Oil India Limited
(A Govt. of India Enterprise)
P.O. Duliajan – 786602, Assam , India

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Tender No. & Date : **SDG 3599 P15/08 of 17.05.2014**

Tender Fee : INR 4,500.00 OR USD 100.00

Bid Security : Applicable

Bidding Type : **SINGLE STAGE TWO BID SYSTEM**

Bid Closing on : As mentioned in the Basic Data of the tender in OIL's e-portal.

Bid Opening on : As mentioned in the Basic Data of the tender in OIL's e-portal.

Performance Guarantee : Applicable

OIL INDIA LIMITED invites Global Tenders for items detailed below:

Item No. / Mat. Code	Material Description	QTY.	UOM
1.	Supply , installation and Commissioning of 2000HP Rig with Top Drive as per the following Annexures: a) Detailed specification- Annexure –A1 . b) Bid Rejection Criteria (BRC) and Bid Evaluation Criteria- Annexure-B .	2	No.

Special Notes :

1.0 The tender will be governed by "General Terms & Conditions" for e-Procurement as per Booklet No. MM/GLOBAL/E-01/2005 for E-procurement (ICB Tenders) including Amendments & Addendum to "General Terms & Conditions" for e-Procurement.

2.0 Technical Check list and Commercial Check list are furnished . Please ensure that both the check lists are properly filled up and uploaded along with Technical bid.

3.0 The item qualifies for Nil duty / Deemed Export benefits. For Deemed Export benefits, please refer Addendum to the General terms and conditions for Global tender.

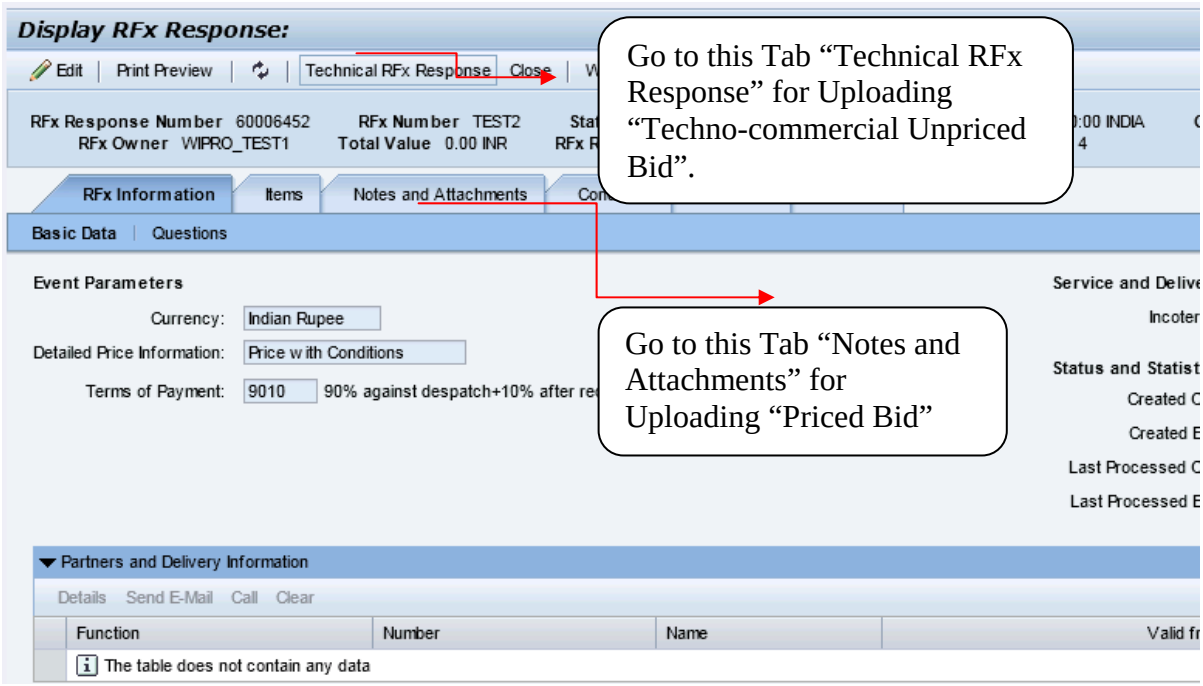
4.0 Please note that all tender forms and supporting documents are to be submitted through OIL's e-Procurement site only except following documents which are to be submitted manually in sealed envelope super scribed with tender no. and due date to The **Head Materials, Materials Department, Oil India Limited, Duliajan- 786602, Assam** on or before the Bid Closing Date and Time mentioned in the Tender.

a) **Original Bid Security.**
b) **Detailed Catalogue and any other document which have been specified to be submitted in original.**

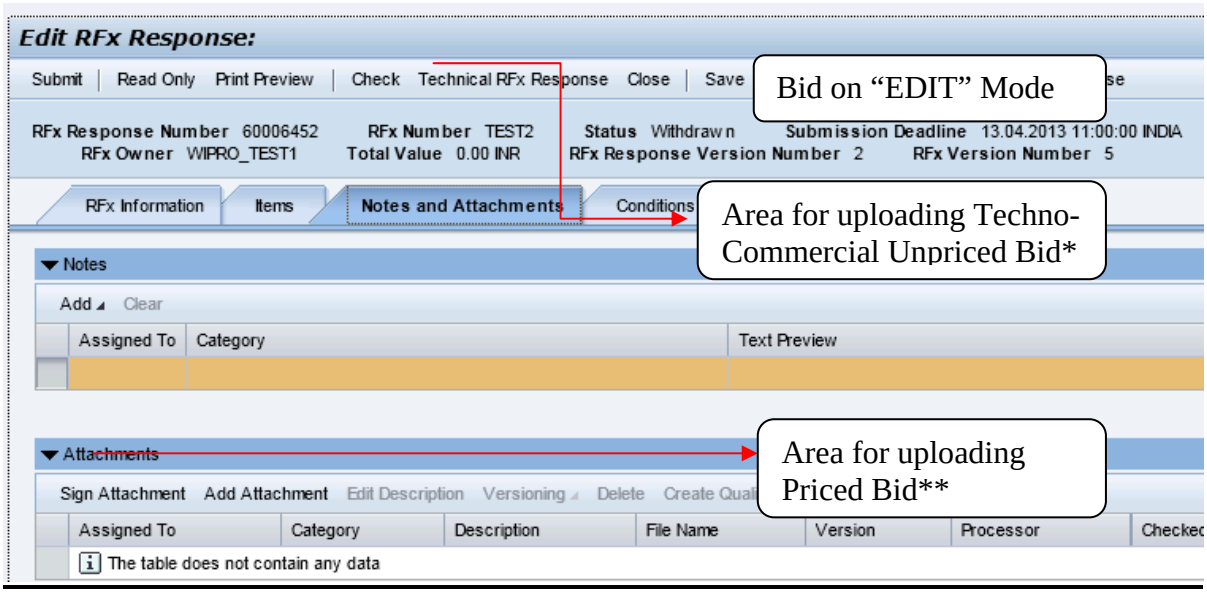
5.0 In case of SINGLE STAGE-TWO BID SYSTEM, bidders shall prepare the "Techno-commercial Unpriced Bid" and "Priced Bid" separately and shall upload through electronic form in the OIL's e-Tender portal within the Bid Closing Date and Time stipulated in the e-Tender. The "Techno-commercial Unpriced Bid" shall contain all technical and commercial details except the prices which shall be kept blank. Details of prices as per Bid format / Commercial bid to be uploaded as attachment in the Attachment Tab "Notes and Attachments".

A screen shot in this regard is given below.

Any offer not complying with above submission procedure will be rejected as per Bid Rejection Criteria mentioned in the tender.



On "EDIT" Mode- The following screen will appear. Bidders are advised to Upload "Techno-Commercial Unpriced Bid" and "Priced Bid" in the places as indicated above:



Note :

* The "Techno-Commercial Unpriced Bid" shall contain all techno-commercial details **except the prices**.

** The "Price bid" must contain the price schedule and the bidder's commercial terms and conditions. For uploading Price Bid, first click on Sign Attachment, a browser window will open, select the file from the PC and click on Sign to sign the Sign. On Signing a new file with extension .SSIG will be created. Close that window. Next click on Add Atachment, a browser window will open, select the .SSIG signed file from the PC and name the file under Description, Assigned to General Data and clock on OK to save the File.

6.0 Bidders are requested to examine all instructions, forms, terms and specifications in the bid. Failure to furnish all information required as per the bid or submission of offers not substantially responsive to the bid in every respect will be at the bidders risk and may result in the rejection of its offer without seeking any clarifications.

7.0 The Integrity Pact is applicable against this tender. OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide Annexure X of the tender document. This Integrity Pact proforma has been duly signed digitally by OIL's competent signatory. The proforma has to be returned by the bidder (along with the technical bid) duly signed (digitally) by the same signatory who signed the bid, i.e., who is duly authorized to sign the bid. Any bid not accompanied by Integrity Pact Proforma duly signed (digitally) by the bidder shall be rejected straightway. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact has been signed by the bidder's authorized signatory who sign the Bid.

OIL's Independent External Monitors at present are as under:

(I) SHRI N. GOPALASWAMI,I.A.S (Retd) ,
Former Chief Election Commissioner of India
E-mail Id : gopalaswamin@gmail.com

(II) SHRI RAMESH CHANDRA AGARWAL , IPS(Retd)
Former Director General of Police
E-mail Id : rcagarwal@rediffmail.com

8.0 Pre –Bid Conference :

(A) A Pre-Bid Conference with the Parties will be held at New Delhi , India on 27th June '2014 to discuss on the technical specifications and other terms and conditions of the tender. All the Parties who purchase the Tender Document within the closing date of sale of the tender will be eligible to attend the Pre-Bid Conference. The exact venue and time of the Pre-Bid conference will be intimated to the Parties at a later date.

(B) Clarification on the technical specifications and other terms & conditions shall be provided to the parties during the Pre-bid Conference. Parties should come fully prepared to the Pre-bid Conference and submit their queries to OIL in the Pre-bid Conference for clarification. More than two persons will not be allowed from each party and they should depute representatives who are competent enough and authorized to take spot decision . The set of queries may also be sent to OIL well in advance for study by OIL.

(C) Any changes in the technical specifications and other terms & conditions arising out of discussion in the Pre-bid Conference shall also form part of the tender document.

(D) Parties, immediately after the purchase of the Tender documents, shall inform OIL at the following address about their participation in the Pre-Bid Conference with details of the persons to enable OIL to make arrangement for the Pre-Bid Conference.

HEAD – MATERIALS
OIL INDIA LIMITED
P.O DULIAJAN, PIN – 786 602
DIST. DIBRUGARH (ASSAM) INDIA
FAX NO. : +91 - 374 – 2800533
E-Mail : matdmmfd@oilindia.in
materials@oilindia.in

SPECIFICATIONS OF 2000 HP VFD DRILLING RIG WITH TOP DRIVE

SECTION 1: DRAW-WORKS

1. DRAW-WORKS

One (1) 2000 HP AC variable frequency drive (VFD) draw-works with undernoted features / specification:

The Single or Dual Speed Gear Driven approximately 500 Short Ton (454 MT) capacity, 2000 HP (1491 kW) rated draw-works with single or dual speed gear box mounted directly onto the drum shaft. The drum shaft to be mounted on spherical roller bearings bolted to the draw-works frame. The drum directly driven by the single or dual speed gear box. The motor shaft to be connected to the gear box input shaft using a gear tooth coupling to reduce the overall size & weight and to reduce down time for motor replacement. Shifting between high/low speeds under no load/no speed conditions using air powered shifting mechanism for single or dual speed gear boxes. This feature to be integrated into the driller's Amphion or similar controls for the draw-works.
Primary/dynamic braking to be performed with AC motors by generating power into braking resistors. The motor and frequency drive should be capable of holding full load at zero speed. Load and speed is limited within motor capacity by the control system.
A pneumatically operated multi-plate disc brake system should be provided for parking and emergency situations, consisting of multi-plate air / water cooled discs with spring applied brake, static braking by springs expanding & forcing all the brake discs together (fail safe). The brake assembly is to be mounted to the end of the drum shaft & is secured to the drum support uprights.
This multi-plate disc brake system should be operated remotely via the draw-works Amphion or similar control system. Emergency brake controls on the draw-works should allow the load to be manually lowered using the multi-plate disc brake system and should be capable of holding full load.

1.1 Specifications:

Input Rating	: 2,000 HP (1491 kW)
Number of Motors	: 2
Hoisting Capacity	: 480 Short Ton (435 MT or 960,000 lbs) with 12 Lines
Nominal depth rating	: 6096 M (20,000 ft) with 4.1/2" OD drill pipe of length range 30-31 ft.
Drum Grooving	: Lebus Type either for 1.3/8" or 1.1/2" wire line.
Primary Brake	: Regenerative Type Braking System
Auxiliary Brake	: 1 (Multi disc type brake system) with locking device
Disc Brake Cooling	: Air / water
Safety Feature	: Dynamic Floor and Crown Saver System

2. AC CAGE INDUCTION MOTOR, VFD

Two (2) AC cage VFD induction motors in accordance with the following:
AC induction motors, designed specifically to handle jobs with typically heavy loads for continuous draw-works oilfield drilling duty. High quality materials, heavy duty construction, state of the art design technology and ISO 9001 manufacturing standards ensuring reliable performance in the naturally hostile oil rig environment.

2.1 Features:

Minimum 1100 HP continuous and 1400 HP intermittent, 3pH, 600V
VF continuous drive with constant torque
Class H VPI form wound
Approximately 7000 lbs
Two heavy duty anti-friction bearings, re-greaseable, insulated
Single shaft with hub
RTDs: 6 x PT100, 2 per phase in stator 2 x PT100
Main terminal box IP56
Differential Pressure Switch
Space Heater
Mounting dimensions same as GEB 28
Mounted Encoder, Avtron or similar
For others refer Chapter: 1.C.1 of Section 19

SECTION 2: MAST & SUBSTRUCTURE

1. MAST

One (1) "Swing lift" Cantilever Beam Leg Mast. Floor mounted cantilever open face mast, designed in accordance with latest API spec. 4F (PSL 1, SSL E2/U2). "Drilling and Well Servicing Structures".
Mast should be designed to accommodate a 500 Short Ton (454 MT or 1,000,000 lbs.) capacity portable top drive system.

2. MAST & ACCESSORIES

i. Minimum 142 ft. (43.28 M) clear height x 30 ft. (9.14 M) base mast stem, single front leg, single pin connected, with raising sheaves and shafts, cat line sheave brackets, and tugger sheave bracket.

ii. One (1) A-frame assembly consisting of one pair of front and rear A-frame legs with raising sheaves, mast drive pins, bolts & deadline anchor support mounted either on the mast leg or sub-structure basement or at any appropriate position on driller's side. Hydraulic snubbing system to be installed in 'A' frames allowing driller to have full control of "break-over" during the raising and lowering operation. The snubbing system should be complete with FLP electric motor driven hydraulic pumping unit & controls.

iii. Full height straight ladder (complete with carrier rail, clamps, safety cage & two safety belts) with at least three rest platforms between drill floor & crown. The ladder lengths should be equal to Mast Sections for ease of transportation

iv. Mast sections should be equipped with lifting eyes. Tested & certified.

v. Mast section should be so designed in order to meet the transportation dimensions as indicated in Section - 22 using heavy duty oilfield truck tractor / trailer.

vi. Mast should be designed to operate in humid weather environment with relative humidity ranging from 50 – 100% & temperature range of 6° C to 45° C.

MAST SPECIFICATIONS

Mast clear height	: Not less than 142 ft. (43.28 M)
Base width	: Not less than 30 ft. (9.14 M)
Static Hook load Capacity	: With 12 lines strung on traveling block, min. 500 Short Ton (454 MT or 1,000,000 lbs.)
Maximum wind load Capacity	: 115 mph (185 Kmph) - no setback
Maximum wind load Capacity	: 100 mph (160 Kmph) - with rated setback

WINDLOADING SPECIFIED TO MEET API 4F SPECIFICATIONS AND DESIGN CRITERIA.
(Note: The raising of the mast should be possible with 10 lines.)

vii. One (1) set of suitable capacity Leveling Equipment for Mast with shims, i.e. hydraulic jacks, hand pumps, hoses, gauges and connections. Bidder to indicate the capacity, make & model of offered jacks.

viii. Two (2) single mast boom kit 2.5 Short Ton (2.27 MT or 5,000 lbs) capacity, around 6.1 M (20 ft.) long boom & complete with 203.2 mm (8 inch) snatch blocks, brackets and support line for mounting on both the rear mast leg.

ix. One (1) set of mast raising lines with equalizer unit. (Draw-works & drill floor to be raised to drilling position by use of power from the draw-works & mast raising lines. Mast raising lines need only to be moved from 'A' frame sheaves to sheaves on drill floor elevators to complete rigging for erection.

x. One (1) 305 mm (12 inch) survey sheave unit, grooved .092" with tapered bearing mounted beneath crown frame at suitable place.

xi. Two (2) 355.6 mm (14 inch) tugger (cat line) sheave unit, grooved 5/8" wire line and swivel mounted, with tapered roller bearings, swivel mounted beneath crown frame.

xii. One (1) 55 Short Ton (50 MT or 110,000 lbs) hanging pad eyes for hanging the traveling block & top drive.

(Note: All pad eyes to be tested to one & half the S.W.L & certified according to API. All pad eyes to be painted safety yellow & marked with the SWL limit.)

xiii. One (1) block hanging line to hold traveling block when slipping drill line, approx. 108' long x 1-1/4" (33 M x 31.75 mm).

xiv. Four (4) sets of Dual Stand pipe Clamps for 127 mm (5 inch) diameter standpipe to be provided on off-Driller's side of Mast complete with clamp cups & bolts.

xv. One (1) set of mast stands equipped with lifting pad eyes (one around 1.8 M (6 ft) high for supporting the mast during assembly & another around 4.9 M (16 ft) high for supporting the mast during assembly of racking board) & complete with wooden headrest.

xvi. Access platforms (fold up) with safety belt rope connecting loop to be provided at:

a) Stand pipe gooseneck connection.
b) Casing stabbing board.
b) Sheave unit lubrication position.
b) The platforms less handrails.

xvii. Pad eyes mounted in mast to accommodate:

Two (2) – 10 Short Ton (9 MT or 20,000 Lbs) cat line sheaves
One (1) – 10 Short Ton (9 MT or 20,000 Lbs) core line unit
One (1) – 55 Short Ton (50 MT or 110,000 Lbs) hang-off line for traveling block

3. RACKING PLATFORM

Heavy duty Racking Platform with a Capacity for racking at least 220 stands (in thribbles) of 5" O.D. drill pipe of Range-II and 8 stands (in thribbles) of 8" drill collar and 4 stands of 9 ½" / 10" drill collar. The length of each single will be in the range 9.14 M to 9.44 M (30 ft to 31 ft) & hence the thribbles length will be 27.43 M to 28.35 M (90 ft to 93 ft).

I. It should be side racking type with adjustable & foldable centre diving board with hinged extension.

II. Adjustable from 25 M to 26.5 M (82 ft to 87 ft) above drill floor level complete & complete with safety chains on all fingers and expanded metal 2' wide walkways on three sides.

III. Fold up floor slab on the fingers on the driller's side (initially the pipes will be racked in fingers on off-driller's side till it is full, during this time the fingers on driller's side will remain covered with foldable floor slab for safety reasons).

IV. Racking board access platform with at least 1 M (3'-6") high Handrails & toe plate on three sides.

V. Geronimo escape line system (EED) with easy and safe access.

VI. One (1) Sure-Lock retractable lifeline complete with ground brackets & to be mounted above diving board.

VII. Mounting bracket to accommodate pullback winch.

4. TUBING (BELLY BOARD)

One (1) tubing support frame (no fingers) mounted at around 45' elevation above drill floor, complete with walkway, and 1 M (3'-6") high handrails with toe plates and access to mast ladder.

5. TONG COUNTERWEIGHTS

Two (2) sets of tong counterweight buckets mounted on mast leg & complete with guides, snatch blocks, wire lines, etc.

One (1) spin-up wrench counterweight bucket, guide and sheave unit, located at convenient place towards the off-driller's side.

6. CROWN BLOCK ASSEMBLY

One (1) 650 Short Ton (590 MT or 1,300,000 lbs.) capacity Crown Block Assembly conforming to API Specification 4F & consisting of:

I. Working cluster consisting of at least six (6) nos. of minimum 60" (1524 mm) diameter sheaves, grooved for 1-3/8" or 1-1/2" diameter wire line complete with tapered roller bearings. Shaft drilled with greased fitting for each bearing with grease seals.
II. One (1) no. of minimum 60" (1524 mm) diameter fast line sheave, grooved for 1-3/8" or 1-1/2", complete with bearing shaft and grease seals.
III. The cluster & fast line assemblies to be mounted on a high strength minimum weight crown frame fabricated from steel shapes and plate.
IV. One (1) set of wooden bumper blocks for safety.
V. Shaft mounting pedestals for working cluster and fast line sheave.
VI. Line guards complete with sheave guard.
VII. Crown safety platform with checker plate flooring with at least 1 M (3'-6") high handrails and toe plates, safety gate at ladder opening, and frame lifting eyes.
VIII. A suitably rated rotating jib crane mounted on crown platform, complete with snatch block, pulleys, etc. to be used for sheave repair / replacement.
IX. One (1) 20" (508 mm) diameter core line sheave unit, grooved for 9/16" dia. Wire line mounted on tapered bearings (with hanging pad eyes).
X. Two (2) 16" (406 mm) diameter cat line sheave units, grooved for 5/8" dia. Wire line mounted on tapered bearings (with hanging pad eyes).
XI. Two (2) 14" (356 mm) diameter Air Hoist sheave units, grooved for 9/16" dia. Wire line mounted on tapered bearings (with hanging pad eyes).

7. CASING STABBING BOARD

One (1) air powered heavy duty counterbalanced Casing Stabbing Board with the following features:

I. Frame should be heavy duty, fabricated from beams.

II. Unit to permit travel from 7 M to 14 M (23 ft to 47 ft) above drill floor.

III. Platform should be raised and lowered by air operated chain hoist / wire line. The chain / wire-line attaches to the platform at a spring -loaded safety latch, ensuring that the safety latch engages at any loss of tension in the chain.

IV. The hoist should be equipped with a positive engaging brake.

V. The platform should include a foot operated latch for fixing the platform at the desired elevation.

VI. The platform and handrails should fold against the tracks when the unit is out of service.

8. SUBSTRUCTURE

One (1) Light Weight Substructure designed to split for transport. Substructure section should be so designed in order to meet the transportation dimensions as indicated in Section - 22 using heavy duty oilfield truck tractor / trailer.

SPECIFICATIONS

Height and Base:
Floor – Minimum **25'** (**7.62 M**) overall height with at least **21'** (**6.40 M**) clear height under rotary beams.

Minimum Floor Dimensions:
Length – **35'** (**10.67 M**) x Width – **40'** (**12.19 M**)
(*Excluding the Doghouse and ODS wing supports.)*

Capacities:
Setback – Minimum 300 Short Ton (272 MT or 600,000 lbs).
Rotary – Minimum 500 Short Ton (454 MT or 1,000,000 lbs).
Designed to accommodates – 2000 HP VFD Draw-works
(Note: The setback load is simultaneous with the hook load & /or the rotary load)

9. RIG-UP

I. The swing lift self elevating substructure with aforesaid drill floor should be supported by welded box sub-bases around 18 M (59 ft) long x 2.4 M (8 ft) wide x 1.37 M (4 ft – 6 inches) high on both sides, including cross tie members to hold sub-bases apart during assembly & erection of the structure.

II. The sub-bases (bottom boxes) to be complete with Mast & 'A' Frame shoes, 0.6 M x 0.6 M (2 ft x 2 ft) access window on the Driller's side for Air, water & BOP closing lines entry and two 8 Cubic meter (50 Barrels US) capacity water tanks one in each sub-base near to the rear of the rig constructed of plate ends and top with man-ways & covers, a 50.8 mm (2 inch) diameter vent pipe and a 101.6 mm (4 inch) drain plug to be fitted.

III. Draw-works & drilling floor to be raised to drilling position by use of draw-works power & mast raising lines, no other rigging or wire line required. The process of rigging up the mast & floors using the draw-works power should complete in around 30-40 minutes including the time for mast pinning.

IV. Substructure should be complete with all bracing & support material while in an erect position and has been constructed in accordance to API 4F specification latest edition.

V. The 'A' frames to be assembled to sub-bases and are to be folded into them for transportation, the transport height should be approx. 2.7 M (9 ft). 'A' Frames can be erected with a Gin Pole Truck. No. 'A' Frame spreader is required. Front end of sub-bases (Bottom Box Extensions) can be removed for ease of entry of the BOP stack & during the drilling operation.

VI. Special alignment guides to be provided whereas applicable for faster assembling of components.

10. DRILL FLOOR

One (1) set of drill floor panels with ¼" thick checkered plate for the substructure and 3/8" thick checkered plate around the rotary area and should be complete with handrails 1 M (3'-6") high with toe plates for the perimeter of the drill floor. Most of the drill floor panels, handrails and floor mounting equipments to be set into position at ground level and raised with the Draw-works & setback support.
A minimum of four (4) lifting rings / slots for each section of the drill floor panel to be provided.

11. ROTARY BEAMS & ROTARY FLOOR SUPPORT UNITS

One (1) set of rotary beams & rotary floor support units designed to accommodate a 952.5 mm (37.1/2 inch) independent drive rotary table. The rotary floor should be flush with the drill floor / working floor.

12. ANTI-SLIP MATTING

One (1) set of anti-slip vinyl / rubber matting (maximum thickness 5 mm) for working area of around 3 feet (914 mm) circumferentially on floor all along the rotary table . The matting should be fixed over the checkered plate flooring.

13. ROTARY / SETBACK SPREADER

I. One (1) rotary/setback spreader complete with framed mouse hole opening, and recess to accommodate 6" (152mm) thick timber (or canvas reinforced rubber composite) over 3/8" (9.5mm) flat plate.

II. Pin tabs are equipped with drop through stops (safety locks).
III. Reinforced floor with 152.4 mm (6 inches) thick Timber or canvas reinforced rubber composite installed.

IV. The parallogram type setback support should be designed to support at least 300 Short Ton (272 MT or 600,000 lbs) of racked pipe simultaneously with 500 Short Ton (454 MT or 1,000,000 lbs) of casing load. The setback support is to be pinned to the Mast while in the horizontal position & raised with the mast.

14. GRASS HOPPER & CABLE ELEVATOR

One (1) Grasshopper type cable elevator with box for collecting cables for rig movement should be furnished.

15. STAIRS & HANDRAILS

Three (3) sets with 1 M (3'-6") handrails, two from substructure floor to ground and one from substructure to mud tank (stairs with serrated bar grating).
One (1) lot of 1 M (3'-6") high removable handrails (1 ¾" pipe) around perimeter of the working floor with toe board.

16. V-DOOR RAMP & STAIRS

One (1) around 7.62 M (25 ft) high ramp 1.8 M (6 ft) wide with 12.7 mm (½") thick plate down to the 1066.8 mm (42 inch) high catwalk elevation with framing and stairs continuing to ground level & complete with 76.2 mm (3 inch) diameter x 0.61 M (2 ft) high pipe rail on both sides of the ramp adjacent to the stairs.
The stairs to be located on the driller's side and should have 1 M (3'-6") removable handrails on one side only.

17. CATWALK

One (1) around 1066.8 mm (42 inch) high x 1524 mm (5 ft) wide x 14.6 M (48 ft) long catwalk, made in two sections (length wise). Top with 9.5 mm (3/8 inch) thick smooth MS plate with 19 mm (¾ inch) plate x 1524 mm (5 ft) long on ramp end & catwalk end bumper stopper and complete with anchor post & lift eyes for each section.

18. TONG BACK-UP

Set of two (2) tong back up supports bolted to rig floor.

19. PEDASTALS FOR AIR WINCHES

Two (2) mounting pedestals for air winches located on drill floor (one on driller's side & other on off-Driller's side).

20. RATHOLE & MOUSEHOLE

To provide openings for rat hole and mouse hole assemblies. O.D. – 273 mm (10-3/4 inch)
One (1) Rat hole guide for drilling out rat hole at ground level.

21. RECEPTACLE FOR IRON ROUGHNECK

One (1) suitable receptacle should be provided on rig floor at appropriate position for installation of Iron Roughneck (Similar to ST-80C2 of National Oilwell Varco).

22. DOGHOUSE AND ODS TOOL ROOM SUPPORTS

Two (2) sets of folding floor modules supports to accommodate doghouse on driller's side & tool room on off-Driller's side each on two (2) supports. Support pins to driller's and off-driller's side floor elevator boxes.

23. DOGHOUSE / DRILLER'S CABIN

As described in Section – 13.

24. TOOL ROOM

One (1) tool room not less than 3.66 M (12 ft) long x 2.44 M (8 ft) wide x 2.44 M (8 ft) high mounted on a three runner skid with load rolls. Exterior side panels fabricated of 4.76 mm (3/16") crimped wall panels and top of skid deck covered with 6.35 mm (¼ inch) checkered plate, doghouse should be complete with:
One (1) personnel door

One (1) window to view well
One (1) window to view exterior
One (1) ladder for roof access
Two (2) tool box/bench 8ft long
One (1) set of interior lights

25. DRILLING LINE SPOOLER, HYDRAULIC DRIVE

One (1) electric / hydraulic powered drilling line spooler, Capacity: not less than 1524 M (5,000 ft) of 1.3/8" or 1.1/2" diameter wire rope, designed to spool, unspool and store drilling line.

FEATURES -

i. The customer supplied steel spool of wire rope is installed on the spooler shaft where it is driven by adjustable pins. The dimensions of steel spool are:
   Maximum OD = 1.88 M (74")
   Maximum outer width (flange to flange) = 1.448 M (57")
   Maximum flange thickness = 101 mm (4")
   Central bore diameter = 130 mm (+1 mm, –0 mm)

ii. Split pillow block bearing housings allow for easy removal and installation of the spooler shaft for wire rope spool replacement.

iii. The spooler shaft chain drive is engaged by the motor sprocket to provide a positive drive for the wire rope spool. It can be dis-engaged to allow the spool to free wheel.

iv. The spooler shaft and drive assembly is mounted on a heavy duty structural steel frame.

v. Lifting lugs and tie-down bolt holes are provided on the spooler frame for handling and field installation.

26. DRILLING / CASING LINE

One (1) reel / spool of 1.3/8" or 1.1/2" drilling / casing line, 6 X 19, Right Regular Lay, IWRC, IPS, length approximately 1524 M (5000'), conforming to API Spec. 9A latest edition & with API monogram embossed. The dimensions of spool should meet the dimensions specified under the heading "DRILLING LINE SPOOLER, HYDRAULIC DRIVE".

27. FALL ARRESTER WITH FULL BODY HARNESS

Two (2) Self retracting lifeline with 20 M (65 ft) of 3/16" galvanized cable and a full arrest body harness.

28. BOP TROLLEY BEAMS & BOP HANDLING SYSTEM

One (1) set of BOP trolley beams designed to pin under the substructure floor allowing for front entry of BOP stack.
One (1) set of complete pneumatically / hydraulically operated BOP handling system complete with necessary trolleys, hoist, etc. with a system capacity of not less than 20 Short Ton (18.14 MT or 40,000 lbs) having vertical lift of around 4.3 M (14 feet).

29. ESCAPE SLIDE

One (1) escape slide constructed in steel designed to suit the floor height and to move personnel from the rig floor in an emergency to be provided on driller's side. Escape slide to break down into transportable sections with limitations as indicated in Section - 22.

30. AIR WINCH FOR RACKING BOARD

One (1) Ingersoll-Rand make BU7A Classic Air Winch for Racking Board having a capacity of at least 0.5 Short Ton (0.45 MT or 1000 lbs) having the following features:

I. Enclosed construction which excludes dirt and dust, seals in oil and grease, and assures complete lubrication of all moving parts.

II. Ball and roller bearings reduce friction.

III. Reliable band type brake for holding rated load.

IV. Disengaging clutch (permits freewheeling of the rope drum for hand unwinding).

V. Powerful radial piston air motor gives positive starting with precise control.

VI. Self-closing throttle shuts off automatically when released, giving well graduated control for spotting loads.

VII. Reversible motor permits full control of load by the throttle when lifting, lowering and pulling.

VIII. Throttle Valve is designed to eliminate air leakage when the winch is idle.

IX. Minimum 3.5:1 design factor at first layer stall load.

X. Minimum 5:1 design factor at half drum load rating.

XI. Includes Drum Guard

XII. 1000 lbs Capacity (Mid Layer Rated)

31. AIR WINCH (MAN-RIDER)

One (1) Ingersoll-Rand make FA2MRA-24MA1G Air Winch having the following features:
- ANSI/ASME A10.22 rated Man rider winch

I. Personnel Ratings at 8 to 1 design factors:
- 1.1 Short Ton (1 MT or 2200 lbs) capacity
- 28 mts./min. (92 fpm) line speed up (at 2200 lbs)
- 21 mts./min. (71 fpm) line speed down (at 2200 lbs)

II. Utility Ratings at 5 to 1 design factors:
- 1.76 Short Ton (1.6 MT or 3520 lbs) capacity
- 20 mts./min. 66 fpm line speed down (at 3520 lbs)
- Battery powered line speed monitor with 120 volt charger
- Dual drum brakes, one automatic and one manual
- Up and down limit switches
- Winch mounted control with automatic spring return “lift & shift” double action throttle lever to prevents accidental starts
- Drum Guard
- 122 M (400 ft) of 12.7 mm (½ inch) wire rope spooled on drum (IWRC, EIPS, 6 x 36, RRL, non-rotating)

32. AIR WINCH (DRILLING USE)

Two (2) Ingersoll-Rand make Model FA5A-24XK1G Air Winch having the following features:

I. Force-Five 'Third Generation' air winch

II. 5 short Ton (4.54 MT or 10,000 lbs) Line pull (half drum)

III. Variable line speed to 50 fpm (half drum)

IV. 4 short Ton (3.63 MT or 8000 lbs) line pull (full drum)

V. Variable line speed to 62 fpm (full drum)

VI. First layer (max) stall should be 8.5 Short Ton (7.7 MT or 17,000 lbs).

VII. Average cfm: 700

VIII. 610 mm (24 inch) drum length

IX. Automatic disc brake

X. Winch mounted throttle control

XI. Drum guard

XII. Filter (with drain)

XIII. Lubricator

XIV. Strainer

XV. Muffler

Meets ASME 30.7 Safety Standard & should be complete with One (1) 183 M (600 ft) of 5/8" wire rope spooled on drum (IWRC, EIPS, 6 x 36, RRL, bright, Non-rotating)

CHECK LIST & DOCUMENTATIONS FOR SECTION 1 & 2

TECHNICAL

Sl. No.	PARAMETERS/REQUIREMENTS			BIDDER'S OFFER (To indicate details or yes/no, as applicable)	REMARKS, IF ANY
1	Draw-works	a	Input Horsepower		
		b	Nominal Depth Rating		
		c	Hoisting Capacity		
		d	Drilling line size		
		e	Lubrication system		
		f	Greasing System		
		g	Auxilary brake		
2	Mast	a	Clear Height from ground		
		b	Static hook load Capacity		
		c	Wind load resistance		
3	Crown Block	a	Capacity		
		b	No. of Sheaves		
		c	Drilling line diameter		
4	Racking / Tubing Board	a	Capacity		
		b	Adjustable height range		
5	Sub-structure	a	Static rotary capacity		

		b	Pipe set back capacity		
		c	Combined capacity		
		d	Work floor dimensions		

DOCUMENTATIONS

Sl. No.	DESCRIPTIONS	DOCUMENT ENCLOSED Yes or No	REMARKS, IF ANY
1	Technical leaflets with detailed dimensional diagram and specifications, Make & Model of draw-works, auxilary brake, mast, sub-structure, etc.		
2	Copies of API Certificates & Authorizations (if any)		

Signature _____
Name _____
Designation _____
Date _____

SECTION 3: DEADLINE ANCHOR

One (1) 50 Short Ton (45.4 MT or 100,000 lbs) minimum capacity, National Oilwell Varco or Dreco make deadline anchor suitable for use with 1.3/8" or 1.1/2" casing / drilling line. The deadline anchor should be designed and manufactured to API Specification 8C latest edition, PSL-1. The deadline anchor should be installed in an easily accessible safe place.

SECTION 4: HYDRAULIC CATHEADS

1. Two (2) Hydraulic Catheads, National Oilwell Varco make, mounted on a heavy fabricated steel main frame & tied down to rig flooring for use in conjunction with tongs on the drill floor to either make-up or break-out tool joints in the drill string & mouse hole.

I.	Type of Catheads	:	Hydraulic
II.	Operating Line pull (min.)	:	11.8 MT (26000 lbs) @ 2000 psi to 14.7 MT (32500 lbs) @ 2500 psi
III.	Speed	:	0 to 1.5 feet/sec @ 29 GPM
IV.	Stroke	:	2.13 M (84 inch)
V.	Cylinder Stroke	:	1.07 M (42 inch)
VI.	Load indicator	:	directly in lbs. of line pull
VII.	Wire Line	:	5/8" or 7/8" Diameter around 12.2 M (40 ft) long (API 9A)
VIII.	Hydraulic Flow Requirement	:	29 to 35 US GPM (110 to 132 lpm)
IX.	Operating Pressure Range	;	2,000 to 2,500 psi (140 to 172 bar)
X.	Line Swivel Capacity	:	90°

2. A remote control panel for the electrically driven hydraulic power unit (for selecting cathead 1 or 2) & all required lines, accessories, etc. for operating the hydraulic cathead.

SECTION 5: ROTATING & HOISTING EQUIPMENTS

1. ROTARY TABLE

One (1) 37.1/2" Rectangular base Rotary Table with cover conforming to API Specification 7K latest edition & with following specification:

Opening	:	37.1/2" (952.5 mm)
Static Load Rating	:	Approximately 650 Short Ton (590 MT or 1,300,000 lbs) 5850 kN
Max. Speed	:	Not less than 300 RPM
Centre line spacing	:	53.1/4" (1352.55 mm)

2. INDEPENDENT ROTARY TABLE DRIVE

One (1) suitable independent rotary drive for 37.1/2" rotary table complete with AC Motor, suitable drive system, Inertia Disc Brake for IRD Component & full guard.

i) MOTOR FOR INDEPENDENT ROTARY TABLE DRIVE

One (1) Variable speed AC Motor having following specification:
Rated power: Minimum 1100 HP
Rated voltage: 600 V
Cooling type: Air forced ventilation 3200 cfm @ 8 inch WC

3. MASTER BUSHING

One (1) split body pin drive master bushing for 37.1/2" Rotary Table, complete with API No.3 bowl,
Lifting sling, and bit breaker plate.

4. INSERT BOWLS

i) One (1) API No. 1 insert bowl for 37.1/2" Rotary Table for use with 11.3/4" – 13.3/8" pipe or casing complete with lifting sling.

ii) One (1) API No. 2 insert bowl for 37.1/2" Rotary Table for use with 9.5/8" – 10.3/4" pipe or casing complete with lifting sling.

5. SPLIT CASING BUSHING

One (1) 37.1/2" x 20" split casing bushing with lifting sling for 37.1/2" Rotary Table.

6. MUD GUARD

One (1) mud guard complete with lifting eyes & chain for 5" Drill Pipe.

7. TRAVELING BLOCK

One (1) 500 Short Ton (454 MT or 1,000,000 lbs) capacity traveling block conforming to API Specification 8C latest edition & with following features & specification:

i) Features:
Heavy Steel Fabricated Main Frame
Heavy Wireline Guards
Steel Sheaves with Flame Hardened API Wireline Grooves
Tapered Roller Bearings in Sheaves

Oil Quenched and Tempered Alloy Steel Pin with Individual Grease Passages to Each Center Pin Bearing
High Strength Steel Beckett

ii) Specifications:

Load Capacity	: 500 Short Ton (454 MT or 1,000,000 lbs)
Lift eye Capacity	: 65 Short Ton (59 MT or 130,000 lbs)
Number of Sheaves	: 6
Minimum Sheave Diameter	: 1270 mm (50”)
Wire line size	: 1.3/8” or 1.1/2”
Approximate Shaft Diameter	: 254 mm (10”)
Coating	: Three Coat Epoxy Paint System
Standard Color	: Safety Yellow

SECTION 6: TOP DRIVE SYSTEM

One (1) 500 Short Ton (454 MT or 1,000,000 lbs) rated AC Top Drive System (Portable) complete with following:

1. Motor Housing, Motor Housing Guard, Onboard Hydraulic Power Unit, Roller-style Carriage, Bail, Pipe Handler, Integral Swivel with Gooseneck & 7500 psi "S-Pipe" assembly and a Shipping/Storage Skid. Drilling Fluids path pressure limit to be around 7,500 psi (517 bar).

2. The unit should be equipped with a 7,500 psi Wash Pipe assembly, forced air cooled AC Drilling Motors (800 HP Total), a 10.5:1 Double Reduction, Helical, quiet Gear Drive, Hydraulic Disc Brakes, Powered Rotating Head, Bail, and Counterbalance with Stand Jump.

3. ONBOARD PIPE HANDLER

The on-board Pipe Handler should be complete with 500 ton rated Link Adapter Assembly (Solid Body Elevator), remote operated, dual crank Upper IBOP Safety Valve, manually operated Lower IBOP Safety Valve, Lower Gripping Jaw (Torque Back-Up), and Hydraulic Link Tilt assembly. The Pipe Handler should be dressed for operation with an NC50 API RH tool joint.

