

Bid Document

Bid Details	
Bid End Date/Time	02-09-2021 09:00:00
Bid Opening Date/Time	02-09-2021 09:30:00
Bid Life Cycle (From Publish Date)	90 (Days)
Bid Offer Validity (From End Date)	65 (Days)
Ministry/State Name	Ministry Of Petroleum And Natural Gas
Department Name	Oil India Limited
Organisation Name	Oil India Limited
Office Name	Oil India Limited
Total Quantity	2
Item Category	Surface Production Facility (SPF) for initial production and testing of newly drilled wells
MSE Exemption for Years of Experience and Turnover	No
Startup Exemption for Years of Experience and Turnover	No
Document required from seller	Certificate (Requested in ATC),Additional Doc 1 (Requested in ATC),Additional Doc 2 (Requested in ATC),Additional Doc 3 (Requested in ATC),Additional Doc 4 (Requested in ATC),Compliance of BoQ specification and supporting document *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Bid to RA enabled	No
Time allowed for Technical Clarifications during technical evaluation	5 Days
Inspection Required (By Empanelled Inspection Authority / Agencies pre-registered with GeM)	Yes
Inspection to be carried out by Buyers own empanelled agency	Yes
Type Of Inspection	Stage-wise Inspection
Name of the Empanelled Inspection Agency/ Authority	Board of Officers
Evaluation Method	Total value wise evaluation

EMD Detail

Required	No
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ePBG Detail

Advisory Bank	HDFC Bank
ePBG Percentage(%)	3.00
Duration of ePBG required (Months).	17

(a). EMD & Performance security should be in favour of Beneficiary, wherever it is applicable.

Beneficiary:

GM MATERIALS (HOD)

Bank Name :HDFC BANK LIMITED Branch Name :Duliajan Bank Account No.:21182320000016 Type of Account :Current Account IFSC Code :HDFC0002118 MICR Code :786240302 SWIFT Code :HDFCINBBCAL The Bank Guarantee issued by the Bank must be routed through SFMS platform as per following details: (i) MT 760 / MT 760 COV for issuance of Bank Guarantee (ii) MT 760 / MT 767 COV for amendment of Bank Guarantee The above message / intimation shall be sent through SFMS by the BG issuing Bank branch to HDFC Bank, Duliajan Branch, IFS Code – HDFC0002118; SWIFT Code - HDFCINBBCAL. Branch Address: HDFC Bank Limited, Duliajan Branch, Utopia Complex, BOC Gate, Jayanagar, Duliajan, Dibrugarh, PIN – 786602. The vendor shall submit to OIL the copy of the SFMS message as sent by the issuing bank branch along with the original bank guarantee (Amrit Loushon Bora)

Splitting

Bid splitting not applied.

MII Purchase Preference

MII Purchase Preference	Yes
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MSE Purchase Preference

MSE Purchase Preference	Yes
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1. Preference to Make In India products (For bids < 200 Crore):Preference shall be given to Class 1 local supplier as defined in public procurement (Preference to Make in India), Order 2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. The minimum local content to qualify as a Class 1 local supplier is denoted in the bid document. If the bidder wants to avail the Purchase preference, the bidder must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which no purchase preference shall be granted. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in -India) order 2017 dated 04.06.2020. Only Class-I and Class-II Local suppliers as per MII order dated 4.6.2020 will be eligible to bid. Non - Local suppliers as per MII order dated 04.06.2020 are not eligible to participate. However, eligible micro and small enterprises will be allowed to participate .In case Buyer has selected Purchase preference to Micro and Small Enterprises clause in the bid, the same will get precedence over this clause.

2. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned

Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% (Selected by Buyer) of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 100%(selected by Buyer) percentage of total QUANTITY.

3. Inspection of Stores by Nominated Inspection Authority / Agency of buyer or their authorized representatives

An independent third party Professional Inspection Body can help buyer in mitigating buyer's risk with pre-dispatch/post-dispatch inspection in order to ensure that equipment, components, solutions and documentation conform to contractual requirements. The buyer has a right to inspect goods in reasonable manner and within reasonable time at any reasonable place as indicated in contract. Inspection Fee/ Charges (as pre-greed between buyer and Inspection Agency) would be borne by the buyer as per their internal arrangement but may be recovered from the seller if the consignment failed to conform to contractual specification and got rejected by the Inspection Officer. If so requested and accepted by the seller, initially seller may pay for inspection charges as applicable and get the same reimbursed from buyer if consignment accepted by the Inspecting Officer. For reimbursement seller has to submit proof of payment to Inspection Agency.

Seller/OEM shall send a notice in writing / e-mail to the Inspecting officer / inspection agency specifying the place of inspection as per contract and the Inspecting officer shall on receipt of such notice notify to the seller the date and time when the stores would be inspected. The seller shall, at his own expenses, afford to the Inspecting officer, all reasonable facilities as may be necessary for satisfying himself that the stores are being and or have been manufactured in accordance with the technical particulars governing the supply. The decision of the purchaser representative /inspection authority regarding acceptance / rejection of consignment shall be final and binding on the seller.

The Seller shall provide, without any extra charge, all materials, tools, labour and assistance of every kind which the Inspecting officer may demand of him for any test, and examination, other than special or independent test, which he shall require to be made on the seller's premises and the seller shall bear and pay all costs attendant thereon.

The seller shall also provide and deliver store / sample from consignment under inspection free of charge at any such place other than his premises as the Inspecting officer may specify for acceptance tests for which seller/OEM does not have the facilities or for special/ independent tests.

In the event of rejection of stores or any part thereof by the Inspecting officer basis testing outside owing to lack of test facility at sellers premises, the seller shall, on demand, pay to the buyer the costs incurred in the inspection and/or test. Cost of test shall be assessed at the rate charged by the Laboratory to private persons for similar work.

Inspector shall have the right to put all the stores or materials forming part of the same or any part thereof to such tests as he may like fit and proper as per QAP/governing specification. The seller shall not be entitled to object on any ground whatsoever to the method of testing adopted by the Inspecting officer.

Unless otherwise provided for in the contract, the quantity of the stores or materials expended in test will be borne by seller.

Inspecting officer is the Final Authority to Certify Performance / accept the consignment. The Inspecting officer's decision as regards the rejection shall be final and binding on the seller.

The seller shall if so required at his own expense shall mark or permit the Inspecting officer to mark all the approved stores with a recognised Government or purchaser's mark.

Surface Production Facility (SPF) For Initial Production And Testing Of Newly Drilled Wells (2 pieces)

(Minimum 50% Local content required for MII compliance)

Brand Type	Unbranded
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Technical Specifications

Buyer Specification Document	Download
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Installation Commissioning and Testing (ICT) details for the above item:

% of Product Cost Payable on Product Delivery	80%
Min Cost Allocation for ICT as a % of product cost	20%
Number of days allowed for ICT after site readiness communication to seller	90 Days

Consignees/Reporting Officer and Quantity

S.No.	Consignee/Reporting Officer	Address	Quantity	Delivery Days
1	DIPANKAR PATHAK	786602,Oil India Limited, Duliajan, Assam	2	300

Buyer added Bid Specific Additional Scope of Work

S.No.	Document Title	Description	Applicable i.r.o. Items
1	BEC/BRC & General Notes View	BEC/BRC (Annexure- VI) & General Notes (Annexure-VIII)	Surface Production Facility (SPF) For Initial Production And Testing Of Newly Drilled Wells(2)

The uploaded document only contains Buyer specific Additional Scope of Work and / or Drawings for the bid items added with due approval of Buyer's competent authority. Buyer has certified that these additional scope and drawings are generalized and would not lead to any restrictive bidding.

