well secured rubber sleeves where hoses touch metal. All hoses should be new.
xiv. No sweated or brazed type hydraulic fittings should be used.
xv. Wire clips should be installed on all clamps.
xvi. Unit packed and prepared for under deck sea shipment.
xvii. Supplied with each unit shall be two (02) copies, in English, of a complete operating, maintenance and spare parts manual.
xviii. Unit should be painted with signal red color (03 coats) and OGDCL monogram, which is available at "ANNEXURE" B". Each coat will be thoroughly dry before the next coat is applied. All metal to metal surfaces will be prime coated on both surfaces before installation. All components will be Epoxy primer and finish painted before installation-except radiator. All fabricated components to be Epoxy Primer.

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3. AUXILIARY ITEMS

Following auxiliary items should be supplied with each unit:

i. 06 numbers 4" suction-discharge hose 15' long having (M x F) Fig100 union end connections.
ii. 02 numbers cross-over size 4" (Male x Male) Fig100 union end connections having 4" butterfly valve (manually operated) in between.
iii. 02 numbers cross-over size 4" (Female x Female) Fig100 union end connections having 4" butterfly valve (manually operated) in between.

4. SPARES (will not be included in evaluation).

a. Necessary spares for maintenance of units for a period of 02 years should be provided.
b. Spares should be quoted for each piece of equipment installed on the unit separately. For example Engine, Centrifugal Pump, Hydraulic Motor and Hydraulic pump etc, with part numbers.

Note: - The quantity of spares can be reduced or increased according to the OGDCL requirement. Bidders are advised (In their own interest) to quote 100% required spare only on the basis of consumption.

5. INSPECTION

1. Third Party Inspection will be arranged by OGDCL. Bidder will show their willingness for TPI only.

2. 02 nos. OGDCL inspectors will verify the assembling/fabrication process at manufacturer's site, for a period of one week. Separate cost to be mentioned for OGDCL inspection (This cost will be the part of financial evaluation).

6. DELIVERY

Maximum delivery period of the Units is 40 weeks.

7. TERMS AND CONDITIONS

i. Supplier will provide the O.E.M. (Original Equipment Manufacturer) Certification of all parts of the Skid Mounted RCM/Batch Mixing/Pumping Units.

ii. Supplier will warrant that all goods supplied against the contract should have no defect arising from design materials and manufacture and that the **supplier should rectify any defect at no cost for a period of One year** under normal use of supplied goods and conditions prevailing in Pakistan.

iii. Supplier should provide the drawings, specifications and dimensions of the equipment mounted on the Skid Mounted RCM/Batch Mixing/Pumping Units.

iv. The bid to be submitted through two envelops one technical and other financial.

v. The manufacturing company must have supplied at least 50 (fifty) similar Units to at least 05 clients and must have at least 15 (fifteen) years manufacturing experience of the Skid Mounted RCM/Batch Mixing/Pumping Units. The bidder should provide the list with names, address and fax number of clients to whom similar Units have been supplied during last 15 (fifteen) years. OGDCL have right to contact these clients directly to know the performance.

vi. If the manufacturer has not previously supplied any cementing units to OGDCL, performance certificates in original from 05 E & P companies of international repute (from other than the manufacturer's country) has to be submitted with the technical bid, otherwise the bid will be stand rejected.

vii. Evaluation will be done on package basis except spares.

viii. For Quality control the O.E.M should be ISO certified.

ix. Supplier will clearly mention the differences of specifications if any, with OGDCL specification.

x. Bidder will provide financial reports of last three years.

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