4. ELECTRICAL PACKAGE

Package should include all Electrical Components (cables, cable glands, connectors, junction boxes, electrical solenoid valves, switches, mounting hardware, etc.) mounted on the Top Drive Motor Housing Assembly.
Service Loop Termination should preferably be on the RH side of the Top Drive. Solenoid Valves are operated with 24 Volts DC Power. Drive Motor cooling Blowers powered by 415 Volts, 3 phase, 50 Hz, 4 HP, TEFC motors.

5. HYDRAULIC PACKAGE

Package should include the Hydraulic Pump with Electric Motor, Misc. Hydraulic components. Directional Control Valves, Filters, Manifolds and general hydraulic piping components. Electrical components must comply with DGMS (India) requirements for use in Hazardous areas of Oil mines. (Refer DGMS approval clause J & K under General Notes).

6. CARRIER PACKAGE

Package should include a Carriage (Frame) with rollers for guiding the TDS in the Guide Beam and for reacting torque from the TDS to the Guide Beam. Also to include the hardware to secure the Carriage to the TDS and Locking Dogs to secure the TDS in the Shipping Skid.

7. PIPE HANDLER PACKAGE

Pipe Handler Package should provide for the functions of clamping onto the drill string to provide Back-Up for making and breaking of the Drill String tool joints at the Top Drive, opening and closing of Upper IBOP Valve and Hydraulic Elevator Link Tilt. Also to include in the package are one Upper IBOP valve, one Lower IBOP valve and one Saver Sub for an NC50 API RH tool joint complete with Locking Rings for the API 6-5/8" Reg connections. The Clamping Mechanism can be positioned to provide Back-Up for removal and installation of the Saver Subs, Lower IBOP Valve and Upper IBOP Valve.
This Package configured with IBOP Valves with H2S Trim and for use with 350 Ton Elevator Links.

8. COUNTERBALANCE PACKAGE

Counterbalance Package should include Counterbalance Cylinders and required hydraulic piping to integrate with Motor Housing Assembly Hydraulic Piping. For use with Bail lengths up to and including 120 inches and for applications utilizing a Hook, Block, Block Adapter or with a Counterbalance Beam.

9. S-PIPE PACKAGE

Package should include a 7500 psi capable S-Pipe with 20 degree elbow. The connection for the Rotary Hose should preferably be a Female, 4 inch Fig 1002 or Fig 1003 Union. Pressure rating of the package, as assembled at the factory, should be 7500 psi. The Rotary Hose connection should be on the Right Hand side of the TDS (viewing TDS from the front) and positioned toward the front of the TDS.
The Elbow should have an upper connection to the S-Pipe that is a Fig 1002 Union with the Female half being on the S-Pipe. The Elbow can be removed to have a 4" Female Fig 1002 Union pointing straight down for connection of the Rotary Hose directly to the S-Pipe.

10. BAIL PACKAGE

Package should include an API 500T Swivel Bail with a nominal length of 120 inches, Bail Pins with retaining devices, Bail Pin Bushings and Counterbalance Cylinder Mounting Brackets. All components should be factory installed on the TDS.
This package should be suitable for applications using a hook and applications utilizing an Adapter Becket. The 120" Bail to be used when direct coupling to a Traveling Block.

11. SHIPPING PACKAGE

Shipping Package should include Lower Section of Guide Beam integrated into a Shipping Skid, Shipping Support for Pipe Handler and Shipping / Lifting Bar for TDS Bail. Shipping Skid should be suitable for Tail Boarding and includes lifting shackles.

12. LUBRICATION KIT

Package should include TDS gear box lubricant, hydraulic system fluid and hand pump for high temperature service. Suitable for ambient temperatures of around 45°C.

13. TOOL KIT

Package to include a Lower IBOP Hex Wrench, Valve Seat Wrench and Valve Seat Puller, along with
a NC50 Saver Sub, a Spacer Sub and a Cross-over Sub for use during well-control procedures.

14. COUNTER BALANCE ATTACHMENT KIT

All required hardware for attaching the Counterbalance Cylinders to the Traveling Block, utilizing the included Counterbalance Beam.

15. GUIDE BEAM KIT

The guide beam to provide guided traveling of the Top Drive and torque reaction. Torque to be transmitted to the derrick/mast structure via the lower tieback. The lower tieback to be designed to interface with a horizontal spreader beam mounted at approximately 10 ft above the drill floor. The guide beam should consist of several segments, allowing easy rig-up / rig-down. Configured for the offered mast height.

16. BASIC TIEBACK KIT

Kit to include Tieback Link and hardware to tie the lower end of the Guide Beam to a Spreader Beam or structural member of Mast for lateral and torsional support of the Guide Beam. Also to include a Guide Beam Intermediate Tieback and a Guide Beam Hang off Link Tieback.

17. DRILLER'S CONSOLE

To features Operating Switches, RPM & Torque Meters, Indicator Lights, Throttle, etc. and housed in a purgeable stainless steel enclosure. Dual Camera video monitoring for top man area to be included at appropriate place for better control of operations by driller.

18. KIT, SERVICE LOOP

Kit to include the Power Cables from the point of Mast Termination to the Top Drive, the Auxiliary Power Cable from the Top Drive thru the Mast Termination & an additional 33.5 M (110 ft) and the Composite (Multi-conductor Control) Cable from the Top Drive thru the Mast Termination & an additional 110 feet. All cables to be provided with connectors on each end. Power Cables to be provided with 4 foot long leads at the Mast end and 3 foot long leads at the Top Drive end. All cables to be provided with means of securing to the Top Drive and Mast Termination points as well as Ring Assemblies to secure the cables together between the Top Drive and Derrick Termination points.

19. MAST LEG CABLE KIT

To includes three power cables and one ground cable (with suitable connectors on both ends) to run from the Mast Termination to the TDS Control House. The Kit should be suitable for a cable run length of 100 M (328 ft) from the Mast Termination to the Control House Termination Points. The Cables to be sheathed together as a single assembly for a length of 41.1 M (135 feet) from the Derrick Termination suspension point.

20. MAST TERMINATION KIT

To include mounting brackets for supporting the Power Loop at mid derrick, allowing for quick disconnect. Also includes Support Saddle for Composite Control Loop, plus mounting hardware.

21. VDC CABLE ASSEMBLY

Cable assembly should comprise of Twisted and Shield pairs of conductors for communication between the TDS Drillers Console and the TDS Control House. Including suitable connectors on each end of the Cable Assembly for connection to the Drillers Console and Control House.

22. CONNECTION KIT, INCOMING POWER CABLE

Kit should contain Connector Pins, which can be installed at the Power Source. VFD Incoming Power Cables will interface with these Pins, allowing quick disconnect of VFD / Control House Power at the source.

23. CABLE KIT, JUMPER

Should include Power and Composite cables. Cables connect between Control House and the Derrick Leg Cables.

24. CABLE KIT, INCOMING POWER

This cable kit is to be used to connect the incoming power from the source (generator set / transmission line) to the TDS Control House. A connector to be provided on each end of each power cable assembly.

25. U-BOLTS & CLAMP for 500 TON ELEVATOR LINK

Set of U-Bolts for accommodating 500 Ton capacity Elevator Links.
Clamp for accommodating 500 Ton capacity Elevator Links.

26. WELDLESS LINKS (As per API Spec. 8C)

One (1) pair of 350 Short Ton (317 MT) Capacity Weld less Links, 2-3/4" x 120" (70 mm x 3048 mm)
One (1) pair of 350 Short Ton (317 MT) Capacity Weld less Links, 2-3/4" x 132" (70 mm x 3353 mm)
One (1) pair of 500 Short Ton (454 MT) Capacity Weld less Links, 3-1/2" x 120" (89 mm x 3048 mm)
One (1) pair of 500 Short Ton (454 MT) Capacity Weld less Links, 3-1/2" x 132" (89 mm x 3353 mm)

27. WEAR GUIDE, MASTER BUSHING AND ADAPTER RING, WEAR GUIDE

Wear Guide Assembly to fit into Pin Drive Master Bushing and complete with "U" shaped Base Plate with split and hinged Wear Guide Ring. Assembly should protect the Master Bushing by limiting the movement of the Drill Pipe during drilling.
Adapter Ring should fit in the Master Bushing Wear Guide for use with drill pipes. The Adapter Rings to fit into the same Master Bushing Wear Guide Assembly. This is a component expected to wear in service.
The master bushing wear guide & adapter ring for wear guide for undernoted drill pipe range:
One (1) set for 3.1/2” to 5” OD drill pipes and
One (1) set for 5.1/2” to 6.5/8” OD drill pipes

SECTION 7: IRON ROUGHNECK

1. One (1) Iron Roughneck, installed on a single mounted socket in the rig floor. The Iron Roughneck should have a compact scissor-arm system to increase the clearance around well centre both during use and when stored.

2. Apart from the standard features the Iron Roughneck should also contain, but not limited to, the following features.

I. The control panel should feature hydraulic pilot controls, strategic placement of levers, system pressure gauge, torque adjust dial, arm adjust control and primary emergency stop.

II. Secondary emergency stop (hydraulic) on the lower arm.

III. Easy accessibility of the control valve and manifold.

IV. Soft Clamp

V. Easy hose routing and hoses should be labeled with port identification.

VI. Quick disconnect service loop couplings.

3. Specifications

I.	Mount	: Floor Socket Mounted
II.	Shut-off Valve	: Manual
III.	Pedestal Rotation	: ±90°
IV.	Hydraulic Requirements Minimum	: 28 GPM @ 2100 psi (106 LPM @ 145 bar)
		40 GPM @ 3000 psi (151 LPM @ 207 bar) Maximum
V.	Tubular Connection (Tool joint) O.D. range	: 4¼" to 8½"
VI.	Spin Speed	: 75 RPM (Nominal on 5" Drill Pipe)
VII.	Spin Torque	: 1,750 ft-lbs (2,373 Nm)
VIII.	Maximum Make up Torque	: 60,000 ft-lbs (81,500 Nm)
IX.	Maximum Break out Torque	: 80,000 ft-lbs (108,500 Nm)
X.	Connection Height	: 23" to 59" (584mm to 1,498mm)
XI.	Horizontal Travel	: 60" (1,524 mm)
XII.	Vertical Adjustment	: 36" or 72" (914mm or 1821mm)
XIII.	Torque Wrench Rotation	: 30°

NOTE: One (1) independent Hydraulic power unit, electrically driven & all required lines, accessories, etc. for providing the hydraulic requirements for operating the Iron Roughneck.

SECTION 8: HYDRAULIC POWER UNIT & CONTROLS

A hydraulic power unit with standard controls capable of providing the hydraulic requirements, simultaneously, for all the rig accessories requiring hydraulic power.

1. HYDRAULIC POWER UNIT (HPU)

The Hydraulic power Unit should be electrically driven and consist of electric motor, motor starter package, pump, reservoir, high pressure filters, system relief valve & oil conditioning system mounted on carbon steel fabricated skid. Skid to have four (4) point lift lugs & oil retention pan with Drain.

2. CONTROL PANEL

Suitable control panel for control of the equipment requiring hydraulic power.

SECTION 9: MUD PUMPS

Two (2) 1600 HP (1193 kW) rated Triplex Electric Motor Driven Mud Pumps, National Oilwell Model 12-P-160 or GD Model PZ-11 or Drillmec Model 12T1600 or BPCL Make or suitable equivalent with following specifications:

Note: Bidders offering equivalent model pumps, other than the three models mentioned above, should have to justify the reliability of the offered pumps with end user certification in original from minimum 3 parties outside country of manufacture. Bidders who have supplied similar or higher capacity pumps to OIL before Bid Closing date need not to provide such certification.

1. TYPE OF PUMP:

Slush pumps triplex single acting, horizontal piston pump with replaceable cylinder liners of various sizes to obtain desired discharge and pressure at rated SPM, complete with standard equipment. Pumps are to be skidded on master skidded with AC motor.

2. CAPACITY OF PUMP:

Input Horse Power rating	: 1600 HP (1193 kW)
Discharge	: Minimum 1575 LPM (416 US GPM) at 351 Kg/sq cm (5000 PSI)
	And 2700 LPM (713 US GPM) at 210 Kg/sq cm (2990 PSI)
Discharge pressure	: Max. 351 Kg/sq cm (5000 PSI)

The above parameters are to be obtained with replaceable liners and pistons at rated speed of the pump. Suitable liners to be fitted with pump at the time of supply to get maximum desired discharge of 3,000 – 3,127 LPM at working pressure.

3. SLUSH PUMP FEATURES:

a. Fully enclosed steel plate fabrication power end.
b. Double helical / herringbone gear for crankshaft gear and pinion shaft gear.
c. Double extended pinion shaft.
d. Self-aligning spherical main and pinion shaft bearing, Roller bearing at crank and crosshead end of connecting rod. (Bearing make should be Torrington, SKF, FAG, NTN or ARB only).
e. Interchangeable standard module (suction and discharge) with shot penned inner surface.
f. Fast change valve covers.
g. Two piece fast change piston rods with clamp.
h. Suction and discharge manifold with suction dampener.
i. Piston – liner lubricant spray system with AC 3 Ph. 50 Hz electric motor driven pump with reservoir.
j. Oil-bath and positive flow lubrication systems
k. External circulating lube oil pump and filter with AC motor, oil gauge and associated piping
l. The pump should be complete with all the components of fluid end and power end.
m. Provision for manual rotation of the crankshaft externally for maintenance purpose.

4. ACCESSORIES:

Each mud pump package should be assembled with the following accessories:

I. One (1) Discharge Strainer Cross Assembly complete with suitable strainer, 5" (125 mm) 5000 psi (351 Kg/sq cm) WP discharge flange connection, 4"(100 mm) – 5000 PSI (351

Kg/sq cm) WP top connection for pulsation dampener and 5" (125 mm) – 5000 PSI (351 Kg/sq cm) WP end connection for strainer clean out.

II. One (1) 3.1/2" ID (4" API LP thread) x 12'or15' (88.9 mm x 3,657.6 mm or 4,572.0 mm), vibrator hose Grade D, 5,000 PSI WP, 10,000 PSI TP with fig 1002/1003 integral union (male & female welded) & hose hobbles(both ends). Built & manufactured according to API spec 7K

III. One (1) Discharge Pulsation Dampener (Make- HYDRIL Model- K-20-5000), maximum service pressure 5000 PSI (351 Kg/sq cm), surge capacity 75 Litres (20 gallons). Connections – 4" (100 mm) API 5000 RTJ, Diaphragm – Hydrogenated Nitrile or equivalent.

IV. One (1) Pressure gauge (Make- OTECO), 0 – 6000 PSI range with 2" (50 mm) line pipe female connection, and there should be provision to isolate the gauge with a 2" (50 mm) flex seal valve (Make- OTECO)

V. One (1) Manual reset (type-B) relief valve, RR, 3"(75 mm) manual reset 1500 – 6000 PSI WP (Make- OTECO or RETSCO).

VI. One (1) Charging hose assy. For pulsation dampener

VII. One (1) Jib crane with trolley installed on pump to handle fluid end parts

VIII. One (1) Yale hand hoist, 1/2 ton LH 8 Ft lift

5. PUMP DRIVE AND MOTOR SKID:

Dual rear mounted V-belt electric motor pump drive for the offered mud pump, including extended skid frame, motor supports, tensioning screws, belt guards to be mounted on the master skid. Pumps are to be fitted with suitable sheaves (including hub) at both sides of pumps. Pump drive should be complete with banded V-belts for use with AC motor and belt guard.

6. PUMP DRIVE MOTOR:

I. Each mud pump shall be driven by two (2) heavy-duty AC Induction motor compatible with the mud pump

II. All the auxiliary motors for lube oil pump (if any) and liner flushing pump to be supplied by mud pump supplier should be rated as follows:

III. Voltage 3-phase, 415 V, 50 Hz. HP will depend on pump but shall be limited to 5 HP for each motor. RPM will depend on pump. Terminal box – fitted with double compression type FLP gland suitable for cable OD 14 mm. Enclosure – flameproof, suitable for use in hazardous area Zone-I gas group IIA & IIB.

7. MUD PUMP SPARE PARTS & SPECIAL TOOLS:

The following spare parts and tools should be included in the scope of supply. These spare parts & tools are to be quoted separately indicating part numbers in technical bid and prices in commercial bid respectively. The cost of these spares & tools will be considered for evaluation of the offers. However, OIL reserves the right to decide whether to purchase these spare parts along with the pump or not.

I. Spares for mud pump with required quantity:

a)	Liner 7”	:	30 No
b)	Liner 6”	:	36 No
c)	Piston Assembly 7”	:	48 No
d)	Piston Assembly 6”	:	60 No.
e)	Piston Rod complete	:	6 No.
f)	Valve seat	:	25 No.
g)	Valve assy. With polyurethane insert	:	100 No
h)	Valve Insert (polyurethane)	:	200 No
i)	Valve spring	:	24 Nos.
j)	Valve cover gasket	:	200 No
k)	Liner gasket, 7”	:	90 No
l)	Liner gasket, 6”	:	90 No
m)	Wear plate gasket	:	12 No
n)	Wear plate	:	6 No
o)	Suction module	:	3 No
p)	Discharge module	:	3 No
q)	Banded power belt	:	2 No

II. Special Tools:

a) One (1) no. of complete valve seat puller assembly (Type & Make to be specified) suitable for above mentioned valve seat.
b) One (1) set of special hand tools for fluid end maintenance must be included with each pump set to be supplied.
c) Suitable Stroke Counter Meter should be provided in each pump.

8. TECHNICAL CHECK LIST FOR MUD PUMP

[THE FOLLOWING CHECK LIST MUST BE COMPLETED AND RETURNED WITH THE OFFER. ALSO ENSURE THAT ALL THESE POINTS ARE COVERED IN YOUR OFFER. THESE WILL ENSURE THAT YOUR OFFER IS PROPERLY EVALUATED. PLEASE TICK MARK **‘YES’** OR **‘NO’** TO THE FOLLOWING QUESTIONS, IN THE RIGHT HAND COLUMN]

Sl. No.	Points	Remarks
1	Whether the Pump offered is rated for continuous operation at full load?	YES/ NO
2	Whether the input HP of the Pump set 1600 HP to obtain the desired Hydraulics as per our NIT.	YES/ NO
3	Whether the pump offered having double helical (herringbone) main gear & pinion shaft with double helix gear?	YES/ NO
4	Whether the offered pump sets are skidded on a master skid?	YES/ NO
5	Whether the pump is equipped with belt driven system as asked for?	YES/ NO
6	Whether auxiliary motors are flame proof and suitable for use in hazardous area?	YES/ NO
7	Whether auxiliary motors are CIMFR certified and DGMS approved?	YES/ NO
8	Whether detail specifications of Pump along with technical literature / catalogue /schematic layout (plan & elevation) of the pump offered enclosed with the offer?	YES/ NO

9	Whether spare parts for the offered pump will be available for next 10 years from now?	YES/ NO
10	Whether 3 sets of part list with part numbers, quantity and unit rate recommended for two years of operation are submitted along with the bid?	YES/ NO
11	Whether separately highlighted any deviation from the technical specification sought for?	YES/ NO
12	Whether Test Certificates of Pump will be submitted along with the supply?	YES/ NO
13	Whether Spares parts & Special tools for the pumps mentioned in Section – 9 para 7 will be supplied?	YES/ NO
14	Provision for manual rotation of the pump	YES/ NO

Offer Ref ..... Dated .....
OIL's Tender No..... Signed .....

For & on behalf of ..... Designation .....

SECTION 10: HIGH PRESSURE MUD PIPING

1. HIGH PRESSURE PIPING SYSTEM FOR TWO PUMPS AND DUAL STANDPIPE

One (1) dual 5" (127 mm) x 5,000 PSI (351 Kg/sq cm) WP high mud pressure delivery system for two mud pumps as follows:

I. Pressure gauge and relief valve (relief lines to suction tank) at each pump discharge.

II. Discharge of each pump complete with one 5" (127 mm) x 5,000 PSI (351 Kg/sq cm) WP BW gate valve and one (1) 5" fig 1002 or fig 1003 integral union.

III. Vibrator hoses installed at each pump discharge [3.1/2" ID (4" API LP thread) x 12'or15' (88.9 mm x 3,657.6 mm or 4,572.0 mm), vibrator hose Grade D, 5,000 PSI WP, 10,000 PSI TP with fig 1002/1003 integral union (male & female welded) & hose hobbles(both ends). Built & manufactured according to API spec 7K].

IV. 5" XXS substructure lines complete with integral unions at break points and heavy-duty clamps for mounting. Two vibrator hoses for connecting to standpipe manifold.

V. Dual standpipe manifold and high pressure piping.

VI. Goose neck with 4" Fig 1002 or fig 1003 Integral Union.

VII. One (1) Kill line kit consisting of a suitable length of XXS pipe (around 150 Mtrs.), swivel joints & integral unions.

VIII. One (1) 9.14 M (30 ft) long low pressure fill line hose with 2" fig 1002 or fig 1003 Integral union at each end.

IX. Sufficient no. of additional intermediate 5,000 PSI (351 Kg/sq cm) rated WP pipes to facilitate extension of the delivery pipe with flanged end up to 170 ft.; to meet the 15m (9m+6m) spacing between the wells in cluster locations.

2. NINE VALVE STANDPIPE MANIFOLD

Standpipe Manifold on the Drill Floor should include:

i. Mud Standpipe Manifold, 5" (127 mm) x 2" (50.8 mm) 5,000 psi (351 Kg/sq cm) WP, Standard Service.

ii. Mud Gate Valves, 5" (127 mm) Butt Weld XXS, Steel Buna Trim, Standard Service.

iii. Mud Gate Valves, 2" (50.8 mm) Butt Weld XXS, Steel Buna Trim, Standard Service.

iv. Gooseneck c/w Integral Bull Plug, 5" (127 mm) 5K Butt Weld XXS, Standard Service.

v. Forged Block Tee, 5" 5K Butt Weld XXS, Standard Service.

vi. Forged Reducing Block Tee, 5" (127 mm) x 2" (50.8 mm) 10K Butt Weld XXS, Standard Service.

vii. Integral Union,1502 Butt Weld XXS, Standard Service.

viii. Integral Union Sub c/w Nut, 5" Fig 1502 Male Butt Weld XXS, Standard Service.

ix. Integral Union Sub c/w Lip Seal, 2" Fig 1502 Female Butt Weld XXS, Standard Service.

x. Integral Union Suc/w Nut, 2" Fig 1502 Male Threaded End, Standard Service.

3. CEMENT STANDPIPES

One (1) single 2" XXS cement standpipe for suitable elevation including gooseneck and 2" Fig 1502 Integral union at gooseneck. Standpipe prepared for welding to rig floor manifold.

4. VIBRATOR HOSE

3.1/2" ID (4" API LP thread) x 12'or15' (88.9 mm x 3,657.6 or 4,572.0 mm), vibrator hose Grade D, 5,000 psi WP, 10,000 PSI TP with fig 1002/1003 integral union (male & female welded) & hose hobbles(both ends). Built & manufactured according to API spec 7K.

5. ROTARY HOSE

Two (2) 4" (101.6 mm) ID, 10,000 PSI (702 Kg/sq cm) test pressure, 5000 PSI (351 Kg/sq cm) Working Pressure rotary hoses with 4" Fig 1002 or fig 1003 Integral Union (Male x Female) as per API spec. 7K with Safety Clamp and Chain (on both ends) of appropriate length (bidder must indicate the length in technical bid).

SECTION 11: MUD & WATER SYSTEM

1. MUD & WATER TANK SYSTEM WITH ACCESSORIES:

One (1) Mud & Water Tank System consisting of the following:

1A: Active and Reservoir Mud Tanks: 3 + 3 = Six (6) tanks
- One (1) Shaker tank – 47.7 cum (300 Barrels US)
- One (1) Intermediate tank – 47.7 cum (300 Barrels US)
- One (1) Suction tank – 47.7 cum (300 Barrels US)
- Three (3) Reserve tanks of Capacity 47.7 cum (300 Barrels US) each (i.e. Total capacity: 900 Barrels US) complete with Mixing Pumps and Mud agitators

1B: Water / Chemical Tanks: Three (3) tanks

1C: Auxiliary Equipment & Accessories for the Mud Tank System:
- One (1) Mud Loading System
- One (1) Mud Pump Super Charger System
- One (1) Feed Pump System for Solid Control System

TECHNICAL DETAILS OF THE ABOVE:

1A: Active and Reservoir Mud Tanks:

Each mud tank should have approximately the following dimensions:
Length: 9900 mm (excluding 300 mm skid extension on each end for tail boarding)
Breadth: 2500 mm
Height: 2250 mm (excluding skid height)

i) Tank Walls: The walls of each of the tanks (including partition walls) are to be constructed with 8 mm thick MS crimped plates. Tank bottoms, to be constructed with 8 mm thick plain plates, should be sloped gradually to a maximum of 3" (75.0 mm) towards the tank cleaning doors to facilitate cleaning.

ii) Master Skid: The tanks should be mounted on three runner oilfield type skids fabricated from 300 mm beams (ISMB) reinforced with suitable channels and angles. The ends of the skid should project out from the tank by 300mm and curve upwards. 150 NB X Sch 80 pipe with provision for lifting should reinforce the end of the skids for tail boarding.

iii) Tank Doors: Two (2) clean out gates should be provided at the rear of each reserve, suction and intermediate tanks and three (3) clean out gates in the shaker tanks. These clean out gates shall be provided with 10" butterfly valves having firm support to withstand transport and handling abuses.

iv) Sand Traps of approx. 10 – 12 cum capacity are to be provided in the Shaker Tanks. Approx. 3" (75 mm) slope is to be maintained towards the clean out gate end.

v) Valves and Couplings: Dresser type pipe couplings, butterfly valves and dumb valves with flanged ends should be provided.

vi) Mud Channels and gates: Mud channel with diversion gates should be provided in all the tanks per the mud system requirement.

vii) Water, Mud and Equalizing Lines: Square tubings of sizes 152 X 6 mm and 101 X 6 mm shall be used for Mud rolling line and Water rim line respectively. Equalizing lines (273mm) should be

provided between shaker tank and intermediate tank with dresser type pipe couplings for end connections. These lines should be provided with suitably placed manifolds / isolating butterfly valves and gates etc. for separation or isolation of tanks or tank in the system. The rim line water tapping for mud system shall be with 1" NPT vertical insert and a plug (2 nos. for each tank). Suction lines of 250 mm (10") nominal dia with butterfly valves and Dresser type pipe couplings for two nos. of mud pumps should be provided in the Suction Tank and in the Intermediate Tank. The suction valves and suction valve system shall be supplied with 10" NB X 6.3 mm thick pipes. Mud hopper suction line of 200mm (8") nominal dia. With butterfly valve and Dresser type pipe coupling should be provided in the Suction Tank and all the reserve tanks.

viii) Tank Top, Handrails and Staircases: All tank top open spaces should be covered with iron serrated bar gratings (Heavy-duty grills) and should have sufficient support and fixing arrangements to ensure stiffness and ruggedness. Removable handrails at least 1 metre high with two-rail railings and 0.15 metre high toe board should be provided on the open side of the tanks per safety standards. All handrails should consist of top rail, knee rail and tick board. Stairways of 1000-mm width and 45 degree maximum angle with handrails as described above on both sides should be provided at convenient places for climbing on to the tanks from ground level and from cable tray to suction tank. These staircases shall be resting on the walkway and also wherever possible be permanently attached / anchored to the tanks. All tanks should have fixed staircases without handrails from tank top to tank bottom for going into the tank. The walkway arrangement shall be Folding type flush with tank top.

ix) Tank Volume Measuring Scale: All the tanks should be provided with permanently attached measuring scale made of anti-corrosive metal / alloy graduated in inch and foot to indicate volume per inch height.

x) Bottom Mud Gun: On the low pressure mud rolling lines a sufficient number of bottom mud guns complete with nipples, pipes, butterfly valves, hammer unions and a handle to rotate the gun from tank surface etc. should be provided in all the tanks.

xi) Mud Agitator: Each mud tank shall be equipped with mud agitators so positioned to have proper churning of mud, each complete with flameproof electric motor(s) of suitable hp (to be specified by the bidder) which shall operate on 415 Volts, 3-phase, 50 Hz AC power supply. The mud agitators should be of aerofoil design impeller and heli-bevel type gearbox. The turn-over rate of the agitators should be around 50 seconds.

xii) Provision for Mounting Solids Control Equipment: Provision should be kept for mounting / installing solids control equipment on the shale shaker and intermediate tanks. Two (2) shale shaker units, placed side by side, with shale slide, mounted on Shale Shaker Tank; one (1) desander unit mounted on shaker tank and one (1) mud cleaner with desilter unit mounted on suction / intermediate tank; one (1) centrifuge & one (1) vacuum degasser unit mounted at suitable place on intermediate & shaker tank respectively. The required partitions, outlets with 200 mm(8") butterfly valves and dresser type couplings should be provided in the shale shaker tank and intermediate tank for operating all these solid control equipment and degasser in the mud system. The skid with feed pumps to all these equipment should be placed in front of the shale shaker/ intermediate tank near their interconnections. A common manifold for suction and delivery of the feed pumps for solid control equipment is to be provided with isolating valves to use either of the two pumps to feed desander, desilter or degasser.

xiii) Surface Preparation/ Sand Blasting/ Painting: All oil deposits should be removed by using approved de-greasing agents with special attention to drilled holes, bolt holes etc. The tanks shall be sand-blasted and painted with one coat of inorganic zinc primer 70 microns in thickness and two coats of Repack high build polyurethane.

xiv) Electrical Earthing System:

a) Each mud tank should have two nos. of GI straps 50 X 6 mm mounted on the out side of the walls facing mud pumps and mud mix skid side.
b) The straps 50 X 6 mm should be welded to the sturdy supports that are welded to the tank wall. The gap between tank wall and strap: 50mm. Spacing between supports: 1000mm. The strap length should be the same as the tank length/ width. Gap between straps should be 150mm.
c) Holes to be drilled in each strap are: (a) one no of 15mm dia. Hole near each agitator (b) two nos. of 15mm dia. Holes with a spacing of 100mm near each strap end.
d) Straps should be mounted at a convenient height for ease of connection.
e) Galvanization of the straps should be of the high quality to withstand the corrosive environment. 2 nos. each 25 X 3 mm GI strips shall be welded to the main strips and the agitator skids (approx. perpendicular to the main strips 50 X 6mm).
f) Two (2) GI straps of size 50 X 6 mm shall be suitably mounted on each skid to facilitate independent double earthing of the pump motors.
g) Holes to be drilled in each strap are: a) two nos. of 15 mm dia holes with a spacing of 100 mm near each motor b) two nos. of 15 mm dia holes with a spacing of 100 mm near each strap end.
h) Foldable type hangers should be mounted on tank wall below the earthing straps to support the mud system cables. Spacing between hangers should be 1000mm. Width of the hangers: 300mm

xv) Mounting of Push button station: Mounting assembly for push button station of each mud/ water tank agitator to be welded to the tank near respective agitator assembly.

xvi) Mud Pill Chamber: A chamber of approx. 12 cum (75 Barrels US) capacity with isolating valves should be provided inside the suction tank for preparation of special mud pills. A suitable sized agitator of stainless steel 304 Aerofoil 3 blade design of approx. dia 36" coupled with flameproof electric drive motor of maximum 10-hp capacity should be provided in this chamber for proper mixing of the mud additives. The pill tank agitator is to be such that it should not foul with the bottom/ internal piping. This chamber should be connected with the suction line for the rig pumps and also with an independent line from the mud loading system with isolating valves.

xvii) Chemical Operator's Cabin: One (1) cabin of size approximately 4.2 m long x 2 m wide x 2.5 m high skid-mounted cabin with proper heat insulation & ventilation, complete with one sliding door, safety glass windows, adequate provision for keeping mud testing equipment and accommodating 2 (two) persons, and with tool box, oilfield mud balance such as Baroid and MF viscometer. The cabin should be placed near the intermediate tank at the level of the walkways.

Tank should be covered with steel collapsible type stackable system and adequate individual lighting arrangement and ventilation facility.

1B: Water / Chemical Tanks:

Three (3) water/chemical tanks fabricated as detailed above for item 1(A) and having approx. dimensions:

Length : 9900 mm (excluding 300 mm skid extension on each end for tail boarding)
Breadth : 2500 mm
Height : 2250 mm (excluding skid height)
Capacity : 47.7 cum (300 Barrels US)

i) Master Skid for Water / Chemical Tank: One Master Skid having 4 runners with a dimension of 3.05 M (10 ft) wide x 9.75 M (32 ft) long for placing the three water tanks. The skid should be fitted with two nos. of centrifugal pumps (as Water Booster) having a minimum flow rate of 80 cum per hour and with 55 mtr. Head driven by suitable explosion proof 415 volts, 50 Hz, 3 phase electric motors and complete with suction and discharge lines for operation of either or both pumps

ii) The following features should be provided in the water / chemical tanks: -

a. Two tanks should have open top and one tank should have covered top with two manholes.
b. Both the open top tanks should be covered with the serrated floorings as described above at 1A(viii).
c. 2" line size hopper shall be fabricated and assembled on one open tank. The maximum height of the hopper shall be limited to the height of the mud agitator and should not exceed 3400 mm.
d. Small, rugged, collapsible type platforms of preferable size 2000 mm (L) x 2000 mm (B) x 500 mm (H) should be provided near the hopper to stack a few sacks of chemicals prior to loading.
e. All the three tanks should be provided with strongly built sturdy ladder both from inside and outside the tanks. Handrails are to be provided for the two (2) open-top tanks with bar grating platforms and walkway between the two tanks.
f. Two (2) clean out gates should be provided at the rear side of each tank. These gates should be provided with 12" Butterfly valves. Approx. 3" (75 mm) slope is to be maintained towards the clean out gate side.
g. All the tanks should be provided with 100 mm drain out plug at the floor of the tanks.
h. The open tanks should be provided with permanently attached measuring scale made out of anti-corrosive metal / alloy graduated in inch and foot to indicate volume per inch height.
i. The inlet feed line shall be supplied with 100 mm (4") Sch.40 ASTM 106 Grade 'B' pipes with butterfly valve and should be anchored firmly with the sidewall of the tank. The rim line water tapping for water tanks shall be with 1" NPT vertical insert and a plug (2 nos. for each tank).
j. All the tanks shall be provided with 152.4mm (6") Sch.40 ASTM 106 Grade 'B' pipes with butterfly valve in the front side of the tanks.
k. The open top tanks should be provided with bottom guns at four sides of the tanks with rotating (180^0) facility from the tank top.
l. Each open-top tank should be provided with two (2) agitators having heli-bevel type gear box.The mud agitators shall be with stainless steel 304 Aerofoil 3 blade design of approx. dia 36". The agitators should be driven by maximum 10 hp, 415 volts, 3-phase, 50 Hz horizontal foot mounted, squirrel cage rotor induction motor with bi-directional cooling fan at NDE. The motor should be fully enclosed fan cooled and offering protection to IP55. Insulation: Class F but the temperature rise should be limited to that of Class B. Earthing: Two nos. of earth points on the enclosure and one no. inside the terminal box. Termination: Motors should have terminal box with studs for connection of supply cable. Canopy: Motors should be provided with a removable type canopy for protection against rain. Canopies should be supported on agitator skids. Paint: Motors should be painted with epoxy paint of DA Grey shade.
m. One of the chemical mixing tanks should have two chambers. One of the chambers should have 100-150 bbl capacity. Both the chambers should have independent suction line and one agitator each. Both the chambers should be connected to hopper for chemical mixing independently with suitable valve arrangements.

iii) The overall height of the tanks including the agitators should not exceed 3400 mm for transport limitations.

iv) Two (2) 75 HP electric motor driven horizontal multistage centrifugal pumps set complete with piping/ Dresser type couplings and butterfly valves should be mounted on an independent three runner oilfield skid. These pump sets will be used to load chemicals through hoppers to water tanks, to gun the mixture and to feed chemical-mixed (gauging) water in the cement hopper for preparation of cement slurry. The two horizontal multi stage centrifugal pumps should have cast steel body, bronze / cast iron impeller, EN 8 shaft with gland type packing and each should be capable of developing 150 m. of head. The discharge of each pump should be about 60.0 m^3 / hr at 1450 rpm.

1C: Auxiliary Equipment & Accessories for the Mud Tank System:

i) Mud Loading System: One (1)
ii) Mud Pump Super Charger System: One (1)
iii) Feed Pump System for Solid Control System: One (1)

i) Mud Loading System:

The following equipment should be mounted on an oilfield three runner skid and top floor with inter connections through piping, dresser type couplings and butterfly valves:

a) Centrifugal Pump sets: Two (2) centrifugal pumps of Mission Magnum – I or equivalent make of size 8" x 6" x 14" with approx. 14" size impeller. The mud mix system shall be provided with 10" suction valve system with 8" suction header.
Each pump will be coupled to a 100 hp, 415 Volts, 3-phase, 50 Hz 1500-rpm flameproof weatherproof electric motor. The motors, starters and the cable glands should be suitable for use in hazardous areas and duly certified by CIMFR (UL or the equivalent certifying authority of the country of origin)and approved by DGMS for Zone I and Gas group IIA & IIB of Oil Mines.
The bidder should submit copies of CIMFR certificates (UL or the equivalent certifying authority of the country of origin) & DGMS approvals for all the flameproof electric motors, starters and cable glands with the quotation. UL certification shall be considered as equivalent to CIMFR (India) certification; however DGMS (India) approval shall be binding and final for all equipments to be used in Hazardous areas as per DGMS Guidelines/ Directive. (Refer DGMS approval clause J & K under General Notes).

b) Loading Hoppers: Four (4) hoppers shall be provided for Bentonite / Barite loading. Two (2) hoppers should be suitable for use for loading barites and two (2) other hoppers coupled with two (2) High Performance Aqua-Shear Jet Shearing / Mixing System capable of handling 1000 GPM of fluid, should be suitable for loading polymer chemicals. The Jet shearing system shall be provided with hopper having 4" line size on a separate skid which shall be placed on one active Active mud mix tank and one on Reserve tank. The inlet and outlet of the jet shearing system shall be connected to one of the mud mix hopper lines with necessary isolation valves. All line connections are to be made in such a way that all the hoppers can be operated simultaneously if situation arises.

ii) Two Mud Pump Supercharging System:

Two (2) 8" x 6" x 14" size Mission Magnum – I or equivalent pumps with approx.14" impeller should be suitably positioned and mounted on a three runner oilfield skid and floor with inter connections through piping, dresser type couplings and butterfly valves to super-charge the mud pumps suction. Gap between supercharger system and mud tank shall be approx. 900 mm to facilitate / ease of slinging of supercharger skid. The supercharger system shall be provided with 10" isolation Butterfly valves and 10" suction header.
Each pump will be coupled to a 100 hp, 415 Volts, 3-phase, 50 Hz 1500-rpm flameproof weatherproof electric motor. The motors, starters and the cable glands should be suitable for use in hazardous areas and duly certified by CIMFR (UL or the equivalent certifying authority of the country of origin)and approved by DGMS for Zone I and Gas group IIA & IIB of Oil Mines.
The bidder should submit copies of CIMFR certificates (UL or the equivalent certifying authority of the country of origin) & DGMS approvals for all the flameproof electric motors, starters and cable glands with the quotation. UL certification shall be considered as equivalent to CIMFR (India) certification; however DGMS (India) approval shall be binding and final for all equipments to be used in Hazardous areas as per DGMS Guidelines/ Directive. (Refer DGMS approval clause J & K under General Notes).

iii) Feed Pump System for Solid Control System:

Desander, Desilter, centrifuge and Degasser Feed Pump Set: Two (2) 8" x 6" x 14" size Mission Magnum – I or equivalent pumps with 14" size impeller should be suitably positioned and mounted on a three runner oilfield skid and floor with inter connections through piping, dresser type desilter and degasser units. Gap between mud mix system and mud tank shall be approx. 900mm to facilitate / ease of slinging of mud mix skid.
Each pump will be coupled to a 100 hp, 415 Volts, 3-phase, 50 Hz 1500-rpm flameproof weatherproof electric motor. The motors, starters and the cable glands should be suitable for use in hazardous areas and duly certified by CIMFR (UL or the equivalent certifying authority of the country of origin)and approved by DGMS for Zone I and Gas group IIA & IIB of Oil Mines.
The bidder should submit copies of CIMFR certificates (UL or the equivalent certifying authority of the country of origin) & DGMS approvals for all the flameproof electric motors, starters and cable glands with the quotation. UL certification shall be considered as equivalent to CIMFR (India) certification; however DGMS (India) approval shall be binding and final for all equipments to be used in Hazardous areas as per DGMS Guidelines/ Directive. (Refer DGMS approval clause J & K under General Notes).
All components of the tanks should be new, unused and free from all defects.
The tanks should be hydraulically tested for 24 hours.