Buyer Added Bid Specific Additional Terms and Conditions

- Actual delivery (and Installation & Commissioning (if covered in scope of supply)) is to be done at following address OIL INDIA LIMITED DULIAJAN (ACTUAL COMMISSIONING WILL BE IN SITES) (SITES ARE WITHIN 70 KM RADIUS IN AND AROUND DULIAJAN) DIBRUGARH ASSAM, INDIA, 786602.
- Bidder financial standing:** The bidder should not be under liquidation, court receivership or similar proceedings, should not be bankrupt. Bidder to upload undertaking to this effect with bid.
- Bidder shall submit the following documents along with their bid for Vendor Code Creation:
 - Copy of PAN Card.
 - Copy of GSTIN.
 - Copy of Cancelled Cheque.

d. Copy of EFT Mandate duly certified by Bank.

4. Buyer Organization specific Integrity Pact shall have to be complied by all bidders. Bidders shall have to upload scanned copy of signed integrity pact as per Buyer organizations policy along with bid. [Click here to view the file](#)
5. Installation, Commissioning, Testing, Configuration, Training (if any - which ever is applicable as per scope of supply) is to be carried out by OEM / OEM Certified resource or OEM authorised Reseller.
6. OPTION CLAUSE: The Purchaser reserves the right to increase or decrease the quantity to be ordered up to 25 percent of bid quantity at the time of placement of contract. The purchaser also reserves the right to increase the ordered quantity by up to 25% of the contracted quantity during the currency of the contract at the contracted rates. Bidders are bound to accept the orders accordingly.
7. Supplier shall ensure that the Invoice is raised in the name of Consignee with GSTIN of Consignee only.
8. The buyer organization is an institution eligible for concessional rates of GST as notified by the Government of India. The goods for which bids have been invited fall under classification of GST concession and the conditions for eligibility of concession are met by the institution. A certificate to this effect will be issued by Buyer to the Seller after award of the Contract. Sellers are requested to submit their bids after accounting for the Concessional rate of GST.
Applicable Concessional rate of GST : 5%
Notification No.and date : 3/2017 dated 28/06/2017
9. While generating invoice in GeM portal, the seller must upload scanned copy of GST invoice and the screenshot of GST portal confirming payment of GST.
10. Whereever Essentiality Certificate is applicable (PEL/ML), successful bidder should provide Proforma Invoice for processeing for EC application and material should be dispatche after receiving of EC rom DGH. In view of the same, an ATC may be incorporated in GeM, viz, "BIDDER/OEM must provide Proforma Invoice for processeing for EC application within 265 days from date of issue of GeM Contract and material should be dispatche after receiving of EC rom DGH."
11. Scope of supply (Bid price to include all cost components) : Supply Installation Testing Commissioning of Goods and Training of operators and providing Statutory Clearances required (if any)
12. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for percentage of 100% of total value.
13. Purchase Preference linked with Local Content (PP-LC) Policy:

The bid clause regarding "Preference to Make In India products" stands modified in this bid and shall be governed by the PPLC Policy No. FP-20013/2/2017-FP-PNG dated 17.11.2020 issued by MoP&NG as amended up to date. Accordingly, bidders with Local Content less than or equal to 20% will be treated as "Non Local Supplier". The prescribed LC shall be applicable on the date of Bid opening. Sanctions on the bidders for false / wrong declaration or not fulfilling the Local Content requirement shall be as per the PPLC policy. Further following additional provisions are added in the certification and verification of local content provision of the Preference to Make in India clause:

- i. In case of foreign bidder, certificate from the statutory auditor or cost auditor of their own office or subsidiary in India giving the percentage of local content is also acceptable. In case office or subsidiary in India does not exist or Indian office/subsidiary is not required to appoint statutory auditor or cost auditor, certificate from practicing cost accountant or practicing chartered accountant giving the percentage of local content is also acceptable.
- ii. Along with Each Invoice: The local content certificate (issued by statutory auditor on behalf of procuring company) shall be submitted along with each invoice raised. However, the % of local content may vary with each invoice while maintaining the overall % of local content for the total work/purchase of the pro-rata local content requirement. In case, it is not satisfied cumulatively in the invoices raised up to that stage, the supplier shall indicate how the local content requirement would be met in the subsequent stages.
- iii. The bidder shall submit an undertaking from the authorized signatory of bidder having the Power of

Attorney along with the bid stating the bidder meets the mandatory minimum LC requirement and such undertaking shall become a part of the contract.

14. Bidder's offer is liable to be rejected if they don't upload any of the certificates / documents sought in the Bid document, ATC and Corrigendum if any.
15. Warranty period of the supplied products shall be 1 years from the date of final acceptance of goods or after completion of installation, commissioning & testing of goods (if included in the scope of supply), at consignee location. OEM Warranty certificates must be submitted by Successful Bidder at the time of delivery of Goods. The seller should guarantee the rectification of goods in case of any break down during the guarantee period. Seller should have well established Installation, Commissioning, Training, Troubleshooting and Maintenance Service group in INDIA for attending the after sales service. Details of Service Centres near consignee destinations are to be uploaded along with the bid.

Disclaimer

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization. Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specification and / or terms and conditions governing the bid. Any clause incorporated by the Buyer such as demanding Tender Sample, incorporating any clause against the MSME policy and Preference to make in India Policy, mandating any Brand names or Foreign Certification, changing the default time period for Acceptance of material or payment timeline governed by OM of Department of Expenditure shall be null and void and would not be considered part of bid. Further any reference of conditions published on any external site or reference to external documents / clauses shall also be null and void. If any seller has any objection / grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

[This Bid is also governed by the General Terms and Conditions.](#)

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws.

---Thank You---

SPECIFICATIONS, SCOPE OF WORK, BID REJECTION/EVALUATION CRITERIA

Annexure I:	Broad Specification of SPF
Annexure II (a):	Instrumentation System
Annexure II (b):	Instrumentation System-List of items
Annexure III (a):	Electrical System
Annexure III (b):	Electrical System-SLD
Annexure III(c):	Electrical System-PCR Layout Diagram
Annexure III (d):	Electrical System-List of items
Annexure IV:	Process Flow Diagram & Plan Layout
Annexure V:	Special Terms & Conditions
Annexure VI:	Bid Rejection/Evaluation Criteria
Annexure VII:	Tentative Bill of Materials
Annexure VIII:	General Notes to bidders

A) SPECIFICATIONS & SCOPE OF WORK

Design, supply, installation and commissioning of portable Surface Production Facility (SPF) for initial production and testing of newly drilled wells

General Description:

1. **Capacity:** Maximum liquid flow rate: 600 KLPD (3774 BPD)
Maximum gas flow rate: 300,000 SCUMD (10.80 MMSCUFD)
2. **Major Components:** The SPF will consist of the following major components apart from others:
 - A. 5-point Manifold (1 no.)**
 - B. Indirect Bath Heater (1 no.)**
 - C. Separators:**
 - i) High Pressure Separators
 - a) Group Unit (1 no.)
 - b) Test Unit (1 no.)
 - c) High Pressure Master Separator (1 no.)
 - ii) Low Pressure Separator – Surge Tank (1 no.)
 - D. Tanks:**
 - i) Crude Oil Tanks (6 nos.)
 - ii) Fire Water Tanks (2 nos.)
 - iii) Water Sintex Tank (1 no.)
 - E. Pumps:**
 - i) EMD Bowser Loading Pumps (2 nos.)
 - ii) DED Fire Water Pump (1 no.)
 - iii) EMD Hot water circulation pump (2 nos.)
 - iv) EMD Oil Transfer Pump (1 no.)
 - F. Huts:**
 - i) Lab Cabin cum Material Store (1 no.)
 - ii) Security hut (1 no.)
 - iii) Crew Hut cum Control Room (1 no.)
 - G. DED Generating Set (2 nos.)**
 - H. EMD Air Compressor (2 nos.)**
 - I. Fire Safety Equipment**
 - i) Fire Extinguisher, DCP (14 nos.)
 - ii) Fire Extinguisher, CO₂ (5 nos.)
 - iii) Portable Fire water monitors (4 nos.)
 - iv) Fire Fighting Delivery Hoses (1 no.)
 - v) Ring line
 - vi) Fire Siren (Electrical – 1 no. & Manual – 1 no.)
 - vii) Wind Sock (1 no.)
 - J. Other equipment**
 - i) Bowser loading system
 - ii) Horizontal Flare stack (1 no.)
 - iii) Oil Diverter Manifold (1 no.)
 - iv) Choke Manifold (1 no.)
 - v) Pipe and pipe rack
 - vi) Flow lines & Unions
 - K. Instrumentation and Control System**
 - L. Electrical Power Control Room: Refer to Annexure – III (a, b, c & d)**