2. MUD LOADING SYSTEM/ BARITES RAMP:

One (1) Mud Loading System / Barites Ramp of 600 – 800 sq. ft. area and 4 ft high for placement adjacent to the Active Mud System, with shade over the ramp for storing Bentonite, Barites and other bulk chemicals

3. TRIP TANK:

One (1) trip tank, 10 m^3 (60 Barrels US) capacity with two nos. centrifugal pumps driven by electric motor with fps gauging system visible from Derrick Floor. Tank to be constructed with 8 mm thick MS crimped plates, mounted on oilfield type skid & complete with following:

Two (2) suitable hole filling pump driven by a approximately 25 HP electric motor & complete with all valves, piping & fittings.
Access ladder both inside & outside.
Casing fill-up line

4. PRE-FLUSH TANK:

One (1) pre-flush tank, 100 barrel capacity for cementing jobs, preparation of soaking solution, etc.

5. LWC TANK:

A standard LWC Tank, Capacity: 100 Barrels (Approx) with connection to Suction & Pre-flush tanks

6. SHALE SHAKER:

Two (2) units of Linear motion "High G" (Minimum 7G) shale shakers with suitable flow divider & mounted side by side on a rugged oilfield type master skid over the shaker tank, each unit of LMSS rated at 500 GPM and capable of running up to 250 plus mesh size screens without overflowing. (The units of LMSS should not be permanently fixed on to the skid but should be designed for easy attaching & detaching on to the skid).
The dimensions of the master skid & LMSS unit should meet the transportable dimensions stated in Section – 20.

7. MUD CLEANER:

One (1) Linear motion mud cleaner complete with sixteen (16) 4" desilter cones with capacity not less than 1000 GPM (US).

8. DESANDER:

One (1) 2-cone Desander with manifold constructed of 8" Sch 40 pipe, mounted the third shaker, having two (2) 10" polyurethane cones with grooved end inlet and overflow, Desanding Capacity: 1000 GPM (US).

9. VACUUM DEGASSER:

One (1) Vertical Vacuum Degasser, mounted on oilfield skid, with one (1) 5 hp, 230 /415 Volt AC, 3-phase, 50 Hz explosion-proof motor, starter, complete with suction and discharge piping, jet nozzles, etc. Degassing Capacity: 1000 GPM

10. "POOR BOY" DEGASSER:

One (1) "Poor Boy" mud gas separator mounted on oilfield type skid having chequered floor plates; with inlet from flow line and choke manifold, one outlet, one drain, one 8" vent and one 20" man way
Diameter: 1220 mm (48 Inch) approx.
Should be of adjustable height to match the system.

11. CENTRIFUGE

One (1) High G-force capacity Centrifuge with long clarification area to process approx.170 gallons of mud per minute with feed density of 9.3 ppg mud at more than 2000G. The function of solids sedimentation, separation and draining are all to be combined in the centrifuge. The unit should be complete with charging pump, main drive motor (FLP Type), hydraulic drive and torque control assembly.

All solid control equipments must be either of Brant (NOV), Derrick or Swaco make. All electrical equipments required to run the Solid control equipments are to be rated at 415Volts, three phase, 50 Hz and must be DGMS approved. (Refer DGMS approval clause J & K under General Notes).

12. TOOLS & SPARE PARTS FOR SECTION 11:

Following additional spares in specified quantity as indicated should be supplied along with the unit. Specific description, part nos., make, etc. and unit price (in commercial bid) of each and every item shall clearly be indicated in the bid.

I. Bidder to quote set of handling & special tools (for screen replacement, vibrator replacement, deck / basket angle adjustment, cone replacement, etc.) required for carrying out operation, repair & maintenance on Shale Shaker, Desander, mud cleaner & Desilter including one torque wrenches & one digital accelerometer (vibration meter). Bidder must forward a list of such tools quoted by them indicating the make & model. **Price of these should be indicated in commercial bid & will be considered for evaluation purpose**.

II. Bidder to quote for the following Shale Shaker Screens of nearby mesh size, Desander & Desilter spares to be procured along with rig package. **Price of these should be indicated in commercial bid & will be considered for evaluation purpose**.

20 mesh Shale Shaker Screens	- Quantity 30
40 mesh Shale Shaker Screens	- Quantity 30
60 mesh Shale Shaker Screens	- Quantity 40
80 mesh Shale Shaker Screens	- Quantity 40
100 mesh Shale Shaker Screens	- Quantity 40

150 mesh Shale Shaker Screens - Quantity 40
175 mesh Shale Shaker Screens - Quantity 30
220 mesh Shale Shaker Screens - Quantity 30
250 mesh Shale Shaker Screens - Quantity 30

175 mesh Mud cleaner Screens - Quantity 30
220 mesh Mud cleaner Screens - Quantity 30
250 mesh Mud cleaner Screens - Quantity 30

Desander cones, complete – 5 Nos.
Desilter cones, Complete – 10 Nos.
Victaulic Clamps with seals for Desander cone – 10 Nos.
Victaulic Clamps with seals for Desilter cone – 20 Nos.

Two extra sets of vibrator motor & starter of Shale shaker.

Two extra sets of vibrator motor & starter of Mud Cleaner.

III. High pressure – low volume suitable water jet cleaner with all accessories – 1 No. (for cleaning the shale shaker screens). **Bidder to quote the specification with price in commercial bid & will be considered for evaluation purpose.**

SECTION 12: HIGH PRESSURE TEST UNIT

1. One (1) Portable Testing Unit having a nominal working pressure of 15,000 psi (1055 Kg/sq.cm.) & consisting of the following:

I. One (1) 43:1 ratio volume pneumatic pump
II. One (1) 300:1 ratio pneumatic pressure pump
III. One (1) Fluid suction manifold and strainer
IV. One (1) High pressure testing manifold complete with 0-20,000 psi gauge, all required valves (incl. safety & bypass), high pressure fittings, etc.
V. One (1) 1" Air supply manifold with lubricator
VI. One (1) Adjustable air regulator set to limit hydraulic output to desired test pressure
VII. One (1) 50 gallon reservoir complete with 1/2" -3,000 psi working pressure control valve, 0-6,000 psi gauge and 3,500 psi relief valve
VIII. Heavy duty skid to contain all of above

2. Stand Mounted Chart Recorder consisting of:

I. 0-15,000 psi recorder, spring chart drive, 8 day wind, 24 hr. / 96 minute chart rotation, 12" diameter chart, single pen style with over range protection.
II. Shock mounted for vibration protection.
III. Unit mounted on heavy duty steel skid.

3. Test Hose 20,000 psi (1406 Kg/sq.cm.) rated WP & 10' (3 Mtr.) long to connect Chart recorder to test unit.

4. High pressure test/ glycol injection hose complete with end fittings, 5,000 – 20,000 psi, 15 M (50 ft) long.

SECTION 13: RIG INSTRUMENTATION & CONTROL SYSTEM

1. DRAW-WORKS CONTROLS

Features:

i. Automatic Shifting between high/low speeds under no load/no speed conditions for draw-works having Single or Dual speed gearboxes.
ii. Emergency brake control system
iii. RTDs: 6 x Pt100 (2 per phase in stator 2 x Pt100), 1 bearing Pt100
iv. Differential Pressure Switch

1.1 DRILLER'S CABIN/DRAWWORKS INTERFACE CONTROLS

The integrated rig control system should be Amphion or equivalent make with the following features:

i. It should be able to manage, control and monitor rig floor equipment in independent and activity-based operations.
ii. It should be designed to allow operators to focus on Drilling, Tripping and Casing processes by providing an efficient and intuitive rig floor command center.
iii. The system should be interactive through the use of color-graphic data and control screens viewed on touch screens integrated into the operator workstations.
iv. Touch screens should allow the Driller to supervise and control all drilling-related functions.
v. The integrated system should have control cabinet, network devices, operator workstations and control modules to drive the rig equipment. All modules should have communication hardware and user software interface functionality.
vi. The control system shall be designed to avoid single point failures through a robust network with redundant touch screens.
vii. The control network shall be designed using touch screens and/or to workstation hardware (such as joysticks) to provide monitoring and control of each tool, plus local and remote access to integrated diagnostics, maintenance and documentation.

1.2 AUTO DRILLING FEATURE

The auto drilling feature should be Amphion or equivalent make with the following minimum features:

i. The Auto Drilling/Electronic Drilling Control Algorithms should be designed to help drillers to significantly reduce drilling costs and improve rig safety.
ii. The software module should have draw-works control systems to provide unique automatic drilling functionality.
iii. Superior drilling performance feature should be incorporated by precisely controlling the drilling line, monitoring or maintaining up to four parameters simultaneously – WOB, ROP, Drilling Torque and Delta-P (differential down-hole motor pressure.) The module required for precise and proportional draw-works braking capability, which is accomplished by regenerative braking through the AC VFD (Variable Frequency Drive) system should be included in the system. The system shall ensure variable continuous feed of the drill line from very slow drilling rates to up to 2000 feet/hour.
iv. Auto Drilling Electronic Drilling Control Algorithms should be designed to provide significant economic benefits:

    a) Constant steady state control at the bit.
    b) Longer bit life, optimum bit performance, reducing bit usage and bit trips.
    c) Maximized Rate of Penetration, reducing drilling time and days on location.

d) Controlled drilling (constant ROP) to improve directional drilling control and accuracy.

1.3 The system package should have the following minimum features:

i) Workstation
- ❖ Wrap Around Operator Chair
- ❖ Touch-screen displays

ii) Tool Controllers
- ❖ Draw-works Control Module
- ❖ Top Drive Control Module
- ❖ Auxiliary Tool Control Module
- ❖ Mud Pumps Control Module
- ❖ Power System Interface Module
- ❖ Driller's Chair Control Module
- ❖ V-DAQ Drilling Information Module

iii) Multi-Tool Control Cabinet
- ❖ MTC with diagnostic touch-screen
- ❖ Power Control MTC Cabinet with touch-screen

iv) Miscellaneous Components
- ❖ Mud Pump Remote I/O
- ❖ E-Stop Controller
- ❖ MCC Interface
- ❖ UPS
- ❖ Mud Logger Output Module
- ❖ Rotary Table Interface Kit
- ❖ Standpipe Pressure Transducers 2 (Two) for use with Auto Drill software
- ❖ Compression Type Triple Redundant Electronic Load Cell for use in dead line anchor

1.4 WORKSTATIONS

i) Wrap Around Operator Station
A Wrap-Around workstation (with latest configuration) is to be provided for the Driller to monitor and control specific drilling parameters. The workstation shall be ergonomically designed chair along with Touch screens and discrete controls for the drilling equipment that is currently in use allowing the operator to operate a wide range of equipment around the drill floor while maintaining an optimal work environment. Control functions and information to be integrated into the touch screens and discrete controls in the respective chairs as required.

The armrests should be positioned to accommodate a wide range of heights for different people as well as a variety of positions the operator may wish to take.

ii) Touch screens
The Safe Area touch screens should be rugged industrial LCD display to be used indoors on drilling rigs. It should be suitable for operation in bright sunlight to low night light conditions.
The touch screens should provide the Operator's interface for control, data input, and monitoring of drilling activities. The equipment controls to be integrated into the touch screen resulting in efficient operations. A standard suite of screens is provided for selection, status and input of the control and information parameters.

1.5 TOOL CONTROLLERS

i) Draw-works Control Module

The Draw-works Control Module should respond to joystick movement and touch screen commands to control the draw-works. It should access and manipulate data from the draw-works remote I/O and user interface to provide monitoring and control such as raising and lowering the block and setting high and low travel set points.

Standard screens:

a. Drilling operation (including back reaming)
b. Tripping operation
c. Draw-works status
d. Draw-works Motor/VFD status
e. Draw-works Diagnostics and Alarm

ii) Top Drive Control Module

The Top Drive Control Module should respond to touch-screen commands to control the Top Drive. It should access and manipulate data from the Top Drive remote I/O and user interface to provide monitoring and control such as setting torque limits.

Standard screens:

a. Top Drive primary control
b. Top Drive Diagnostics and Alarm

iii) AUXILIARY TOOL CONTROL MODULE

The Auxiliary Control Module should respond to touch screen commands to control various auxiliary equipments. It should access and manipulate data from the auxiliary remote I/O and user interface to provide monitoring and control such as setting Cat Head torque limits etc.

Standard screens:

a. Tool control, diagnostics, & alarms
b. Duty: HPU, Hydraulic Catheads, Rotary Table, etc.

iv) MUD PUMPS CONTROL MODULE

The Mud Pump Control Module should respond to touch-screen commands to control both the Mud Pumps. It should access and manipulate data from both the Mud Pumps remote I/O and user interface to provide monitoring and control such as setting SPM limits.

Standard screens:

a. Mud Pump primary control
b. Mud Pump Diagnostics and Alarm

v) MUD PUMPS LOCAL CONTROL PANEL

The Mud Pump Local Control Panel to operate one or both the mud pumps from local station (near to mud pump) in addition to the controls through touch screen commands.

vi) POWER SYSTEM CONTROL MODULE

The Power System Control Module should accesses power system data from the generator control modules, feeder breakers, bus breakers, rectifiers & ground fault detectors.

Standard screens:

a. Generator Status
b. Rectifier Status
c. Drive Status
d. Ground fault / feeder status
e. Ground Fault / feeder status

vii) V-DAQ CONTROL MODULE

The V-DAQ is to provide an interface between the Control Network, Touch-screen and Rig Sense system or equivalent.

Following minimum features should be included:

a. Electronic Gauges for primary drilling instrumentation

b. Pit volume Totalizer (PVT) for monitoring mud pits
c. Electronic Driller Recorder for strip chart trending
d. Interface to support four connections
e. Software license for four seats.

viii) E-STOP CONTROLLER
The E-Stop Controller shall consist of required hardware to facilitate E-stop of supplied tools as mentioned elsewhere in the NIT (Also Refer Section: 19 under the heading "Features of the Rig Control System"). The controller shall consist of failsafe system to accomplish the appropriate E-Stop actions.

ix) UPS
On-line UPS of suitable capacity for emergency backup of the Control System and the Power System controls for a period of 6 hours. Two UPS's will provide backup for control system and two will provide back up for the power system. The UPS's shall include bypass switches which will allow line power to be fed directly to the load in case of UPS failure.

x) MUD LOGGER OUTPUT MODULE
The Analog Output Option is to provide minimum 6 pre-defined analog signals (4-20mA) to be exported from the system to a third Party service company PLC, such as a Mud logger.

xi) DRILLER'S CABIN
The driller's cabin is to be designed in order to provide the drilling operator a safe and comfortable work environment. The driller's cabin and other control panels are to be designed to make the operator able to work long shifts without stress or strain. The positioning of instruments and controls has to be thoroughly evaluated with regard to frequency of use, interrelation and ease of operation and help reduce fatigue to the driller.

xii) Layout
From the driller's cabin the operator should able to control most of the equipment used in the drilling process. Most controls used should to be integrated into the driller's chair, minimizing additional hardware. The driller's cabin should be designed to have a clear line of sight to the operating machinery and people on the drill floor. The equipment/control panels in the driller's cabin should be placed in the most visual / convenient position. Sample Layout to be furnished along with offer.

Driller's Cabin should have the following minimum features
- Driller's cabin enclosure material: carbon steel
- Protections bars to be provided on overhead windows
- Internal and External lighting
- Noise & vibration insulation
- Insulated walls, roof and floor
- Architectural items such as wall panels, ceiling panels, floor cover, door and windows
- Window wiper and washer system
- Independent HVAC system (Window type, "Ex" rated Air Conditioner to be used)
- Knowledge Box (stainless)
- Talk back system consisting of pre-amplifier, PSU, audio speaker (outside cabin), microphone (inside cabin), footswitch (inside cabin)

1.6 RIGSENSE OR EQUIVALENT SYSTEM

Suitable drilling information management system, utilizing a combination of proven technologies, providing reliable services with the capability of meeting the customer's needs should be provided. It should provide critical information for making intelligent decisions about drilling operations. It should be a comprehensive system with the ability to gather data from multiple

sensors and input sources. Typical users of the system will be Tool pusher, Drillers and Assistant Drillers, Rig Managers, Operator Representatives, Mud and Drilling Engineers.

The quoted system should provide the following minimum functionality:

i. Historical and real-time data viewing and printing
ii. User customization of screens to their own channel preferences
iii. Digital read-out display of numerical real-time data
iv. It should provide accurate time and event based ton-mile measurements
v. Modifiable alarm parameters for changing conditions and rig activity
vi. Storage and access to historical information and notifications, as well as messaging capability with other workstations on the network
vii. Generate IADC reports for billing and payroll purposes with electronic transmission capability
viii. The quoted system should be scalable
ix. The system shall provide minimum four different types of printed reports including Drill Log, ROP/Gas Log, ROP Report and Pipe Tally Report
x. The proposed system should consist of Server, Workstations, suitable UPS & Printers
xi. The display should be in English Language only

1.7 DRILLING PARAMETERS

Following minimum parameters shall be displayed at the derrick floor for continuous operation and monitoring:

i. Hook Load
ii. Weight on Bit
iii. Stand Pipe Pressure
iv. Casing Pipe Pressure
v. Choke Manifold Pressure
vi. Kill Line Pressure
vii. Tong Line Pull
viii. SPM Mud Pump 1
ix. SPM Mud Pump 2
x. Total SPM
xi. RPM, Rotary Table
xii. RPM, Top Drive
xiii. Rotary Torque
xiv. Top Drive Torque
xv. ROP
xvi. Hole Depth
xvii. Bit Position
xviii. Mud Loss/Gain Volume
xix. Active Mud Tank Volume
xx. Total Mud Tank Volume
xxi. Trip Tank Volume
xxii. Mud Return Flow
xxiii. Mud Density In
xxiv. Mud Density Out
xxv. Mud Temperature In
xxvi. Mud Temperature Out
xxvii. Ton Mile
xxviii. Flammable Gas at Shale Shaker/Bell Nipple
xxix. H_2S Gas at Shale Shaker/Bell Nipple
xxx. Mud Conductivity In/Out

1.8 ALARMS

Audio visual alarm shall be provided for the following minimum parameters:
1. Active Pit Level
2. Mud Return Flow Rate High/Low
3. Flammable Gas
4. H_2S Level
5. Rate of Penetration High
6. Pump Pressure High/Low
7. Block Proximity Crown & Floor

6. TOP DRIVE INSTRUMENTATION SYSTEMS

The Operating Switches, RPM & Torque Meters, Indicator Lights, Throttle, etc. are to be housed in a purgeable stainless steel enclosure

7. HYDRAULIC POWER UNIT CONTROLS

Hydraulic control panel suitable for draw-works control, disc brake control, cathead control, iron Roughneck control, casing running tool control and any other control required for the rig package shall be supplied by the manufacturer.

8. MUD PUMPS

One Pressure gauge (Make – OTECO), 0 – 6000 PSI range with 2" (50 mm) line pipe female connection and a 2" (50 mm) flex seal valve (Make – OTECO) for isolation of the gauge should be supplied for each pump.

9. RIG AIR SYSTEM

One (1) suitable Air System consisting of following:
1. PLC/Microprocessor based control system for air compressors
2. Refrigerated air dryer controls with online dew point meter
3. Air receiver complete with safety relief valve, pressure gauge and auto drain

10. CONTROL CABLES

Length of all the instrumentation control cables should be sufficient enough to facilitate extension up to 170 ft. From original location i.e. to meet the 15 metres spacing between the wells in cluster locations (the static will remain at original location & moving the mast & sub-Structure only to forward cluster locations). Bidder to confirm the same while quoting.

11. CABLE TRAYS

Cable trays with galvanized steel covers suitable for elevating with derrick floor shall be used for leading and supporting all instrumentation control cables. No cable will be allowed to be laid on ground outside of a cable tray. Length of cable tray should be sufficient enough to facilitate extension up to 170 ft. From original location i.e. to meet the 15 metres spacing between the wells in cluster locations (the static will remain at original location & moving the mast & sub-Structure only to forward cluster locations). Bidder to confirm the same while quoting.

12. STORAGE & TRANSPORTATION

Suitable arrangement should be made for proper storing of all the instrumentation equipment / sensors including cables after dismantling during rig down operation for rig movement. Bidder to forward the specification of the same with drawing. The dimensions of such container should be within the specified limits indicated under Section – 20 of this document.

13. SPARE PARTS

Instrumentation spares for two years normal operation for all equipment/system should be included in the offer indicating item, part no. & quantity required. Item wise price of such spares should also be provided in commercial bid. Bidder should indicate the part nos. against each item along with OEM's part no. if any. The cost of these spares will not be considered for price comparison. However, OIL reserves the right to either buy the complete set of spares or part of it along with the Rig package.

14. PARTS CATALOGUE, INSTRUCTION MANUAL & DRAWING

Supplier shall provide three sets of instrument spare parts catalogue and six sets of Operation and Maintenance Manual for all instrumentation and control systems along with schematics. Two sets of the above documents shall be supplied in compact disc.

15. CERTIFICATION REQUIREMENT

All the electronic instruments required to be installed in hazardous area are to be approved by Directorate General of Mines Safety (DGMS), Dhanbad, India for installation in Zone 1, Gas Group IIA and IIB classified area. Copies of approvals to be forwarded with the technical bid. (Refer DGMS approval clause J & K under General Notes).

16. SOFTWARE

Bidder shall provide diagnostic tool (Laptop with latest configuration) with licenses software for configuring/calibration of Rig Control as well as Rig Instrumentation System.

17. MAINTENANCE

i) Bidder shall also quote for three (3) year ON-SITE maintenance, troubleshooting and support service package for the complete rig instrumentation and Rig control system (software and hardware) for the following:

a. Draw Works Controls
b. Draw Works Interface Controls
c. Auto Drilling Controls
d. Work Stations
e. Rigsense or Equivalent System
f. Top Drive Instrumentation Controls
g. Hydraulic Power Unit Controls
h. Rig Air System Controls

ii) The maintenance package shall include services of an Instrumentation Team comprising of competent engineer and technicians as well as provision of special tools, tackles and instruments. Also, bidder/ supplier shall have minor spare parts at site for immediate replacement so that rig operation does not suffer

iii) The following points shall be considered for the AMC for rig instrumentation:

a. For maintenance and trouble shooting of rig instrumentation & controls one qualified expert engineer shall be employed.
b. The person shall be fully conversant with the complete system of rig instrumentation & Rig control system. He should be physically fit for working in the well site. He shall also be able to work with his own hands fully conversant with English language (US & UK).
c. The spares required for maintenance will either be provided by OIL or will be procured from the service provider if required urgently.

iv) For other matter related to AMC not spelt out above, bidder shall be guided by the "General Notes" under Section 22.

v) Broad activities:

a. Maintenance of the rig instrumentation & control system including subsystems, input/output modules, remote modules, re-programming or modification of the control system software as per drilling requirement etc.
b. Calibration of sensors as per OEM's standards
c. Familiarizing the instrumentation crew with the above mentioned equipments/systems and imparting hands-on training for basic troubleshooting and maintenance.
d. Preparation of inventory and spare list
e. Rectification of any problems, abnormalities, anomalies and defects noticed/logged during the course of a well.

vi) Bidder/ supplier shall arrange for hiring / summoning the services of technical experts in case site engineer is unable to rectify/ troubleshoot a particular problem, at no extra cost to OIL.

SECTION 14: RIG ENGINES

Four (4) CAT 3512 B Series or latest model diesel engines coupled to alternators conforming Tier-III emission norms. Each engine should be with following specifications:

1. Caterpillar 12-cylinder, direct-injected, turbocharged, after cooled diesel oilfield engine; 4 cycle, 170 mm bore x 191 mm stroke (6.7 in bore x 7.5 in stroke) with separate-circuit after-cooler and optimized for low emissions. Engine rotation: standard (counter-clockwise as viewed from flywheel end). Engine rating of minimum 1250 HP at rated RPM coupled with alternator to generate power at 50 Hz.

2. EMISSION NORMS

The engine shall conform to minimum Tier-III or latest emission norms, it shall be bidder's endeavor to offer Caterpillar make engines only. **Engine Fault Diagnostic Tools (both software as well as hardware) shall be supplied along with the unit. Bidder shall categorically confirm in the bid that the offered software is for the particular engine.**

3. Each engine should be complete with the following:

i) AIR INLET SYSTEM

After cooler core, corrosion resistant Air cleaner, Heavy duty, with soot filter. Service indicators.

ii) CONTROL SYSTEM

Advance Diesel Engine Management (ADEM) –III, ECM with electronically controlled unit injectors, control by electronic/ PLC 24V DC Battery along with the charging system to be supplied.

iii) COOLING SYSTEM

In order to ensure compliance in use, optional or customer-supplied radiators must be capable of rejecting enough heat to allow proper operation at worst case site conditions, and also must supply 122 deg F (50 deg C) SCAC cooling water to the after cooler inlet, with an SCAC flow rate of at least 100 GPM (379 l/m) with an ambient temperature of 86 deg F (30 deg C) and at-site conditions (including altitude considerations). Maximum allowable SCAC flow rate is 115 GPM (435 l/m).

iv) RADIATOR COOLED LAND BASED

Outlet controlled thermostat and housing. Jacket water pump, gear driven. Dual outlets: 88.9 mm O.D. (3.5 in) elbow hose connections. After cooler fresh water cooling pump (SCAC), gear driven centrifugal SCAC pump circuit contains a thermostat to keep the after cooler coolant from falling below 30 deg C (85 F).

v) EXHAUST SYSTEM

Exhaust outlet: 292 mm I.D. (11.5 in).
12-10.5 mm dia holes EQ SP, 376 mm bolt hole dia.
Exhaust flexible fitting:
318 I.D. mm (12.5 in)
12-14 mm dia. Holes EQ SP, 375 mm bolt hole dia. 306.6 mm tall with compressed gasket.
Exhaust adapter:
297 mm I.D. to 340 mm I.D. (11.7 in to 13.4 in).
12-10.5 mm dia. Holes EQ SP, 376 mm bolt hole dia.
12-13.8 mm dia. Holes EQ SP, 430 mm bolt hole dia.

158.5 mm tall with compressed gasket.
Weldable flange:
360 mm I.D. (14.2 in).
12-13.8 mm dia. Holes EQ SP, 430 mm bolt hole dia.
17.4 mm wide with compressed gasket.
Exhaust manifolds, dry.
Dual turbochargers with w/c bearings.

vi) 12" SPARK ARRESTING MUFFLER – INDUSTRIAL GRADE

Includes nuts, bolts, and flanges for connections.

vii) FLYWHEELS & FLYWHEEL HOUSINGS

Flywheel, SAE No. 00
Flywheel housing, SAE No. 00
SAE standard rotation

viii) FUEL SYSTEM

Fuel filter.
Fuel transfer pump
Flexible fuel lines
Fuel priming pump, LEFT HAND
Electronically-controlled unit injectors.

ix) INSTRUMENTATION

Electronic instrument panel, LEFT HAND.
Analog gauges with digital display data for:
Engine oil pressure gauge.
Engine water temperature gauge.
Fuel pressure gauge.
System DC voltage gauge.
Air inlet restriction gauge.
Exhaust temperature (prior to turbochargers) gauge.
Fuel filter differential pressure gauge.
Oil filter differential pressure gauge.
Service meter (digital display only).
Tachometer (digital display only).
Instantaneous fuel consumption (digital display only).
Total fuel consumed (digital display only).
Engine start-stop (off, auto start, manual start, cooldown timer).

x) LUBE SYSTEM

Crankcase breather
Oil cooler
Oil filter.
Shallow oil pan
Oil pan drain valve, 2' NPT female connection
Lubricating oil, SAE 10W30, Caterpillar DEO (CG4) 643 L.

xi) MOUNTING SYSTEM

Rails, mounting, floor type, 254 mm (10 in).

xii) POWER TAKE-OFFS

Accessory drive.
Lower LEFT HAND front (available for PTO usage).
Front housing, two-sided

xiii) PROTECTION SYSTEM

ADEM – II ECM or any advanced version monitoring system provides engine de-ration, or shutdown strategies to protect against adverse operating conditions. Selected parameters are customer-programmable. Status available on engine- mounted instrument panel and can be broadcast through the optional customer communications module or programmable relay control module(s). Initially set as follows:
Safety shutoff protection, electrical: Oil pressure, water temperature, over speed, crankcase pressure, after cooler temperature. Includes air inlet shutoff, activated on over speed or emergency stop.

Alarms, electrical:
ECM voltage, oil pressure, water temperature (low and high), over speed, crankcase pressure, after cooler temperature, low water level, air inlet restriction, exhaust stack temperature, filter differential pressure (oil and fuel).

Derate, electrical:
High water temperature, crankcase pressure, after cooler temperature, air inlet restriction, altitude, exhaust temperature.
Emergency stop push button, located on instrument panel. Alarm switches (oil pressure and water temperature), for connection to alarm panel.

xiv) STARTING SYSTEM

Air starting motor, RIGHT HAND, 620 to 1034 kPa (90 to 150 psi), LEFT HAND
Control Air silencer

xv) GENERAL

Paint, Caterpillar Yellow
Vibration damper and guard
Lifting eyes

4. THE FOLLOWING ACCESSORIES SHOULD BE INCLUDED:

i) GOVERNOR CONVERSION:
TECHNICAL: Converts engine to direct rack controls requiring 0-200 MA DC control.

ii) FLEXIBLE COUPLING:
Viscous damped.
Includes flywheel guard.

iii) COUPLING HUB – 127 MM DIA MAX:
FOR USE WITH: 127 mm (5 in) diameter maximum shaft, 31.7 x 31.7 mm (1-1/4 x 1-1/4 in) key.

5. ACOUSTIC ENCLOSURE:

i) The acoustic enclosure shall be designed for minimum 25 db(A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side. (As per guideline of Central Pollution Control Board, Januray 2008 (Ministry of Environment & Forests, Govt of India)
The DG set shall be provided with proper exhaust muffler with insertion loss of minimum 25 db(A)

ii) The canopy should be sound proof, weather proof and environment friendly conforming to the latest environment (Protection Act 1986 of Ministry of Environment & Forest notification dated 17.05.2002 and 12.07.2004).

iii) No sets shall be accepted without the CPCB (Central Pollution Control Board, India) certificate of the following authorized agencies.

a. Automotive Research Association of India, Pune
b. National Physical Laboratory, New Delhi
c. Naval Science & Technology Laboratory, Visakhapatnam
d. Fluid Control Research Institute, Palghat.
e. National Aerospace Laboratory, Bangalore

6. COMPONENTS TO BE OFFERED WITH POWER PACK

i) Two (2) sets of standard tool kit as per ANNEXURE-I (indicated at the end of this section) for carrying out normal maintenance of engine should be supplied in a conventional tool box.

ii) In addition to above, the special tools as mentioned below should be supplied along with the engine

a. Alternator Alignment Tool kit with Instruction Manual - 2 Nos.
b. Blow-by Measurement Tool kit - 1 No.
c. Fuel Injector Timing setting tool - 1 No.
d. Air Restriction Measurement tool - 1 No.
e. Heavy Duty Digital Multimeter – 2 Nos.
f. Lube Oil testing Kit - 2 Nos.
g. Infra Red Digital Tachometer(0 to 9999 RPM) – 2 Nos.
h. Belt Tension Gauge - 2 Nos.
i. Laptop (ET) for monitoring Engine Parameters. – 1 No.
j. CAT battery Charger/ Charging Alternator & 24 V Battery for ECM for each unit – 1 Set
k. Rechargeable Emergency lamp - 2 Nos.

iii) Bidder has to quote the price of the tool kit and special tools as mentioned above separately. The cost of the tool kit and special tools will be considered for commercial evaluation.

7. OPERATING SITE CONDITION

The engines should be suitable for operation at the following site condition –

Engine site temperature	-	50°Cent. (Max)
Engine site temperature	-	6°Cent. (Min)
Maximum relative humidity at 21°C	–	100%
Maximum relative humidity at 35°C	-	95%
Maximum relative humidity at 41°C	-	70%
Altitude above sea level	-	150 m.
Average annual rainfall	-	343 cms.

8. NOTES FOR SECTION 14

8.1 SPARE PARTS

Spares for two years normal operation of engine and its accessories should be included in the offer. Item wise breakdown price of spares should also be provided. Bidder should indicate the part nos. against each item along with supplier's part no. if any. The cost of spares will not be considered for price comparison.

8.2 PARTS LIST, INSTRUCTION MANUAL & DRAWING, TECHNICAL INFORMATION & BULLETIN.

The supplier should provide 6 (six) set of parts list, dimensional drawing of all major components, operations manual & service manual covering all the items with the delivery of the material. Technical details of the engine, etc. along with 1 (one) set of part list, dimensional drawing of all major components, operation manual & service manual are to be provided along with the offer.

The supplier has to provide installation diagram of the complete set along with performance curve along with the quotation for our technical scrutiny.

The bidder shall furnish technical data sheets and dimensional drawing along with the quotation.

8.3 TEST CERTIFICATE

The complete sets have to be load tested at manufacturers work & test certificate have to be provided along with the delivery of material. Our engineer will visit to witness the load test.

The nature of after sales services, which can be provided by the successful bidder during initial commissioning as also in subsequent operation, should be clearly indicated.

Supplier must categorically confirm regarding compliance with the inspection / test procedure and other terms and conditions detailed above are very essential. Offers will be rejected in the absence of such confirmation.

Deviation in respect of any specification as detailed above should be highlighted with technical calculation / catalogue/literature etc.

9. TECHNICAL CHECK LIST FOR CATERPILLAR ENGINE

[THE FOLLOWING CHECK LIST MUST BE COMPLETED AND RETURNED WITH THE TECHNICAL BID. ALSO ENSURE THAT ALL THESE POINTS ARE COVERED IN YOUR OFFER. THESE WILL ENSURE THAT YOUR OFFER IS PROPERLY EVALUATED. PLEASE TICK MARK '**YES**' OR '**NO**' TO THE FOLLOWING QUESTIONS, IN THE RIGHT HAND COLUMN]

Sl. No.	Points	Remarks
1	Whether the offered engine is four stroke diesel engine having direct injection, turbocharged, after cooled and counter clock-wise rotation (as viewed from flywheel end) ?	YES/ NO
2	Whether the offered engine is capable of developing minimum gross horse power of 1250 suitable to operate at 50 hz and should be capable to drive the Alternator of 1215 KVA capacity ?	YES/ NO
3	Whether the offered engine is compatible to power and torque trend (varying loading pattern), responsive to instantaneous load and torque changes?	YES/ NO
4	Whether the offered engine is for continuous duty?	YES/ NO
5	Whether the offered engine is compatible to SCR or Variable Frequency Drive (VFD) and suitable for drilling rig application?	YES/ NO
6	Whether detail specifications of engine and alternator along with technical literature / catalogue /schematic layout (plan & elevation) of the engine and alternator offered enclosed with the offer?	YES/NO
7	Whether the RPM of the engine is 1000 or 1500?	1000/1500

8	Has the bidder clearly mentioned the specification of the cooling system of the offered engine. Whether the bidder provided the heat load calculations for offering Radiator along with the offer for OIL's scrutiny. ?	YES/ NO
9	Has the bidder clearly mentioned the specification of all the general accessories /fittings of the offered engine?	YES/ NO
10	Has the bidder included the list of spare parts for engine and its accessories required for normal operation of the offered engine for two years? Has the bidder mentioned the price of each spare separately?	YES/ NO
11	Has the bidder provided the general arrangement / dimensional drawing of the offered engine and alternator?	YES/ NO
12	Whether the bidder gives assurance that after sales service in respect of engine and alternator will be provided by their respective OEMs or authorized dealer for 10 years?	YES/ NO
13	Whether the bidder gives the confirmation from the OEMs that the equipment to be supplied are not going to be obsolete for next 10 years and provision for supplying spares of the equipment to be continued?	YES/ NO
14	Whether the bidder will install and commission the power packs at site in and around Duliajan, Assam, India. ?	YES/ NO
15	Do you agree to the conditions that power packs will be inspected in stages by OIL's representatives before electric and load testing of the same shall be carried out in presence of OIL's representative at manufacturer's works?	YES/ NO
16	Has the bidder separately highlighted any deviation from the technical specifications?	YES/ NO
17	Whether the Emission norms of the Supplied Engines are as per Tier–III?	YES/ NO
18	Has the bidder mentioned any other items/ points not indicated/ included in the specifications, but deemed necessary for installation/ commissioning and efficient control, operation and protection of the alternators and engines?	YES/ NO
19	Whether the bidder will supply the Special Tools as mentioned?	YES/ NO
20	Whether the bidder will supply the Tool Box as per Annexure I as mentioned?	YES/ NO
21	Whether acoustic enclosure of the power pack is provided as per NIT?	YES/ NO

Offer Ref ..... Dated .....

OIL's Tender No. ..... Signed .....

For & on behalf of .....Designation .....

ANNEXURE –I

STANDARD TOOL KIT CONSISTS OF FOLLOWING TOOLS FOR CATERPILLAR ENGINES

1) One (1) each of OPEN JAW DOUBLE ENDED SPANER, SIZES (in MM): 6 x 7 , 8 x 9 , 10 x 11, 12 x 13 , 14 x 15 , 16 x 17 , 18 x 19 , 20 x 22 , 21 x 23 , 24 x 26 , 25 x 27 , 28 x 30 , 30 x 32 (TOTAL 13 NOS.)
MAKE: GRIPHOLD / MEKASTER / STANLEY

2) One (1) each of DOUBLE ENDED RING SPANNER, SIZES (in MM): 6 x 7 , 8 x 9 , 10 x 11, 12 x 13 , 14 x 15 , 16 x 17 , 18 x 19 , 20 x 22 , 21 x 23 , 24 x 26 , 25 x 27 , 28 x 30 , 30 x 32 (TOTAL 13 NOS.)
MAKE: GRIPHOLD / MEKASTER / STANLEY

3) One (1) each of HEAVY DUTY DOUBLE HEX. STD. SOCKETS IN 1/2" SQ. DRIVE, ISIZES (in MM): 8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32 & 34 (TOTAL 26 NOS.)
MAKE: GRIPHOLD / MEKASTER / STANLEY

4) One (1) REVERSIBLE RATCHET IN 1/2" SQ.DRIVE, OVERALL LENGTH: 260 MM.
MAKE: GRIPHOLD / MEKASTER / STANLEY

5) One (1) SLIDING T-HANDLE IN 1/2" SQ.DRIVE, OVERALL LENGTH: 300 MM.
MAKE: GRIPHOLD / MEKASTER / STANLEY

6) One (1) each of EXTENSION BAR IN 1/2" SQ.DRIVE, with OVERALL LENGTH 75 MM, 125 MM & 300 MM respectively.
MAKE: GRIPHOLD / MEKASTER / STANLEY

7) One (1) UNIVERSAL JOINT IN 1/2" SQ.DRIVE, OVERALL LENGTH: 78 MM.
MAKE: GRIPHOLD / MEKASTER / STANLEY

8) One (1) SWIVEL HANDLE IN 1/2" SQ.DRIVE, OVERALL LENGTH: 380 MM.
MAKE: GRIPHOLD / MEKASTER / STANLEY

9) One (1) L-HANDLE IN 1/2" SQ.DRIVE, OVERALL LENGTH: 210 MM.
MAKE: GRIPHOLD / MEKASTER / STANLEY

10) One (1) ADAPTER 3/4" F x 1/2" M
MAKE: GRIPHOLD / MEKASTER / STANLEY

11) One (1) ADAPTER 3/4" M x 1/2" F
MAKE: GRIPHOLD / MEKASTER / STANLEY

12) One (1) each of UNIVERSAL SOCKET WRENCH,1/2" DRIVE, SIZE: 1/4", 3/8", 1/2", 9/16" & 5/8" (TOTAL 5 NOS.)
MAKE: GRIPHOLD / MEKASTER / STANLEY

13) One (1) each following TORQUE WRENCHS
CAPACITY: 0-250 LBF-FT
CAPACITY: 0-1000 LBF-FT
MAKE: GRIPHOLD / MEKASTER / STANLEY

14) One (1) SCREW DRIVER ENGINEER PATTERN: 200 X 10
MAKE: GRIPHOLD / MEKASTER / STANLEY

15) One (1) SCREW DRIVER PHILLIPS PATTERN: 8 X 150
MAKE: GRIPHOLD / MEKASTER / STANLEY

16) One (1) each of ADJUSTABLE WRENCH: 8" & 12" respectively.
MAKE: GRIPHOLD / MEKASTER / STANLEY

17) One (1) set of ALLEN KEYS 1.5 MM TO 10 MM
MAKE: GRIPHOLD / MEKASTER / STANLEY

18) One (1) COMBINATION PLIER: 6”
MAKE: GRIPHOLD / MEKASTER / TAPARIA / EVEREST.

19) One (1) LONG NOSE PLIER: 160 MM
MAKE: GRIPHOLD / MEKASTER / STANLEY

20) One (1) CIRCLIP PLIER –INTERNAL: 175 MM
MAKE: GRIPHOLD / MEKASTER / STANLEY

21) One (1) CIRCLIP PLIER –EXTERNAL: 175 MM
MAKE: GRIPHOLD / MEKASTER / STANLEY

22) One (1) CENTRE PUNCHES: 4”
MAKE: GRIPHOLD / MEKASTER / STANLEY

23) One (1) BALL PIEN HAMMER: 200 GMS
MAKE: GRIPHOLD / MEKASTER / STANLEY

24) One (1) PLASTIC TIP HAMMER:25 MM DIA
MAKE: GRIPHOLD / MEKASTER / STANLEY

25) One (1) FEELER GAUGE-300 MM (26 BLADES) INCH AND MM COMBINED
MAKE: GRIPHOLD / MEKASTER / STANLEY

26) One (1) FOOT RULE: 12” (Stainless Steel)

27) One (1) MEASURING TAPE: 3 MTS (METALLIC)

28) One (1) DIAGONAL CUTTING PLIER: 160 MM
MAKE: GRIPHOLD / MEKASTER / STANLEY

29) One (1) each THREAD GAUGE: For BSW, METRIC & UNC threads.
MAKE: GRIPHOLD / MEKASTER / STANLEY

30) One (1) OUTSIDE CALIPER 6”
MAKE: MAKE: GRIPHOLD / MEKASTER / STANLEY

31) One (1) INSIDE CALIPER 6”
MAKE: MAKE: GRIPHOLD / MEKASTER / STANLEY

32) One (1) SCREW EXTRACTOR SET (HEXAGONAL) CONTAINING DRILL SIZE IN INCHES: 1/4”, 3/16”, 3/8”, 5/16”, 7/16”, 9/16”, 1/2”, 5/8”, 3/4”, 11/16”, 1/8”, 13/16”, 7/8” (TOTAL 13 NOS)
MAKE: SNAP ON

33) One (1) SPIRIT LEVEL 30 CM (12”)

34) One (1) ULTRA LOW FLAT JACK REMOTE CONTROL COMPLETE WITH HYDRAULIC HAND PUMP, PRESSURE RELIEF VALVE, PRESSURE GAUGE AND 2.5 TO 3 MTS HYDRAULIC HOSE .
CAPACITY: 10 TON, CLOSED HEIGHT: 40-43 MM, STROKE: 10-12 MM, RAM DIA: 34-38 MM, WEIGHT OF THE JACK: 2 TO 4 KG.
MAKE: MAKE: GRIPHOLD / MEKASTER / STANLEY

SECTION 15: RIG AIR SYSTEM

1. **One (1) suitable Air System consisting of following:**

   i. Two (2) Sullair model 4509 or equivalent AC/AC heavy-duty industrial rotary screw compressors each rated 267 CFM at 125 PSI, with 415 volts AC, 3 phase, 50 Hz TEFC motors, WS microprocessor controller standard, starters, controls in NEMA 4 enclosed.

   ii. One (1) Sullair Model SRL-700 or equivalent Refrigerated Air Dryer designed to provide a pressure dew-point of 35-39 deg F. with an inlet flow of 700 scfm, an inlet pressure of 100 psig, an inlet temperature of 100 deg F and 100 deg F Ambient. Electrical 415 volts AC, 3 phase, 50Hz. Includes suitable One each Pre-filter & After filter.

   iii. One (1) suitable cold start reciprocating air compressor unit, two stage, two-cylinder; pressure lubricated and to provide 42.4 CFM at 175 psig. The compressor should be powered by a suitable air cooled diesel engine. Unit includes intake filter, V-belt drive and guard, pneumatic pilot and clutch PTO. The compressor and engine should be mounted on a rigid steel base.

   iv. Two (2) Vertical Air Receiver of capacity of around 400 US gallon (53 cu. Ft.), Vertical air receiver with 2" NPT inspection opening and saddles, size 36"x 101" ASME code 165# MWP, to come complete with relief valve, pressure gauge and auto/drain. One number skid mounted receiver to be placed near the derrick floor.

2. **SPECIAL NOTE:**

   i. All the components of the Air system are to be accommodated in the Power Pack Skids and within the Acoustic Enclosure.

   ii. HP rating of the Electrical motor to be matched to get desired pressure & capacity.

SECTION 16: RIG FUEL SYSTEM

1. One (1) suitable Fuel System consisting of following:

i. 02 (Two) nos. of Fuel tanks with total capacity of around 500 bbl (80 KL), mounted on a two runner oilfield skid. The diameter and the length of the tank shall be 243.83 cm (8 ft) and 914.4 cm (30 ft) respectively. Tank(s) should be cylindrical & to have exterior and interior ladder, man way, and vent.

ii. The bidder shall provide Tank Calibration Chart in centimeter scale. The tanks shall be complete with graduated scale on a suitable place so that fuel depth can be measured from outside

2. One (1) FUEL FILTER SYSTEM

i. This filter package should be three-stage filter type. There is a pre-filter to remove dirt, a electric element to form dissolved water into droplets and separator element to make the water droplets drop out of the fuel.

ii. PRE-FILTER: Contains a quantity of **three** pleated paper filter elements each rated to remove solids to five (5) microns. The three elements will hold approximately twenty pounds of dirt before time to change out the elements. The purpose of the pre-filter is to trap solids or dirt before they can reach the lectric.

iii. DIESEL FUEL TRANSFER PUMPS–Two packages each having a gear pumps with built in relief valve, rated at 35-39 GPM mounted on a base with a Flexible coupling, OSHA coupling guard and a 3 HP, 1450 RPM, explosion proof motor, 415 volt, 3 phase, 50Hz. HP rating of the Electrical motor to be matched to get desired pressure & capacity.

3. MOUNTING:

These two filter tanks along with the two pump packages to be mounted on a base, piped with valves for series flow through the tanks or to bypass the filters. The pumps will be manifold together so that product can flow through either pump while the other pump is operating. Pressure gauges are mounted on each of the tanks to measure pressure drop and know when to change filters. The system will also include an **automatic drain for water**, and all necessary valves, unions etc. to make it a complete functional unit. The system only requires a hose from the main fuel storage and a hose to the day tank. The total unit is painted with a two part catalyst setting epoxy.

SECTION 17: RIG INTERCOM SYSTEM

One (1) suitable Rig Intercom system consisting of following:

i. One (1) Line Balance Assembly, for Division 2 areas.

ii. One (1) Wall Mount Audio Messenger Interface.

iii. Four (4) Outdoor Station, 5 party line for Division 2 areas consisting of:

a. Handset/ speaker amplifier with press bar handset and an auxiliary receptacle.
b. Weather proof metallic enclosure at Driller's position, shakers and choke manifold.

iv. One (1) Indoor Wall Station for Division 2 areas, consisting of:

a. Handset/ Speaker Amplifier with press bar handset an auxiliary jack.
b. Indoor enclosure SCR house.

v. Four (4) Indoor Wall Stations, 5 Party Line for Class 1, Division 2, consisting of:

a. Handset/ speaker amplifier with press bar handset
b. Indoor enclosure at Doghouse, tool pusher office, company man office, safety supervisor office.

vi. Nine (9) Weatherproof Driver Unit for Division 2 areas, rated 30 watts at 16 ohms.

vii. Nine (9) Weatherproof Re-entrant Horns.

viii. Nine (9) Speaker Mounting Assemblies.

ix. One (1) Headset/ Microphone Assembly. Includes double receiver, gooseneck noise canceling microphone and a five foot coil cord.

x. One (1) extension cable for use with headset microphone includes push-to-talk button, belt clip and 6-pin plug for Derrick man (at Racking Board).

xi. One (1) 1 KVA UPS system with internal batteries that will provide a 1 KVA backup for 10 minutes and standby for 1 hour based on the system offered.

xii. One (1) lot of cables and disconnects for this rig intercom system.

SECTION 18: MATHEY WIRELINE UNIT

One (1) Mathey Surveyor 2007 or equivalent wire line unit of following specification:

1. DRUM ASSEMBLY:

i. Capacity: 7620 M (25,000 ft) of 0.092 in. wire line
ii. Large diameter drum shaft
iii. Pillow block bearings each end
iv. Hand crank to be provided for rig up/rig down operation

2. OPERATOR CONTROLS:

All controls located so that unit is operated from front of unit. All control levers, knobs, etc. should be located conveniently for operator.

3. BRAKE ASSEMBLY:

Disc brake, Mechanical brake lever convenient to operator

4. DRIVE ASSEMBLY:

Chain and sprocket drive
Transmission, 3 speeds forward, 1 reverse

5. POWER DRIVE ASSEMBLY:

15 HP explosion proof electric motor, 3-phase, 50 Hz, 415 volt AC, Class I, Group D, Division I, 55°C ambient temp., Explosion proof starter box with start/stop station, Explosion proof coupling between starter box and motor, All components UL / CSA rated.

6. HYDRAULIC ASSEMBLY:

i. Open loop system, 2,000 PSI working pressure
ii. Relief valve; adjustable
iii. Hydraulic pump
iv. Hydraulic motor
v. Governor valve (Speed Control)
vi. Directional valve (4-Way)
vii. Diverter valve (Run / Stop)
viii. System pressure gauge
ix. Large hydraulic reservoir with sight gauge
x. Filtration system
xi. All hoses and fittings sized for maximum flow
xii. All controls located for operator efficiency and comfort

7. SPOOLING/MEASURING ASSEMBLY:

Rack arm post; installed (for installation of Rack Arm assembly)

8. MOUNTING:

Skid mounted, Raised drum for ease of operation, Lifting shackles, Forklift pockets, Sheet steel cover guards & Compact footprint.

9. PAINT: 3-COAT PAINT SYSTEM

i. Abrasive blast to bright metal
ii. Prime coat – Inorganic zinc rich primer
iii. Intermediate coat – epoxy
iv. Topcoat – Acrylic urethane

10. APPROXIMATE PERFORMANCE:

i. Line Pull 3400 lbs. (1542 kg)
ii. Speed 1375 fpm (419 mts/min)

11. APPROXIMATE SPECIFICATIONS:

i. Wt. 2000 lbs. (900 kg)
ii. Dim. 36" F-B (914.4 mm); 60" H (1701 mm); 48" W (1219 mm)

12. One (1) WIRELINE .092" X 25,000' Conforming to API Spec. 9A with API Monogram.

13. One (1) WIRELINE CLAMP (0.082-3/16)

14. One (1) Floor Sheave Assembly with Line Wiper, 7", (0.066-0.092)
Weight around 17.9 Pound & Consisting of 7" Hay Pulley machined for .066" through .092" diameter wire line, 7" Floor Stand, and Line Wiper.

15. One (1) "O" METER, 7 INCH, METERAGE MEASURE, DIRECT, .092
Meterage Measure; counter attached to meter

16. One (1) DOUBLE RACK ARM ASSY

17. One (1) WEIGHT INDICATOR, ENGLISH, 0-2000 LBS

SECTION 19: RIG ELECTRICALS

Contents:
Broad outlines

Chapter I: Specification of Items/ Equipment
- I.A: General
- I.B: Power packs
  - I.B1: Engine
  - I.B2: Generators
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    - Features and Constructional Details
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    - b) Generator Control Panels
    - c) Synchronizing System
    - d) Converter / Rectifier Panels
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    - f) Brake Chopper Panel
    - g) Braking Resistor Banks
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    - l) Driller's Control & Mud Pump Control
    - m) Plug and Socket Panel
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  - I.C2: Auxiliary Control PCR (ACPCR)
    - a) Construction
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- I.D: Drive Motor Specifications
  - I.D1: DrawWorks Motor Specifications
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  - I.D5: AC Auxiliary Motors
- I.E: Cables
- I.F: Auxiliary Equipment & Systems
  - I.F1: Rig Lighting System
  - I.F2: Well-site Area & Crew Hut Illumination Control Panel, Skid Mounted
  - I.F3: Cable handling system consisting of Cable trays, Cable boxes and grasshopper arrangement to derrick floor
  - I.F4: Rig Earthing System
  - I.F5: Electrician's tools, instruments, special tools, computers for the rig system

Chapter II: Standards, Statutory Rules and Regulations to be followed

Chapter III: Spares

Chapter IV: Approval of Drawings, Stage Inspection, Performance Testing at Works, Training and Support Service package

Chapter V: Electrical Annexures

VA Electrical Annexure- Statutory- Hazardous area classification, Cables
VB Electrical Annexure- Standards
VC Electrical Annexure- ACPCR MCC Starters/ Feeders
VD Electrical Annexure- Schedule of Submission of Drawings/ Documents
VE Electrical Annexure- Datasheet
VE Electrical Annexure- Indicative Drawings
VG Electrical Annexure- Commissioning Schedule of Electrical Equipment

BROAD OUTLINES

i. Electrical Scope of the rig shall encompass complete Design, Engineering and Manufacture, Supply, Commissioning and Testing of the different electrical equipment/drives to be used in the rig with their connected loads. In addition, all current/ latest statutory Indian rules, regulations and standards as well as International standards applicable shall be mandatory in design, engineering, application and commissioning.

ii. The electrical system of the rig shall be complete in all respect. All equipments specified below shall be new, unused, of recent manufacture and free from all manufacturing defects. Equipment should be of proven design, and running successfully under similar conditions of operation.

iii. Bidder/ supplier should integrate all supplied equipment and systems and functionally test the complete setup.

iv. In case any of the following equipment/ items is/are outsourced, bidder shall clearly indicate country and company of origin.

v. **All documents, technical drawings, manuals, literatures, brochures etc. pertaining to the equipment below shall be in English language (UK or US).**

vi. The following chapters give the detailed specifications for the Rig Electricals.

CHAPTER I: SPECIFICATIONS OF ITEMS / EQUIPMENT

I.A GENERAL:

i. The rig shall be powered by captive power packs consisting of turbo-charged diesel engine driven alternators. Number of power packs should be commensurate with the total power to be delivered during full drilling operations with all auxiliary systems, including power requirement for the site camps. The power packs shall be suitable for generating alternating voltage at 600 V, 50 Hz (cps).

ii. Bidder shall also include in the package, auxiliary electrical systems for operation of the rig, viz. all electrical motors of the solid control system, rig lighting system, utility system (compressed air, water etc.), cable system including cable trays, boxes & grasshopper/ elevators, earthing system, maintenance and testing facility for rig control system, complete set of spares etc.

iii. Control system for the power packs and all electrical drives, lighting loads and auxiliary electrical system shall be housed inside power control rooms (PCRs). Various drives & equipment of the rigs will be powered from the PCRs by electrical/ electronic/ digital signal, power and control cables.

iv. A suitable integrated proven rig control system (electronic) shall be used to enable:

a. The driller to control the Main drives and auxiliary drives from his cabin/ control panel
b. Communicate among various drives and the driller and monitor/ offer real time status of various parameters including engine/ alternator status, motor drives status, current, voltage, power etc. along with the major drilling parameters.

v. The main drive motors shall be VFD controlled AC cage induction motors. The VFD system shall preferably be PWM / direct torque control system, suitable for controlling drilling motors.

vi. The Electrical System of the rig should be broadly designed to operate the following major equipment:

a. Power Packs (4 nos.)
b. Draw-works drive- with 02 nos. of VFD controlled AC drilling cage motors
c. Top drive (electrical) – Separate feeder or fully functional VFD cubicle for top drive shall be available in the main power control room.
d. Rotary table- with 1 no. suitable rotary drive AC cage motor
e. Mud pumps (2 nos.)- with 2 nos. each VFD controlled AC cage drilling motors
f. Auxiliary braking system: The auxiliary/dynamic braking system shall be integrated with the VFD control, in conjunction with braking resistors.

vii. In addition, the Electrical system shall also operate the auxiliary electrical equipment.

viii. **Rig shall be designed for cluster drilling operation and be capable of drilling 1+3 cluster wells from the same plinth, without moving the PCRs. Each well is 15 metres apart.**

All AC Auxiliary motors used in Hazardous Areas shall be CIMFR Certified and DGMS (India) Approved. Bidders should ensure that their offer conforms to this clause.

I.B POWER PACK

i. Quantity: Minimum 4 (four) nos.

ii. Engine coupled with the Generator shall be unitized and enclosed in a weather-proof, acoustical, skid mounted enclosure. Power packs shall be

a. Compatible for varying loading pattern, quick responsive to instantaneous load and torque changes
b. Suitable for VFD controlled AC drives
c. Compatible with suitable control signals coming from Power Control Rooms (these may be actuator control / speed sensor signals).
d. The Generators (with the engines) shall be suitable for parallel operation.

I.B1 Engine: Detailed specifications are available elsewhere

Engine Control: Engine control system shall be integral to the engine.
The engine control System (ECS) shall send speed engine speed feedback data to, and accept speed control signals from, the Generator control panels.

I.B2 Generators:

i. Generators shall be matched to the engines. They shall be of heavy-duty construction, designed for drilling applications, which require heavy duty motor starting and predominantly non-linear loads such as SCRs /VFDs. The Generator shall be able to withstand the shock and vibration associated with the frequent relocation of drilling rigs, as

also to withstand severe environmental conditions including heat and high humidity. Rotors should be dynamically balanced and engineered to withstand 125% over nominal speed.

ii. Generators should be manufactured to international standards and should meet or exceed BIS, NEMA, IEEE, ANSI and IEC requirements. **Bidder to confirm standards followed in design and construction**.

iii. The following are the minimum specifications for the Generator

Rated voltage	600 VAC
Capacity:	Minimum 1215 kVA (850 kW at 0.7 p.f.)
Power factor	0.7 lagging
Phases	3 phase,3 wire, star connected with isolated ungrounded neutral, but neutral available at terminal box
Frequency	50 Hz
Speed	Matched with the Engine
Duty Continuous Running, at 55 deg. C ambient	
Insulation Class	H for exciter, rotor and stator
Enclosure	Open drip proof IP 23 minimum, Terminal box IP 44 minimum
Temperature rise	80 deg. Celsius at full load and max. ambient taken as 55 deg C.
Type of cooling	Forced air type blower fan on DE
Generator waveform	Deviation factor : 5 % max Crest factor : 1.41± 0.07 Form factor : 1.11 ± 0.05 Harmonics content : 3 % max. (total) : 2 % max (individual)
Voltage regulation	Voltage regulation shall be within ± 2%
Voltage balance	With balanced loads, the voltage to be held within 1.0% between phases.

iv. **Constructional Features of the Generators:**

a. The Generator should be mounted in a single skid with the engine.
b. Rotor and stator shall be vacuum pressure impregnated and dried.
c. Drip proof enclosure and drip proof removable cover for exciter shall be provided.
d. Terminal box shall be of termite and dust proof construction with removable cover.
e. Stator leads shall be terminated on suitably rated copper straps (standoff connectors) for connection to load side.
f. Two non-corrosive stainless steel ground pads mounted diagonally opposite each other on generator frame shall be provided.
g. Plate for main cable entry should be of non-magnetic materials to avoid heating by generation of eddy currents, as single core power cable will be used for termination.
h. Insulation barrier should be provided to separate power and control terminals.
i. Two nos. eye bolts for lifting the machine should be provided on the main frame.
j. Channel mounted terminal block shall be provided for terminating the following-
    i. RTD Leads
    ii. Exciter field leads
    iii. Space heater leads
    iv. Engine actuator leads, if required
    v. Magnetic pickup leads, if required
    vi. Engine protection system leads
k. Two nos. of single core 300 sq. mm cables are to be used for each phase.
l. Plugs / Sockets should be Amphenol / Pyle National /Connectwell / Cutler Hammer make.
m. Cable glands shall be provided for safe and proper entry of all cables
n. All the terminals shall be labeled properly.

v. Technical Notes:

a. The Generator make should be **Kato/ BHEL**
b. Complete power pack should be load tested prior to dispatch and to be commissioned in field.
c. Reports of following standard commercial tests performed on the offered Generators (in accordance with IEC, IEEE Std. 115, NEMA MG-1, or MIL-Std. 705 standards) *shall be attached with the technical bid*.
   - Resistance on all windings (cold)
   - Insulation resistance on all windings
   - High potential test on all windings
   - Open-circuit saturation curve
   - Voltage balance on windings
   - Current balance on windings
   - Phase sequence
   - Mechanical balance (vibration)
   - Circulating current (when applicable)
   - Three-phase build-up short-circuit (conducted if the generator has a PMG or SBO)
   - Voltage transient at rated kVA (voltage regulation, stability, and response)
d. *Bidder shall submit the datasheet of the offered Generator along with the technical bid*, which shall include the data of the offered Generator. The following shall also be mentioned:
   i. Overload capacity: In percentage along with short-circuit capability
   ii. Phase unbalance capacity (negative sequence component)
   iii. Efficiency at 25%, 50%, 75%, 100%
   iv. Permissible vibration limit: In micron & mm/sec for bearing & foundation pad
   v. Radial & axial clearance for DE / NDE bearings: Maximum & minimum tolerable clearances
e. Any other relevant details may be mentioned.

I.C: POWER CONTROL ROOMS (PCRS)

Power control room (s) shall house controls for main drives and auxiliary drives of the rig.

Features:

There shall be two (2) PCRs, as follows:

1. Main PCR, which is the primary control room, shall house
   i. Generator control panels,
   ii. Rectifier and VFD panels,
   iii. Auxiliary motor control panels (if required by design).
   iv. Auxiliary brake controller/ chopper shall be housed in the Main PCR; however, braking resistors if used, shall be outside the PCR enclosure, but on the same skid.
   v. Plug socket compartments for interconnection with various main and auxiliary loads.
   vi. Any other electrical system like air conditioners etc., necessary for operation of the rig electrical equipment.

2. Auxiliary Control PCR (ACPCR) shall house
   i. MCC for all auxiliary motor starters/ feeders.
   ii. One Main transformer, Two lighting transformers and one isolation transformer
   iii. Aviation (white) warning light controller
   iv. Plug socket compartments for interconnection with various main and auxiliary loads.
   v. Any other electrical system necessary for operation of the rig electrical equipment

Constructional features:

a) PCR (s) shall have the following dimensions for the structure (not including projections due to door handles, rain protection canopies, light pole brackets etc).

Limiting Dimensions: Length 12.0 mtrs. X Width 3.0 mtrs. X Height 3.0 mtrs.
Limiting weight: 28.0 Tonnes
(Note: The skid should be four runner type & the spacing between the middle runners to be kept more for better stability)

b) Both the PCRs should be of out-door, weather proof, transportable steel housing with self-supporting skid suitable for oil field application and should not weigh more than the limiting weight specified above.

c) Both PCRs should be designed for lifting from the bottom.

d) PCR house columns and ceiling frame are to be constructed from structural steel seam welded. The outside shall be fabricated from twelve-gauge sheet steel. All corners are to be formed by bending leaving no sheet edge exposed. Roof of the PCR should have proper slopes so that no water logging takes place during rainy season.

e) Walls to be insulated with three-inch thick polystyrene block insulation. The floor and the wall with the receptacles and plugs will not be insulated. The inside surface of the walls shall be finished with a sandwich style insulating board three eight's of an inch thick with white pebble coating on the interior side and aluminum foil on the exterior side. A rubber neoprene mat should be provided over the **full floor area of the house.**

f) Panel line up can be provided in centre or wall attached on both sides with centre corridor. Supplier can offer their standard panel line up arrangement in the PCR. The panel line-up should be such that the PCR is load balanced for easy lifting, with CG in the centre. All components of the panels including Bus bars shall be easily accessible for maintenance and repair.

g) Plug panel for the Generator and Drilling motor cables to be provided on the front side plug panel (side facing the DW). In case it is difficult to provide generator plug panel on front side then standard arrangement of supplier i.e. generator plug panel recessed type on the side facing power packs can be provided but height of the plug panel should be around 1.5 mtrs from bottom of the PCR.

h) Fluorescent lighting fixtures (2 x 40 Watt) is to be provided for aisle lighting. Four- (4) 240 volt Phase – Phase duplex receptacles (suitable for Indian style plug pins) to be included, two at each end of the house. The PCR shall be equipped with two portable (for working in panels) emergency lights which shall adequately light up the PCR in the event of a blackout. Additionally, two emergency lighting fixture with EXIT signs to be also included at each end of the House. 240 V Phase-Phase AC power supply shall be supplied from Main PCR lighting feeder and space heaters supply.

i) Two (2) doors with anti panic hardware will be furnished – one at each end and on opposite sides of the house. Both doors shall be designed to open to the outside by pushing on the crash bar. Doors should have a rubber sealing lining.

j) Complete air conditioning system for the PCR should be mounted on the same skid.

k) PCR is to be provided with four brackets to hold flood light poles.
The Main PCR should have a recessed panel on the rear end to feed electrical equipments mounted on the ACPCR such as the primary side of the transformers and other electrical equipments as required. Plug Panel for 4 x 20 core cable interconnection with AC PCR to be provided on the front side.

l) Surface preparation: Surface finishing should be Commercial Metal Blast Grade (SSPC-SP-6) 1.5 to 2.5 mils anchor profile before primer painting. Primer and final top coat shall be of premium quality.
Top coat colour will be urethane linear white.
Over all dry film thickness of the painting should not be less than 8 mils (200 microns).
Surface preparation and painting shall be adequate for the harsh rainy & humid environmental conditions.

m) Both the PCRs shall be fitted with adequately rated tinned copper bus bars, insulated with sleeves, cable alleys/trays and vertical bus chambers.

Hardware for all bus connections shall be of stainless steel bolts, aircraft locking nuts with nylon inserts suitable for bus bar operating temperature at full load or alternatively hardware with plain & spring washers to be used.

I.C1 MAIN PCR

Main components:

a) Rig Control System (Programmable)

The rig control system shall perform the following functions and have the features for overall VFD control, interlock with accessories and monitoring.

- Shall incorporate the VFD control logic.
- Should be suitable for a cable length of up to 100 meters from Main PCR to Driller Console to meet cluster drilling requirement.
- Shall provide status, alarm and diagnostic tools.
- Will provide automatic starting of Mud Pump and Draw works auxiliaries with indicating lights on console.
- Shall have touch screen (inside the main PCR) for all miscellaneous indications for generators & VFD panels, indications for various drives, ground faults, power limits, Hour meter, current & voltage metering, trending of historic data & faults etc.

Features of the Rig Control System

i) The control system shall include the main driller's control (D'CON) with control switches to control main drive motors, power packs and various indication meters, speed controllers, display screens (touch screen controls) and display of Generator/ engine parameters, VFD converter/ inverter panels' fault & status etc. In addition, fault storage facility and history/ trend data should be available in the system with built-in self-diagnostic features.
ii) The control system should be complete with all necessary software, hardware and remote communication capability. User Licenses for all software, including hardware keys (if needed) should be licensed to Oil India Limited. Such Licenses should not have expiration dates.
iii) **In case of failure of rig control system/ communication, the system will be provided with a standby/backup manual assignment/ control system option for emergency drilling operation.**
iv) The rig control system shall also include **two Emergency Stop controllers** for facilitating emergency stopping of major equipments: one for stopping the main drives (VFD units) and the other for stopping the power packs (for total rig power shutdown). These stop buttons should preferably be hardwired.
v) The rig control system shall be suitable for communication with remote consoles and other rig components and devices. In addition, fault storage facility and history/ trend data should be available in the system with built-in self-diagnostic features.
vi) The rig control system shall be field proven, running successfully for a minimum of 3 (three) years in land drilling rigs.

Touch Screen (in the Main PCR):
A touch screen/soft button display screen, as part of the Rig Control system shall be provided in the Main PCR cubicle. This screen should display data pertaining to the Generators / VFD Motors / Console command status etc., preferably on multiple screens.

b) Generator control panel

The control for power pack engines (ECM – Engine Control Modules) should be integral to the engine (detailed specs for control of power packs are available elsewhere). The input from the Generator control panel to the ECM shall be indicated by the bidder

Generator control panel shall be suitable for operating/ controlling/ protecting the generator. The generator control system shall be suitable for control of the generator, individual running or paralleling & load sharing with other power packs. **There shall be one Generator control panel per Generator.** All control switches, devices, and meters should be available on the front fascia of the panel.

Generator control panels are to be fitted with the following:

i) Generator control unit (package) –for operation, control, metering and protection of–Generator. This should interact with the overall Rig control system.
ii) Withdrawable type incomer air circuit breaker of sufficient nominal rating, breaking/ withstand and making capacity, manually chargeable, electric opening/closing, with solid state trip unit, UV release and necessary auxiliary contacts. **Breaker should be interchangeable with VFD panel breakers**.
iii) Breaker ON/OFF (”Close”/ ”Open”) pushbuttons
iv) Engine control switch, three position: OFF-IDLE-RUN.
v) Manual engine speed & Generator voltage adjust potentiometer
vi) Reactive power sharing circuit / module.
vii) LED Indication lamps (with low voltage glow protection) –Gen. RUN, Gen. ON-LINE, Gen. SYNCH, Gen. FAULT, Engine FAULT
viii) Control Transformers, fuses, links, terminal blocks etc.
ix) Any other Electronic control system for remote communication with other devices/ equipment
x) Synchronizing controls: Please refer Para (c) ”Synchronising system” below.
xi) Voltage regulator with the following:
    a. Electronic AVR, with reactive load sharing feature
    b. Voltage regulation with 3% droop

Each panel should be fitted with the following ANALOG meters:

- Generator Ammeter 0-2000 A (selectable for all three phases)
- Generator Kilowatt meter 0-2000 KW
- Generator Kilovar meter 0-2000 KVAR
- Generator power factor meter (–)1.0 – 0 – (+)1.0
- Generator cumulative running Hours meter

Additionally, Each Generator panel shall feature the following DIGITAL meters:

- Generator Energy (kWHr) meters
- Generator temperature meter and switch

Digital display for all the parameters may be offered as an ADDITIONAL option.

Suitable kW and kVAR load sharing scheme should be implemented. Bidder to indicate scheme / type of load sharing employed.

Generator Protection features:

The Generator protection features shall include:

- Overcurrent – Set to trip at 110% of max. rated current
- Overvoltage – Set to trip at 116% of Generator terminal voltage (600 V), with 10 mSec. delay
- Overfrequency – Set to trip at 110% (i.e. 55 Hz) of rated frequency (50 Hz)
- Underfrequency – Set to trip at 42 Hz (16% below rated)
- Reverse Power – Set to trip at 8-10% of rated kW

Engine control should include:

Electronic engine governor with the following-

- The speed regulation (Engine governor)
- **Speed feedback/MPU Signal Range: Bidder to specify**
- **Engine throttle/actuator signal range: Bidder to specify**

The engine control system may feature batteries for Engine and Generator safety / Control System. If batteries are provided inside the PCR, these should preferably be maintenance free, dry cells.

Each Generator-engine control panel should be independent and complete in all aspects with switching and control devices. Loss of one panel should not affect the others. However, they will communicate with one another for load sharing.

c) Synchronizing system

i. A manual synchronising system should be provided.

ii. Synchronizing switch shall be provided on any one of the Generator control panels, with positions for each generator, bus and off. Additionally, a synchronising panel should be provided. This synch panel should be visible from all Generator control panels, and allow each Generator to be brought on-line. The panel shall feature the following minimum instruments:

   a. Synchroscope

   b. Synchronising lamps – clear (dark lamp synchronizing)

   c. Voltmeters for incoming generator and running (bus)

   d. Frequency meters for incoming generator and running (bus).

iii. Sync Check Relay:

There shall be a synch-check relay to allow Generator to be synchronized with the bus. The circuit breaker "close" signal shall be interlocked with this relay.

d) Converter/ Rectifier panels

Suitably rated incomer/rectifier sections capable of providing the full load of all the drives, shall be provided in the main PCR for supplying the VFD line-up. Each section shall include the following:

i. Withdrawable type incomer air circuit breaker of sufficient nominal rating, breaking/ withstand and making capacity, manually chargeable, electric closing, with solid state trip unit, UV release and necessary auxiliary contacts
ii. Fixed mount 2 pole motor operated disconnect switch
iii. 6-pulse air-cooled diode bridge rectifier
iv. Input line reactor of sufficient rating
v. AC & DC voltmeters
vi. Panel Blower, if required
vii. Panel heater with thermostat

Any other feature required for efficient functioning of the Converter panel shall be included.

e) VFD/ Inverter Panels

i. The Main PCR shall house air cooled VFD panels of sufficient capacity, suitable for driving the following:
   - One 2000 HP DW (driven by two AC cage motors)
   - One Independent rotary drive AC cage motor
   - Two mud pumps (each mud pump driven by two AC motors)
   - One Top Drive (driven by AC cage motors)
   - One spare panel (fully functional, rated for the highest powered drive)

ii. **TOP DRIVE** – The Top Drive may be an external control (not in the Main PCR VFD Panel), in which case, there should be a 600 VAC feeder with aequtely rated ACB for feeding power to the Top Drive PCR.

iii. Proper schemes for the following shall be employed:
   - Load sharing of the two motors of a mud pump, if two motors per pump are employed, and they are run from the same panel
   - Current & torque limiting features for rotary/ draw works and
   - Mud-pump single/ double motor operation, if two motors per pump are employed.

iv. All necessary protection like over temperature, over current etc should also be incorporated in the respective panels.

v. Each VFD panel shall consist of the following main equipments:

   - Suitably rated Air circuit breaker with adjustable trip, Draw-out type. Each breaker to be manually Chargeable, electrically closed and electrically tripped and with auxiliary contacts. Alternatively, DC isolation switch and DC fuses may be offered.
   - Inverter(s), suitably rated
   - Semiconductor fuses with indicator switches
   - Control module (s), card (s), cables
   - Communication modules
   - Inverter firmware package
   - Emergency Stop Safety Relay
   - Cubicle Space Heater (To be "ON" when VFD is not in operation)
   - Blower unit for cooling of the VFD panel

vi. The following Buttons / Indications / Meters should be available on the front fascia of the panels:
   - Drive control pushbutton LCD operator panel
   - Voltmeter, 0-1000 VAC; Analog / Digital Display
   - Ammeter, 0-2000 AAC; Analog / Digital display
   - VFD "ON" indicating lamp, (Red) LED type
   - Drive fault alarm – should be available in the Main PCR with external electrical hooter.

f) Brake Chopper Panel

One or more chopper panel shall be housed in the main PCR consisting of the following:

i. DC Brake Chopper with suitably rated continuous current output to match the full dynamic braking of the draw-works with sufficient overload capacity
ii. Suitably rated Air circuit breaker with adjustable trip, Draw-out type. Each breaker to be manually chargeable, electrically closed and electrically tripped and with auxiliary contacts.
iii. Semiconductor fuses with indicator switches
iv. Resistor bank Temperature monitoring circuit
v. Resistor bank cooling fan pressure monitoring circuit
vi. DC Bus indication lamp
vii. Fuse fault lamp
viii. thermostatically controlled cabinet heater

g) Braking Resistor Banks

Suitably rated resistor banks shall be provided for brake chopper. The banks shall be on the same skid, but outside the enclosure. The resistor banks shall consist of:

i. Stainless steel air cooled resistors, suitably rated
ii. cooling fan
iii. Thermal limit switch
iv. Pressure sensing switch
v. IP 55 Stainless steel resistor bank enclosure
vi. IP 56 Stainless steel cable termination box

h) Hands Off Cranking Circuit (HOC)

i. The HOC shall supply power for the engine starting circuit (Actuator / equivalent) and the pulse pick-up circuit in each of the engine generator modules with the following:

- 2 nos. – 12 VDC batteries
- 1 no. – Battery charger PC card
- 1 no. – Double pole circuit breaker

ii. HOC Sytem to be suitable for CAT 3512B / 3512C / similar engines.

i) Power Limit Controller

A Power Limit Controller is to be provided to monitor the KW & KVAR/current of each of the engine – generator sets. If either of these parameters reach its limits, the Power Limit Controller shall reduce the power being delivered to the loads, so that the load on each generator is held at its limit until the loads on the VFD drives are reduced (by other action) to a level below the generator limit. The Controller will allow for adjustment of each parameter independent of the other.
The range of adjustment will allow the Power Limit to be lowered to 80% or raised to 110%.
The Power Limit may also be provided as an integrated feature of the Rig Control System.

j) Ground fault detection system

Ground fault detection system consisting of the following items;

i) *600 VAC ground fault detection*
Ground fault detection circuit, 3 nos. ground fault lights (for each phase), percentage AC ground fault meter

ii) *DC ground fault detection (for rectifier+ DC bus/ link system)*
DC ground fault detection system with percentage DC ground fault meter (+/0/-), test pushbutton

iii) *Variable AC voltage ground detection circuit for AC drilling motors with GF lamps and meters*

All ground fault alarms shall be audio as well as visual, with provision for remote annunciation of fault.

k) Air conditioning

i. The PCR (s) will be air conditioned and humidity controlled. The ambient air is expected to vary from 0 Deg C to 55 Deg C.
ii. The air conditioning for the PCR (s) shall be properly sized and air conditioning units located to take into account the **heat generated by internal equipment in full load conditions in high ambient locations**.
iii. Air conditioning system components shall be located on the same skid as the PCR.
iv. The temperature inside the PCR (s) should not exceed 25 deg C under any circumstances
v. The humidity should be considered for a maximum of 98%.
vi. **The AC system should have 100% redundancy, i.e., half the capacity should be standby at all time**.
vii. Bidder to furnish details of Air Conditioners

l) Driller's control cabin & Mud Pump Control Console

i. Driller's control cabin (or D'CON) and Mud pump control console shall be integral parts of the rig control system.

ii. The D'CON should consist of the following minimum controls and display functions:
- HMI to enable the driller to monitor and control the entire drilling operation.
- Control switches to control main drive motors
- Indicators and meters
- Speed controllers to control speed and direction of various main motors- DW, Rotary, top drive & Mud pumps
- Generator/ engine parameters, VFD converter status/ alarm etc.
- Supercharger pumps shall be started & stopped manually from Driller's Console.
- Two emergency stop button, one for the main drive motors, and another for the power packs (total power shutdown)
- Brake control levers / Joysticks.

iii. The Driller's Control cabin shall be air-conditioned, with the air-conditioner being Ex type, suitable for installation in hazardous areas, Zone 1 and 2.

iv. **Mud Pump Console**: The MP Console or MPCON shall be provided for local control of mud pumps, with suitable switches, speed control and indication system. It shall also be able to communicate with the rig control system. The MPCON shall be able to control the mud pumps up to full speed. The controller to be used shall be suitable for communication with remote consoles and other rig components and devices.

m) Plug and Socket Panels

i. Suitable plug and socket arrangement shall be provided for interconnection of the Main PCR with Generators, motors, auxiliary loads, remote interface modules, ACPCR etc. with cables. Socket compartments shall be suitable for ease of quick rig-up and rig-down operations. Matching plugs will be fitted in the cables.
ii. Socket compartments should be preferably located to either end of the Main PCR. Generator and Drilling motor power and control cable socket board shall be towards the derrick.
iii. The plug / socket compartments shall be well illuminated and suitably marked for ease of identification of circuits / loads.
iv. The plug sockets cable termination shall be crimped type. Horizontal steel bars shall be provided in the compartments for supporting the layers of cables.
v. There should be adequate no. of spare sockets of each type available in the socket board.
vi. Flap covers for rain protection of the sockets should be provided.

n) Transformer Feeder(s)

The Main Transformer (1000 kVA, or 2 x 500 kVA), located in the Auxiliary Control PCR, shall be fed from the Main PCR's 600 VAC Bus. Suitably rated Air Circuit Breakers shall be provided for each transformer feeder.

I.C2 AUXILIARY CONTROL PCR (ACPCR)

General:

The power to ACPCR will be fed from 600 VAC main bus in Main Power control room through the 600/415 AC main transformer. The starters/feeders to be housed in the ACPCR are given in the Annexure, *"Annexure-ACPCR Starters/Feeders".*

a) Construction:
Construction shall be similar to the Main PCR, as detailed above.

b) Dimensions:
Limiting Dimensions and Weight will be identical to those given in Main PCR.

c) Air Conditioning:
Four numbers split AC units, of sufficient rating are to be provided. Two of these will be in operation, whereas two will remain as standby, i.e., 100% redundancy will be assured. **Supplier has to provide suitable capacity AC's, after AC requirement calculation taking into consideration the normal running of all loads from the ACPCR.**

d) Transformers:

- There shall be four power transformers in all:
  i. One Main Transformer (1000 kVA) for MCC supply (Alternatively, two 500 kVA Transformers, with identical % impedance for parallel operation may be provided).
  ii. Two Lighting transformers (Minimum 60 kVA each) for lights in hazardous areas
  iii. One Isolation transformer (100 kVA) for camp-site power & general lighting
- All the transformers shall be protected through suitably rated MCCBs in the primary and secondary sides.
- All live parts of the transformers not insulated shall be protected adequately.
- Transformers shall be placed at suitable positions, taking into consideration working space, socket board positions, equal distribution of weight of the PCR etc.

1. *Main Transformer(s) for MCC supply:*
1 no. main transformer (Alternatively, two identical 500 kVA transformers for parallel operation), dry type, copper wound, air cooled to meet the auxiliary motor/ other load requirement as described in "Annexure ACPCR MCC starter/feeder".

- Capacity – 1000 kVA minimum, continuous rating (rating commensurate with the load)
- Voltage – 600/415 volts
- Vector Group – Dyn11, Star connected secondary (neutral available at terminal box)
- Frequency – 50 Hz
- Phases – 3 phase
- Impedance – 5% for connection
- Ambient temperature – 55 Deg C
- Temperature rise above ambient – 115 Deg C. The transformer shall not exceed this temperature rise when operating continuously at full load capacity
- Insulation – Class H (or 220 Deg C)
- Cooling- Air Natural cooled
- Rated power freq. withstand – 3 kV (RMS) or better

Standards – Indian Standard IS: 11171 or equivalent international standard

Primary and secondary side terminations:

1. Three nos. of single core cables on both primary and secondary sides.
2. Size of cable: 1x 300sq.mm flexible copper cable for all phases.
3. Stand-off copper termination (termination using copper flats) shall be provided. All cable lugs shall be terminated using removable nut and bolts.