3. Well Fluid properties: The likely range of characteristics of the well fluid to be tested and produced in the SPF:

a) API gravity of oil: 16 Deg – 45 Deg (approx.)

b) Water specific gravity: 1.02-1.08

c) Gas gravity: 0.65-0.80 (Air=1)

d) Inlet Gas Composition:

	Component	Percentage by volume
I.	Methane	86.0 - 95.5
II.	Ethane	2.7 - 6.4
III.	Propane	0.6 - 3.1
IV.	Butane	0.2 - 1.5
V.	Pentane + Hexane	0.3 - 0.6
VI.	Nitrogen	0.4 - 0.5
VII.	Carbon-dioxide	2.0 - 0.2

e) Pour Point of oil: maximum 36 Deg C.

f) Wax(Paraffin) content: 15% maximum by volume

g) Sand/solid/silt content: There may be a very small amount of sand/silt/drilling fluids content in the well stream. Particle size: 20 to 300 micron.

A. **FIVE (5) POINT MANIFOLD**: A skid mounted, high pressure (5000 psi) five (5) point manifold, comprising of Main Header, Test Header, Gate Valves, Isolating Plug Valves and Check Valves as per generalized drawing below is to be provided. Instruments to be fitted on manifold are described in Annexure II (a).

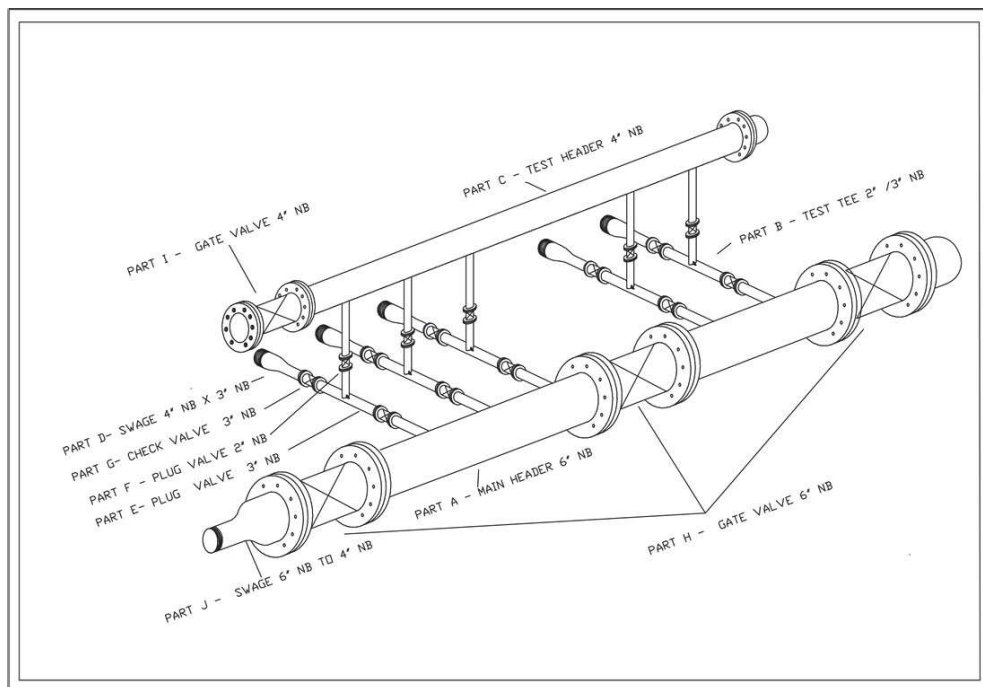


Fig: 5 - Point Manifold

1. **MAIN HEADER**:

i) Main Header of 6-inch OD seamless API 5L PSL1 grade pipe.

ii) Both sides of the header shall be welded with RTJ 900 class weld neck flange. Suitable weld neck type companion flange with 6" X 4" swage shall be supplied for one side of the main header and other side shall be plugged by a blind flange. All flanges shall be as per ASME B 16.5, pressure class 900. Requisite nos. of ring gasket & stud/nuts shall be supplied.

iii) 3 nos. of 6-inch Gate Valves as depicted in the above figure.

2. TEST HEADER:

- i) Test header of 4-inch OD seamless pipe as per API 5L PSL1 grade.
- ii) Both sides of the test header shall be welded to RTJ 900 class weld neck type Flange. Suitable weld neck type companion flange shall be supplied for one side of the test header and other side shall be plugged by a blind flange. All flanges shall be as per ASME B16.5, pressure class 900. Requisite nos. of ring gasket & stud/nuts shall be supplied.
- iii) 1 no. of 4-inch Gate Valve as depicted in the above figure.

3. PLUG VALVES:

- i) Regular Pattern 3-inch (5 nos.) and 2-inch (5 nos.) Plug valves, 900 class, API 6D Monogrammed, fire safe to API 6FA, Cast Steel, Pressure Balanced type, hyper seal, Gear operated, along with a pair of Forged companion flanges with requisite quantity High Tensile Stud Nuts & gaskets.
- ii) Features: Pressure balanced construction (Protected balance type), hyper seal and renewable seat with online valve sealant injection facility, bolted cover with metal gasket, anti-blow-out and threaded stem with online emergency packing injection facility.

4. CHECK VALVES:

- i) Cast carbon steel 76mm (3-inch) nominal dia. (5 nos.) 900 class Swing check valve as per API 6D (latest edition) with regular port, body and cast steel cover conforming to ASTM A216 grade WCB with disc of 13% and body seat ring. The ends should have RTJ flanges in accordance with ASME B16.5 complete with companion flange as per ASME B16.5 accompanied by studs, bolts, nuts and RTJ gaskets.

5. GATE VALVES:

Gate valve, cast carbon steel, 4-inch (1 no.) and 6 inch (3 nos.), 900 class, manufactured as per API standard 600, API monogrammed, regular bore type, rising stem, bolted bonnet, outside yoke, integrally cast flexible wedge gate, end flange having serrated raised face drilled in accordance with ASME B16.5, face to face dimension as per ASME B16.10 & tested as per API Standard 598, complete with companion flange in both sides and requisite Nos. of studs & nuts and RTJ gaskets.

6. INLET CONNECTION:

For connecting the wells to each of the five points of manifold, 3-inch X 4-inch swage with ASME 900 class flange (4-inch) to be provided.

B. INDIRECT BATH HEATER:

- (1) Skid mounted Direct Fired Water Bath Heater of heating capacity 0.88×10^6 watts (3.0 MM BTU/HR.) –
 - a. Double coil (4”), 8 pass per coil for heating process crude feed to Test and Group Separator individually.
 - b. Provision for taking hot water feed from heater shell for closed circuit circulation of hot water to storage tank heating coil with the help of circulating pump.
- (2) The heater shall be equipped with flame arrestor and burner management system for firing the burner either with diesel or natural gas.
- (3) The Heater shall be equipped with hot water circulating manifold for circulating hot water to heating coil of storage tanks. Design basis of manifold as per heater shell. Shall be provided with all inlet, outlet, NRV valves and FLP motor driven hot water circulating pump.
- (4) The heater shall be equipped with adequate inlet outlet and bypass valves to isolate the heater from the process system.
- (5) The indirect bath heater and all hot water circulating lines should be heat insulated.
- (6) Instruments to be fitted on indirect bath heater are described in Annexure II (a).

B.1 PURPOSE OF THE HEATER

- A. For heating maximum 5000 BBLS/Day of process fluid feed to Group Unit and Test Unit separately through 2 nos. of process-coil (4" dia) so as to maintain a constant temperature of about 65 degree centigrade in the process fluid.
- B. For heating the crude in storage tank (total tank volume = 37.37 Kls x 6 nos.) by circulating hot water through heating coil of storage tank. The feed for the hot water circulation to be taken from the water bath of the heater and the circulation system to be in closed circuit, without any loss of hot water, by circulating pump. Desired temperature to be maintained in storage tank is 45 deg Centigrade.

B.2 SERVICE CONDITION:

- i. Fluid to be handled:
 - a. In the Coil: Process fluid
 - b. Heater Shell: Water -100%
- ii. Sufficient to Maintain temperature of process fluid @ 65-degree C
- iii. Heater Configuration: Horizontal
- iv. Shell Operating Pressure: Water fill-up.
- v. Water bath temperature: 80-100 Deg. C
- vi. Design Temperature: 120 °C
- vii. Coil Operating Pressure: 105 KG/cm²
- viii. Corrosion allowance:
 - 3 mm on Bath side.
 - 3 mm on Coil process line.
 - 1.6 mm on Piping

B.3 APPLICABLE STANDARDS FOR MATERIAL OF CONSTRUCTION & FABRICATION:

- i. Fire Tube: Seamless Carbon Steel Pipe as per ASTM A106 Gr. B Standard
- ii. Fire Stack/ Chimney: IS 2062 Gr. B / SA106 Gr. B
- iii. Process Coil Pipe & return bend: Seamless Carbon Steel Pipe as per ASTM A106 Gr. B
- iv. Shell Body: As per IS 2062 Gr. B Standard
- v. Flange: As per ASTM 105
- vi. Fasteners: As per IS 1364 / ASTM A 307 Standard (For non-pressure parts)
- vii. Studs & Nuts: As per ASTM A193 Gr. B7 & ASTM A194 Gr. 2H Standard
- viii. Welding: As per ASME Section IX.
- ix. Design, fabrication & Shop testing: As per API Spec 12K
- x. Hot Water Headers: As per shell body standard.
- xi. Design Temperature: 120^o C
- xii. All valves at the heater inlet, outlet and bypass shall be 4" x 900 class plug valves as per API 6D.

B.4 SHELL:

- i. The shell must have adequate nozzles for inlet, outlet of coils, fire tube, chimney and mountings, various equipment & instruments, dual fuel burner management system, drain valves etc. along with additional requirement of Hot water suction and discharge nipples from shell body.
- ii. The Indirect Heater shell will have suitable lifting lugs attached for lifting and placing the same at site.
- iii. The Indirect Heater shell will have Two (2) nos. plates to be welded with 3/4" studs with nuts (1 each at one of the legs and the vessel) for electrical earthing.
- iv. Indirect Heater should have arrangement for auto water filling so that it maintains the constant water level in shell.
- v. The heater body and piping shall be thermally insulated by rock wool (Density 120) and aluminium sheet (20 gauges) covered with tight sealing, to prevent heat loss and external insertion of water and foreign elements.

B.5 COILS (SEAMLESS):

- i. No. of Coil: 2 (two) sets (8 pass per coil)
- ii. Coil size: 4 inch (101.6mm) NB x (Schedule 80/XS) for both straight pipe & return bends.
- iii. Coil Material: Seamless pipe as per API-5L Gr. B, ASTM A106 Gr. B.
- iv. Coil Operating Pressure: Max: 105 kg/cm² (1500 psig)
- v. Coil Hydraulic Test Pressure: 1.5 times the maximum working pressure
- vi. Radiography of weld joints of Coil bundle: 100 %

B.5.1 COIL END CONNECTION:

- i. Coil End: Flanged, 4"(101.6 mm NB) x 900 class RTJ, conforming to ASME B16.5.
- ii. Companion Flange: The Indirect Heater shall be complete with bevel ended companion flanges conforming to ASME B16.5, ring joint gasket and required Nos. of high tensile studs-nuts as per ASTM A193 Gr. B-7, ASTM A194 Gr. 2H respectively.

B.6 FIRE TUBE & CHIMNEY/ FIRE STACK:

a) FIRE TUBE:

- i. MOC of Fire Tube: Seamless Carbon Steel Pipe as per ASTM A106 Gr. B Standard
- ii. Post and pre-heat treatment of the fire tubes should be carried out as per ASME section VIII.
- iii. Welding: As per ASME Section IX.
- iv. Flanges should be fabricated out of Boiler quality plates.
- v. Fire tubes should be hydraulically tested as per API standard, 12K.
- vi. All welded joints of the fire tube are to be 100% Radiographed & stress relieved.
- vii. No welding joint is acceptable for straight segment of fire tube. Welding joints are acceptable only in the U-portion of fire tube.
- viii. The fire tube should be designed according to the burner.

b) CHIMNEY/ FIRE STACK:

01 One) no. of Chimney, which should be designed according to the burner, with proper heat resistant industrial insulations up to 2/3rd of the height of the chimney.

B.7 BURNER & ACCESSORIES:

BURNER DETAILS:

• Type	: Force Draught, dual-block, Burner
• Total Heat Capacity	: 3 MM Btu/hr / 7.5 Lac Kcal/hr
• Fuel	: Both HSD and Natural Gas
• Ignition System	: Auto Ignition
• Efficiency	: 70 % (minimum)
• Calorific value of Natural Gas	: 8500 KCAL/SCM
• Power Voltage	: 415 V
• Control Voltage	: 230 V
• Frequency	: 50 Hz

- A. BURNER:** One Dual-Block Burner, two stages progressive without Preheated Air inlet for fuel combustion, forced draught, suitable for operating with both HSD and Natural Gas, with modulating setting, with separate supplies, fully automatic, made up of:

- Air damper for air setting with variable profile cam controlled by air servomotor.
- Variable geometry combustion head that can be set according the required output.
- Minimum air pressure switch.
- Electrical interface box with ignition transformer inside.
- UV Photocell for flame detection.

- Safety nozzle valve.
- Valves group with safety oil valves.
- Oil capacity regulator controlled by air servomotor linkage.
- Maximum oil pressure switch on the return circuit.
- Pressure gauge on delivery and return circuit.
- Maximum gas pressure switch.
- Gas pressure test point to the combustion head.
- IP54 protection level.

B. BURNER MANAGEMENT SYSTEM (BMS) - Control Panel for safe operation of the burner (Safe Area).

C. AIR SUPPLY: Two (1Working + 1 Standby) Forced Draught (FD) Fan with drive motor assembly to feed Fresh Air to Burner for combustion of fuel. FD Fan to be supplied with Multivane manual operated Damper at inlet to control fresh air feed to burner. (Motor is Zone 2 Gr IIA/IIB, T3).

D. FUEL SUPPLY (HSD): One Fuel Oil Pumping skid, required to maintain required pressure in burner, flow, return flow from burner to ensure proper combustion & better efficiency. The skid comes with below equipment's mounted on & preassembled:

- ✓ 2 Nos. (1W + 1S) fuel oil pump with circulation from day tank to Burner
- ✓ Automatic back pressure relief valve.
- ✓ All valves, filters, interconnecting pipeline, etc.
- ✓ All instrumentation like pressure switch, temperature control, etc.

E. One HSD Day Tank of capacity adequate for minimum 24 hours operation with required instruments. Constructed from IS 2062 Plates with required supports.

- ✓ Mechanical Level Gauge
- ✓ Level Switch (ATEX certified)

F. FUEL SUPPLY (NATURAL GAS): Fuel Scrubber

Scrubber with high efficiency wire mesh type mist extractor of adequate size to cater Fuel & Servo Gas Flow requirement shall be used for supplying liquid free fuel to the burner and servo gas to the pneumatic instruments.