2. *Lighting supply transformers for mast and rig lighting (hazardous area lighting):*

2 nos. lighting supply transformer [fed from the main 415 VAC bus of ACPCR], Minimum 60 KVA, dry type, 415 V/ 240 V (phase-to-phase), 50 Hz, copper wound, air cooled to meet the hazardous area lighting load, as per the following broad specifications:

Quantity – 2 (Two) transformers
Capacity – 60 kVA, continuous rating
Voltage – 415/240 volts (Phase-to-Phase)
Frequency – 50 Hz
Phases – 3 phase
Impedance – 4%
Vector Group – Dyn11, Star connected secondary, neutral available for connection
Enclosure – IP23 type, with provision for natural circulation of cooling air.
Ambient temperature – 55 Deg C
Temperature rise above ambient – 80 Deg C
Insulation – Class F
Rated power freq. withstand – 3 kV (rms) or better
Standard – Indian standard IS: 11171

Primary and secondary side terminations:

One no. of 3 core, 35 mm2 cable for 600V side and one no. 3 core, 35 mm2 cable for 240V side.
Stand off copper termination (termination using copper flats) shall be provided. All cable lugs shall be terminated using removable nut and bolts.

The lighting transformer secondary shall be connected to a suitable lighting distribution board, located on the MCC.

3. *Isolation Transformer:*

1 No. 100 kVA dry type isolation transformer with the same specification as the lighting transformers, except the following:

Quantity – 1(one) transformer
Capacity– 100 kVA, continuous rating
Voltage – 415/415 volts, Dyn11, neutral available for connection.

The isolation transformer shall be used to supply the general rig area lighting, crew camp supply and auxiliary loads which need a 240 V phase-to-neutral connection. Neutral of the isolation transformer shall be grounded solidly.

Primary and secondary side terminations:

Two nos. 3 core, 35 mm2 cable for both primary and secondary sides.
Stand-off copper termination (termination using copper flats) shall be provided. All cable lugs shall be terminated using removable nut and bolts.

e) Motor Control Centre – ACPCR MCC Panel (1 set):

i) The starters/feeders as given in *"Annexure-ACPCR Starters/Feeders"* are to be incorporated in the ACPCR MCC.

ii) All motors shall be started from MCC located inside PCRs only. No starter panel shall be located near the motors.

iii) All starters for motors below 55 kW (75HP) should be DOL type. Starters for motors of 55 kW and above shall be provided with a "soft starter", with suitable contactor arrangement.

iv) All remote control circuits (On-Off Control) for motors located in hazardous areas shall be of Intrinsically Safe (Ex-i) type.

v) Broad Specifications:

- Bus voltage – 415 Volts AC, 50 Hz
- Bus current (nominal) – 4000 Amps (indicative)
- Bus material – Tinned Copper bars, insulated
- Spare cubicles – As per list
- Cubicle type – Panel type, non-draw-out.
- Bus Fault Level –suitably rated

vi) Other features

- All the starters for AC motors (except LMSS/LMMC, BOP, Bug blower & centrifuge) irrespective of rating are to be housed in the MCC panel of power control room and only push button stations with On/Off controls are to be located near respective equipment. All motors and push button stations will be directly connected to the power control room through individual cables and plug sockets. Various auxiliary motor drives, ACPCR interior lighting and air-conditioning system shall be supplied from the MCC panel through switchgear.
- All the components including MCC bus should be approachable from the front.
- MCC bus shall be fed from the main 1000 KVA transformer (600 V/ 415 V, 3 phase, 50 Hz) in the ACPCR. The AC busbars shall be adequately rated. A voltmeter and 'bus bar live' indicator lamp shall be provided to find out the bus status. Bus shall be accessible for maintenance. AC bus bars shall be insulated properly.
- Each panel shall contain suitably rated MCCBs, contactors, thermal overload relays, earth leakage circuit breaker, ammeter; OLR reset push button, Hand-Off-Auto selector, indication lamps etc.

All breakers/ MCCBs used in the MCC shall be suitable for IT system as per IEC 947-2 / IS 13947. **All breakers, MCCBs used in the MCC shall be suitable for disconnection and shall have positive visual isolation**. **The neutral shall not be served and supply from the MCC bus shall be 3 Phase & 3 Wire**. However the neutral bus is to be provided in the MCC.

Each individual starter panel/lighting/ AC unit feeder panel shall be provided with an earth leakage circuit breaker which shall cut off the power supply in case of an earth fault in that particular circuit. Trip setting should be at 300 mA.

vii) Protection:

All starters and feeders shall have individual MCCBs as incomers, except those started with the soft starters. However, for the soft starter started motor groups, there will be a single incomer MCCB per group, with sufficient current carrying capacity for simultaneous running of all motors in the group at full load.

Short Circuit Protection
Overload
Contactor

- Earth leakage trip (100mA & 300mA selectable)
- Remote (Push Button Station) PBS/ Hand Off Auto feature as required
- Control Circuit voltage shall not exceed 110V
- Control Circuit including Remote PBS shall have earth leakage protection

IT system of neutral grounding shall be used in the ACPCR. As per IT system, line to neutral supply cannot be used and hence individual control transformer (415/24V) shall be provided for each starter panel. Earth leakage protection shall be provided on the secondary side of the control transformer for all starters with external/remote PBS for protection of PBS circuit from earth leakage. Control Transformer secondary should be connected to ground.

Main transformer secondary MCCB shall be 4 pole type, supplying the TPN bus. A single NGR on the neutral bus shall be provided.

viii) **MCCB for individual starters/feeders**-

There will be 3 pole MCCB, fitted with RCD, as the primary device for protection and isolation in all starters. Fuse systems instead of MCCB will not be accepted.

Features –

- The MCCBs should be suitable for DOL motor starting (Induction motors) for all motors below 55 KW.
- Control supply of individual starters shall be tapped from its own line, the starter shall be in-operative if the MCCB is off.
- The MCCB shall have clear ON/OFF/TRIP positions.
- The MCCB should have facility for time delayed-Overload protection (adjustable 0~10 sec, 0.4~1.0 In), Short Ckt protection (10 In), and RCD **with trip setting of 100mA and 300mA**
- MCCB should be of Line-Load reversible type.
- Operating handle should be accessible from the exterior of the MCC cubicle, with the door shut.
- The MCCB will be of fixed mounting type, without extended operating handles.
- All starters above 30KW shall be provided with individual soft starters.
- All the power cable terminations are to done with proper colour coded terminal blocks (R phase(phase-1)-Red, Y phase(phase-2)-yellow,B-phase(phase-3)-Blue,Neutral-Black).

The selection of MCCB, contactors and relays for the starter panels should be as per Type 2 coordination (IS 13947 / IEC 947).

All components fitted in the starter panels should be preferably of a single make.

ix) Lighting supply:

Secondary side of the lighting transformers (415/240 VAC), phase-to-phase, supplied from the AC main 415 bus) shall be connected to the 3-phase rig lighting DB. The lighting DB rating shall be sufficient for supplying the full rig and mast lighting. All outgoing feeders from the DB shall be 240 VAC, phase-to-phase, through 2-pole MCB units, with built-in residual current protection (RCBO), tripping at 300mA.
Provision shall be given for supplying the lighting DB from external supply, in case of failure of the lighting transformers. Accordingly, a suitably rated change over switch shall be provided in the MCC panel, in conjunction with the feeder supplying the lighting transformers.

x) Air conditioner supply:

Air conditioning supply will be 415 VAC, 3 phase, 3 wire.

Power Feeders

Apart from motor starter panels, certain other loads are also required, e.g. Welding sets, Hand tools, etc. There should be individual feeders for such loads.

xi) Internal Cabling

All internal wiring of the MCC starter panels shall be done with 1.1 KV grade fire retardant PVC insulated tinned copper multi-stranded flexible cables with proper lugs.

xii) <u>Push Button Stations</u>

Push Button Stations shall be provided, containing Emergency Stop / Lockout pushbuttons, Local-Remote and Start-Stop push buttons for local control of Electrical equipment. The PBS should have facility for lockout of the motor in order to enable maintenance work to be done. All PBS should have IP66 type

protection and canopies for rain shade. All PBS should satisfy requirements for installation in Zone 1 Hazardous area, Gas groups IIA & IIB.

Additionally, all PBS circuit for motors shall be Intrinsically safe (Type Ex-i), with a maximum voltage of 30V.

f) Type of Earthing:

IT system of neutral grounding with maximum ground fault current limited to 750 mA using suitable NGR as per CEA Regulations is to be used. All breakers, MCCB shall be suitable for IT system as per IEC 947-2. The neutral shall not be served and supply from the main MCC bus shall be 3 Phase & 3 Wire.
Main Transformer output shall be provided with a Residual Current Monitor (RCM) for indication/ alarm. Scheme, Type, Make and Model of RCM shall be approved by OIL.

g) NGR System:

The NGR system shall have the following features:

- Maximum earth fault current is 750 mA
- Restricted earth leakage protection at 1000 kVA transformer star connected secondary

NGR shall be provided with a Permanent Insulation Monitor (PIM) or NGR monitoring (NGRM) device of reputed make (Bender RC48N or equivalent) with audio alarm in the PCR for monitoring NGR continuity and leakage current. Scheme, Type, Make and Model of PIM/NGRM shall be approved by OIL. NGR scheme shall have to conform to National/International standards.

h) Plug and Socket Panels

Suitable plug and socket arrangement shall be provided for interconnection of the ACPCR with motors, auxiliary loads, lighting socket board etc. with cables. Socket compartments shall be suitable for ease of quick rig-up and rig-down operations. Matching plugs will be fitted in the cables.
Socket compartments should be located to either end of the ACPCR. The plug / socket compartments shall be well illuminated and suitably marked for ease of identification of circuits / loads.
The plug sockets cable termination shall be crimped type. Horizontal steel bars shall be provided in the socket compartments for supporting the layers of cables. Plug-in type connections are not permissible at motor end.

Flap covers for rain protection of the sockets should be provided.

I.D. DRIVE MOTOR SPECIFICATIONS:

I.D1: DRAW WORKS MOTORS

AC drilling motor, inverter duty rated, suitable for driving 2000 HP electrical draw-works. Type: Ex-p, pressurized enclosure, suitable for use in hazardous Gas atmospheres, Gas groups IIA & IIB.

Quantity	: 2 nos.
Electrical rating	: minimum 1100 HP.
RPM range at constant torque	: **To be specified by bidder**
RPM range at continuous full horse power	: **To be specified by bidder**
Temp. rise	: Class H
Duty	: Continuous drive with constant torque, at 55 Deg. Centigrade
Stator insulation	: Class H VPI form wound
Bearing	: Two heavy duty roller bearing, re-greasable
single shaft with hub	

Motors should be complete with the following:

- Main terminal box with IP56 protection. Terminal box should be easily accessible for connection.
- Differential pressure switch (air flow relay/switch) for pressure sensing
- Blower assembly with suitable capacity explosion proof motor, 415 VAC, 50 Hz rated
- Space heater

I.D2: ROTARY DRIVE AC MOTOR

AC drilling motor, inverter duty rated, suitable for independent rotary drive. Type: Ex-p, pressurized enclosure, suitable for use in hazardous atmospheres, Gas groups IIA & IIB.

Quantity : 1 no.
Electrical rating : minimum 1100 HP.
RPM range at constant torque : **To be specified by bidder**
RPM range at continuous full horse power: **To be specified by bidder**
Temp. rise : Class H
Duty : Continuous drive with constant torque, at 55 DegC
Stator insulation : Class H VPI form wound
Bearing : Two heavy duty roller bearing, re-greasable, Single shaft with hub

Motor should be complete with the following:
- Main terminal box with IP56 protection. Terminal box should be easily accessible for connection.
- Differential pressure switch (air flow relay/switch) for pressure sensing
- Blower assembly with suitable capacity explosion proof blower motor, 415 VAC, 50 Hz rated
- Space heater

I.D3: TOP DRIVE MOTORS

AC motor, inverter duty rated, suitable for variable speed 800 HP top drive unit. Type: Ex-p, pressurized enclosure, suitable for use in hazardous atmospheres, Gas groups IIA & IIB

Quantity : 2 nos.
Electrical rating : Total minimum 800 HP.
RPM range at constant torque : **To be specified by bidder**
RPM range at continuous full horse power: **To be specified by bidder**
Temp. rise : Class H
Duty : Continuous, with constant torque, at 55 Deg. Centigrade
Stator insulation : Class H VPI form wound
Bearing : Two heavy duty roller bearing, re-greasable, Single shaft with hub

Motors should be complete with the following:
- Main terminal box with IP56 protection. Terminal box should be easily accessible for connection.
- Differential pressure switch (air flow relay/switch) for pressure sensing
- Blower assembly with suitable capacity explosion proof blower motor, 415 VAC, 50 Hz rated
- Space heater

I.D4: MUD PUMP DRIVE MOTORS

AC drilling motors, inverter duty rated, suitable for heavy duty 1600 HP slush pump application. Type: Ex-p, pressurized enclosure, suitable for use in hazardous atmospheres, Gas groups IIA & IIB.

Quantity: Total 4 nos., 2 each for 2 mud pumps
Electrical rating : minimum 1100 HP.

RPM range at constant torque : **To be specified by bidder**
RPM range at continuous full horse power: **To be specified by bidder**
Temp. rise : Class H
Duty : Continuous drive with constant torque, at 55 Deg. Centigrade
Stator insulation : Class H VPI form wound
Bearing : Two heavy duty roller bearing, re-greasable
Single shaft with hub

Motors should be complete with the following:

- Main terminal box with IP56 protection. Terminal box should be easily accessible for connection.
- Differential pressure switch (air flow relay/switch) for pressure sensing
- Blower assembly with suitable capacity explosion proof blower motor, 415 VAC, 50 Hz rated
- Space heater

The draw-works and slush pump motors shall be of the same make and power rating such that interchangeability of the motors is maintained.

I.D5: AC AUXILIARY MOTORS

Bidder shall submit list of all AC auxiliary drive motors.

Motors shall be rated for 415 Volts 3 phase AC, 50 Hz supply. All motors are to be flameproof /explosion-proof, weather proof and conforming to IP65 suitable for use in Zone 1 & 2, Gas groups IIA & IIB [as per Indian & European (CENELEC) Standards] Hazardous areas of oil mines.

Motors to be used in the Hazardous areas of the rig, as classified by DGMS (India), shall be approved by DGMS (India) for use in such areas (Refer DGMS approval clause J & K under General Notes).
Motors shall be fitted with FLP/Exp double compression cable glands, terminal studs and earthing leads for connection to common earth bus.

Plug-in type connections are not permissible at motor end.

I.E: CABLES

1. **All cables from the VFD panels shall be rated for use with VFDs / Inverters.**

2. **Lengths of cables:**

All the cables for draw works, rotary, top drive power and control cables, mast lighting, D'CON control cables, Brake water cooling system power and control cables and any other cables required for cluster drilling operation shall be suitable for drilling 1 + 3 cluster wells. *Oil India drills cluster wells 15 metres apart on the surface, on a straight line.*

3. All cables shall
   - Be suitable for use in oil field environment.
   - Have copper conductors only.
   - Be approved by DGMS (India). Refer Electrical Annexure-Statutory for details of cables.

4. Generator power cables, Drilling motor power cables, main transformer cables shall be single core, multi-stranded, flexible, 1100V grade, unscreened copper cables with EVA (Ethyl Vinyl Acetate rubber) insulation and EVA sheath. These cables should be heavy duty, acid, oil and abrasion resistant, flame retardant.

5. Suitable Top drive cables with auxiliary drive cables if any.

6. Auxiliary AC motor/ 3- phase electrical equipment cables shall be multi-stranded, 1100 V grade, flexible, ethylene-propylene rubber (EPR) insulated, HOFR elastomeric CSP sheathed, either individually or collectively copper screened, 4 core copper conductor cables.

7. Control cables shall be 2.5 mm2 cross-section, 1100 V grade, EPR insulated and HOFR elastomeric CSP sheathed, copper screened flexible multi-stranded copper conductor having cores up to a maximum of 20. Each individual core should be identifiable by means of colour / number and each core terminal shall be marked with cable markers / ferrules to identify the connections. Cables shall generally conform to IS: 9968.

8. Cables for light fittings shall be EPR insulated and HOFR elastomeric CSP sheathed 3 core, 1100 V grade copper conductor cables.

9. Control system shall be supplied with suitable shielded twisted pair cable for communication with the remote controllers in Driller & MP Consoles.

10. All the cables including power, control, lighting etc. shall be supplied complete with suitable male/female plug/ connectors which shall go into proper male/female plug/connectors mounted in the Main PCR, ACPCR, D'CON, MP'CON, lighting fixtures and motor Terminal boxes.

11. No soldered terminal socket will be allowed. All terminations shall be properly crimped.

I.F AUXILIARY EQUIPMENT & SYSTEMS

Auxiliary electrical system shall include the following systems:

I.F1 Rig lighting system:

Rig lighting system shall cover the following areas:

Hazardous areas (within a radial distance of 30 m from well-head):

i) Mast, racking board and aviation obstruction lighting
ii) Rig floor/ draw works lighting
iii) Pipe rack and area lighting
iv) Substructure lighting
v) Mud tank lighting
vi) Mud mix/ storage skid lighting
vii) Mud pump lighting
viii) Fuel pump/ tank area lighting
ix) Trip tank pump lighting
x) Choke manifold lighting
xi) Water tank area lighting

(All lighting load for hazardous areas shall be supplied from 2 nos. 60 KVA, 415 V/ 240 V Phase to Phase transformers, as detailed in the paragraph for ACPCR lighting transformer. All Light fittings used in hazardous areas shall be FLP (Ex-d type).

Non-Hazardous (general) areas:

xii) Power pack lighting
xiii) Air compressor/ utility house lighting
xiv) BOP unit lighting
xv) General plinth and periphery lighting (supplied from isolation transformer)
xvi) Offices, chemical/ geological lab and crew camp lighting (supplied from isolation transformer)

(All lighting load for general area lighting, camps and un-classified areas shall be supplied from the isolation transformer. Heavy duty flameproof and weather proof light fittings (in hazardous areas) and normal weather proof light fittings shall be used in all other areas; for illumination.

xvii) For external source supply (in case the main 415 V bus is not energized), a changeover switch with mechanical interlock will be provided, serving both the 60 KVA transformers through suitable incomer circuit breakers.

xviii) All lighting circuits shall have RCBO/ RCD for current leakage sensitivity of 300 mA. Vertical discriminating type RCDs shall be used wherever required.

xix) Each light fitting shall have weather-proof and Ex certified type **plug and receptacle disconnect** to allow safe and easy removal of fitting for service or movement to another location day or night without interruption of any power or illumination. Disconnects are to be provided at appropriate mast breaks, sub-separation etc. for easy rig up/ rig down of lighting system. **Make of disconnects – Crouse Hinds / Appleton**.

- All the FLP light fittings shall be DGMS approved.
- For mud tank lighting, suitable mounting/ hanging arrangement with tubular structures (see sl. No. 7 below) for well glass fittings shall be provided on the tanks.
- All the light fittings shall include the necessary control gears needed for smooth operation.

xx) The minimum number and type of light fittings and accessories to be supplied for each rig lighting system are given below-

Sl. No.	Type of Light Fitting	Quantity	Remarks
1	FLP CFL well glass light fitting for 2x20W CFL Lamps, type-Screw cap E-27	90 nos.	Light fittings shall be provided with lamps & necessary control-gear
2	FLP flood light fittings for HPMV 1 x 250 W lamps	10 nos.	
3	Weather proof, 250 W metal Halide light fitting for area lighting	10 nos.	
4	Weather proof, 400W HPSV light fitting for area lighting	20 nos.	
5	Red aviation LED type warning lamp Double fitting Single fitting	 02 nos. 01 no.	
6	Aviation obstruction (daytime aviation warning) lamp	01 no.	With necessary cable, control panel and other accessories and lamps
7	Portable small size “T” type light pole for mud tank and mud pump illuminations, 50 mm OD, 4000 mm height- fitted with anti-vibration devices	40 nos.	Indicative diagram of the “T” pole is attached
8	Galvanized and non corrosive swaged type (stepped) steel tubular poles of length 9 m along with double brackets for fixing of HPSV/ HPMV type light fittings	20 nos.	

xxi) A mast lighting socket board (FLP/Exp type) should be supplied at a convenient place outside the driller’s cabin/ dog house to facilitate easy connection/ disconnection for mast/ derrick area lights.

xxii) Aviation warning / obstruction lamps, consisting of the following:

a) Aviation obstruction day time white flasher unit (one no.) shall be fixed atop the mast (near crown block). This unit shall be complete with controller, suitable cable, mounting hardware, photo-electric cell etc.

Day time: 20,000 Cd, flasher type with 40 flashes per minute (White)

Night time: 2,000 Cd, fixed (white)
With automatic change over from day to night

b) Red aviation LED warning lamps: LED lamps, continuous glow, to be fixed near the white flasher unit.

Bidder shall submit a complete and detailed list of light fittings and lighting schematic to be used in the rig.

I.F2 Well-site Area & Crew Hut Illumination Control Panel, Skid Mounted

i) **Details**:

An oilfield type skid mounted electrical control panel for supplying power to area/ boundary lights and crew houses (camp site) shall be supplied.
The system shall consist of incomers, changeover switch, distribution feeders (MCBs/ switches), plugs and sockets etc., mounted on an oil-field type skid. The complete system will be designed to meet the present load demand as well as the increase in near future. The panel shall be fed from the ACPCR 415/415 V isolation transformer feeder with a changeover option for running from standby camp/ auxiliary genset.

ii) Construction:

The panel shed shall be an outdoor, weatherproof, transportable steel house on a self supporting oil field skid suitable for tail boarding from either end in balanced condition. The shed shall be suitable for either top or bottom lift. There shall be provision for lifting the skid at both ends. **Shed shall be of man height**. Overall dimensions of the shed shall be calculated for working comfortably inside.

The shed shall be a fabricated sheet steel (not less than twelve-gauge) structure and shall house the incomer plug socket compartment, incomer MCCBs (with built-in Over current/ short circuit and earth leakage protection), changeover switch, TPN bus and distribution board, outgoing Plugs-sockets, and plug socket compartments. The power to the bus is to be fed from either isolation transformer feeder in AC Power control room or from the auxiliary genset, through a changeover switch.

The side panels containing the incomer and outgoing feeder plug socket arrangement shall swing out for ease of connections / maintenance. Another panel/cover shall be provided outside the socket board panels for protection of the socket board panels during transportation. The outer panel shall be hinged at the top and provided with supports, so that it can also give rain protection to the plug-socket panels, when in operation. All corners of the shed are to be formed by bending, leaving no sheet edge exposed. Skid and panel shall be painted with anti-corrosive paint.

Lighting and camp loads shall be equally distributed on the three phases (240 V Phase to neutral). Each outgoing feeder shall be fed through a suitably rated RCBO, of leakage current setting of 300 mA. There shall be minimum 6 (six) outgoing feeders from each phase. Identical nos. of plugs and sockets (3 Phase, 5 pin) shall be provided in the outgoing plug socket compartment.

- Tinned copper Busbars
- Phase indication lamps
- Voltmeter (on both incomers)
- Internal shed illumination with 1 no. 2x40 W fluorescent indoor industrial corrosion proof luminaire, IP-65, with clear cover, complete with MCB on/off switch mounted outside, wiring (with armoured copper cable, suitably glanded to fitting) at a suitable place
- Internal wiring/cabling- Cables shall be of suitable size, 4 core, copper, screened, FRLS PVC/Elastomer insulated, sheathed and of reputed make
- Plug-sockets (fitted)
- Incomer MCCBs and outgoing RCBO / RCDs

- Changeover switch
- Provision for earthing of the skid

I.F3 Cable handling system consisting of Cable trays, cable boxes and grasshopper arrangement to derrick floor

i) Grasshopper cable rack suitable for elevating with derrick floor shall be used for leading and supporting draw works, rotary and top drive cables including control, lighting, and auxiliary motor cables.

No cable will be allowed to be laid on ground outside of a cable tray / cable racks. Sturdy and durable cable trays with non-skid type, hinged, galvanized steel covers shall be provided. Tray covers shall also double up as a convenient walkway. No. of cable trays shall be sufficient for 1+3 cluster well operation.

For mud/water tank cables, foldable type cable hangers should be mounted on mud/ water tank walls, to support the mud system cables. Suggested spacing between hangers is 1000 mm, width of the hangers is 300 mm.

In addition to the cable trays, there should be at least 5 (five) steel cable boxes, skid mounted, for cable storage during rig movement. Cable boxes shall be designed for in-line arrangement.

ii) Design of cable trays / boxes:

Trays:
Dimensions:

Short Tray – 1m(L) x 1m(B) x 1m(H) – 35 Nos.

Long Tray – 5m(L) x 1m(B) x 1m(H) – 15 Nos.

Indicative dimensional drawing for cable trays is attached. Cable Trays shall be of steel, with the tray covers electrical and hinged to the base. Earthing leads shall be provided at both ends of each tray.

Total Length of the trays shall be suitable for 1+3 Cluster wells (a total distance of 75 metres from PCR to last well). Cable trays shall be supplied for all other routes as well. Tray covers shall be suitable to support a weight of 300 kgs minimum.

Cable Boxes (5 nos.):

Steel Cable boxes, with electrical covers shall be provided. Earthing leads shall be provided at both ends of the box.
Indicative dimensional drawing for box is attached.
Dimension of cable box: (with hinged cover) – 4 m (L) X 1 m (W) X 1.2 m (H)

I.F4 Rig earthing system

i) Complete rig earthing system shall be supplied, consisting of the following:
   - G.I. earth electrodes,
   - Suitable size G.I. straps to connect all generators, motors, junction boxes, light fittings, mud tanks, mud pumps, sub structure, water/ fuel tanks, houses, lighting poles and the main PCR (s) to the earth.

ii) Earth electrodes shall be of two sizes, 1200 mm and 2000 mm length, each of 50 mm OD heavy duty steel tube with galvanization. Electrodes shall have holes drilled in the body, MS plates welded on the top for connection of earth straps.

iii) Indicative dimensional drawing for earth electrode is attached.

iv) Frames of all electrical equipment including motors, Generators, Mud tanks, Cable Trays, Mud Tanks, junction boxes, light fittings, push button stations, light fitting mounting poles etc. shall be connected to earth using two (2) nos. separate and distinct suitably sized earth conductors as per CEA Regulations, which in turn shall be connected to the main earth grid. The whole earthing should be in accordance with IS: 3043.

v) The Earthing scheme along with the electrode layout should be submitted along with the bid.

I.F5 Electrician's tools, instruments, special tools, computers for the rig system

This specification covers the details of Electrician's Tool Kit required for general maintenance & trouble shooting of the Electrical controls for the Rig.

- Set of Standard Maintenance Tools – 1 Lot
- Set of Alignment Tools – 1 Lot
- Air Pressure regulator for engine starting – 1 No.

Technical Details:

Tool kit should comprise of 1 each of following instruments /tools:

Digital Multimeter: Model Fluke 177, Fluke/Megger/Kyoritsu with meter hanging kit along with other accessories
Analog multimeter
Digital Clamp meter: Fluke/Megger / Kyoritsu
Digital Insulation Tester (with analog indication): AVO/Megger / Fluke / Kyoritsu
Earth resistance tester: Make AVO/Megger / Fluke
Phase rotation meter
Combined temperature and humidity meter, make: Fluke/Megger/Kyoritsu
Infrared Temperature Meter
Sound level (dB) meter
Vibration meter, make: Fluke / Entek IRD
Tachometer (Non-contact type)
Cable Height Meter
Lux meter range- 0-50 lux
Soldering Iron 25W, 240VAC
Desoldering tool (Vacuum pump type)
Screw Driver set
Wire tracer
Combination Pliers- 2 sizes, 6", 8"
Long Nose Pliers
Side Cutting Pliers with cable stripper
Socket Set (22 sockets + 5 Accessories)
Open ended spanner set up to 42 mm
Ring ended spanner set up to 42 mm
"Mekaster" / Equivalent tool set for foundation bolts of Generators and AC main drilling motors
Adjustable wrench spanner
Chain pulley with frame - 01 number
Crimping tool (0.5sqmm – 16sqmm cables)
Wire stripper (0.5sqmm – 6sqmm cables)
Allen key set 1.5 mm to 10 mm (9 piece set)
Portable Hand Drill (up to drill bit size 25 mm)
Industrial duty vacuum cleaner in SS body
Crimping tool kit for 20 pin plug & sockets – Pyle National USA / equivalent Make
Long handled hand crimping tool

Torque wrench
Hydraulic Crimping Tool for Generator and AC motor 300 sq mm cables
Dual channel Oscilloscope with programmable screen, battery operated and portable
Function generator
Laptop computer with latest configuration for control system programming- **bidder to provide details**
Desktop computer with latest configuration- **bidder to provide details**
Multifunction printer (with fax, copy and scan facilities- suitable for A3/A4 size paper)
Software for **CONTROL SYSTEM** with license
Secondary injection test kit for Generator/Top Drive/Transformer feeder breakers

CHAPTER II: STANDARDS, STATUTORY RULES AND REGULATIONS TO BE FOLLOWED

1. Standards

i) All relevant safety systems are to be incorporated and safety codes, relevant international codes to be strictly followed.

Systems to be designed & manufactured to the latest version/ editions of the following International and Indian Standards wherever applicable & should meet all present accepted international standards for the product/application:

I.S. (Indian Standards) / IEC / NEC / IEEE-45 / API 505 / NEMA

ii) All components, modules, subsystems shall be of current generation with latest technology which must be in production and must not face obsolescence in near future. The supplier and the manufacturer in turn shall guarantee that spare parts shall be available for at least fifteen years.

iii) The controls i.e. all electronics including modules and different electronic components, PLC etc. shall have high levels of noise immunity. They shall have high level of EMC and shall be immune from noise generated by future AC Variable Frequency Drive for Top Drive inclusion that will be powered from the 600 VAC Top Drive Feeder in the PCR.

2. Rules and Regulations:

Notwithstanding the conformity of the electrical equipment to the standards as mentioned above the following Rules shall be taken as final and absolute standard as applicable in India.

CEA Regulations, 2010;
Oil Mines Regulations (OMR), 1984 with latest amendments

i) The electrical equipment to be used in hazardous areas of oil mines as classified by DGMS (India) **[Extract of the Directive from DGMS given as Electrical** *Annexure-Statutory* shall be approved by DGMS (India) for ZONE-1 and ZONE-2, Gas groups IIA and IIB of oil mines. **(Refer DGMS approval clause J & K under General Notes).]**

a. *The DGMS (India)'s approval for all electrical equipment to be used in the hazardous areas shall be submitted with supply of the rig, or during pre-despatch inspection, whichever is earlier.*

ii) All electrical equipment not suitable for hazardous area, e.g., Power Control Rooms (PCR), Power Packs etc. shall be placed at least 30 metres away from well head. Bidder to furnish rig layout drawing indicating dimensions (as per OMR, 1984).

Note: Since PCR (controls) is placed at least 30 m away, cable length from PCR to Driller's Electric Console, Draw works, any other derrick equipment etc. shall be approximately 50 m. OIL carries out cluster drilling up to a surface distance of 45 m from 1st well. This makes cable length of approximately

100 m for these equipment. The electrical system including Variable Frequency Drive cables shall be suitable for this requirement. **Bidder to confirm the same.**

CHAPTER III: SPARES

1. **Commissioning spares**: It is the responsibility of the supplier to provide adequate commissioning spares and consumables required during commissioning.

2. **Mandatory spares:** as per the following lists (*These will be evaluated for bid comparison)*:

List of Mandatory Spares (Bidders to quote for these spares)

A. Equipment

Sl. No.	Equipment	Used in	Qty.	Remarks
1	Generator (as per Clause # I.B2)	Power packs	01 no.	
2	DW/ MP AC motor (as per # I.D1)	AC drives	01 no.	
3	Blower unit (for drilling motor) complete with drive motor (#I.D1)	AC drilling motors	1 unit	Motor to be FLP (Ex-d)
4	IRD Motor (as per Clause # I.D2)	Rotary Drive	01 no.	
5	Top drive motor (as per # I.D3)	Top Drive	01 no.	
6	Complete VFD Unit (# I.C1-e)	Main PCR	02 nos.	
7	Soft starter (as per clause # I.C2-e)	ACPCR starter panels	01 no.	
8	Air Conditioner, Ex type (# I.C1 – l)	Driller's Cabin	01 No.	Window type

B. Devices & Consumables

Sl. No.	Spare item	Used in	Qty.	Remarks
1	Rotating rectifier assembly of each type	Generator of power pack and standby gensets	1 unit	
2	Exciter unit of each type	Generator of power pack and standby gensets	1 unit	
3	Diodes of rotating rectifier (3 fwd. + 3 rvs.) of each type	Generator of power pack and standby gensets	1 set	
4	Movistor of each type	Generator of power pack and standby gensets	3 nos.	
5	Control fuses of each type	Main PCR & ACPCR	02 sets	
6	Fuse holder set (base and carrier) of each type	Main PCR & ACPCR	02 no.	
7	Control switches of each type	Main PCR, ACPCR, D'con/ driller's cabin, MPcon	01 no.	Driller's cabin electrical part only
8	Indicating meters of each type	Main PCR, ACPCR, D'con/ driller's cabin, MPcon	01 no.	Driller's cabin electrical part only
9	Control pots of each type	Main PCR, ACPCR, D'con/ driller's cabin, MPcon	01 no.	Driller's cabin electrical part only
10	Control relays of each type	Main PCR, ACPCR, D'con/ driller's cabin, MPcon	02 nos.	Driller's cabin electrical part only

11	Contactors of each type	Main PCR, ACPCR, D'con/ driller's cabin, MPcon	02 nos.	Driller's cabin electrical part only
12	Diodes/ thyristors for rectifier section	Main PCR	02 sets	
13	Power fuse for diodes (rectifier section)	Main PCR	02 sets	
14	DC link components	Main PCR	01 set	
15	Power fuse for VFD Units of each type/rating	Main PCR	06 nos.	
16	Air circuit breaker/MCCB of each type	Main PCR generator/ rectifier/ inverter/transformer panels	01 no.	
17	Control module for air circuit breaker of each type	Main PCR generator/rectifier/ inverter/ transformer panels	01 no.	
18	PCB of each type	Main PCR generator/ rectifier/ inverter/transformer / MPcon/ D'con/ Ground fault	01 no.	
19	Control/ regulating transformer of each type	Main PCR generator/ rectifier/ inverter/transformer / MPcon/ D'con/ Ground fault	01 no.	
20	MCCB for AC motor starters of each type	ACPCR starter/ feeder panels	01 no.	
21	Contactors for AC motors of each type	ACPCR starter/ feeder panels	01 no.	
22	Overload relays of each type	ACPCR starter/ feeder panels	02 nos.	
23	RCD of each type	ACPCR starter/ feeder panels	02 nos.	
24	Indication lamps of each type and colour	Main PCR, ACPCR, D'con, MPcon	06 nos.	
25	Light fittings of each type	Area illumination	01 no.	
26	Bulbs/ tubes of each type	Area illumination	20 nos.	
27	Plug and socket set of each type	Main PCR, ACPCR, D'con, MPcon	06 nos.	
28	PBS unit	AC motors	02 nos.	
29	Solid control system motors, of each type/ size	Solid control system	01 no.	
30	Emergency lamp	PCRs	02 no.	

CHAPTER IV: APPROVAL OF DRAWINGS, STAGE INSPECTION, PERFORMANCE TESTING AT WORKS, TRAINING & SUPPORT SERVICE PACKAGE

1. Following minimum drawings, documents and details of electrical equipment shall be submitted by the party for approval:

Schedule for submission of drawings and documents are attached in the Annexure - Schedule of Submission of Drawings and Documents

i) Rig layout drawing, showing relative distances of all equipment
ii) Interconnect drawings (power, network, signal)
iii) PCR (s) dimensions
iv) Rig earthing layout
v) Single line power flow diagram of the rig
vi) Cable specifications/ details
vii) Details of all electrical equipment used in the rig, including Generators, motors, cables, light fittings, push button stations, plug & sockets, junction boxes, starters etc. used in the rig

1.1 In case of the successful bidder, OIL shall study the drawings and incorporate modifications/ corrections if required. The bidder shall incorporate the modifications in the drawings and submit the same to OIL for approval. Only after getting due approval of drawings from OIL, the bidder/ manufacturer shall proceed for manufacturing/ integration of the electrical system.

1.2 Bidder/ supplier shall submit the following along with the supply of materials:

i) Twenty (20) sets of drawings as above – in hard copy & Ten (10) sets of drawings as above – in CD-ROM
ii) Operation and Maintenance manuals of PCRs, generators, AC drive motors, auxiliary AC motors, components of panels, light fittings, rig control system etc.
iii) "As built" drawings (Corrected and final drawings after commissioning)
iv) "As built" Bill of Materials (BOM)- Final after commissioning

2. Inspection of Equipment by Oil India Limited (OIL):

Bidder shall agree to stage-wise inspection as per following schedule, of the major electrical equipment, as well as the complete rig package by OIL personnel, at various stages of manufacture, before dispatch.

The Inspection cum Acceptance process would include the following minimum steps/tasks, (valid for that stage of manufacture / integration) –

i) Physical verification/inspection of all the items/fittings/accessories including all Parts Catalogue, Maintenance & Service Manuals, Schematics.
ii) Operational / functionality testing of each & every system under load (if applicable) / no load. Performance parameters shall match quoted specifications.
iii) Supplier shall have to take note of any modification/s for operational requirement suggested by the inspection team and comply with the same at no extra cost.
iv) The minutes of inspection process would be prepared at the end of each inspection and jointly signed by both the parties.
v) Supplier shall confirm in writing compliance of all the points raised in the minutes of inspection as well as any other subsequent additions/changes, felt necessary.
vi) Supplier to inform 60 days in advance for inspection of the major electrical equipment as well as the complete rig package.
vii) Supplier will affect dispatch of the unit only on receipt of OIL's dispatch advice.

	Intermediate Assembly of individual equipment, after FAT, at manufacturer's works	Complete Assembly of individual equipment, after FAT, at manufacturer's works	Complete, integrated rig package, at suitable location, before dispatch for string and load test
Main PCR	√	√	√
Auxiliary PCR	√	√	√
Power Packs	-	√	√

Auxiliary systems- Lighting, earthing, crew cabin, cables etc.	-	-	√
Complete Rig Package	-	-	√

FAT – Field Acceptance tests / Manufacturers standard acceptance procedures, valid for that stage of manufacture.
Inspection of individual equipment – equipment include the PCRs, Power Packs etc.

3. Training:

Bidder shall quote a structured training programme specially designed for electrical operation and maintenance crew and engineers. The following minimum training modules are to be included in the programme.

Course / Level	Basic	Intermediate	Advanced
	To be attended by		
Theory of AC drive technology and application of the same in drilling rigs	Elect. Crew		
Maintenance and troubleshooting of AC drives (for the particular model of AC drive fitted in the rig) including converter panels and DC link	Elect. Crew and engineer	Elect. Engineer	Elect. Engineer
Rig control system	Elect. Engineer	Elect. Engineer	Elect. Engineer
Maintenance & overhauling of Generators and AC drilling motors	Elect. Crew and engineer	Elect. Crew and engineer	Elect. Crew and engineer
Maintenance and troubleshooting of electrical top drive system including motors	Elect. Crew and engineer	Elect. Engineer	Elect. Engineer

Training should comprise of classroom as well as hands-on training at workshop, as appropriate. Number of participants per course shall be indicated by bidder. Location of these courses shall be fixed after mutual discussion between OIL and the supplier.

Cost of training package will be evaluated.

4. Maintenance

Bidder shall also quote a three (3) year ON-SITE maintenance, troubleshooting and support service package for the complete rig electrical for the following, but not limited to, list of equipment/ system.

i. Rig control system (complete package)
ii. Rig Generators
iii. Generator control system
iv. Rectifier sections
v. DC bus sections
vi. VFD / Inverter panels
vii. Drilling motors
viii. Top drive (electrical) control system and motors

ix. Transformers
x. Soft starter panels
xi. Auxiliary AC motor starter/feeder panels
xii. Air conditioning systems

4.1 The maintenance package shall include services of one competent electrical engineer as well as provision of special tools, tackles and instruments. Also, bidder/ supplier shall have minor spare parts at site for immediate replacement so that rig operation does not suffer. Bidder/ supplier will be supplied with all standard tools and tackles and manpower required for the purpose by OIL at site.

4.2 Broad activities:

I. Maintenance of generator control system, converter/ rectifier panels, DC bus link and filters, inverter/VFD panels, starter/ feeder panels

II. Maintenance of the rig control system including sub-systems, input/output modules, remote modules, re-programming or modification of the control system software as per drilling requirement etc.

III. Familiarizing the electrical crew with the above mentioned equipments/systems and imparting hands-on training for basic troubleshooting and maintenance

IV. Preparation of inventory and spare list

V. Rectification of any problems, abnormalities, anomalies and defects noticed/logged during the course of a well (operation at full/ rated load). This will cover setting/adjustment/calibration of limits in the control system/ drives etc.

4.3 Bidder/ supplier shall arrange for hiring/ summoning the services of technical experts in case site engineer is unable to rectify/ troubleshoot a particular problem, at no extra cost to OIL.

CHAPTER V: ELECTRICAL ANNEXURES

V .A ELECTRICAL ANNEXURE – STATUTORY [As per DGMS(India) Guidelines]

1. Classification of areas in oil mines into different zones according to the degree of probability of the presence of hazardous atmosphere, as given below:

A. <u>Drilling and Work-over Operations</u> :

(1) <u>Well-head area</u> :

(a) When the derrick is not enclosed and the substructure is open to ventilation, the area in all directions from the base of rotary table extending up to 3.0 m shall be Zone 2 hazardous area. Any cellars, trenches and pits below the ground level shall be Zone 1 hazardous area; the area lying up to 3.0 m in horizontal direction from the edge of any cellars, trenches or pits and 0.5 m vertically above the cellars, trenches or pits shall be Zone 2 hazardous area.