The scrubber shall be equipped with

- ✓ Pressure indicator with isolating valve.
- ✓ Drain connection with isolation valve
- ✓ Sight glass/level gauges with gauge cocks
- ✓ Safety Relief valve- 2 Nos. (set at 33 kg/cm²)
- ✓ Operating pressure of 30 kg/sq cm
- ✓ Hydraulic Test Pressure: 1.5 times the maximum working pressure i.e. 45 kg/cm² (640 psig)
- ✓ Main Fuel Gas Regulator:
 - a) Input Supply: 30 Kg/Sq.cm
 - b) Output: As per burner design
 - c) Type: Spring Loaded
 - d) Make: Invalco / Samson/ Fisher/ Kimray

- G. CONTROL:** An Interlock to be provided, installed, and wired on activation of the heater / combustion safety & shutdown controls. These controls shall include

Sr. No	CONTROL & SAFETY DESCRIPTION	INTERLOCK
1	Hot Water Temperature	Firing Modulation
2	Hot Water Temperature High	Firing Trip
3	Level Low / High – Heater	Firing Trip
4	Level Low / High – Tank	Firing Trip
5	Burner Flame Failure	Firing Trip
6	HSD Pressure Low	Firing Trip
7	Level High / Low – Tank	Fuel Pump Trip

B.8 INSTRUMENTS TO BE MOUNTED ON SHELL AND PROCESS COIL:

The Equipment shall be equipped with all Instrumentation and control gears, mounting & Accessories as per design requirements for safe and effective control of Functions. Among the others, the following mounting shall be essentially fitted:

- i. Temperature Gauges with Thermo-well on shell and process coils outlet
- ii. Temperature transmitter on shell and process coils outlet
- iii. Level Gauge
- iv. Burner Management System
- v. Liquid level & Temperature switch for BMS
- vi. Pressure Gauges on process coils inlets & outlets
- vii. Level Transmitter for water level
- viii. Water Filling Float Valve

C. SEPARATORS

C.1.1 HIGH PRESSURE SEPARATORS: The SPF should be equipped with three (3) skid mounted high pressure separators. The separators must conform to API specification 12J, ASME section VIII, Div-I, and must be complete with all mountings, accessories, piping and valves-all unitized and protected suitably and mounted on a robust oilfield type skid for portability. All instruments to be fitted on the separators are described in Annexure II (a). The separators are described below:

C.1.2 GROUP UNIT

C.1.2.1 The Group Unit is to be designed and manufactured to meet the following service requirement:

- a. To separate liquid (Oil & Water) and gas efficiently from the well stream.
- b. To arrest 99% entrained liquid particles from the separated gas.
- c. To measure and record the gas flow rate of the separated gas.
- d. Suitable provision to take liquid and gas samples for analysis.

C.1.2.2 SEPARATOR SIZING PARAMETERS: The Group Unit is to be sized to suit the following service condition:

- a. Separator Configuration: The Group Unit should be horizontal, cylindrical shell type having dished end.

- b. Operating Pressure & Temperature: The separator is to be sized for the following operating conditions:
 - i) Design pressure: 720 psi (50 Kg/Sq. Cm)
 - ii) Operating temperature: 30 Deg C to 45 Deg C
 - iii) Design Temperature: 100 Deg C
 - iv) Hydraulic testing of the vessel and unit: 1080 Psi (75 Kg/Sq. Cm)
- c. Handling Capacity:
 - Liquid Handling Capacity: 600 KLPD (3774 BPD)
 - Gas Handling Capacity: 3,00,000 SCUMD (10.80 MMSCFD)
- d. Water content in liquid: 0% - 90%

C.1.2.3 SCOPE OF WORK: Scope of works includes design, fabrication, packaging, testing & supply of the separator package. Details of the same are as under:

- I. Design of the vessel to be done to meet the duty conditions and separation of gas liquid specified under Point No C.1.1.1 & C.1.1.2 above.
- II. Mechanical Design & Fabrication of the vessel/separator unit: The separator, piping and valves must be designed and fabricated considering the following parameters in addition to the parameters given in Point No C.1.1.1 & C.1.1.2 above.
 - a) Shell Body diameter- diameter of the vessel should be between 1 to 1.5 meters.
 - b) Corrosion Allowance: 6 mm (1/4") minimum
 - c) Dished end shall be pressed and spun in dished end spinning machine.
 - d) The shell plate thickness should not be less than 32 mm.
 - e) Material of Construction:
 - i) Separator Shell: SA 516 Gr. 70
 - ii) Flanges: ASTM A 105, Conforming to ASME B 16.5
 - iii) Nozzles: SA 106 Gr. B
 - iv) Pipes: SA 106 Gr. B
 - v) Screwed Fittings: ASTM A 105 Gr. B
 - vi) Welded Fittings: ASTM A 234 Gr. WBP
 - vii) Studs: ASTM A 193 Gr. B 7
 - viii) Nuts: ASTM A 194 Gr. 2 H
 - ix) Gasket: Spiral Wound Non-Asbestos as per ASME B16.20
 - x) Instrument Tubing: 316 SS
 - f) All flanged outlet/inlet connections must be rated to ASME 300 Class RF only as per ASME B16.5.
 - g) All coupling connections and other pipe fittings must be rated for 210 Kg/Sq. Cm (3000 PSIG) as per ASME B16.11.
 - h) Radiography: As per requirement of ASME Section VIII.
 - i) Post-Weld heat treatment/stress relieving: Required for the entire vessel /separators.
 - j) ASME U Stamped.
 - k) Design code: ASME Sec. VIII Div. 1.
 - l) Separator should have suitable bypass provision.

C.1.2.4 SEPARATOR INTERNALS: The following internal elements are a minimum requirement for the separator:

- a) Internal Diverter/ Baffles
- b) Liquid settling section: It must have good liquid depth volume
- c) Primary Separation Device / Inlet Separation Section
- d) Secondary Section "Gravity Separation Section"
- e) Float Protector Baffle

C.1.2.5 SEPARATOR CONNECTIONS/NOZZLES:

The vessel must be provided with the following connections to facilitate mounting of liquid level control gear, inlet/outlet piping, valves, gauges etc.

- a) 1 no Inlet
- b) 1 no Gas outlet
- c) 1 no Liquid level control gear
- d) 1 no Liquid outlet
- e) 2 nos. Safety Relief Valves
- f) 1 no Drainage
- g) 1 no Liquid level gauge
- h) 2 nos. Pressure gauge
- i) 1 no Temperature gauge
- j) 1 no Pressure Transmitter
- k) 1 no Level Transmitter
- l) Suitable Manhole with Hinges or Davits for swinging open for internal inspection of the vessel.

C.1.2.6 SEPARATOR MOUNTINGS: The separator is to be equipped with the following mountings:

- a) Fluid inlet should be equipped with API 600, ASME 300 Class Gate Valve at skid limit with companion flange, Spiral Wound Gasket & stud-nuts.
- b) Gas outlet should have suitable ASME 300 Class Flanged RF, Diaphragm operated air to close type back-pressure Control Valve with Pressure Controller, Positioner and Servo Regulator.
Pressure Controller shall be indicating type, upstream control and having pressure element range of 0-50 Kg/Sq. Cm.

The control valve shall have suitable bypass provision. The isolation and bypass Valves shall be of API 600, ASME 300 Class, Flanged RF Gate Valves.

All Gate Valves shall be API 600 monogrammed, regular bore type, rising stem, bolted bonnet, outside yoke, integrally cast flexible wedge gate, end flange having serrated raised face drilled in accordance with ASME B16.5, face to face dimension as per ASME B16.10 & tested as per API Standard 598, complete with companion flange in both sides and requisite Nos. of studs & nuts and RTJ gaskets.

- c) 1 No of Diaphragm operated Liquid Level Control Valve with valve positioner having 100 % of designed liquid dumping capacity. The positioner shall be of same make as that of the control valve for better compatibility.

The liquid level controller shall be either Caged Displacer type or Internal Ball Float Type Level Controller.