(b) When the derrick floor and substructure are enclosed, the enclosed substructure below the derrick floor, including cellars, pits or sumps below the ground level, shall be Zone 1 hazardous area; the enclosed area above the derrick floor shall be Zone 2 hazardous area.

(2) Mud Tank and Channel :

The free space above the level of mud in tank and channel shall be Zone 1 hazardous area; the area in a radius of 3.0 m in all directions from the edge of mud tank and channel shall be Zone 2 hazardous area.

(3) Shale Shaker:

(a) The area within a radius of 1.5 m in all directions from the shale shaker to open air shall be Zone 1 hazardous area. The area beyond 1.5 m and up to 3 m in all directions from the shale shaker shall be Zone 2 hazardous area.
(b) When the shale shaker is located in an enclosure, the enclosed area shall be Zone 1 hazardous area to the extent of the enclosure. The area outside the shale shaker and up to 1.5 m in all directions from the shale shaker shall be Zone 2 hazardous area.

(4) Degasser :

The area within a radius of 1.5 m from the open end of the vent extending in all directions shall be Zone 1; the area beyond 1.5 m and up to 3 m in all directions from the open end of vent shall be Zone 2 hazardous area.

(5) Desander and Desilter :

The area within a radius of 1.5 m in all directions from the desander and desilter located in open air shall be Zone 2 hazardous area.

(6) Effluent Pit and Open Sump :

The free space above the level of flammable liquid within the effluent pit or sump shall be Zone 1 hazardous area; the free space lying up to 3.0 m in horizontal direction from the edge of any effluent pit or sump and 0.5 m vertically above the effluent pit or open sump shall be Zone 2 hazardous area.

B. Oil and Gas Processing and Storage Equipment :

(1) Storage Tanks :

(a) In case of floating roof tank, the space above the floating roof and inside the enclosure up to top level of the enclosure wall shall be Zone 1 hazardous area; the area beyond Zone 1 hazardous area and up to a radius of 4.5 m in all directions from tank shell and shell top shall be Zone 2 hazardous area. In case of a dyke, Zone 2 hazardous area shall extend vertically up to the height of the dyke and horizontally up to the physical boundary of the dyke.
(b) In case of fixed roof tank, the area inside the tank and within a radius of 1.5 m from all openings including breather valve, dip hatch, thief latch and safety valve shall be Zone 1 hazardous area; the area beyond Zone 1 hazardous area and up to a radius of 3 m in all directions from shell and roof of the tank shall be Zone 2 hazardous area. In case of a dyke, the sump in the dyke shall be Zone 1 hazardous area and an area extending vertically up to a height of the dyke and horizontally up to the physical boundary of the dyke shall be Zone 2 hazardous area.

2. Use of flexible cables in drilling rigs and in other similar equipments in Oil Mines

1.0 Flexible cables are in use with drilling rigs and in other similar equipments in oil mines.

2.0 The electrical equipment used in a drilling rig is high capacity DC motors, 3 phase AC motors, their control gears, light fittings and instrumentations.

3.0 Flexible cables used with circuits exceeding low voltage shall be provided with flexible metallic screening or pliable armouring.

4.0 Such flexible metallic screening if used as a means of protection from mechanical Injury it shall not be used by itself to form an earth conductor, but it may be used for that purpose in conjunction with an earthing core.

5.0 Though the metallic screening shall not be used by itself to form an earth conductor the same shall have conductivity at all parts and at all joints at least equal to 50 per cent of the conductivity of the largest conductor.

6.0 IS: 14494-1998 "Elastomer insulated flexible cables for use in mines-specification" and IS: 9968 Part I & II, "Specifications for elastomer insulated cables" are the relevant Indian Standards available on elastomer insulated cables.

7.0 IS: 14494-1998 is mainly for flexible cables used in below ground and open cast mines. This standard does not cover flexible cables used in oil mines. Though IS:9968(Part-I) does not speak about metallic screening for cables at voltages above low voltages, however, to afford protection against mechanical injury, it is imperative that flexible cables for use in oil mines must have metallic screening also.

8.0 Hence it becomes mandatory that

(a) The flexible cables used to connect 3 phase electrical equipments shall be EPR (Ethylene Propylene Rubber [IE-2]) insulated and HOFR (heat resisting, oil resisting & flame retardant) Elastomeric CSP (Chloro- Sulphonated Polyethylene) sheathed, either individually or collectively copper screened, 4 core copper conductor cables with fourth core having 50% conductivity of the largest conductor and the combined screen having 50% conductivity of the largest conductor.

(b) The flexible cables used to connect light fittings shall be EPR insulated and HOFR elastomeric CSP sheathed unscreened 3 core copper conductor cables.

(c) The flexible cables used with Generators and motors shall be single core EVA (Ethyl Vinyl Acetate rubber) insulated and sheathed, copper conductor cables, and,

(d) The flexible cables used for control connections shall be EPR insulated, and HOFR elastomeric CSP sheathed, copper screened flexible copper conductor cables having cores up to 20 and shall generally conform to IS:9968 (Part-1).

9.0 Termination of flexible cables with electrical equipments installed in hazardous area shall be through appropriate size of double compression glands and with electrical equipments installed in non-hazardous areas shall be through a readily detachable plug and socket assembly.

V .B ELECTRICAL ANNEXURE - STANDARDS

STANDARDS TO BE FOLLOWED BY DIESEL ELECTRICAL AC-VFD RIGS IN OIL'S MINING AREAS

Sl. No.	Item	Statutory Rules/ Guidelines/ Directives	OIL's Remarks

1	Distance of PCR and power packs (engine + Generator) from well shall be 32.0 m	OMR-1984 (Amended 1996) specifies 30.0 m (Reg # 67)	OIL's practice is 32.0 m [As per I. S. Code 5572 (1994)]
2	All electrical equipment including motors, starters, push button stations, lighting fixtures, plugs and sockets, glands/ connectors, junction boxes and accessories etc. used in hazardous/ dangerous areas of oil mines shall be either flameproof/ explosion proof (Ex-d) or increased safety type (Ex-e) and must have approval from DGMS (India) for use in Zone 1 and Zone 2, gas groups IIA and IIB of Oil Mines.	DGMS Directive and OMR Rules 73, 75	It is a statutory requirement and must be complied with.
3	The supply of electricity to every electrical installation….shall be controlled by an earth leakage protective device so as to disconnect the supply instantly on the occurrence of earth fault or leakage of current.	CEA Regulations, 2010, Reg # 42	ELCB will disconnect the supply instantly at the occurrence of earth fault or leakage current.
4	600 V ungrounded generator system with AC/DC GFD system shall have audio-visual annunciation.		Audio annunciation is to be provided.
5	Power supply to lighting circuits for lights in Hazardous areas shall be from, 240 V (phase-to-phase), 50 Hz supply	CEA Regulations, 2010; Reg # 102(ii)(b)	
6	Aviation warning lamp: **Day lamp**: 20,000 Cd, flasher type with 40 flashes per minute (WHITE) **Night lamp**: 40 Cd, fixed (RED) *[5 nos. of flashers are indicated, one at crown and four nos. at thribble board, colour unspecified]*	Ministry of Defence, (Govt. of India) directive	The lights shall be operational at all times from the moment the mast is raised until the mast is finally lowered irrespective of well operation.
	General Illumination Levels (Minimum) to be maintained: Pump-house shed- 100 Lux Derrick floor- 80 Lux Pipe rack area- 60 Lux Monkey Board- 30 Lux Compressor shed-100 Lux Sub-structure- 150 Lux Engine room- 80 Lux Peripheral/ General area- 10 Lux	As per OIL requirement	
7	Pressurized type D'CON/ foot throttle shall be used; alarm will be provided for loss of purging.	This is required as an additional safety feature.	
8	Emergency shut off device (ESD) system- at Driller's control panel	Two ESD switches are required – One to stop all AC Drives, and another to stop all running Power Packs.	

V.C ELECTRICAL ANNEXURE – ACPCR MCC STARTERS/ FEEDERS

SL. NO.	STARTER PANEL	MOTOR/ LOAD (HP)	QUANTITY	PANEL CAPACITY (HP)	REMARKS
1	MUD AGITATOR	10	18	10	
2	WATER AGITATOR	10	4	10	
3	PILL CHAMBER	10	1	10	
4	DESANDER	100	1	100	
5	DESILTER	100	1	100	
6	MUD MIXERS	100	4	100	
7	MULTI-STAGE PUMPS	100	2	100	
8	PIT PUMP	75	1	100	
9	SOURCE WATER WELL	5	2	5	
10	SHALE SHAKERS	5	3	5	
11	DEGASSER	5	1	5	
12	CELLAR	5	1	5	
13	FUEL PUMPS	5	2	5	
14	BUG BLOWER	5	1	5	
15	TRIP TANK	15	2	20	
16	RECYCLING PUMP	5	2	10	
17	IR FILTER, WATER	1	1	5	
18	MUD CLEANER	5	2	5	
19	HIGH PRESSURE JET CLEANER	1	1	5	
20	POWER TONG	60/70	1	100	
21	AC PCR AIR CONDITIONER	40	1	40	
22	BOP FEEDER	40	1	40	
23	FEEDER FOR LIGHTING TRANSFORMERS	60	2	100	
24	RIG LIGHTING D.B.	-	-	-	
25	EC BRAKE	50	1	100	
26	WELDING MACHINE	50	1	60	
27	3 WIRE 240 V Ph-Ph FEEDER	-	2	5	
27	2 WIRE 240 V Ph-Ph FEEDER	-	3	1	
28	HAND LAMP	1	2	5	
29	110 V SUPPLY FEEDER	1	1	5	
30	AIR DRIER	1	1	5	
31	INST. MANAGER'S CABIN	10	1	20	
32	MOBILE AIR COMPRESSOR, FOR CEMENTING	40	1	50	
33	TORQUE WRENCH, BOP	2	1	5	
34	EASY TORQUE	5	1	5	

35	MUD VOLUME TOTALIZER	1 KVA	1	5	
36	BOP TROLLEY	20	1	20	
37	CENTRIFUGE	25 + 15	2	30	
38	SPARE STARTER	-	1	100	
39	SPARE STARTER	-	1	40	
40	SPARE STARTER	-	2	10	
41	SPARE FEEDER	100	2	100	
42	SPARE FEEDER	20	2	20	
43	SPARE FEEDER	10	2	10	
44	LINER FLUSHER, MUD PUMPS	3	2	5	
45	MAIN LUBE, MUD PUMPS	1	2	5	If supplied
46	CHAIN OILER, MUD PUMPS	1	4	5	If supplied
47	SUPER CHARGERS	75	2	100	
48	BLOWER MOTORS	7.5	9	10	Including 1 no. for IRD
49	WATER BOOSTERS	30	2	40	
50	DWKS LUBE PUMP	5	3	5	Including 1 no. for IRD
51	DW BRAKE WATER COOLING	60	2	100	
52	DISC BRAKE C/WATER PUMP	60	2	100	
53	AIR COMPRESSOR	40	2	50	
54	AFTER COOLER	1	2	5	
55	MAIN PCR AIR CONDITIONER	50	1	100	
56	SPARE STARTER	-	1	100	
57	SPARE STARTER	-	1	40	
58	SPARE STARTER	-	1	10	
59	SPARE FEEDER	-	1	40	

Sl. No.	Details of drawing / document	Submission schedule		
		With the bid	Stage / Pre Despatch Inspection	After commission-ing
1	Indicative single line power flow diagram of the rig, showing all voltage levels	✓		
2	Indicative Rig Layout diagram (Plan), showing relative distances of all electrical equipment	✓		
3	Indicative PCR dimensional drawings, including details of rain protection for transformers, cable & plug sockets etc.	✓		
4	Layout of the complete earthing system including earthing of PCRs, AC motors, Generators, diesel tanks & any other electrical equipment used for the purpose	✓		
5	Third party inspection report/ equipment literature	✓		
6	DGMS approval for all electrical equipment within classified areas		✓	
7	Mandatory spare parts/ Spare equipment / Consumables list	✓		
8	Rig lighting schematic with light fittings used	✓		
9	*Annexure-Datasheet* (given later) with all relevant documents	✓		
10	"As-built" drawings, operation and workshop manuals and any other relevant documents			✓

CHAPTER	Information requested from bidder	Bidder's reply	Remarks (if any)
Statutory			
Chapter II	All electrical equipment to be used in classified Hazardous areas to be DGMS (India) approved. Bidder will arrange for approval from DGMS. Bidder to forward the DGMS (India)'s approval for all electrical equipment to be used in the hazardous areas along with the technical bid.		
	Restricted neutral earth system used in the system shall have a maximum earth fault current of 750 milliAmps using NGR. Bidder to confirm.		
	Earth fault system to have both audio and visual alarms. Bidder to confirm.		
General			
Chapter I.B, General Outline	Complete electrical of the rig offered?		
	Any deviation/ non-submission regarding above shall be given in a separate sheet.		
Chapter IV	Is the training module/ package offered along with the bid (*prices to be quoted in the commercial bid*)? Cost of training package to be evaluated.		
	Does the bidder agree to stage-wise inspection of the major electrical equipment as well as final rig package?		
	Has the bidder quoted for the on-site maintenance package?		
	Generation system voltage: 600 VAC- Offered?		
	Completer rig control system- offered?		
	Emergency Stop controllers on D'con/Drillers cabin- Offered?		
	Entire Electrical AC system frequency shall be 50 Hz- Bidder to confirm.		
	"Mandatory Spares" offered?		
	Vintage/ year of manufacture of equipment- New/ Unused / recent manufactured- Bidder to indicate.		
	System shall be suitable for 1+3 cluster well drilling, with continuous cable lengths of up to 100 metres. Bidder to confirm.		
	Top drive cable length shall be suitable for cluster drilling, as explained above. Bidder to confirm		
415 VAC auxiliary system			
	Spare MCC cubicles (with at least one from each size of starter/ feeder) available?		
	Each individual panel in the 415 VAC MCC provided with RCD / ELCB for power circuit as well as control circuit. Bidder to confirm		
	Control voltage (e.g. 110 VAC or lower) employed in motor control circuits		
	Permanent Insulation monitor provided in the NGR system?		

	Bidder to indicate Standards followed for selection of MCCB, contactors and relays for motor starting / power feeders at AC MCC (415 VAC)		
Power packs			
Chapter I.B	No. of power packs offered		
	Make of Generator offered		
	Generator rating (kVA)		
	Generator temp. rise above ambient (degree C)		
	Speed (RPM)		
	Bidder to indicate standards followed in design and construction of Generator.		
	Datasheet of the offered Generator- Bidder to submit		
	Are the Generators suitable for VFD controlled AC drive?		
	HOC circuit offered?		
	Reports of standard commercial tests performed on the offered Generators (in accordance with IEEE Std. 115, NEMA MG-1, or MIL-Std. 705 standards) attached		
	Type of engine control system offered- AC module (Hill Graham/ Ross Hill type)/ engine & Generator control separate/ any other type- Bidder to specify.		
Rig control system			
Chapter I.C	Rig control system is field proven and running for a minimum period of 3 years? Credentials for this to be submitted with bid.		
	The control system should be complete with all necessary software, hardware and remote communication capability. Bidder to confirm.		
	All software, including hardware keys (if needed) should be licensed to Oil India Limited. Such Licenses should not have expiration dates. Bidder to confirm.		
	Manual bypass mode provided (in case the control system fails)? Bidder to confirm.		
Power Control Rooms			
Chapter I.C	Dimensions (as given in Specifications) to be adhered to- Bidder to confirm.		
	Weight (as given in Specifications) to be adhered to- Bidder to confirm.		
	PCRs are suitable for bottom lifting- Bidder to confirm		
	PCRs oil field type Skid mounted- Bidder to confirm		
	PCRs suitable for heavy rain/humid areas		
	Plug socket cable terminations are of crimped type- Bidder to confirm		
	PCR to be weight-balanced with CG at centre		
VFD panels			
Chapter I.C	No. of panels offered- sufficient panels should be available for simultaneous running of all drives, with one spare panel: Bidder to indicate		
	Amps rating of VFD panel: Bidder to indicate		

	Type of auxiliary braking employed in Draw works- Bidder to indicate.		
Air conditioning			
Chapter I.C, I.C1(k) and I.C1 (l)	Cooling Capacity (tons) – Bidder to provide tonnage requirement for each PCR individually and details of the air conditioning system.		
	Type (Split / window/ package)		
	Full redundancy (100%) provided for air conditioning? Bidder to confirm.		
	Mounting of Air conditioners on the same skid as PCR – Bidder to confirm		
	Make of AC offered		
	Model of AC offered		
Transformer (main transformer in Main PCR)			
Chapter I.C	Capacity offered – Minimum 1 x 500 KVA- bidder to confirm.		
	Voltage ratio		
	Transformer temperature rise above ambient I		
	Transformer & associated switchgear suitable for parallel operation (Yes/No)		
	Transformer insulation class		
	Transformer impedance (%)		
	Transformer Enclosure type (IP 23 etc) if offered		
	Transformer terminations – primary and secondary (Stand off / cable connected in air filled enclosure)		
	Transformer make		
	Transformer model		
	Provision for Star connected secondary with neutral terminal available in terminal box		
Transformer (main transformer in ACPCR)			
Chapter I.C	Capacity offered – Minimum 1 x 1000 KVA		
	Voltage ratio		
	Transformer temperature rise above ambient I		
	Transformer & associated switchgear suitable for parallel operation (Yes/No)		
	Transformer insulation class		
	Transformer impedance (%)		
	Transformer Enclosure type (IP 23 etc) if offered		
	Transformer terminations – primary and secondary (Stand off / cable connected in air filled enclosure)		
	Transformer Make		
	Transformer model		
	Provision for Star connected secondary with neutral terminal available in terminal box		
Transformer (Lighting- ACPCR)			
Chapter I.C	Capacity offered – Minimum 2 x 60 KVA		
	Voltage ratio		
	Transformer temperature rise above ambient I		
	Transformers suitable for parallel operation (Yes/No)		
	Transformer insulation class		
	Transformer impedance (%)		
	Transformer Enclosure type (IP 23 etc) if offered		
	Transformer terminations – primary and		

	secondary (Stand off / cable connected in air filled enclosure)		
	Transformer Make		
	Transformer model		
	Provision for Star connected secondary with neutral terminal available in terminal box		
Transformer (Isolation – ACPCR)			
Chapter I.C	Capacity offered – Minimum 1 x 100 KVA		
	Voltage ratio		
	Transformer temperature rise above ambient I		
	Transformers suitable for parallel operation (Yes/No)		
	Transformer insulation class		
	Transformer impedance (%)		
	Transformer Enclosure type (IP 23 etc) if offered		
	Transformer terminations – primary and secondary (Stand off / cable connected in air filled enclosure)		
	Transformer Make		
	Transformer model		
	Provision for Star connected secondary with neutral terminal available in terminal box		
MCC-Main PCR			
Chapter I.C	The starters as given in "Annexure-Main PCR Starters/Feeders" are to be incorporated in the MCC panel of Main PCR. Bidder to indicate deviations and additions if any.		
	The MCCBs, contactors and relays for the starter panels shall be as per Type 2 coordination (IS 13947 or IEC60947). Bidder to confirm.		
MCC-ACPCR			
Chapter I.C	The starters as given in "Annexure-ACPCR Starters/Feeders" are to be incorporated in the MCC panel of ACPCR. Bidder to indicate deviations and additions if any.		
	The MCCBs, contactors and relays for the starter panels shall be as per Type 2 coordination (IS 13947 or IEC60947). Bidder to confirm.		
Socket Board- Main PCR & ACPCR			
Chapter I.C	Type, make and no. of plug-sockets provided. Bidder to indicate.		
Drive Motors			
Chapter I.D1- Draw works motors	AC inverter duty motor offered?		
	Capacity- HP/KW		
	Voltage		
	Speed (RPM) range at full HP output		
	Speed (RPM) range at constant torque		
	Max. Current (FLC, in Amps)		
	ambient temperature I		
	Torque (lb-ft)		
	Make		
	Model		
Chapter I.D2-	AC inverter duty motor offered?		

Rotary drive			
	Capacity- HP/KW		
	Voltage		
	Speed (RPM) range at full HP output		
	Speed (RPM) range at constant torque		
	Max. Current (FLC, in Amps)		
	ambient temperature I		
	Torque (lb-ft)		
	Make		
	Model		
Chapter I.D3- Top drive	AC inverter duty motor offered?		
	Capacity- HP/KW		
	Voltage		
	Speed (RPM) range at full HP output		
	Speed (RPM) range at constant torque		
	Max. Current (FLC, in Amps)		
	ambient temperature I		
	Torque (lb-ft)		
	Make		
	Model		
Chapter I.D4- Mud pump motors	AC inverter duty motor offered?		
	Capacity- HP/KW		
	Voltage		
	Speed (RPM) range at full HP output		
	Speed (RPM) range at constant torque		
	Max. Current (FLC, in Amps)		
	Temperature risel		
	Rated torque (lb-ft)		
	Make		
	Model		
Chapter I.D5- AC auxiliary motors	The motors as given in “Annexure-Main PCR Starters/Feeders” are to be supplied. Bidder to indicate deviations and additions if any.		
	The motors as given in “Annexure-ACPCR Starters/Feeders” are to be supplied. Bidder to indicate deviations and additions if any.		
	DGMS approval for electrical equipment (motors) to be used in hazardous areas to be obtained and submitted as per “Annexure- Schedule for Submission of Documents”. Bidder to confirm.		
	Motors shall be fitted with FLP/Exp double compression cable glands- Bidder to confirm		
Cables			
Chapter I.E	Cable lengths shall be designed taking into account the requirement for 1+3 cluster wells. Bidder to confirm.		
Refer Annexure-Statutory for Cables.	Type of cable for 3 phase equipment- HOFR, EPR insulated, CSP sheathed and copper screened 4 core copper conductor. Bidder to confirm.		
	Type of cable for light fittings- HOFR, EPR insulated, CSP sheathed and copper 3 core copper conductor. Bidder to confirm.		
	Type of cable for Generators & Motors- single		

	core EVA insulated and sheathed copper conductor. Bidder to confirm.		
	Type of cable for control connections- HOFR, EPR insulated, CSP sheathed and copper screened copper conductor having cores up to 20. Bidder to confirm.		
	All the cables including power, control, lighting etc. shall be supplied complete with suitable male/female plug/ connectors. Bidder to confirm.		
	Cores shall be identifiable by colour/ number.		
Rig lighting system			
Chapter I.F1	All the FLP light fittings shall be DGMS approved. Bidder to confirm.		
	All the light fittings shall be provided with necessary control gears and lamps. Bidder to confirm.		
	Mast lighting socket board offered?		
	Lighting voltage (e.g. 240 volt phase to phase in Hazardous areas/ 240 volt phase to neutral for other areas)?		
	Aviation warning lights offered – Red colour, continuous glow(night), white colour – flashing(day)		
	Lighting scheme and details of submitted?		
Area lighting panel			
Chapter I.F2	Offered as per specifications? Bidder to confirm.		
Cable handling system			
Chapter I.F3	Cable trays, boxes, grasshopper arrangement offered as per specifications?		
Rig earthing system			
Chapter I.F4	The Earthing scheme along with the electrode layout submitted? Bidder to confirm.		
Tools and Tackles			
Chapter I.F5	The list of tools and tackles as given in the specifications are to be supplied. Bidder to indicate deviations and additions if any.		
	Laptop and desktop computers for control system programming. Bidder to provide details.		
Spares			
Chapter III	"Mandatory spares" as given in the specifications are to be supplied. Bidder to confirm and indicate deviations and additions if any.		
Drawings and Documents to be submitted with the bid			
	Schedule for submission of drawings and documents are attached in the Annexure- Schedule of Submission of Drawings and Documents		
	viii) Rig layout drawing, showing relative distances of all equipment ix) Interconnect drawings (power, network, signal)		

	x) PCR (s) dimensions xi) Rig earthing layout xii) Single line power flow diagram of the rig xiii) Cable specifications/ details xiv) Lighting scheme and details xv) List and details of all electrical equipment us the rig, including Generators, motors, cables, fittings, push button stations, plug & soc junction boxes, starters etc. used in the rig		

Checked and Confirmed

_____

(Signature)

V.F ELECTRICAL ANNEXURE- INDICATIVE DRAWINGS

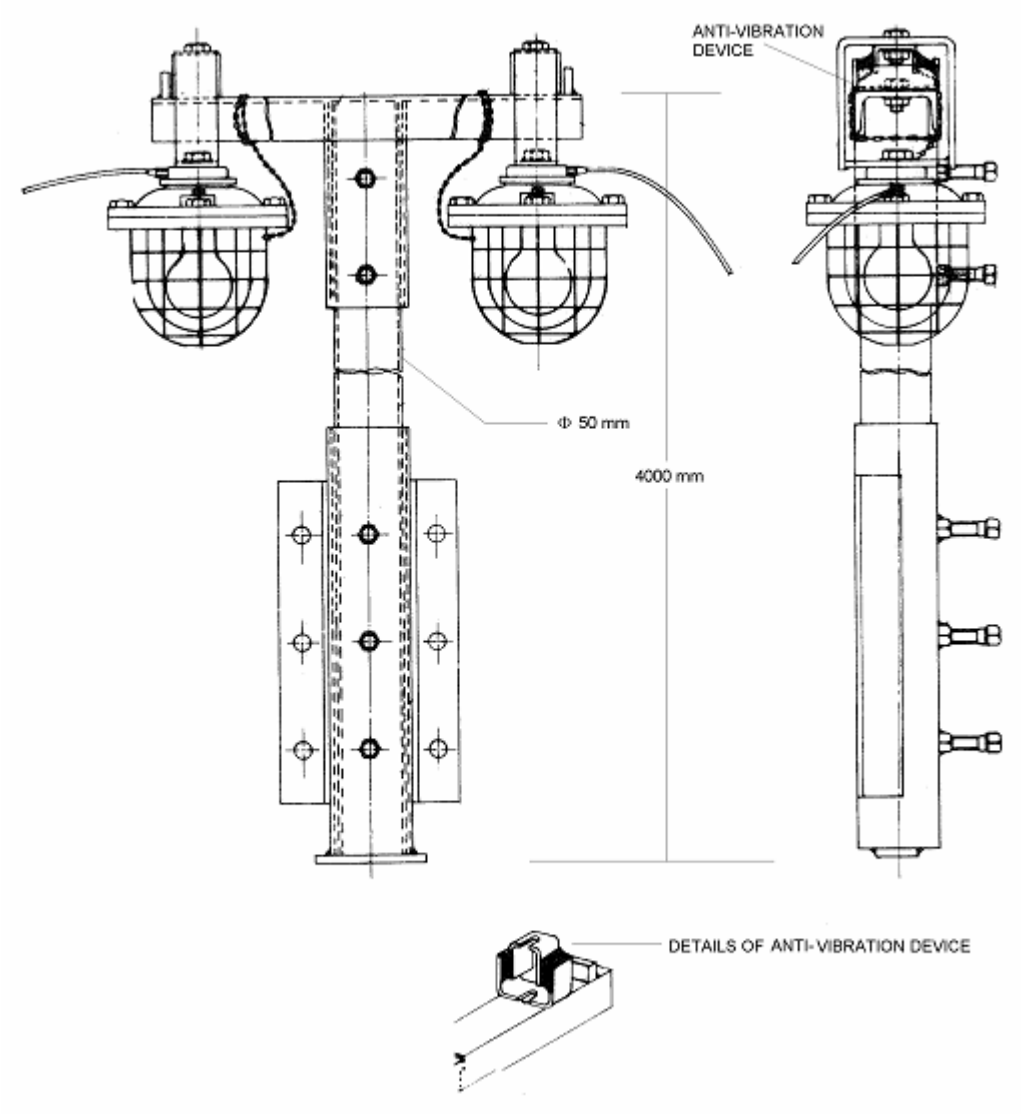
1. Indicative diagram of 'T' –pole

2. Indicative diagram of cable trays

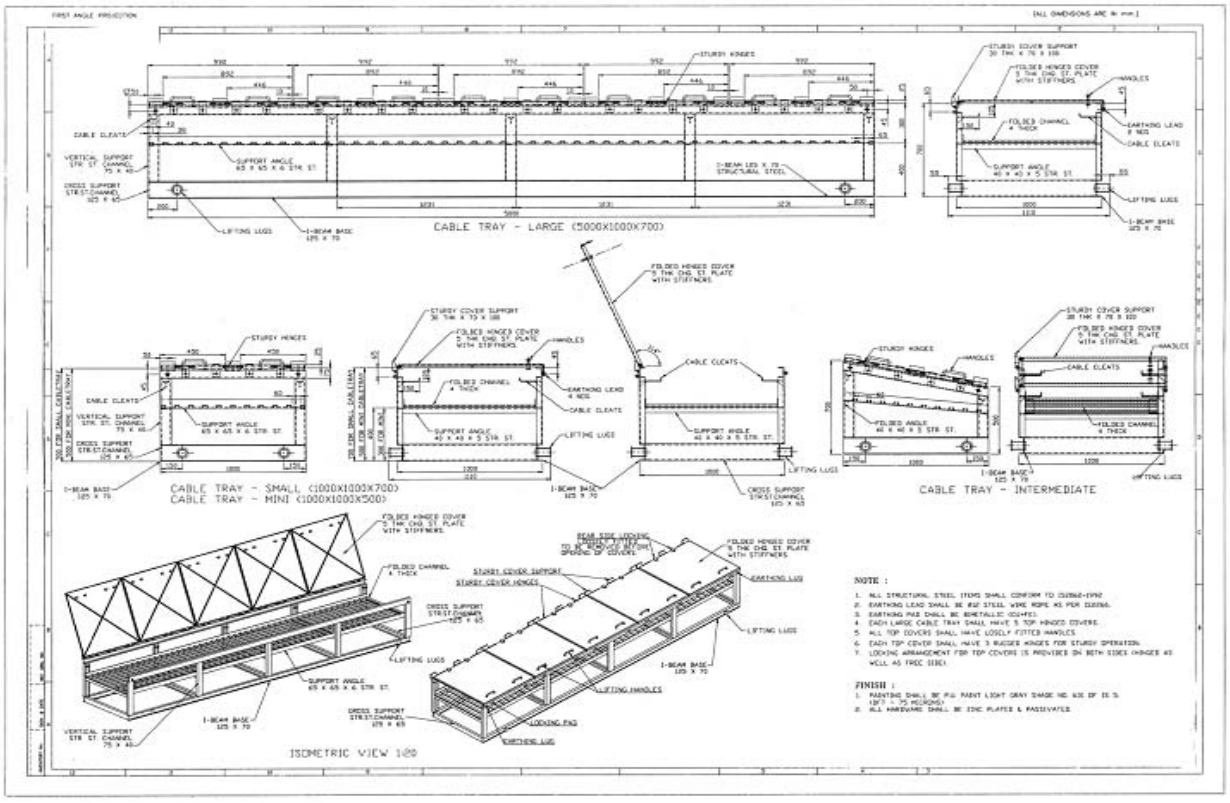
3. Indicative diagram of cable box

4. Indicative diagram of earth electrode

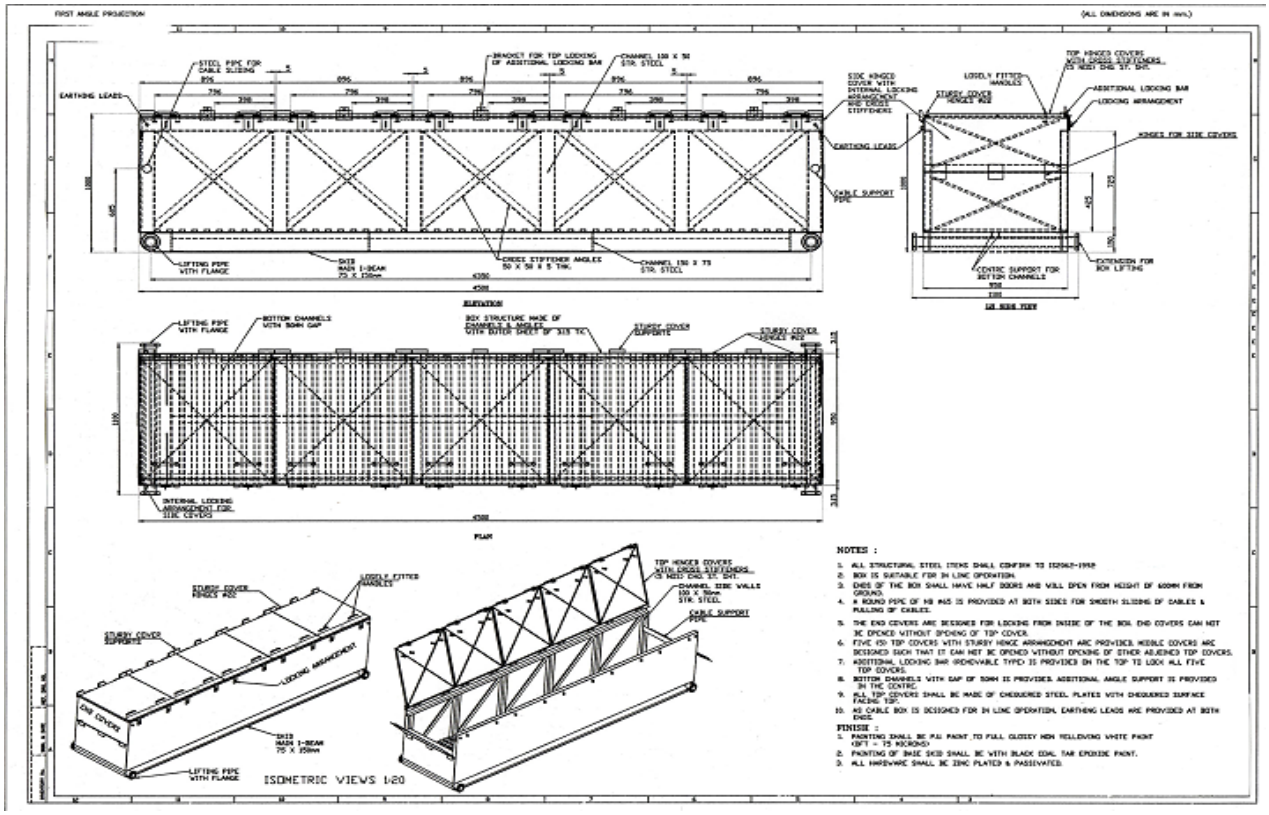
INDICATIVE DIAGRAM: "T"- POLE



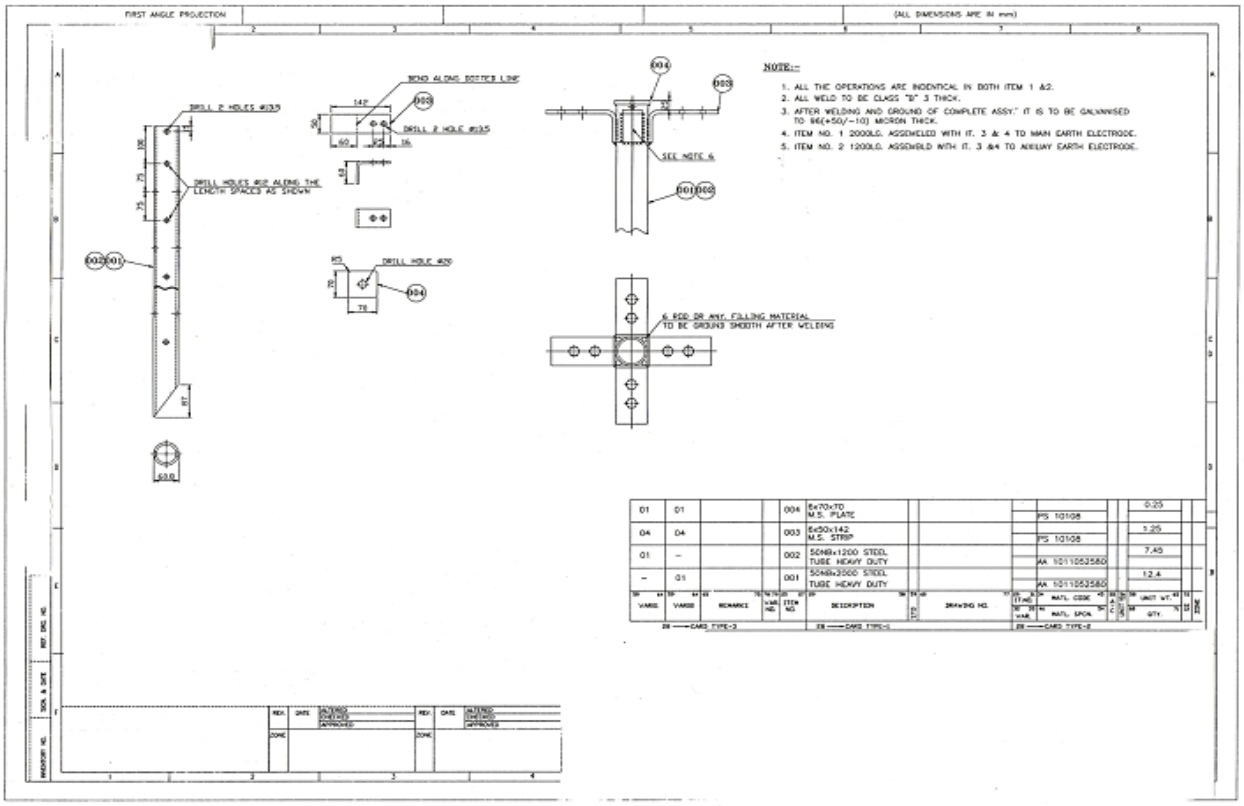
INDICATIVE DIAGRAM- CABLE TRAYS



INDICATIVE DIAGRAM- CABLE BOX



INDICATIVE DIAGRAM- EARTH ELECTRODE



V.G ELECTRICAL ANNEXURE- COMMISSIONING SCHEDULE OF ELECTRICAL EQUIPMENT

COMMISSIONING STAGES

1. **Installation, wiring and laying out of equipment:** On arrival of equipment and materials (commissioning spares etc.) at OIL's premises the supplier should carry out inspection of the supplied items to ascertain and certify that there is no transit damage and items are complete in all respect and ready for installation. In case of any discrepancy, supplier shall take necessary action for immediate replacement/ replenishment of the same before installation.
   After receipt, the equipment shall be installed at site. This will include wiring/ cabling, fitting of plugs and sockets and any other activity required to make the equipment ready for commissioning.

2. **Initial commissioning after start up connection:** This activity will cover insulation checks, wiring checks, phasing up (powering up) of individual equipment and the system as a whole. After start up connection and powering up, the complete system shall be tested at no load and minimum/ low load at OIL's well site. Any modification/ re-wiring/ repair shall be carried out at this stage.

3. **Final commissioning:**
   Any problems, abnormalities, anomalies and defects noticed/ logged during the completion of the well (operation at full/rated load) shall be rectified by the supplier. This will cover setting/ adjustment/ calibration of limits in the control system, drives etc.

4. Initial commissioning should be completed within 8 (eight) weeks per rig, along with the rig package, after receipt of all the items at Duliajan and final commissioning to be carried out within 45 days after completion of the initial commissioning.

5. **The following Table outlines the jobs expected to be done at the various stages.**

Sl.	Equipment	Commissioning schedule

No.		Installation, wiring and laying out of equipment	Initial commissioning after start up connection	Final commissioning
1	MAIN PCR	**Pre-wired**	✓	✓
2	ACPCR	**Pre-wired**	✓	✓
3	Cables (termination with proper lugs/ sockets)	✓		
4	Main drives (drilling motors): Connection, preliminary checks and power up	✓	✓	✓
5	Auxiliary drives (AC motors): Connection, preliminary checks and power up	✓	✓	✓
6	Rig lighting system: Connection, preliminary checks and power up	✓	✓	✓
7	Rig earthing system: Connection, measurement of earth resistance	✓		

- *Supplier's commissioning engineer and personnel shall be available at all the three stage of commissioning as explained above during the complete period.*
- *Any equipment that fails during commissioning at any stage shall be REPLACED at suppliers cost. Supplier shall ensure adequate commissioning spares/ consumables are dispatched.*

SECTION 20: CASING RUNNING TOOL

One (1) Casing Running Tool, National Oilwell Varco, Baker Hughes or Tesco make, for lowering casing of sizes 9-⅞" to 4-½" by connecting to the Top Drive System main shaft. The casing running tool (CST) should be able to hoist, lower, spin out and make up the casing connection. It should also have the ability to fill up and rotate the casing string while circulating.