The control valve shall have suitable bypass provision. The isolation and bypass Valves shall be of API 600, ASME 300 Class, Flanged RF Gate Valves.

All Gate Valves shall be API 600 monogrammed, regular bore type, rising stem, bolted bonnet, outside yoke, integrally cast flexible wedge gate, end flange having serrated raised face drilled in accordance with ASME B16.5, face to face dimension as per ASME B16.10 & tested as per API Standard 598, complete with companion flange in both sides and requisite Nos. of studs & nuts and RTJ gaskets.

- d) One No. drain valve API 600, ASME 300 Class Gate Valve, RF flanged to be mounted on the nozzle provided on the vessel.
- e) Flow cum pressure recorder for measuring gas production. Both Daniel orifice fitting with a full set of orifice plates and DP Chart Recorder required for gas measurement and also compatible with Flow transmitter as detailed in Point no: C.6 of Annexure-II.
- f) Two nos. of Sampling points 12 mm (1/2" NPT), one for liquid and one for gas complete with needle valve.
- g) Two Nos. of Safety Relief Valve, Rating ASME 300 Class RF, to relief full gas capacity against atmosphere. SRV outlet to be routed to the flare pit.
- h) Two Nos. of Dial Type Pressure Gauge with 150 mm (6") dia. (0 - 60 Kg/Sq. cm).
- i) One - Dial type temperature gauge with 150 mm (6") dia. (0 - 100 Deg C).

- j) One -Reflex type liquid level gauge complete with cocks & glass gauge suitable protected from external damage. Working Pressure: As per Vessel's design pressure.
- k) One set of assorted - Pneumatic lines, regulators etc. as required.
- l) Accessories, Piping & Valves etc.
- m) All accessories and valves companion flanges with stud & nuts should be of ASME 300 class rating.
- n) Mounted with suitable transmitters for pressure and level monitoring from control room.
- o) One no. Exclusive Quick opening closure Door with spare seal.
- p) **Separator Piping:** The separator should be complete with all process piping and accessories installed and connected to the vessel and anchored or rigidly attached to the skid. The inlet and outlet (Oil & Gas) piping are to be taken out and placed at the end of the skid. The ends must be fitted with union half/ flanges, such that these can be easily connected to the field lines at the well site.

C.1.2.7 STRUCTURAL SKID:

a) The unit along with all the mounting and accessories should be placed on a rugged oilfield type skid with adequate working space. Suitable Overhead Platform with Cage Ladder to be provided for servicing/testing of vessel accessories. The top of the skid should be fitted with 3/16" thick chequered plates. Primary member will be adequately cross-braced to prevent flexing or distortion of skid during lifting, transportation and installation. Suitable lifting lugs shall be provided for lifting the unit for transportation.

b) While designing the skid, party should ensure that skid is of sufficiently rugged design. Any bend / deformation during transit / placement of separator at site due to poor workmanship or improper selection of cross beam sizes/ materials, skid will be rejected and in that case vendor shall have to replace the skid without any cost implication.

c) All the inlet and outlet pipes as specified should be terminated at the skid level on the skid- edge.

d) Overall equipment along with skid should not exceed 9.0m (L) x 2.5m (B) x 2.75m (H) for ease of transportation.

e) Skid should be equipped with provisions for Earthing-strip anchoring / fixing.

C.1.2.8 CODE OF PRACTICE AND STANDARDS TO BE FOLLOWED:

The unit should be manufactured conforming to the following code of practices and standard.

- a) Separator: API standard 12J & ASME section VIII, Div. I (Latest Edition)
- b) Piping: ASME B 31.3, Petroleum Refinery Piping
- c) Flanges: ASME B 16.5
- d) Valves: API standard 600
- e) Safety Relief Valves: ASME section VIII, Div-I
- f) Structural: IS 226
- g) Material of construction: As per Point No C.1.1.3 II (e) and above codes.
- h) Welding - As per ASME section IX.

C.1.2.9 ACCESSORIES TO BE PROCURED FROM THE FOLLOWING VENDORS:

- i. Control Valves: Fisher / Invalco / Kimray
- ii. Pneumatic Level Controller- Fisher / Norriseal / Kimray/ V-Automat
- iii. Pneumatic Pressure Controller: Fisher / OMC/ ABB
- iv. Temperature Controller (Thermostatic Valve): Samson/ Brightech/ Kimray
- v. Level Gauge Glass: Pratolina/ Levcon/ Daniel/Chemtrol/ Pune Tectrol
- vi. Safety Relief Valve: Farris/ Crosby / Fisher/ Brightech/ Nirmal
- vii. Temperature & Pressure Gauge: WIKA / ODIN / Murphy/ General Instruments
- viii. Pressure/ Temperature Transmitter: Emerson/ Honeywell/ Yokogawa/ ABB
- ix. Level transmitter: Emerson/ Honeywell/ Yokogawa/ ABB
- x. SS Tubes and fittings: Swagelok, Parker, Sandvik.
- xi. Flow Cum Pressure Recorder: Procon/ Cameron
- xii. Multivariable flow transmitter for gas: Emerson / Yokogawa/ Honeywell/ ABB

C.1.3 TEST SEPERATOR (TEST UNIT):

Technical specifications are identical as **C.1.1 Group Unit**

C.1.4 HIGH PRESSURE MASTER SEPARATOR (HPMS)

C.1.4.1 The HPMS is to be designed and manufactured to meet the following service requirement:

- a. To separate liquid (Oil & Water) and gas efficiently from the well stream.
- b. To arrest 99% entrained liquid particles from the separated gas.
- c. To measure and record the gas flow rate of the separated gas.
- d. Suitable provision to take liquid and gas samples for analysis.

C.1.4.2 SEPARATOR SIZING PARAMETERS: The HPMS vessel is to be sized to suit the following service condition:

- a. Separator Configuration: The HPMS should be vertical, cylindrical shell type having dished end.
- b. Operating Pressure & Temperature: The separator is to be sized for the following operating conditions:
 - i) Design pressure: 720 Psi (50 Kg/Sq. Cm)
 - ii) Operating temperature: 30 Deg C to 45 Deg C
 - iii) Design Temperature: 100 Deg C
 - iv) Hydraulic testing of the vessel and unit: 1080 Psi (75 Kg/Sq. Cm)
- c. Handling Capacity
Liquid Handling Capacity: 45 KLPD
Gas Handling Capacity: 15 MMSCFD
- d. Liquid content in gas: 0% - 1% (considering that 99% liquid particles will be arrested in Group and Test Unit)

C.1.4.3 SCOPE OF WORK: Scope of works includes design, fabrication, packaging, testing & supply of the separator package. Details of the same are as under:

- I. Design of the vessel to be done to meet the duty conditions and separation of gas liquid specified under Point No C.1.3.1 & C.1.3.2 above.
- II. Mechanical Design & Fabrication of the vessel/separator unit: The separator, piping and valves must be designed and fabricated considering the following parameters in addition to the parameters given in Point No C.1.3.1 & C.1.3.2 above.
 - a) Shell Body diameter- diameter of the vessel should be between 1 to 1.5 meters.
 - b) Corrosion Allowance: 6 mm (1/4") minimum
 - c) Dished end shall be pressed and spun in dished end spinning machine.
 - d) The shell plate thickness should not be less than 32 mm.
 - e) Material of Construction:
 - i) Separator Shell: SA 516 Gr. 70
 - ii) Flanges: ASTM A 105, Conforming to ASME B 16.5
 - iii) Nozzles: SA 106 Gr. B
 - iv) Pipes: SA 106 Gr. B
 - v) Screwed Fittings: ASTM A 105 Gr. B
 - vi) Welded Fittings: ASTM A 234 Gr. WBP
 - vii) Studs: ASTM A 193 Gr. B 7
 - viii) Nuts: ASTM A 194 Gr. 2 H
 - ix) Gasket: Spiral Wound Non-Asbestos as per ASME B16.20
 - x) Vane Pack - Radial Type: SS 304
 - xi) Instrument Tubing: 316 SS
 - f) All flanged outlet/inlet connections must be rated to ASME 300 Class RF only as per ASME B16.5.
 - g) All coupling connections and other pipe fittings must be rated for 210 Kg/Sq. Cm (3000 PSIG) as per ASME B16.11.
 - h) Radiography: As per requirement of ASME Section VIII.
 - i) Post-Weld heat treatment/stress relieving: Required for the entire vessel /separators.

- j) ASME U Stamped.
- k) Design Code: ASME Sec. VIII Div. 1.
- l) Separator should have suitable bypass provision.

C.1.4.4 SEPARATOR INTERNALS: The following internal elements are a minimum requirement for the separator:

- a) Internal Diverter/ Baffles
- b) Liquid settling section: It must have good liquid depth volume
- c) Primary Separation Device / Inlet Separation Section
- d) Secondary Section "Gravity Separation Section"
- e) Mist extractor: Vane Pack type to arrest entrained oil/liquid particles from the separated gas up to 10 microns.
- f) Float Protector Baffle

C.1.4.5 SEPARATOR CONNECTIONS/NOZZLES:

The vessel must be provided with the following connections to facilitate mounting of liquid level control gear, inlet/outlet piping, valves, gauges etc.

- a) 1 no Inlet
- b) 1 no Gas outlet
- c) 1 no Liquid level control gear
- d) 1 no Liquid outlet
- e) 2 nos. Safety Relief Valves
- f) 1 no Drainage
- g) 1 no Liquid level gauge
- h) 2 nos. Pressure gauge
- i) 1 no Temperature gauge
- j) 1 no Pressure Transmitter
- k) 1 no Level Transmitter

C.1.4.6 SEPARATOR MOUNTINGS: The separator is to be equipped with the following mountings:

- a) Fluid inlet should be equipped with API 600, ASME 300 Class Gate Valve at skid limit with companion flange, Spiral Wound Gasket & stud-nuts.
- b) Gas outlet should have suitable ASME 300 Class Flanged RF, Diaphragm operated air to close type back-pressure Control Valve with Pressure Controller, Positioner and Servo Regulator.
Pressure Controller shall be indicating type, upstream control and having pressure element range of 0-50 Kg/Sq. Cm.

The control valve shall have suitable bypass provision. The isolation and bypass Valves shall be of API 600, ASME 300 Class, Flanged RF Gate Valves.

All Gate Valves shall be API 600 monogrammed, regular bore type, rising stem, bolted bonnet, outside yoke, integrally cast flexible wedge gate, end flange having serrated raised face drilled in accordance with ASME B16.5, face to face dimension as per ASME B16.10 & tested as per API Standard 598, complete with companion flange in both sides and requisite Nos. of studs & nuts and RTJ gaskets.

- c) 1 No of Diaphragm operated Liquid Level Control Valve with valve positioner having 100 % of designed liquid dumping capacity. The positioner shall be of same make as that of the control valve for better compatibility.
The liquid level controller shall be either Caged Displacer type or Internal Ball Float Type Level Controller.
The control valve shall have suitable bypass provision. The isolation and bypass Valves shall be of API 600, ASME 300 Class, Flanged RF Gate Valves.

All Gate Valves shall be API 600 monogrammed, regular bore type, rising stem, bolted bonnet, outside yoke, integrally cast flexible wedge gate, end flange having serrated raised face drilled in accordance with ASME B16.5, face to face dimension as per ASME B16.10 & tested as per API Standard 598, complete with companion flange in both sides and requisite Nos. of studs & nuts and RTJ gaskets.

- d) One No. drain valve, API 600 Gate Valve, RF flanged, ASME 300 Class to be mounted on the nozzle provided on the vessel.
- e) Flow cum pressure recorder for measuring gas production. Both Daniel orifice fitting with a full set of orifice plates and DP Chart Recorder required for gas measurement and also compatible with Flow transmitter as detailed in Point no: C.6 of Annexure-II.
- f) Two nos. of Sampling points 12 mm (1/2" NPT), one for liquid and one for gas complete with needle valve.
- g) Two Nos. of Safety Relief Valve, Rating ASME 300 Class RF, to relief full gas capacity against atmosphere. SRV outlet to be routed to the flare pit.
- h) Two Nos. of Dial Type Pressure Gauge with 150 mm (6") dia. (0 - 60 Kg/Sq. cm).
- i) One - Dial type temperature gauge with 150 mm (6") dia. (0 - 100 Deg C).
- j) One -Reflex type liquid level gauge complete with cocks & glass gauge suitable protected from external damage. Working Pressure: As per Vessel's design pressure.
- k) One set of assorted - Pneumatic lines, regulators etc. as required.
- l) Accessories, Piping & Valves etc.
- m) All accessories and valves companion flanges with stud & nuts should be of ASME 300 class rating.
- n) Mounted with suitable transmitters for pressure and level monitoring from control room.
- o) **Separator Piping:** The separator should be complete with all process piping and accessories installed and connected to the vessel and anchored or rigidly attached to the skid. The inlet and outlet (Oil & Gas) piping are to be taken out and placed at the end of the skid. The ends must be fitted with union half/ flanges, such that these can be easily connected to the field lines at the well site.

C.1.4.7 STRUCTURAL SKID:

a) The unit along with all the mounting and accessories should be placed on a rugged oilfield type skid with adequate working space. Suitable Overhead Platform with Cage Ladder to be provided for servicing/testing of vessel accessories. The top of the skid should be fitted with 3/16" thick chequered plates. Primary member will be adequately cross-braced to prevent flexing or distortion of skid during lifting, transportation and installation. Suitable lifting lugs shall be provided for lifting the unit for transportation.

For vertical vessels, all mountings should be on one side of the vessel while the other side should have a "Vertical Support member". This will facilitate tilting the vessel by 90 degree to be supported in lying condition on the "vertical support member" which will in turn facilitate easy transportation of the vessel to prevent damage of the separator's connections/ fittings/instruments.

b) While designing the skid, party should ensure that skid is of sufficiently rugged design. Any bend / deformation during transit / placement of separator at site due to poor workmanship or improper selection of cross beam sizes/ materials, skid will be rejected and in that case vendor shall have to replace the skid without any cost implication.

c) All the inlet and outlet pipes as specified should be terminated at the skid level on the skid- edge.

d) Overall equipment along with skid should not exceed 9.0m (L) x 2.5m (B) x 2.75m (H) for ease of transportation. For vertical vessels, it will transport keeping the vessel in horizontal positions, therefore height of the vessel along with skid should not exceed the max length of 9.0 m.

e) Skid should be equipped with provisions for Earthing-strip anchoring / fixing.

C.1.4.8 CODE OF PRACTICE AND STANDARDS TO BE FOLLOWED:

The unit should be manufactured conforming to the following code of practices and standard.

- a) Separator: API standard 12J & ASME section VIII, Div. I (Latest Edition)
- b) Piping: ASME B 31.3, Petroleum Refinery Piping
- c) Flanges: ASME B 16.5

- d) Valves: API standard 600
- e) Safety Relief Valves: ASME section VIII, Div-I
- f) Structural: IS 226
- g) Material of construction: As per Point No C.1.3.3 II (e) and above codes.
- h) Welding - As per ASME section IX.