1. System Components

Hoist and Torque Tool
Adjustable Link-Tilt Frame
Pipe Weight Compensator
Pipe Sensor
Single Joint handling assembly (Hydraulically operated single joint elevator, cylinder assembly for link tilt / Link tilt assembly, frame for housing the components)
Hydraulic / Air Swivel
Fill up and Circulating Tool
CRT Monitor
Hydraulic Controls and Hydraulic Power Unit

2. Specifications

Hoist Rating (API 8C)	: 350 Short Ton (317 metric ton)
Casing Size	: 4-½" to 9-⅞"
Fill Up and Circulation	: 4-½" to 9-⅞"circulation and fill up
Maximum Circulation Pressure	: 5,000 psi / 34,500 kPa 5,000 psi for 4-½" to 5-½" casing 4,000 psi for 7" casing 2,000 – 2,500 psi for 9-⅝" to 9-⅞" casing
Rotational Speed	: 0 – 20 RPM
Maximum Push down Force	: 20,000 lbs (9,072 Kg)
Maximum Torque	: 35,000 ft-lbs.
Compensator Capacity @ 90 psi air supply	: 8,500 lbs (3,900 Kg)
Link Tilt out distance	: 15" (4.5m)
Shaft Connection	: NC50 (4-½" IF) API RH Box Or 6-⅝" Reg API RH Box with cross over to 4-½" IF API RH Box

NOTE: One (1) independent Hydraulic power unit, electrically driven & all required lines, accessories, etc. for providing the hydraulic requirements for operating the Casing Running Tool.

SECTION 21: MISCELLANEOUS ITEMS / EQUIPMENT

1. CELLAR PUMP:

One (1) Gorman Rupp make diaphragm pump of model 4DB or similar pump having same capacity driven by explosion proof electric motor with matching frequency complete with all suction and delivery lines mounted on a 1 feet high suitable oil field type skid, for cellar cleaning purpose. Pump should be suitable for class I, dir. 2 areas and gas group I, IIA & IIB and with Flexible coupling. [Alternately, a suitable cellar ejection system may be offered]

One (1) Vertical Type Vortex Pump (Make: Flygt)
Model: H 8044 (complete package with control & monitoring data)

2. TOOLS & WRENCHES SET:

One (1) set of tools & wrenches with tool boxes for every accessories / system viz. draw-works, mud pumps, engines & compressor unit, mud tanks, electrical system, top drive, mast & substructure, etc.

3. RIG WASHER

2 (Two) nos. of suitable electrically operated (single phase 220 V 50 Hz ac power) high pressure portable cleaning pump complete with suitable electric motor, 20 ft long cable & necessary fittings. The pump should have 1" suction port & 40 ft. long delivery hose with nozzle for cleaning the draw-works & mast with water jet.

4. BUG BLOWER

2 (Two) nos. of suitable explosion-proof electric motor driven bug blowers complete with guard & 48" (1219 mm) impeller.

5. SOURCE WATER PUMP:

01(one) no. of Diesel Engine Driven Reciprocating type Duplex Double acting pump having different sizes of liners with a maximum flow rate of **60** cubic mtr per hour and a maximum head of **35** mtr.
The power transmission shall be through belt & pulley drive and suitable power take-off (Clutch) arrangement.

6. SUBMERSIBLE PUMP:

02(Two) nos. of Electric Motor driven submersible pumps with 2" delivery outlet having a maximum flow rate of 10 cubic mtr per hour and maximum head of 30 mtr.

7. RATHOLE ASSEMBLY:

One (1) Rathole assembly with digger unit or suitable mechanical device for drilling rat hole and mouse hole complete with suitable size scabbards.

8. MOUSEHOLE SCABBARD ASSEMBLY:

One (1) Mousehole Scabbard Assembly

9. TOOLS & WRENCHES SET:

One (1) set of tools & wrenches with tool box for following (List of tools & quantities should be furnished in bid document):

1. Draw-Works
2. Mast & Sub-Structure
3. Mud Pumps

10. CASING LINE CUTTER

1 (One) no. Of manually operated wire line cutter suitable for cutting 1-½" & smaller size wire line (casing line).

11. SOUND LEVEL METER & CALIBRATOR

2 (Two) nos. Of portable battery operated Sound Level Meter with Liquid Crystal Display (LCD) providing readings in 0.1 dB increments with 40-130 dBA measurement range. The sound level meter should have low battery indicator, RFI-shielded construction and all required accessories, certified to be intrinsically safe & complete with storage case.

1(One) no. Of sound meter Calibrator to verify accuracy of sound meter.

SECTION 22: INSTRUCTIONS / NOTES

1. TRANSPORT DIMENSIONS LIMITATION & DESIGN:

i) All major items of the rig package viz. Power Control Room (PCR), Power-pack, Tanks, Pumps, Gen-sets, etc. shall be mounted on heavy duty self-loading skid used in oilfields.

ii) OVERALL DIMENSION OF INDIVIDUAL ITEM HAVING SKID should not preferably exceed (including skid) 9.0 meter × 2.50 meter × 2.5 meter (L x W x H). However, for PCR, Power-pack, Mud pump & Draw Works same (including skid) may be up to 12.0 meter X 3.0 meter X 3.0 meter (L x W x H).

iii) OVERALL DIMENSION OF INDIVIDUAL ITEM WITHOUT SKID like, mast part, etc. should not preferably exceed 10.0 meter x 2.5 meter x 2.75 meter (L x W x H). However, for major derrick parts and other critical items, same may be up to 10.0 meter X 3.0 meter X 2.75 meter (L x W x H). In all cases the items shall be so designed that they can be evenly placed on trailers with proper load distribution as well as within the above specified dimensions of 2.5 meter width & 2.75 meter height for ease of transportation (3.0 meter width for major mast parts and other critical items as above). Dimensions of the sub base should not exceed 12meter X 3meter X 2.5meter (L X B X H).

iv) The overall weight of single individual item (with or without skid) including all accessories mounted on it and the skid as applicable should be as minimum as possible and should not preferably exceed 18.0 MT. However, weight of major items like PCR, Power –pack, Mud Pump, Draw works, Sub base etc. can be up to 28.0 MT.

v) Each longitudinal channel of a skid shall be of single length and shall have smooth finish underneath and curve finish at both the end, so that the skid can roll over smoothly on surfaces/truck body without any obstruction.

vi) For skids of width 2.5 meter & above, there should be at least 4(four) longitudinal channels with two mid channels kept sufficiently apart so that the unit can be placed evenly on narrow trailers (general width of trailers 2.4 to 2.6 meters only) with proper load distribution & balancing. This is essential as because for a skid of width 2.5 meter & above, the extreme two side channels shall rest only partially on a narrow trailer platform.

vii) The skid so designed should be sufficiently strong and properly welded at joints and should be able to withstand shocks which are bound to come while being handled and transported over rough and slushy roads/locations. Height of the joint used for the longitudinal members should be minimum 20 cm.

viii) As far as possible, the length of the skid should be at least 1.00 meter longer than the overall length of the equipment mounted on it, and same equally distributed on either ends. On no account should a skid be less than 3.00 meter in length irrespective of the length of the equipment mounted on it. CG (Center of Gravity) of the equipment with the skid should be at centre of the complete unit to the extent possible.

ix) The roof and side walls of equipment, tools hut, bunkhouse, etc, as applicable, should be rounded off at the corners for safe & ease of loading, offloading & transportation.

x) Suitable lifting lugs should be provided for each individual item. For items with skid, 4(four) lugs at each corner of the skid should be provided.

2. PAINTING INSTRUCTIONS:

At least 3 coats after applying primer. Under Coating with Anti Corrosive Treatment for cement & rust and polyurethane paint. The preferred color shade should be as under.

MAST (Bottom Section)	-	WHITE
MAST (Top 20 ft. Section)	-	RED
CROWN	-	RED
RACKING BOARD	-	WHITE
ALL HAND RAILS	-	YELLOW

MUD PUMPS	-	BLUE
MUD PUMP SKID	-	GREY
TRAVELLING BLOCK	-	YELLOW
DRAW-WORKS	-	BLUE
AIR TANK / UTILITY HUT	-	WHITE
MUD & WATER TANK	-	GREY
VFD CONTROL ROOM	-	WHITE
HSD TANK	-	SILVER

All operating and warning labels on equipment should be in English

3. TEST CERTIFICATE

The complete sets have to be functional tested at manufacturers work & test certificate have to be provided along with the delivery of material.

Supplier must categorically confirm regarding compliance with the inspection / test procedure and other terms and conditions detailed above are very essential. Offers will be rejected in the absence of such confirmation.

Deviation in respect of any specification as detailed above should be highlighted with technical calculation / catalogue/literature etc.

4. SPARE PARTS:

Spares for two years normal operation of all equipment / system should be included in the offer indicating item, part no. & quantity required. Item wise price of such spares should also be provided in commercial bid. Bidder should indicate the part nos. against each item along with OEM's part no. if any. The cost of spares will not be considered for price comparison. Purchase of these spares will be optional. The price of such spares should not change for next 2 years from the date of quotation. Bidders must confirm the same along with the availability of spares for next 10 years.

5. PARTS CATALOGUE, OPERATION / INSTRUCTION MANUAL & DRAWING, TECHNICAL INFORMATION & BULLETIN:

5.1 The bidder should provide at least one set of parts list, operations manual & service manual covering all the items & its accessories including any special / alignment tools for the same along with the technical offer. Technical details of the engine, draw-works, mast & sub-structure, top drive, rig controls, mud system, electrical system with dimensional drawing (including circuit diagrams) must also be forwarded along with the technical offer.

The supplier should provide the following information wherever applicable along with the technical offer –

i) Dynamic load
ii) Static load
iii) Unbalance load
iv) Location of centre of gravity.

5.2 The catalogue should include

i) Weight of each & every major component such as draw-works, mast, engine, sub-structure, etc.
ii) All principal dimensions, including those required for foundation / skid mounting & maintenance clearance.
iii) All horizontal & vertical clearance required for assembling & dismantling.

5.3 Installation, operation & maintenance manual should cover the following:

i) Start up, normal shut down, emergency shut down, operating limits & operational procedures.
ii) Rig-up & rig-down sequence.
iii) Layout drawing of all components on the unit with details of load distribution

5.4 Foundation & site layout drawings with load bearing capacity / distribution for various components of the rig package covering the following:

i) Assumed parameters of design of CC / RCC foundations shall be furnished.
ii) The Safe Bearing Capacity (CBC) of soil may be assumed as 8 Tonne /sq.mtr. (1486 lbs/sq.ft.) for design of the CC / RCC foundations.
iii) All design for foundation shall confirm to BIS – 456:2000.
iv) For Machine Foundation the code to be followed are IS – 2974 & IS – 13301 respectively.

6. MANUALS & CATALOGUES

Supply of 6(six) sets of Catalogue indicating exploded view of each & every Spare Parts with part nos. & quantity, Workshop & Service Manual, etc. for all major components/systems like Engines, Draw-works, Mast & Sub-structure, Top Drive, Iron Roughneck, hoisting & rotating equipments, mud system & solid control equipments, electrical system, Casing Running Tool etc. including it's sub-assemblies complete with all schematics along with the unit.
In addition, supply of 2 (Two) sets catalogue/manual in compact disc.
All manuals & catalogues should be in English language (UK & US).

7. DOCUMENTATION AND BID SUBMISSION

Bidder's response should clearly be defined – specific details/specifications are to be provided in the bid. Response like – 'As per NIT Specifications/ Technical Leaflet', 'Noted', 'Accepted' or in any similar fashion is not encouraged.

The following documents shall be submitted along with the bid for bid evaluation –

Technical leaflets with detailed dimensional diagram and specifications, Make & Model of each & every accessories / system, etc.

Copies of valid API Spec 4F, 7-1, 7K, 8C & 9A respectively of other concerned manufacturer(s) also in case any of the accessories / component will be outsourced by bidder.

8. THIRD PARTY INSPECTION:

A. Bidder is to arrange for Third Party Inspection by the any one of the following inspection agencies at manufacturer's plant as per broad scope of work enclosed as Annexure-A5. Bidder will confirm categorically their acceptance towards such TPI and confirm to extend all required facilities for TPI at respective plants during various steps of rig manufacturing . Bidder will quote the charges for such inspection separately and indicate in the priced bid which will be considered for bid evaluation.

1. Moduspec, Singapore.
2. Aberdeen Drilling Consultant, UK.
3. Oil Field Aufit & Service Inc., USA
4. EMI - TUV, Budapest

B. However , OIL reserves the right to arrange for inspection of the rigs through any of the third party inspection agencies including the above at its own cost. Bidder must extend the required facility for inspection by such agencies. Bidder is to confirm compliance of this requirement in the bid categorically.

9. PRE-DESPATCH INSPECTION

Complete package of drilling rig (with all accessories) after assembling & testing should be offered for inspection & functional testing at manufacturer's yard by OIL's team prior to dispatch with at least two months notice. Bidder should indicate their acceptance in the technical bid. Bidders to note that pre dispatch inspection will be carried out by OIL only after receipt of final TPI report. Bidder is to quote for Pre-dispatch inspection charges separately which will be considered for evaluation purpose. However , all to & fro , boarding , lodging expenses of OIL personnel will be borne by OIL.

The Inspection cum Acceptance process would include but not limited to the following minimum steps/tasks –

i) Physical verification/inspection of all the items/fittings/accessories including all Parts Catalogue, Maintenance & Service Manuals, Schematics, all tools under complete tool kit as well as other tools, all spares as per the Spare Parts List, etc.
ii) Operational / functional testing of the Power Packs, Draw-works, Top Drive, Iron Roughneck, Casing Running Tool, Electric & Lighting system, Mud Pumps, Air Compressors, Rig-up & Rig-down sequence, etc.
iii) Supplier shall have to take note of any minor modification(s) for operational requirement suggested by the inspection team and comply with the same at no extra cost.
iv) The minutes of inspection process would be prepared at the end of the inspection and jointly signed by all parties.
v) Supplier shall confirm in writing compliance of all the points raised in the minutes of inspection as well as any other subsequent additions/changes, following deliberation with the inspector after arrival at Duliajan.
vi) Supplier will affect dispatch of the unit only on receipt of OIL's dispatch advice.
vii) Any other testing / joint inspection indicated elsewhere in this tender.

10. GUARANTEE / WARRANTY

i) The complete package / unit shall be under guarantee / warranty by the supplier (or the successful bidder) for a minimum period of 1 (one) year from the date of successful commissioning of the complete unit at site.

ii) OIL reserves the right to inspect, test & if necessary reject any parts / parts after delivery at site (including incomplete manuals, catalogues, etc.) in case of any fault on the part of the supplier. It shall in no way be waived by the reason that the unit / item was previously inspected & passed by OIL as per Inspection Clause detailed elsewhere in the NIT.

iii) To keep the unit fully operational, in case of failure of any item during the warranty period, it is the supplier's responsibility to arrange replacement / repairing at site at their

own cost including custom duty, freight, etc. within a period of maximum 3 (three) weeks from the date of notification of such failure.

11. TRAINING

A. The supplier should arrange for comprehensive training programme, in English Language (UK &US), immediately after the pre-dispatch inspection for 1 (one) Mechanical Engineer from Technical Services, 1 (one) Mechanical Engineer from Field Engineering department, 1 (one) Instrumentation Engineer, 2 (Two) Electrical Engineers, 1 (one) Transport Engineer, 4 (Four) Drilling Engineers of OIL at their manufacturing plant / works for a period of 2 (two) weeks on Operation (including simulator or on-site training), Maintenance, Troubleshooting & Working Principle of following system / items in the unit amongst other relevant subjects with at least two months notice [Bidder should indicate the training module with duration. Traveling expenses of OIL's personnel (i.e. from Duliajan, India & back), boarding, lodging & food expenses during training will be on OIL's account].

A.1 For Mechanical Engineer (Technical Services & Field Engineering):
Power Packs & Generating Set Engine systems including their adjustments
Mud Pump & accessories
Major Rig Equipment
Air system

A.2 For Instrumentation Engineer:
Draw-works control & Electronic digital monitoring system.
Rig sense or equivalent system for Mud Parameters.
Sensor Calibration & maintenance.
Report generation, printing & documentation.
Instrumentation for auxiliary equipment.
Training on software for programming & trouble shooting of drilling instrumentation system.

A.3 For Electrical Engineer- Refer: Section 19 (Chapter IV) under the heading "Training"
Generating sets
Power Control
Power distribution
VFD Control training

A.4 For Drilling Engineer and Crew
Various controls & operation (including simulator training)
Draw-works
Hydraulic system
Top Drive controls
Iron Roughneck Controls
Casing Running Tool Controls

A.5 For Transport Engineer
Rig assembling & dismantling

B. The supplier should also arrange for comprehensive training programme immediately after installation and commissioning of the rig package for around 30 numbers of crew members and technicians of OIL domain in Mechanical, Electrical, Instrumentation and Drilling engineering at OIL's premises for a period of 2 (two) weeks on Operation, Maintenance, Troubleshooting & Working Principle of following system / items in the unit amongst other relevant subjects [Bidder should indicate the training module with duration. Training charges at OIL's premises should include amongst others to and fro fares, boarding/lodging, local transport at Duliajan and other expenses of supplier's training personnel during their stay at Duliajan, Assam (India)].

B.1 For Mechanical Engineer Crew (Technical Services & Field Engineering):
Power Packs & Generating Set Engine systems including their adjustments
Mud Pump & accessories
Major Rig Equipment
Air system

B.2 For Instrumentation Technician:
Draw-works control & Electronic digital monitoring system.
Rig sense or equivalent system for Mud Parameters.
Sensor Calibration & maintenance.
Report generation, printing & documentation.
Instrumentation for auxiliary equipment.
Training on software for programming & trouble shooting of drilling instrumentation system.

B.3 For Electrical Crew – Refer: Section 19 (Chapter IV) under the heading "Training"
Generating sets
Power Control
Power distribution
VFD Control training

B.4 For Drilling Crew
Maintenance of Draw-works, Rotary Table, Rotary Swivel & other Major Rig Equipment
Rig up and Rig down
Hydraulic system
Top Drive controls & Maintenance
Iron Roughneck controls & Maintenance
Casing Running Tool controls and Maintenance

C. The bidder should quote for both training at the manufacturing plant / works and also training at Oil's premises. The training charges will be considered for evaluation of the offers. The bidder should also note that payment against training will be released only after successful completion of both the trainings.

12. MAKE OF RIG ACCESSORIES

Make of rig accessories for supply with rig package should be as per the undernoted options only:

Sl. No.	Equipment Detail	Make / Name of Vendor	API Specification
1.	Crown Block Assembly	No Option	4F
2.	Mast & Sub-Structure	No Option	4F
3.	Draw Works	No Option	
4.	Top Drive System (Portable)	1. Aker Maritime 2. Can Rig 3. National Oilwell Varco 4. Tesco	-
5.	Disc Brake (Auxiliary Draw-works brake)	1. Eaton Corporation 2. National Oilwell Varco 3. Wichita, UK	-
6.	Rotary Table	1. American Block Company 2. Bharat Heavy Electricals Ltd 3. Drillmec S.p.A. 4. Hackers Industries 5. National Oilwell Varco 6. Varco BJ	7K
7.	Traveling Block & Hook	1. American Block Company 2. Bharat Heavy Electricals Ltd	8C

		3. Drillmec S.p.A. 4. National Oilwell Varco Or Equivalent (For equivalent make, other than the listed, the bearings should be Torrington or SKF or FAG Only).	
8.	Elevator Links	1. Blohm & Voss GmbH 2. National Oilwell Varco 3. Varco BJ	8C
9.	Dead Line Anchor	1. Dreco Energy Services 2. National Oilwell Varco	8C
10.	Casing / Drilling Line	1. Bridon American Corp. 2. Usha Martin Limited. 3. Wire Rope Corporation of America Inc.	9A
11.	Rotary Hose	1. Dunlop Argentina 2. Phoenix Beattle 3. Gates Corpn.,	7K
12.	Solid Control Equipments (Shale Shakers, Desander, Mud Cleaner cum Desilter, Degasser & Centrifuge)	1. Derrick Equipment Co. 2. National Oilwell Varco 3. Swaco Norge AS / MI Swaco	-
13.	Drilling Instruments & Gauges	1. Can Global 2. Martin Decker 3. Oteco 4. Wagner	-
14.	Pneumatic Winches	1. Ingersoll Rand International 2. Braden, USA 3. JDN Nehaus Ltd., UK 4. Red Rooster,UK	-
15.	Rotary Swivel	1. American Block Company 2. Bharat Heavy Electricals Ltd 3. National Oilwell Varco 4. Soilmec Or Equivalent (For equivalent make, other than the listed, the bearings should be Torrington or SKF or FAG Only).	8C
16.	Kelly	1. NOV Grant Prideco 2. VAM Drilling 3. Smith Services 4. Weatherford U.S. 5. Diado Steel Co. Ltd. 6. Hacker Industries	7-1
17.	Kelly Bushing	1. National Oilwell Varco 2. FORUM 3. Den-Con Tools Co. 4. Cam-Tech Products 5. Drillmec SPA	7K
18.	Master Bushing	1. Blohm & Voss Repairs GmbH 2. National Oilwell Varco 3. Hacker International 4. Den-Con Tools Co. 5. Cam-Tech Products 6. Drillmec SPA 7. FORUM	7K

19.	Drill Pipe Spinner	1. Blohm & Voss Repairs GmbH 2. National Oilwell Varco	-
20.	Kelly Spinner	1. National Oilwell Varco 2. Weatherford	-
21.	Generator	1. Kato 2. BHEL	-
22.	AC drilling motor	1. GE	-
23.	VFD / Inverter panels	1. ABB 2. Siemens	-
24.	Air Circuit Breakers	1. Merlin Gerin (Group Schneider) 2. ABB 3. Siemens	-
25.	Air Conditioner (for main PCR)	1. Trane 2. Carrier 3. Hitachi	
26.	NGR Monitoring system	1. Bender 2. I-Guard 3. Little Fuse	
27.	Plug and Socket	1. Appleton 2. BCH (India) 3. C-Hinds	-
28.	Plug-Socket disconnects for light fittings	1. Appleton 2. Crouse Hinds	To be of "Ex" type
29.	FLP light fittings	1. Sudhir (India) 2. FCG (India) 3. Or equivalent	DGMS approved fittings only
30.	AC-PCR electrical panel fittings inclusive of MCCB	1. Telemechanique 2. Siemens 3. L&T	
31.	Soft starters for AC auxiliary motors	1. ABB 2. Siemens	
32.	Ac auxiliary motors (all ratings)	1. CG (India) 2. BB (India) 3. Kirloskar (India)	DGMS approved motors only
33.	Sync check relay	1. Basler 2. Or equivalent	
34.	Cables	-	DGMS approved cables
35.	Power Pack Engine	1. Caterpillar	-
36.	Mud Pump	1. National Oilwell Varco 2. GD 3. Drill Mac 4. BPCL Or Equivalent	-
37.	Centrifugal Pumps	1. TRW Mission 2. Harrisburg 3. SPD Baker	-
38.	Air Compressor	1. Sulair 2. Ingersoll Rand Or Equivalent	-
39.	HP Valves & fittings	1. Oteco 2. Demco	-
40.	Hoses &Banded V-belts	1. Gates 2. Dunlop, Argentina or equivalent	-

41.	Multi stage Gauging water pump	1. Beacon Weir or equivalent	
42.	Casing Running Tool	1. National Oilwell Varco 2. Baker Hughes 3. Tesco	
43.	Iron Roughneck	1. National Oilwell Varco 2. Weatherford 3. Blohm + Voss	

(Note: The equipment confirming to API specifications must have the API monogram die stamped on the body)

13. GENERAL NOTES (In addition to notes mentioned elsewhere in this tender.)

(a) The 2000 HP Rig packages, inclusive of the accessories, should be brand new, unused, of recent manufacture (not prior to six months from date of issuance of Letter Of Intent) & free from any manufacturing defect. This shall be categorically confirmed by the bidders in their quotations.

(b) Any deviation(s) from the tender specification should be clearly highlighted specifying justification in support of deviation. The word 'equivalent' appearing after any indicated make of an item / equipment / accessories implies that any other make of such item / equipment / accessories is also acceptable provided the specification as indicated in tender is met in toto.

(c) Offers shall be complete in all respects and all the items/equipment as specified in the tender must be included in the package. Offers deemed to be incomplete shall be liable for outright rejection. (Bidders may quote additional items / equipment or accessories, other than **Handling Equipment** & **Well Control Equipment,** not covered in this enquiry, if felt necessary for the completeness and efficient operation of the rig package).

(d) The Bidder shall categorically confirm that the compatibility of all equipment offered has been thoroughly scrutinized and verified for smooth and trouble-free operation of the entire package to avoid unwarranted hitches during commissioning.

(e) Quotations shall be accompanied by detailed technical specifications, manufacturer's printed specification sheets, literature, drawings, layout drawings & catalogues as indicated in English (UK & US).

(f) Bidders must specify the weight of major components indicating the major dimensions.

(g) Bidders should specifically note the document submission schedule indicated elsewhere (i.e. in sections) including special documents requiring statutory clearances.

(h) All equipment to be supplied with the Rig Package shall be in full conformance to and monogrammed per the respective API Specification as mentioned in the tender viz. API Spec 4F, API Spec 5L, API Spec 7-1, API Spec 7-2, API Spec 7F, API Spec 7K, API Spec 8C, API Spec 9A, API RP 500 & API RP 13E, etc.

(i) Deleted

(j) Electrical / Electronic equipment shall be CIMFR (or equivalent) certified and DGMS approved. The CIMFR certificate number and DGMS approval number shall be affixed or embossed on each piece of equipment. In case DGMS approved electrical / electronic equipment is not available, the same shall be supplied with DGMS field trial permission

certification. The field trial may be carried out in any E&P company operating in India or during the commissioning of the rig package for which it is procured.

(k) The details of how the payment will be made in case of DGMS approved /pending for DGMS approved package is supplied is given under Para 14 of this Section.

(l) Bidders shall confirm categorically that Installation & Commissioning of the Rig Package with all accessories would be carried out by their competent personnel at OIL's designated drill site, in Duliajan, ASSAM, INDIA. However, the basic facilities required for installation & commissioning such as to & fro transportation to site from Duliajan, Crane service, electric power, water supply, pressurized air and welding & cutting set shall be provided by OIL. Rig-up at designated site will be the responsibility of OIL but, supplier should provide the supervisory assistance by deputing their competent personnel including API certified welder (if required).
Bidders should specifically note that commissioning for rig electricals will be in two stages.

For details refer Section - 19, Chapter V.G of this document.

Commissioning shall be completed within 8 (eight) weeks per rig after receipt of all the items at Duliajan.

(m) Bidders, quoting for any bought out item(s) should undertake & comply with Guarantee / Warranty clause indicated elsewhere in this tender.

(n) Bidder should confirm in their technical bid that they will agree for keeping their technical personnel at OIL's Headquarter Duliajan, Assam for trouble shooting & providing timely warranty/guarantee repair/replacement/maintenance services on regular basis during the normal warranty / guarantee (as stated elsewhere in this tender) for a period of 1 year (12 months) from successful commissioning of each rig package at site.

(o) Among others, the bidders shall categorically confirm that prices of major rig components will be submitted within 30 days from placement of order as specified under different sections for Drilling Rig packages in the format furnished in Annexure A4.

(p) Bidder should also confirm in their technical bid that they will agree for an Annual Maintenance Contract (AMC) with OIL for keeping their technical personnel at OIL's Headquarter Duliajan, Assam for carrying out the job as indicated against scope of work on regular basis after expiry of the warranty period. The charges for such AMC should be indicated in the commercial bid. The bidder should indicate the year-wise break-up AMC charges for three years. This will be considered in evaluation of the tenders.

The scope of work for AMC in broad sense shall be as follows:

i) Supervisory services for maintenance, trouble shooting & providing support services in keeping the complete rig packages in good health.
ii) The person(s) shall be fully conversant with the relevant system of the rig. The person(s) should be physically fit for working in the well-site. The person(s) shall also be able to work with his own hands & should be able to communicate in English (US & UK).
iii) For further details on electrical part the scope of AMC may also be referred as indicated in section: 19 (Chapter IV) under the heading "Maintenance".
iv) The service provider should have to arrange for the services required for their bought out items installed in the rig package.
v) Supervisory services will be required for rig-up, rig-down & inter-location movement in proper way for top drive system and rig sense or equivalent system.

vi) The spares required for maintenance will either be provided by OIL or will be procured (if required urgently) from the service provider.
vii) The scope of AMC for instrumentation items should include the complete instrumentation and control system supplied as per the Section – 13 of this specification.
viii) List of all spares required for maintenance of instrumentation and control system along with price shall be provided by the service provider and the same shall be made available as and when required.
ix) The man power & tools including OIL's own workshop facility required for carrying out the maintenance & trouble shooting will be made available by OIL.
x) No accommodation, food, boarding & lodging will be provided by OIL. However an unfurnished office space limited to one room & local transportation will be made available by OIL.
xi) The personnel(s) of service provider during the AMC period should be available at Duliajan, Assam.
xii) The personnel(s) of service provider should preferably be Indian citizens fully trained by service provider for the AMC.
xiii) Payment against the AMC shall be released quarterly or after completion of every three months as certified by OIL.
xiv) OIL will enter a separate contract for AMC services.

A check list of technical specification for the rig package has been furnished vide Annexure-A2 & A3

14.Payment clause for the Tender :

Payment shall be released as follows:

a) Rig package supplied with valid DGMS Approval of rig components :

i) 80 % value shall be released on supply against proof of despatch/shipment of the package and submission of valid DGMS certificate against each rig separately.

ii) Remaining 20 % along with installation & commissioning charges shall be paid after successful commissioning and acceptance by OIL at site.

OIL may consider making 100 % payment of the rig package value towards supply of the rig package against proof of dispatch/shipment provided bidders agree to pay interest @ 1% above prevailing Bank Rate (CC rate) of State Bank of India for 20 % of the rig package value and also submit Bank Guarantee for the equivalent amount plus interest valid till successful commissioning of rig package at site. This is in addition to the 10 % of the order value towards Performance Security as per the tender requirement.

b) Rig package supplied without DGMS approval of rig components, but with Field Trial Permissions only:

(aa) 50 % value shall be released on supply against proof of despatch/shipment of the package .

(bb) 30% value upon submission of DGMS approval only.

(cc) Balance 20 % along with installation & commissioning charges shall be paid after successful commissioning and acceptance by OIL at site.

Note : (I) In case DGMS approval is not available, the same shall be supplied with DGMS field trial permission certification. Details of obtaining DGMS field trial permission are available at the web site of DGMS. The field trial may be carried in any E&P Company operating in India or during the commissioning of the project for it is procured.

(II) The price of each electronics/electrical equipment/instrument wherever DGMS approval is required as per technical specifications shall be quoted separately.

(III) A system shall be considered as successfully commissioned only after obtaining valid DGMS approval for all the constituent/instruments of the system.

15. The Drilling Rig packages covered under this enquiry will be used by OIL in the PEL/ML areas issued/renewed after 01/04/99, applicable Customs Duty for import of goods shall be ZERO. Indigenous bidders shall be eligible for Deemed Export and should quote Deemed Export prices Excise Duty under Deemed Export exempted.

CHECK LIST OF TECHNICAL SPECIFICATIONS
FOR 2000 HP DRILLING RIG PACKAGE

	Essential Technical Parameters	Deviations (if any)	Justification in support of deviation
1.	Does the Horse Power rating of the offered rig meet the specified Horse Power Rating of 2000 HP?		
2.	Have you confirmed and substantiated that the Rig Package is suitable for operation under the climatic conditions specified in tender & BRC?		
3.	Does your offer include two (2) triplex mud pumps each rated at 1600 HP and meeting the discharge & pressure ratings specified in the tender?		
4.	Have you indicated the size of drilling / casing line?		
5.	Does your offer include four (4) power packs with Power Control Rooms, sufficient to meet all load requirements to drive the draw-works, mud pumps; solids control equipment, auxiliary motors, lighting system, etc.?		
6.	Is the offered Mast, Substructure & Crown Block Assembly manufactured & monogrammed per API Spec 4F and have a Minimum Static Hook Load Capacity of 500 Short Ton (454 MT or 1,000,000 lbs) with 12 lines strung?		
7.	Does the Wind Load Capacity of the mast meet the maximum specification of 100 mph with full set back & 115 mph without set back?		
8.	Does the offered rig have a nominal depth rating of 20,000 ft with 4.1/2" drill pipe?		
9.	Does the capacity of the Substructure meet the minimum specification of Static Rotary Capacity of 500 Short Ton & a Simultaneous Pipe Setback Capacity of 300 Short Ton?		
10.	Is the Minimum Clear Height under rotary beams of the Substructure Assembly is 21 feet?		
11.	Do all electrical equipment such as motors, light fittings, push button stations, plugs & sockets, junction boxes, motor starter, etc used in hazardous area have CMRI certification (UL or equivalent certification from competent authority from the country of origin) and DGMS (India) approval for gas group II A & II B? If so, have you forwarded copies of the same with the bid? UL certification shall be considered as equivalent to CMRI (India) certification; however DGMS (India) approval shall be binding and final for all equipments to be used in Hazardous areas as per DGMS Guidelines/ Directive. (Refer DGMS approval clause J & K under General Notes).		
12.	Does your offer include all items, equipment as		

Essential Technical Parameters		Deviations (if any)	Justification in support of deviation
	specified in the enquiry? Do they conform to the respective API Specification and will bear the official API monogram?		
13.	Have you enclosed copies of all API Specifications including the special requirement of API Spec 4F certificates for last 10 years preceding the bid closing date?		
14.	Have you verified and confirmed compatibility of all equipment included in the package?		
15.	Does your offer indicate technical specifications in detail? Have you enclosed manufacturer's printed specification sheets, literature, drawings, layout drawings & catalogues as requested?		
16.	Have you enclosed duly filled-up & signed checklist & all other required documents as specially indicated under various sections?		
17.	Have you confirmed that Installation & Commissioning of the entire package shall be carried out by your competent personnel, in the event of an order? Have you indicated applicable charges towards the same in commercial bid?		
18.	Do you have the experience of supplying similar Drilling Rigs to reputed international drilling companies? Have you enclosed a 'Track Record' of such supplies made by you during the last 3 years?		
19.	Have you confirmed to extend a warranty [from the manufacturer(s)] that shall be valid for 12 months from date of commissioning of the items, (in the event of an order) that the product supplied will be free from all defects & fault in material, workmanship & manufacture and shall be in full conformity with API specifications?		
20.	Have you highlighted the deviations in the offer, if any, to technical specifications of the tender?		
21.	Have you indicated for services during guarantee / warranty & AMC?		
22.	Have you indicated regarding pre-dispatch inspection and training modules?		

OTHER CHECK LISTS

CHECK LIST & DOCUMENTATIONS FOR SECTION 1 & 2

TECHNICAL

Sl. No.	PARAMETERS/REQUIREMENTS			BIDDER'S OFFER (To indicate details or yes/no, as applicable)	REMARKS, IF ANY
1	Draw-works	a	Input Horsepower		
		b	Nominal Depth Rating		
		c	Hoisting Capacity		
		d	Drilling line size		
		e	Lubrication system		
		f	Greasing System		
		g	Auxilary brake		
2	Mast	a	Clear Height from ground		
		b	Static hook load Capacity		
		c	Wind load resistance		
3	Crown Block	a	Capacity		
		b	No. of Sheaves		
		c	Drilling line diameter		
4	Racking / Tubing Board	a	Capacity		
		b	Adjustable height range		
5	Sub-structure	a	Static rotary capacity		
		b	Pipe set back capacity		
		c	Combined capacity		
		d	Work floor dimensions		

DOCUMENTATIONS

Sl. No.	DESCRIPTIONS	DOCUMENT ENCLOSED Yes or No	REMARKS, IF ANY
1	Technical leaflets with detailed dimensional diagram and specifications, Make & Model of draw-works, auxilary brake, mast, sub-structure, etc.		
2	Copies of API Certificates & Authorizations (if any)		

Signature _____
Name _____
Designation _____
Date _____

ANNEXURE – A4

Cost of Major Rig Components

Among others, the bidders must indicate the price of major rig components within 30 days from placement of order in the following format:

2000 HP VFD DRILLING RIG WITH TOP DRIVE

Sl. No.	Section	Major components	Quantity (Offered)	Rate (Currency)	Total Cost (Currency)
1	1	DRAW-WORKS			
2	1	AC CAGE INDUCTION MOTOR, VFD (DRAW WORKS MOTORS)			
3	2	MAST & SUBSTRUCTURE			
4	2	CROWN BLOCK ASSEMBLY			
5	2	DOG HOUSE/DRILLERS CABIN			
6	2	TOOL ROOM			
7	2	DRILLING LINE SPOOLER, HYDRAULIC DRIVE			
8	2	DRILLING / CASING LINE			
9	2	BOP TROLLEY BEAMS & BOP HANDLING SYSTEMS			
10	2	AIR WINCH(S)			
11	3	DEADLINE ANCHOR			
12	4	HYDRAULIC CATHEADS			
13	5	ROTARY TABLE			
14	5	INDEPENDENT ROTARY TABLE DRIVE			
15	5	MOTOR FOR INDEPENDENT ROTARY TABLE DRIVE			
16	5	MASTER BUSHING			
17	5	INSERT BOWLS			
18	5	SPLIT CASING BUSHING			
19	5	MUD GUARD			
20	5	TRAVELLING BLOCK			
21	6	TOP DRIVE SYSTEM			
22	6	WELDLESS LINKS			
23	7	IRON ROUGHNECK			
24	8	HYDRAULIC POWER UNIT			
25	8	HYDRAULIC CONTROL PANEL			
26	9	MUD PUMP			
27	10	HIGH PRESSURE PIPING SYSTEM FOR TWO PUMPS & DUAL STAND PIPE			
28	10	NINE VALVE STAND PIPE MANIFOLD			

29	**10**	**CEMENT STAND PIPE**			
30	**10**	**VIBRATOR HOSE**			
31	**10**	**ROTARY HOSE**			
32	**11**	**MUD & WATER TANK SYSTEM**			
33	**11**	**TRIP TANK**			
34	**11**	**PRE-FLUSH TANK**			
35	**11**	**LWC TANK**			
36	**11**	**SHALE SHAKER**			
37	**11**	**MUD CLEANER**			
38	**11**	**DESANDER**			
39	**11**	**VACUUM DEGASSER**			
40	**11**	**"POOR BOY" DEGASSER**			
41	**11**	**CENTRIFUGE**			
42	**11**	**CENTRIFUGAL PUMPS**			
43	**12**	**HIGH PRESSURE TEST UNIT**			
44	**14**	**RIG ENGINE**			
45	**15**	**RIG AIR SYSTEM**			
46	**16**	**RIG FUEL SYSTEM**			
47	**17**	**RIG INTERCOM SYSTEM**			
48	**18**	**MATHY WIRELINE UNIT**			
49	**19**	**ALTERNATOR**			
50	**19**	**MAIN POWER CONTROL ROOM**			
51	**19**	**DRILLER'S CONTROL CONSOLE / CABIN & MUD PUMP CONTROL CONSOLE**			
52	**19**	**AUXILIARY CONTROL PCR**			
53	**19**	**TOP DRIVE MOTORS**			
54	**19**	**MUD PUMP DRIVE MOTOR**			
55	**19**	**AC AUXILIARY MOTORS**			
56	**20**	**CASING RUNNING TOOL**			
57	**21**	**CELLER PUMP(S)**			
58	**21**	**RIG WASHER**			
59	**21**	**BUG BLOWER**			
60	**21**	**SOURCE WATER PUMP**			
61		**BIDDERS MAY INDICATE COST OF OTHER COMPONENT(S) NOT INCLUDED ABOVE BUT FORMING PART OF TOTAL COST OF DRILLING RIG PACKAGE AS PROVIDED IN COMMERCIAL BID FORMAT (SUMMARY).**			

SCOPE OF WORK FOR THIRD-PARTY INSPECTION FOR 2000 HP DRILLING RIGS WITH TOP DRIVE

Broad Scope of Work:

Supplier / Manufacturer shall be responsible for all operational and documentation formalities required to inspect the Rig.

1. Checking the complete specification of rig package with ordered specifications (including instructions / Notes / DGMS approvals for electrical / electronic equipments, various test certificates, make, etc. as applicable).
2. Verification of purchase documents related to bought out items including but not limited to documents audit, API monogram & PSL verification (wherever applicable), etc.
3. NDT report of critical drilling equipments such as Mast & Sub-Structure, Draw works, Dead Line anchor foundation / sheave, air winch foundation, link, bails, clamps, etc. as applicable.
4. The calibration of critical gauges on the drill floor instrumentation panel, stand pipe manifold, drillers console, mud pumps, load cells etc. as applicable.
5. Calibration of relief valve and same should be tagged with test pressure and test date.
6. Inspection of safety equipment as applicable.
7. Issue of inspection report (in English language only).

The scope of work will be sufficient to ensure the unit is fit for purpose and fully operational and will include, but not necessarily be limited to, the following functions:

Pre-Inspection Check:

Before carrying out tests / detailed inspection, the TPI agency shall perform the following checks:

a) Submission of all documents, datasheets, drawings, test certificates etc. by the rig manufacture.
b) Verification of Bill of materials as per OIL' approved documents.
c) Visual inspection as per OIL's approved drawings.
d) Dimensional check as per OIL's approved drawings.
e) All equipment shall have provision for lifting and double earthing.
f) Nameplate and / or Identity marking on all equipment.

Section No	Equipment	Inspection Work to be performed
1.	Draw-works	• Fully function testing at maximum load. • Verification of hoisting capacity. • Verification of lebus grooving & wireline size. • Running traveling block between crown to drill floor in all speeds for at least twenty operations. • Measurement of temperature, noise, assessment of vibration etc. • Verification of motor current. • Verification of dynamic braking system.

Section No	Equipment	Inspection Work to be performed
1.	Disc Brake	• Manufacturer's commissioning documentation. • Examination of unit integrity. • Fully function tested at maximum load. • Function tested during draw-works testing. • Measurement of temperature, noise, vibrations, coolant flow, etc.
2.	Mast	• Verification of quality control measures during construction. • Examination of NDT testing. • Close inspection of visual integrity. • Examination & verification of raising system & lines. • Raising & lowering the mast for at least six Operations. • Recording of critical data including max. Load during raising & lowering. • 100% Load Test of Mast and Substructure. • Verification of clear height, base width & hook load capacity. • Verification of racking platform's position, dimensions & capacity. • Verification of belly board's position & dimensions. • Examination of the crown for structural integrity including operational testing with maximum load on the draw-works. • Verification of Crown Block capacity, no. of sheaves, sheaves dia. & groove, fixation of sheaves and wire runs not obstructed during operation. • Verification of casing stabbing board's dimensions, travel limit, safety latches, etc. fully functional testing including raising & lowering the board for at least six operations.
2.	Substructure	• Verification of quality control measures during construction. • Examination of NDT testing. • Close Inspection of visual integrity. • Raising and lowering substructure base for at least two Operations. • Recording critical data including max. Load during raising & lowering. • Verification of various dimensions, setback & rotary load capacities. • Verification of dimensions & safety aspects for drill floor, stairs & handrails, V-door, catwalk, etc.
2.	Fall Arrestors	• Inspection of fall arrestors. • Functional testing at rated load capacity.
2.	Air Winches	• Verification of features & specification including load capacity. • Functional testing at full load. • Operational testing at maximum load for at least 20 times.
3.	Deadline Anchor	• Fully functional testing at maximum load. • Functional testing during draw-works & mast testing.

Section No	Equipment	Inspection Work to be performed
4.	Hydraulic Catheads	• Examination of unit integrity. • Recording of various parameters including line pull, wireline size, hydraulic flow, etc.
5.	Rotary Table	• Manufacturer's commissioning documentation. • Verification of different parameters including load capacity. • Full function testing at all speeds/gears. • Rotational testing for at least six Hours. • Measurement of temperature, noise, assessment of vibration etc.
5.	Independent Rotary Table Drive	• Manufacturer's commissioning documentation. • Verification of different parameters including drive & safety aspects. • Full function testing at all speeds/gears. • Measurement of temperature, noise, assessment of vibration etc.
5.	Traveling Block	• Examination of the traveling block for structural integrity. • Verification of specification & features. • Operational testing with maximum load on the Draw-works
6.	Top Drive	• Manufacturer's commissioning documentation. • Full Function testing. • Rotational testing for at least six hours • Pumping through fluids using the Mud Pumps. • Measurement of temperature, noise, assessment of vibration etc.
7.	Iron Roughneck	• Manufacturer's commissioning documentation. • Full Function testing.
8.	Hydraulic Power Unit & Controls	• Manufacturer's commissioning documentation. • Full Function testing.
9.	Mud Pumps	• Manufacturer's commissioning documentation. • Verification of specification & features. • NDT of welded joints on the body of the pumps. • Function Testing of SRVs with verification of relevant certifications. • Function test of mud pumps for six hour period at maximum strokes and pressure.
9.	Relief Valve	• Verification of specification. • Certification related to relief valves. • Location.
10.	High Pressure Mud Piping	• Verification of specification. • Witness & recording the pressure testing (at least 100% of working pressure). • NDT of welded joints & pipes. • Function testing of all the valves.
11.	Mud & Water Tanks system	• Verification of specification, dimensions & capacity. • Witness & recording the hydrostatic test. • Function testing of all the agitators, valves, superchargers, loading systems, etc.
11.	Solid Control Equipments (viz. Shale Shaker, Mud Cleaner, Desander,	• Manufacturer's commissioning documentation. • Verification of specification, features, dimensions & capacity. • Function test for all for at least six hours at

Section No	Equipment	Inspection Work to be performed
	Vacuum Degasser, Poor Boy Degasser & Centrifuge)	maximum capacity. • Measurement of noise, assessment of vibration, etc.
12.	High Pressure Test unit	• Manufacturer's commissioning documentation. • Verification of specification, features & capacity. • Function test for at least two times at maximum test pressure.
13.	Draw-works controls	• Full functional testing of instrumentation & control system of a) Driller's Cabin b) Auto Drilling Feature c) Work Stations d) Rig Sense or Equivalent System e) Drilling Parameters f) Alarms
13.	Top drive Instrumentation systems	• Full functional testing of top drive instrumentation system • Purging system of control panel
13.	Hydraulic power unit controls	• Full functional testing of draw works control, disc brake control and cat head control
13.	Mud pumps	• Full functional testing of instruments related with mud pumps
13.	Rig air system	• Full functional testing of all instruments and safety switches connected with Air Dryer, Air Compressor and Air Receiver.
13.	Documentation	• Verification of technical documentation including service and operation manuals, physical layout drawings, as built diagrams etc. • Verification of spare parts list for all sub-systems. • Verification of DGMS (India)'s approval for all instrumentation equipment supplied for use in the hazardous area of the rig.
14.	Rig Engines	• Manufacturer's commissioning documentation. • Verification of make, specification & features. • Function test of all engines for six hour period. • Verification of load sharing. • Function testing of safety shutoff devices. • Verification of Acoustic Enclosure performance (i.e. Minimum 25 db(A) insertion loss). • Verification of calibrations of various meters and tools that are to be provided along with the Rig Engines. • Measurement of temperature, noise, assessment of vibration etc.
15.	Rig Air System	• Verification of specification & features. • Full functional testing of system. • Hydraulic Testing of Air Vessels and function testing of SRVs fitted to the Air system. • Function Testing of Air Dryer unit. • NDT of welded joints of Air vessels.
16.	Rig Fuel System	• Verification of specification & features. • Full functional testing. • Suitability of construction.

Section No	Equipment	Inspection Work to be performed
		• Verification of Fuel transfer. • Hydraulic Testing of Fuel Tanks. • NDT of welded joints in the Fuel tanks. • Verification of Calibration Chart / Scale for Fuel Tanks as provided by Manufacturer.
17.	Rig Intercom System	• Verification of specification & features. • Full functional testing.
18.	Mathey Wireline Unit	• Manufacturer's commissioning documentation. • Verification of specification, features & capacity. • Function test for at least two times at all speeds/gears including load testing. • Measurement of noise, assessment of vibration etc.
19.	Supply of complete electricals	• Verification of supply of complete electrical system package, including auxiliary electrical systems for operation of the rig, viz. all electrical motors of the solid control system, rig lighting system, utility system (compressed air, water etc.), cable system including cable trays, boxes & grasshopper/ elevators, earthing system, maintenance and testing facility for rig control system, complete set of spares etc. • Verification of nameplate rating and make/ model of all electrical equipment against ordered specification. Applicable standards to be followed - Approved drawings / Industry best practices / applicable IS code.
19.	Rig control system	• Functional tests of all supplied hardware and software including Touch screen(s), PLCs, modules, uploading and downloading of programs etc. • Control system complete with all necessary software, hardware and remote communication capability • Separate instrument earthing bus • All software, including hardware keys licensed to Oil India Limited. Such Licenses shall not have expiration dates. • Bypass mode provided (in case the control system fails) • Verification of fault annunciation on simulated possible faults Applicable standards to be followed - As per relevant standards / tests of control system manufacturer.
19.	Power pack (engine generator)	• 100% load test of all power packs (individually) • Verification of load sharing (all possible power pack combinations) • Testing of safety devices like emergency stops, over speed trip, LLOP, HAT, HWT etc. in engine and E-stop switches from D'con • Proper foundation bolts and operation • Double earthing provision

Section No	Equipment	Inspection Work to be performed
		Type Test and Routine Test records of alternators as per standards shall be submitted. Applicable standards to be followed - Alternators shall be manufactured and tested as per IS 13364, Part 2 1992, IEEE Std. 115, NEMA MG-1, or MIL-Std. 705 ANSI C50.12, BS 4999, CSA, C22.2NO.100, IEC 34, API-546
19.	Main Power Control Room (MPCR) *Physical parameters*	• Physical dimensions and weight as per order/drawing • Suitable for bottom lifting • Oil field type skid mounted • Suitable for heavy rain/humid areas-Check for water ingress/seepage • To be weight balanced at the centre • NDE for lifting lugs and critical areas and wherever welding is done • Surface preparation • High voltage tests • Primary and secondary injection testing • Sufficient working space (min. 1 m in front of panels) Panels- • **Verification of electrical clearances (phase to phase and phase to ground)** • **Verification of electrical creepage distance** • **Checking of tightness of all connections in bus bars and links and supports** • **Checking of terminations for proper crimping and tightening** • **Checking of wiring by ferrule numbers and tracing of wires as per drawing reference** • Checking of hot spots with infra-red thermometer (in load condition) • No. of starters along with spare starters as per order • Each individual panel in the MCC provided with RCD / ELCB for power circuit as well as control circuit • IR value test using 1000 V IR tester all around (with all breakers open)- main 600 VAC bus, 415 VAC auxiliary bus, DC bus • Power frequency voltage test for 1 minute • Mechanical operation of all ACBs/ MCCBs/ switches/ doors/ door latches/ locks etc. • Functional testing of all individual panels • Calibration settings of MCCB and trip test • Calibration settings of overload relays • Calibration settings of earth fault leakage detection devices and trip test • Recording of amps reading during commissioning • Calibration results of all meters (initial calibration results may be provided by the

Section No	Equipment	Inspection Work to be performed
		manufacturers themselves) • Functional testing of air conditioners • Cooling Capacity (tons) –tonnage and details (type, full redundancy-100%, make, model, mounting etc.) of the air conditioning system as per order • Plug socket cable terminations are of crimped type <u>Applicable standards to be followed</u> - PCR shell and components shall be manufactured as per IS Codes-513, 613, 694, 1248, 1646, 1897, 1901, 2026, 2062, 2071 (2), 2102, 2147, 2551, 3043, 5578, 6875, 8084, 8623, 10118, 12021, 13118, 13703, 13947 etc. or *their equivalent international standards like IEC, NEMA*, IEC 60947 etc. and conform to Indian Electricity Rules 1956 *Wherever values are mentioned in the order, for example, "SCR blowers should be capable of "X" CFM of air per minute or second", this has to be verified.* *All starters below 55 kW (75HP) should be DOL type. Starters above this shall be provided with a "soft starter", with suitable contactor arrangement*.
19.	Generator Panels (inside MPCR)	• Checking of terminations for proper crimping and tightening • Functional testing of each panel including all switches, speed/ voltage adjust pots • Synchronization and load sharing of generators (in all possible combinations) • **Verification of Fault annunciation on simulated faults on alternator/ engine** <u>Applicable standards to be followed</u> - As indicated in above row.
19.	Converter / rectifier panels (inside MPCR)	• Functional testing of panels • Checking of tightness of all connections in bus bars and links and supports • Checking of terminations for proper crimping and tightening <u>Applicable standards to be followed</u> - As per approved drawing
19.	VFD panels (inside MPCR)	• Checking of tightness of all connections in bus bars and links and supports • Checking of terminations for proper crimping and tightening • Assignment verification • Full load testing from all panels • Type of auxiliary braking employed in Draw works

Section No	Equipment	Inspection Work to be performed
		Applicable standards to be followed - As per approved drawing
19.	D'con (Driller's control console)	• Checking of terminations for proper crimping and tightening • Assignment verification • Verification/functionality tests of all switches, throttles (up to 100%) and meters and annunciation • Functionality test of foot throttle • Supply and functionality testing of pressurization (air purging system) in D'con and foot throttle • Rotary torque current limit verification Applicable standards to be followed - As per approved drawing
19.	MP'Con (Mud pump control console)	• Verification/functionality tests of all switches, throttles (up to 100%) and meters Applicable standards to be followed - As per approved drawing
19.	ACPCR (Auxiliary controls power control room)	• Physical dimensions and weight as per order/drawing • Suitable for bottom lifting • To be weight balanced at the centre • Oil field type skid mounted • Suitable for heavy rain/humid areas-Check for water ingress/seepage • NDE for lifting lugs and critical areas and wherever welding is done • Surface preparation • High voltage tests • Primary and secondary injection testing • Sufficient working space (minimum 1 meter in front of panels) Panels- • Verification of electrical clearances (phase to phase and phase to ground) • Verification of electrical creepage distance • **Checking of tightness of all connections in bus bars and links and supports** • **Checking of terminations for proper crimping and tightening** • **Checking of wiring by ferrule numbers and tracing of wires as per drawing reference** • Checking of phase sequence of main supply transformers • Checking of hot spots with infra-red thermometer (during load testing) • No. of starters along with spare starters as per order • Plug socket cable terminations are of crimped type • IR value test using 1000 V IR tester • Power frequency voltage test for 1 minute • Each individual panel in the MCC provided with

Section No	Equipment	Inspection Work to be performed
		RCD / ELCB for power circuit as well as control circuit • Mechanical operation of all ACBs/ MCCBs/ switches/ doors/ door latches/ locks etc. • Function testing of all individual panels • Calibration settings of MCCB and trip test • Calibration settings of overload relays • Calibration settings of earth fault leakage detection devices and trip test • Recording of amps reading during commissioning • Calibration results of all meters (initial calibration results may be provided by the manufacturers themselves) • Functional testing of air conditioners • Cooling Capacity (tons) –tonnage and details (type, full redundancy-100%, make, model, mounting etc.) of the air conditioning system as per order Applicable standards to be followed - PCR shell and components shall be manufactured as per IS Codes- 513, 613, 694, 1248, 1646, 1897, 1901, 2026, 2062, 2071 (2), 2102, 2147, 2551, 3043, 5578, 6875, 8084, 8623, 10118, 12021, 13118, 13703, 13947 etc. or *their equivalent international standards like IEC, NEMA*, IEC 60947 etc. and conform to Indian Electricity Rules 1956 *Wherever values are mentioned in the order, for example, "SCR blowers should be capable of "X" CFM of air per minute or second", this has to be verified.* *All starters below 55 kW (75HP) should be DOL type. Starters above this shall be provided with a "soft starter", with suitable contactor arrangement.*
19.	Main drilling motors	• AC-inverter duty motor supplied • Record of insulation testing • Functional testing of pressurization of blower and pressure switch/ relay • Functional testing of all interlocks • Operation testing- full load and single/ double motor in pumps • Load sharing in double motor operation • Foundation bolts (for both main and blower motor) • Double earthing provision (for both main and blower motor) Applicable standards to be followed - NEMA Standard MG1, Part 31.4.4.2 or equivalent international standards *Type test and routine tests- certificates for both*

Section No	Equipment	Inspection Work to be performed
		to be submitted
19.	Auxiliary motors	• Number and type/ rating of motor as per order • Record of insulation testing • Functional testing- no load/ partial load/ full load • DGMS approval supplied Applicable standards to be followed- Manufactured and tested as per IS- 325, 1231, 2148, 3682 *Type test and routine tests- certificates for both to be submitted*
19.	Ground fault detection and Neutral grounding system of MPCR and ACPCR	• Functional testing of ground fault detection system including audio-visual alarm / indication (600/415 AC bus in MPCR, DC bus in rectifier panels) • Functional testing of Variable AC voltage ground detection circuit for AC drilling motors with audio-visual annunciation • Functional testing of and records (including audio/ visual alarm tests) of restricted neutral earth system used in the system designed for maximum earth fault current of 750 milli Amps using NGR • Permanent Insulation monitor provided in the NGR system Applicable standards to be followed - IS-3043, Indian Electricity Rules; Approved drawings
19.	Transformers	• Name plate rating as per order • Full load testing including temp. rise • Transformer terminations – primary and secondary (Stand off / cable connected in air filled enclosure) • Provision for Star connected secondary with neutral terminal available in terminal box (for isolation transformer) Applicable standards to be followed - Standard – Indian standard IS-11171, 2026 or equivalent international NEMA/ IEC *Type test and routine tests- certificates for both to be submitted*
19.	Top drive system	• Cable length shall be suitable for 1+3 cluster drilling • Functional testing (from Top drive feeder, fully functional and assignable or supplying to separate top drive house) • Functional testing of AC unit (in case of separate top drive house)
19.	Rig Lighting system	• Quantity and type of light fittings • All the FLP light fittings DGMS (India) approved. • All light fittings provided with necessary control gears and lamps.

Section No	Equipment	Inspection Work to be performed
		• Provision of mast lighting socket board • Lighting voltage (e.g. 240 volt phase to phase in Hazardous areas/ 240 volt phase to neutral for other areas)? • Provision of aviation warning lights– Red color, continuous glow(night), white color flashing (day) as per order • Lighting scheme and details light fittings • All lighting circuits with RCBO/ RCD for current leakage sensitivity of 300 mA Applicable standards to be followed - DGMS (India) approval & as per order specifications.
19.	Area and crew cabin illumination system	• As per order • Functional testing of all feeders
19.	Cables and cable handling system	• Cable system suitable for 1+3 cluster drilling • Trays, boxes, grasshopper etc. provided • Type of cable for 3 phase equipment, light fittings, alternators, motors, controls connections- HOFR, EPR insulated, CSP sheathed and copper screened copper conductor, EVA insulated and sheathed copper conductors per order • All the cables including power, control, lighting etc. supplied complete with suitable male/female plug/ connectors • Cores identifiable by color/ number Applicable standards to be followed - DGMS (India) approval & as per order specifications.
19.	Rig Earthing system	• Earthing scheme along with the electrode layout • Double earthing provision in all equipments. Applicable standards to be followed - IS-1573, 3043
19.	Electrical tools and instruments	• Calibrated- calibration records by manufacturer submitted • Laptop and desktop computers for control system programming- of latest models Applicable standards to be followed - As per order specifications.
19.	Spares	• As per order quantity, make, model / type Applicable standards to be followed - As per order specifications.
19.	DGMS approval for Hazardous area equipments	• DGMS (India)'s approval for all electrical equipment supplied for use in the hazardous areas of the rig Applicable standards to be followed - Oil Mines Regulation 1984.
19.	Surface finish and painting	• All applicable equipment- as per order • Painting/ powder coating thickness verification Applicable standards to be followed – IS-5, 101
20.	Casing Running Tool	• Manufacturer's commissioning documentation.

Section No	Equipment	Inspection Work to be performed
		• Full Function testing. • Rotational testing for at least three hours • Pumping through fluids using the Mud Pumps.
21.	Miscellaneous Items / Equipment	• Full Functional Testing of Cellar Pumps & Submersible pump.

During the performance of the Services the TPI agency / contractor will observe all relevant regulatory requirements and shall comply with Manufacturer's HSE requirements. TPI agency / Contractor shall have and shall implement a quality system that ensures, a high standard of proficiency is maintained by its personnel and during the performance of the Services. This system shall be documented and auditable records shall be maintained. The system will be subject to Company's approval and Company shall have the right to periodically inspect and audit Contractors places of business, workshops and audit implementation of quality standards.

ANNEXURE- B
(Tender No. SDG3599 P15/08)

BID REJECTION CRITERIA & BID EVALUATION CRITERIA

(I) BID REJECTION CRITERIA:

The bids shall conform generally to the specifications and terms as well as conditions laid out in the tender. Bids will be rejected in case the items offered do not conform to the required parameters stipulated in the technical specifications and to the respective international/national standards wherever stipulated. Notwithstanding the general conformity of the bids to the stipulated specifications and terms and conditions, the following requirements will have to be met by the bids, without which, the same shall be considered as non-responsive and stand rejected.

(A) TECHNICAL:

1. Drilling Rig Package shall be suitable for operating in OIL's fields in Assam, India where temperatures ranges between a minimum of 6 degrees Celsius & a maximum of 45 degrees Celsius with Maximum relative humidity of 100 % at 21 deg Celsius, 95 % at 35 deg Celsius & 70 % at 41 deg Celsius; Average annual rainfall: 343 cm. This shall be substantiated by the Manufacturer's printed specifications of the respective equipment.

2. The Input Horse Power Rating of the Draw-works of Drilling Rig shall not be less than 2000 HP and the draw-works must be AC variable frequency drive (VFD).

3. The Mast, Substructure and Crown Block Assemblies shall be manufactured & monogrammed per API Spec 4F, latest edition.

4. The Mast should be "swing lift" cantilever beam type with a minimum clear height of 142 feet and the sub-structure should have a minimum height of 25 feet from ground level.

5. The Substructure shall have a Minimum Clear Height under Rotary Beams of 21 feet.

6. The Minimum Static Hook Load Capacity of the Mast shall be 500 Short Ton (454 MT or 1,000,000 lbs) with a 12-line string-up.

7. Raising of Mast should be possible with 10 Lines.

8. The Maximum Wind Load Capacity of the Mast with full set back should be 100 miles/hr (160 Km/hr) without set back 115 miles/hr (185 Km/hr).

9. The Nominal Depth Rating of the Rig shall be a Minimum of 20,000 feet (6,096 metres) with 4.1/2" drill pipes of length range 30-31 ft (9.14-9.44 M).

10. The Substructure shall have a Minimum Static Rotary Capacity of 500 Short Ton (454 MT or 1,000,000 lbs) & a Simultaneous Pipe Setback Capacity of 300 Short Ton (272 MT or 600,000 lbs).

11. The Rig Package shall include two (2) Single Acting Triplex Mud Pumps each rated at 1600 Input Horse Power with a minimum discharge of 2700 LPM (713 GPM) at 210 kg/sq cm (2990 PSI). The maximum Discharge Pressure of the Pumps shall be 351 kg / sq cm (5000 PSI).

12. The Rig Package shall be complete with four (4) Power Packs each with one no. of Diesel engine having capacity not less than 1250 BHP at 1000 RPM coupled with alternator (as per Chapter IB.2 of Section-19 of NIT).

13. The manufacturers shall have the experience of supplying at least 05 Nos. of 2000 HP or higher capacity Drilling Rig packages to reputed international drilling companies / service providers and submit a 'Track Record' of such supplies made during the last 5 years preceding the technical bid closing date.

    Performance Certificates from end users towards at least three (3) rigs out of five mentioned above of same manufacturer to be provided by the bidder.

    Manufacturer should certify to this effect and provide a list of Customers along with the following details together with documentary evidence:

    - Customer's Name, Address & Contact Details.
    - Supply Order No. & Date.
    - Quantity Supplied.
    - Invoice No. & Date.

    Experience criteria as above shall not be applicable for manufacturers who has successfully supplied Drilling Rigs of same or Higher capacity to OIL in past.

14. Bids are invited from manufacturers of rig package or their duly authorized distributors/ dealers/ supply houses. The bidders, other than manufacturers, shall submit original certificate of authorization from the manufacturer for the offered rig package.

    However, the bidders quoting on behalf of the manufacturers must specifically submit undertaking in original from the rig manufacturer for offer & supply of rigs, warranty, back up guarantee, testing facilities, after sale services and uninterrupted supply of spares for at least 10 years.

    The authorized distributors / dealers/ supply houses should quote for the supply of rigs from the manufacturers who meet the experience & other criteria including BRC/BEC requirements mentioned in the bid document.

15. Manufacturer must be a valid licensee of API Spec. 4F for a period not less than 10 years continuously without any break preceding the bid (technical) opening date. Bids from bidders having API Spec 4F license (of Manufacturer) less than 10 years or having a break in between, preceding the bid opening date will not be considered (copies of API certificate for all the 10 years must be forwarded with technical bid).

16. Bidder must indicate regarding the services during guarantee / warranty & AMC (annual maintenance contract) in their technical bid (& quote for the same in commercial bid).

17. Bidder must indicate regarding the pre-dispatch inspection by OIL's team and training module in their technical bid.

18. Bidder must quote for both the rigs.

(B) COMMERCIAL :

1.0 Bids are invited under Single Stage Two Bid System. Bidders shall quote accordingly under Single Stage Two Bid System. **Please note that no price details should be furnished in the Technical (i.e. Unpriced) bid.** The "Unpriced Bid" shall contain all techno-commercial details except the prices which shall be kept blank. The "Priced Bid" must contain the price schedule and the bidder's commercial terms and conditions. Bidder not complying with above submission procedure will be rejected.

2.0 Bid security of US $ 15,51,000.00 or Rs.6,98,00,000.00 shall be furnished as a part of the TECHNICAL BID. Any bid not accompanied by a proper bid security in ORIGINAL will be rejected without any further consideration. For exemption for submission of Bid Security, please refer Clause No. 9.8 (Section A) of General Terms and Conditions for Global Tender. The Bid Security shall be valid till 22/07/2015 (dd/mm/yy) .

3.0 Bidders must confirm that Goods, materials or plant(s) to be supplied shall be new of recent make and of the best quality and workmanship and shall be guaranteed for a period of twelve months from the date of commissioning of the complete package at site against any defects arising from faulty materials, workmanship or design. Defective goods/materials or parts rejected by OIL shall be replaced immediately by the supplier at the supplier's expenses at no extra cost to OIL.

4.0 Successful bidder will be required to furnish a Performance Bank Guarantee @10% of the order value. The Performance Bank Guarantee must be valid for one year from the date of successful commissioning of the complete package at site. Bidder must confirm the same in their Technical Bid. Offers not complying with this clause will be rejected.

5.0 The prices offered will have to be firm through delivery and not subject to variation on any account. A bid submitted with an adjustable price will be treated as non-responsive and rejected.

6.0 Validity of the bid shall be minimum 180 days. Bids with lesser validity will be rejected.

7.0 Bids received after the bid closing date and time will be rejected. Similarly, modifications to bids received after the bid closing date & time will not be considered.

8.0 Bidders shall quote directly and not through Agents in India. Offers made by Indian Agents on behalf of their foreign principals will be rejected. Similarly offers from unsolicited bidders will be rejected.

9.0 Bids containing incorrect statement will be rejected.

10.0 Offers received without Integrity Pact duly signed by the authorised signatory of the bidder will be rejected.

11.0 No offers should be sent by Telex, Cable, E-mail or Fax. Such offers will not be accepted.

12.0 Bidders are required to submit the summary of the prices in their commercial bids as per bid format (Summary), given below :

BID FORMAT (SUMMARY)

(i) Commercial Bid Format (SUMMARY) for Foreign Bidders :

		With Top Drive	
		For Each Rig Package	For Two nos. Rig Package
(A)	Total material cost of Drilling Rig (other than Sl. No. B to E below)		
(B)	Cost of Mud Pump Spares & Special Tools (refer Section 9, Para 7)		
(C)	Cost of Tools, Spares, Screen etc. (refer Section 11, Para 12 (I, II & III))		
(D)	Cost of Tool Kit & Special Tool Kit (refer Section 14, Para 6)		
(E)	Cost of Spares for Electrical items (refer Section 19, Chapter III)		
(F)	Grand Total Material Cost, (A + B + C + D + E)		
(G)	Third Party Inspection Charge		
(H)	Packing & FOB Charges		
(I)	Total FOB Port of Shipment value, (F+ G + H) above		
(J)	Ocean Freight Charges upto Kolkata, India		
(K)	Insurance Charges @ 1% of Total FOB Value vide (I) anove		
(L)	Total CIF Kolkata value, (I + J + K)		
(M)	Pre-shipment Inspection charges by OIL		
(N)	Training charges		
(O)	Installation & Commissioning charges		
(P1)	AMC Charges for 1st year		
(P2)	AMC Charges for 2nd year		
(P3)	AMC Charges for 3rd year		
(Q)	Total Value, (L + M + N + O + P1 + P2 + P3)		
(R)	Total value in words :		
(S)	Gross Weight :		

(T)	**Gross Volume :**		

(ii) Commercial Bid Format (SUMMARY) for Indigenous Bidders :

		With Top Drive	
		For Each Rig Package	For Two nos. Rig Package
(A)	Total material cost of Drilling Rig (other than Sl. No. B to E below)		
(B)	Cost of Mud Pump Spares & Special Tools (refer Section 9, Para 7)		
(C)	Cost of Tools, Spares, Screen etc. (refer Section 11, Para 12 (I, II & III))		
(D)	Cost of Tool Kit & Special Tool Kit (refer Section 14, Para 6)		
(E)	Cost of Spares for Electrical items (refer Section 19, Chapter III)		
(F)	Grand Total Material Cost, (A + B + C + D + E)		
(G)	Third Party Inspection Charge		
(H)	Packing and Forwarding Charges		
(I)	Total Ex-works value (F + G + H)		
(J)	Excise Duty including Cess, (Please indicate applicable rate of Duty & Cess)		
(K)	Sales Tax, (Please indicate applicable rate of Tax)		
(L)	Total FOR Despatching station price, (I + J + K)		
(M)	Road Transportation charges to Duliajan		
(N)	Insurance Charges		
(O)	Total FOR Duliajan value, (L + M + N)		
(P)	Pre-despatch Inspection charges by OIL		

(Q)	**Training charges**		
(R)	**Installation & Commissioning charges**		
(S1)	**AMC Charges for 1st year**		
(S2)	**AMC Charges for 2nd year**		
(S3)	**AMC Charges for 3rd year**		
(T)	**Total Value, (O + P + Q + R + S1 + S2 + S3)**		
(Q)	**Total value in words :**		
(R)	**Gross Weight :**		
(S)	**Gross Volume :**		

Please provide Breakup of Prices along with above Bid Format wherever specified in Tender document.

NOTES :

1. The Rig package covered under this tender will be used by OIL in the PEL/ML areas issued/renewed after 01/04/99, applicable Customs Duty for import of goods shall be ZERO. Indigenous bidders shall be eligible for Deemed Export and should quote Deemed Export prices. Excise Duty under Deemed Export exempted.

2. Installation/Commissioning charges must be quoted separately on lumpsum basis which shall be considered for evaluation of the offers. These charges should include amongst others to and fro fares, boarding/lodging, local transport at Duliajan and other expenses of supplier's commissioning personnel during their stay at Duliajan, Assam(India). All Income, Service, Corporate Taxes etc. towards the services provided under installation / commissioning shall be borne by the supplier and will be deducted at source at the time of releasing the payment. Bidder should also confirm about providing all these services in the Technical Bid.

3. Training charges, if any must be quoted separately on lumpsum basis which shall be considered for evaluation of the offers. Training charges at OIL's premises should include amongst others to and fro fares, boarding/lodging, local transport at Duliajan and other expenses of supplier's training personnel during their stay at Duliajan, Assam(India). Bidder should also confirm about providing the service in the Technical Bid. In case of training at Bidder's premises, to and fro fares, boarding/lodging and other enroute expenses of OIL's personnel shall be borne by OIL.

4. Successful bidder shall offer the Rig Package for Pre-despatch/shipment Inspection by OIL's team of technical/commercial executives. Pre-despatch/Shipment Inspection charges, if any, must be quoted separately on lumpsum basis which shall be considered for evaluation of the offers. The to and fro fares, boarding/lodging and other enroute expenses of OIL's

Engineers shall be borne by OIL.Bidders must categorically indicate the Installation / Commissioning, Pre-despatch/Shipment Inspection, Training and AMC charges in their offers and must confirm about providing the same in their Technical bids.

5. While quoting AMC charges, bidders should note that boarding, lodging, fooding, accommodation, etc. of bidder's personnel will not be provided by OIL. However local transportation from base to well site and unfurnished office space limited to one room only will be provided by OIL. Bidder should indicate year-wise breakup for AMC Charges.

6. All Income, Service, Corporate Taxes etc. towards the services provided under installation / commissioning, Training and AMC shall be borne by the supplier and will be deducted at source at the time of releasing the payment.

7. Banking charges in the country of the foreign bidder shall be borne by the bidder

(II) BID EVALUATION CRITERIA :

The bids conforming to the specifications, terms and conditions stipulated in the tender and considered to be responsive after subjecting to the Bid Rejection Criteria will be considered for further evaluation as per the Bid Evaluation Criteria given below:

A. TECHNICAL :

1.0 Both the rigs (i.e. 2000 HP Drilling Rigs with Top Drive) shall be procured from same source

B. COMMERCIAL :

1.0 The evaluation of bids will be done as per the Commercial Bid Format (SUMMARY) detailed vide Para 12.0 of BRC.

2.0 If there is any discrepancy between the unit price and the total price, the unit price will prevail and the total price shall be corrected. Similarly, if there is any discrepancy between words and figure, the amounts in words shall prevail and will be adopted for evaluation.

3.0 For conversion of foreign currency into Indian currency, B.C. selling (Market) rate declared by State Bank of India, one day prior to the date of price bid opening shall be considered. However, if the time lag between the opening of the bids and final decision exceed 3(three) months, then B.C. Selling(Market) rate of exchange declared by SBI on the date prior to the date of final decision shall be adopted for conversion and evaluation.

4.0 Offers not complying with the payment terms indicated in the enquiry shall be loaded with one percent above the prevailing Bank rate (CC rate) of State Bank of India for duration of commissioning time indicated in the tender plus transit time (3 months) for evaluation purpose.

5.0 All the items are to be procured from the same source . Bids will be evaluated accordingly.

6.0 To ascertain the inter-se-ranking, the comparison of the responsive bids will be made as under, subject to corrections / adjustments given herein.

6.1 **When only foreign bidders are involved :**

Comparison of bids will be done on the basis of " TOTAL VALUE" which is estimated as under :

(A) Total material cost of Drilling Rig (other than Sl. No. B to E below)
(B) Cost of Mud Pump spares & Special Tools(refer Setion -9 , Para 7)
(C) Cost of Tools , Spares , Screen etc. (refer Section -11 , Para 12(I ,II &III)
(D) Cost of Tool Kit & Special Tool Kit (Refer Section -14, Para 6)
(E) Cost of spares for Electrical items (refer Section 19 , Chapter –III)
(F) Grand Total Material Cost, (A + B + C + D + E)
(G) Third Party Inspection Charge
(H) Packing & FOB Charges
(I) Total FOB Port of Shipment value, (F+ G + H) above
(J) Ocean Freight Charges upto Kolkata, India
(K) Insurance Charges @ 1% of Total FOB Value vide (I) above
(L) Banking Charges @ 0.5% of Total FOB Value vide (I) above in case of payment through Letter of Credit (If confirmed L/C at buyer's account is required, 1.5% of Total FOB Value will be loaded)
(M) Total CIF Kolkata Value, (I + J + K + L) above
(N) Pre-Despatch Inspection charges by OIL
(O) Training charges
(P) Installation & Commissioning charges
(Q) AMC Charges for 3 years
(R) Total Value, (M + N + O + P + Q) above

NOTE : Banking charge in the country of the foreign bidder shall be borne by the bidder.

6.2 When only domestic bidders are involved or when more than one domestic bidders are in contention in case of mixed response :

Comparison of bids will be done on the basis of " TOTAL VALUE" which is estimated as under :

(A) Total material cost of Drilling Rig (other than Sl. No. B to E below)
(B) Cost of Mud Pump spares & Special Tools(refer Setion -9 , Para 7)
(C) Cost of Tools , Spares , Screen etc. (refer Section -11 , Para 12(I ,II &III)
(D) Cost of Tool Kit & Special Tool Kit (Refer Section -14, Para 6)
(E) Cost of spares for Electrical items (refer Section 19 , Chapter –III)
(F) Grand Total Material Cost, (A + B + C + D + E)
(G) Third Part Inspection charge
(H) Packing and Forwarding Charges
(I) Total Ex-works value, (F+ G + H) above
(J) Excise Duty including Cess
(K) Sales Tax

(L) Total FOR Despatching station price, (I + J + K) above
(M) Road Transportation charges to Duliajan
(N) Insurance Charges @0.5% of Total FOR Despatching Station Value ( ) above
(O) Total FOR Duliajan value, (L + M + N) above
(P) Assam Entry tax
(Q) Pre-Despatch Inspection charges by OIL
(R) Training charges
(S) Installation & Commissioning charges
(T) AMC Charges for 3 years
(U) Total Value, (O + P + Q + R +S +T) above

NOTE: **Excise Duty in case of the indigenous bidder is EXEMPTED.**

6.3 **When both foreign and domestic bidders are involved :**

The Total Value of domestic bidder (inclusive of customs duty on imported raw material and components etc, and applicable terminal excise duty on the finished products and Sales Tax) excluding inland transportation to destination and Insurance charges worked out as per Para 6.2 above and Total Value of the foreign bidder worked out as per Para 6.1 above excluding inland transportation to destination will be compared. No price preference will be allowed to indigenous bidders except that for capital goods, the domestic manufacturers would be accorded a price preference to offset CST to the extent of 4 % or actuals, whichever is less subject to 30 % local content norms as stipulated for World Bank Funded project to the satisfaction of OIL. When more than one domestic bidders fall within price preference range, inter-se-ranking will be done on Grand Total Value basis.

Note: If the Government of India revises these evaluation criteria the same as applicable on the bid closing date will be adopted for evaluation of the offers.

7.0 Other terms and conditions of the enquiry shall be as per General Terms and Conditions for Global Tender. However, if any of the Clauses of the Bid Rejection Criteria / Bid Evaluation Criteria (BEC / BRC) mentioned here contradict the Clauses in the General Terms & Conditions of Global Tender of the tender and/or elsewhere, those mentioned in this BEC / BRC shall prevail.

COMMERCIAL CHECK LIST

THE CHECK LIST MUST BE COMPLETED AND SUBMITED WITH YOUR OFFER. PLEASE ENSURE THAT ALL THESE POINTS ARE COVERED IN YOUR OFFER. THESE WILL ENSURE THAT YOUR OFFER IS PROPERLY EVALUATED. PLEASE SELECT "Yes" OR "No" OR INDICATE TO THE FOLLOWING QUESTIONS, IN THE RIGHT HAND COLUMN.

Sl No.	REQUIREMENT	COMPLIANCE
1.0	Whether bid submitted under Single Stage Two Bid System?	Yes / No
2.0	Whether quoted as manufacturer?	Yes / No
3.0	Whether ORIGINAL Bid Bond (not copy of Bid Bond) Sent separately? If Yes, provide details	
	(a) Amount :	
	(b) Name of issuing Bank :	
	(c) Validity of Bid Bond :	
3.1	Whether offered firm prices?	Yes / No
3.2	Whether quoted offer validity of Six months from the date of closing of tender?	Yes / No
3.3	Whether quoted a firm delivery period?	Yes / No
3.4	Whether agreed to the NIT Warranty clause?	Yes / No
3.5	Whether confirmed acceptance of tender Payment Terms ?	Yes / No
3.6	Whether confirmed to submit PBG as asked for in NIT?	Yes / No
3.61	Whether agreed to submit PBG within 30 days of placement of order?	Yes / No
3.70	Whether Price submitted as per Price Schedule (refer Para 13.0 of BRC)?	Yes / No
3.71	Whether confirmed that all spares & consumables will be supplied for a minimum period of 10 years after supply ?	Yes / No
3.72	Whether cost of two years running Spares quoted as mentioned in Section -13 & 14?	Yes / No
3.8	Whether quoted as per tender (without any deviations)?	Yes / No
3.81	Whether quoted any deviation?	Yes / No
3.82	Whether deviation separately highlighted?	Yes / No
3.9	Whether indicated the country of origin for the items quoted?	Yes / No
3.91	Whether technical literature / catalogue enclosed?	Yes / No
3.92	Whether weight & volume of items offered indicated?	Yes / No
4.0	For Foreign Bidders - Whether offered FOB / FCA port of despatch including sea / air worthy packing & forwarding?	Yes / No
4.1	For Foreign Bidders – Whether port of shipment indicated. To specify:	Yes / No
4.2	For Foreign Bidders only - Whether indicated ocean freight up to Kolkata port (Excluding marine insurance) ?	Yes / No
4.3	Whether Indian Agent applicable ?	Yes / No
	If YES, whether following details of Indian Agent provided?	
	(a) Name & address of the agent in India – To indicate	
	(b) Amount of agency commission – To indicate	

	(c) Whether agency commission included in quoted material value?	
5.0	For Indian Bidders – Whether indicated the place from where the goods will be dispatched. To specify :	Yes / No
5.1	For Indian Bidders – Whether road transportation charges up to Duliajan quoted?	Yes / No
5.2	For Indian Bidders only - Whether offered Ex-works price including packing/forwarding charges?	Yes / No
5.3	For Indian Bidders only - Whether indicated import content in the offer?	Yes / No
5.4	For Indian Bidders only - Whether offered Deemed Export prices?	Yes / No
5.5	For Indian Bidders only – Whether all applicable Taxes & Duties have been quoted?	Yes / No
6.0	Whether all BRC/BEC clauses accepted ?	Yes / No
7.0	Whether confirmed to offer the equipment for Pre-despatch/shipment Inspection & testing?	Yes / No
7.1	Whether Pre-despatch/shipment inspection & testing charges applicable?	Yes / No
7.2	If Pre-despatch/shipment inspection & testing charges applicable, whether quoted separately on lumpsum basis?	Yes / No
7.3.	Whether confirmed to carry out Installation & Commissioning of the equipment at Duliajan (Assam) ?	Yes / No
7.4	Whether Installation & Commissioning charge applicable?	Yes / No
7.5	If Installation/ Commissioning and Training charges applicable, whether separately quoted on lumpsum basis?	Yes / No
7.6	Whether to & fro air fares, boarding/lodging of the commissioning personnel at Duliajan , Assam(India) included in the quoted charges ?	Yes / No
7.7	Whether confirmed that all Service, Income, Corporate tax etc. applicable under Installation/ Commissioning are included in the prices quoted ?	Yes / No
8.0	Whether Integrity Pact exactly as per format enclosed with digital signature uploaded and all clauses of the pact has been accepted ?	Yes / No
9.0	Whether prices of DGMS approved items quoted separately ?	Yes/No
10.0	Whether AMC charges yearwise have been indicated ?	Yes/No

Offer reference	
Name of the Bidder	