C.1.4.9 ACCESSORIES TO BE PROCURED FROM THE FOLLOWING VENDORS:

- i. Control Valves: Fisher / Invalco / Kimray
- ii. Pneumatic Level Controller- Fisher / Norriseal / Kimray/ V-Automat
- iii. Pneumatic Pressure Controller: Fisher / OMC/ ABB
- iv. Temperature Controller (Thermostatic Valve): Samson/ Brightech/ Kimray
- v. Level Gauge Glass: Pratolina/ Levcon/ Daniel/Chemtrol/ Pune Tectrol
- vi. Safety Relief Valve: Farris/ Crosby / Fisher/ Brightech/ Nirmal
- vii. Temperature & Pressure Gauge: WIKA / ODIN / Murphy/ General Instruments
- viii. Pressure/ Temperature Transmitter: Emerson/ Honeywell/ Yokogawa/ ABB
- ix. Level transmitter: Emerson/ Honeywell/ Yokogawa/ ABB
- x. SS Tubes and fittings: Swagelok, Parker, Sandvik
- xi. Flow Cum Pressure Recorder: Procon/ Cameron
- xii. Multivariable flow transmitter for gas: Emerson / Yokogawa/ Honeywell/ ABB

C.2 LOW PRESSURE SEPARATORS: The SPF should be equipped with 01 (One) no skid mounted low pressure separator. The separator must conform to API specification 12J, ASME section VIII, Div-I, and must be complete with all mountings, accessories, piping and valves-all unitized and protected suitably and mounted on a robust oilfield type skid for portability. All instruments to be fitted on the separators are described in Annexure II (a). The separator is described below:

C.2.1 SURGE TANK

C.2.1.1 The unit is to be designed and manufactured to meet the following service requirement:

- a. To separate liquid (Oil & Water) and gas efficiently from the well stream.
- b. To arrest 99% entrained liquid particles from the separated gas.
- c. To measure and record the gas flow rate of the separated gas.
- d. Suitable provision to take liquid and gas samples for analysis.

C.2.1.2 SEPARATOR SIZING PARAMETERS: The Surge Tank is to be sized to suit the following service condition:

- a) Separator Configuration: The Surge Tank should be vertical, cylindrical shell type having dual compartment and dished end.
- b) Operating Pressure & Temperature: The separator is to be sized for the following operating conditions:
 - i. Storage capacity : 250 bbls
 - ii. Design pressure : 3.5 kg/cm²
 - iii. Test pressure : 5.25 kg/cm²
 - iv. Working temperature : 30 to 45 deg C
 - v. Design temperature : 80 deg C
 - vi. Gas flow rate : 0.14 MMSCMD
 - vii. Primary objective : Gas-Oil separation
- c) Water content in liquid: 0% - 90%

C.2.1.3 SCOPE OF WORK: Scope of works includes design, fabrication, packaging, testing & supply of the separator package. Details of the same are as under:

- I. Design of the vessel to be done to meet the duty conditions and separation of gas liquid specified under Point No C.2.1.1 & C.2.1.2 above.

- II. Mechanical Design & Fabrication of the vessel/separator unit: The separator, piping and valves must be designed and fabricated considering the following parameters in addition to the parameters given in Point No C.2.1.1 & C.2.1.2 above.

a) Shell Body diameter- Diameter of the vessel should be between 2.0 -2.5 meters.

b) Corrosion Allowance: 3 mm (1/8") minimum

c) Dished end shall be pressed and spun in dished end spinning machine.

d) The plate thickness of the vessel should not be less than 16 mm.

e) Material of Construction:

i) Separator Shell: SA 516 Gr. 70

ii) Flanges: ASTM A 105, Conforming to ASME B 16.5

iii) Nozzles: SA 106 Gr. B

iv) Pipes: SA 106 Gr. B

v) Screwed Fittings: ASTM A 105 Gr. B

vi) Welded Fittings: ASTM A 234 Gr. WBP

vii) Studs: ASTM A 193 Gr. B 7

viii) Nuts: ASTM A 194 Gr. 2 H

ix) Gasket: Spiral Wound Non-Asbestos as per ASME B16.20

x) Instrument Tubing: 316 SS

xi) Union: Fig.602

f) All flanged outlet/inlet connections must be rated to ASME 300 Class RF only as per ASME B16.5.

g) All coupling connections and other pipe fittings must be rated for 210 Kg/Sq. Cm (3000 PSIG) as per ASME B16.11

h) Radiography: As per requirement of ASME Section VIII.

i) Post-Weld heat treatment/stress relieving: Required for the entire vessel /separators.

j) ASME U-Stamped

k) Separator should have suitable bypass provision.

C.2.1.4 SEPARATOR INTERNALS: The following internal elements are a minimum requirement for the separator:

a) Internal Diverter/ Baffles

b) Vortex Breaker

c) Stiffening Rings

C.2.1.5 SEPARATOR CONNECTIONS/NOZZLES:

The surge tank must be provided with the following connections to facilitate mounting of liquid level control gear, inlet/outlet piping, valves, gauges etc.

a) 2 nos Inlet (1 no in each chamber)

b) 1 no Gas outlet (Common for both the chamber)

c) 2 nos Liquid outlet (1 no in each chamber)

d) 1 no drainage valve

e) 2 nos Safety Relief Valve

f) 2 nos Liquid level gauge (1 no in each chamber)

g) 2 nos Pressure gauge

h) 1 no Temperature gauge

i) 1 no Pressure Transmitter

j) 4 nos Sampling Point (2 each/chamber: One for gas & one for liquid)

k) 2 nos Level Transmitter

l) High & Low Level alarm in each chamber

C.2.1.6 SEPARATOR MOUNTINGS:

a) Fluid inlet should be equipped with API 600, ASME 300 Class Gate Valve at skid limit with companion flange, Spiral Wound Gasket & stud-nuts.

b) Fluid outlets should have suitable ASME 300 Class Flanged RF Diaphragm operated Liquid Level Control Valve with valve positioner having 100% of designed liquid dumping

capacity. The positioner shall be of same make as that of the control valve for better compatibility.

The liquid level controller shall be either Caged Displacer type or Internal Ball Float Type Level Controller.

The control valve shall have suitable bypass provision. The isolation and bypass Valves shall be of API 600, ASME 300 Class, Flanged RF Gate Valves.

All Gate Valves shall be API 600 monogrammed, regular bore type, rising stem, bolted bonnet, outside yoke, integrally cast flexible wedge gate, end flange having serrated raised face drilled in accordance with ASME B16.5, face to face dimension as per ASME B16.10 & tested as per API Standard 598, complete with companion flange in both sides and requisite Nos. of studs & nuts and RTJ gaskets.

- c) Gas outlet should have suitable ASME 300 Class Flanged RF, Diaphragm operated air to close type back-pressure Control Valve with Pressure Controller, Positioner and Servo Regulator.

Pressure Controller shall be indicating type, upstream control and having pressure element range of 0-15 Kg/Sq. Cm.

The control valve shall have suitable bypass provision. The isolation and bypass Valves shall be of API 600, ASME 300 Class, Flanged RF Gate Valves.

All Gate Valves shall be API 600 monogrammed, regular bore type, rising stem, bolted bonnet, outside yoke, integrally cast flexible wedge gate, end flange having serrated raised face drilled in accordance with ASME B16.5, face to face dimension as per ASME B16.10 & tested as per API Standard 598, complete with companion flange in both sides and requisite Nos. of studs & nuts and RTJ gaskets.

- d) Two nos. of Pressure gauge with isolation valves. One no in each chamber.
- e) Flow cum pressure recorder for measuring gas flare. Both Daniel orifice fitting with a full set of orifice plates and DP Chart Recorder and also compatible with Flow transmitter as detailed in Point no: C.6 of Annexure-II.
- f) Two nos of Sampling points 12 mm (1/2" NPT), one for liquid and one for gas in each chamber complete with needle valve.
- g) Two Nos. of Safety Relief Valves, Rating ASME 300 Class RF, to relief full gas capacity against atmosphere. SRV outlet to be routed to the flare pit.
- h) Two - Dial type temperature gauge with 150 mm (6") dia. (0 - 100 Deg C). One no in each chamber.
- i) Reflex type liquid level gauge in each chamber complete with cocks & glass gauge suitable protected from external damage. Working Pressure: As per Vessel's design pressure.
- j) One set of assorted - Pneumatic lines, regulators etc. as required.
- k) Accessories, Piping & Valves etc.
- l) All accessories and valves companion flanges with stud & nuts should be of ASME 300 class rating.
- m) High- and low-level alarm in each compartment.
- n) Mounted with suitable transmitters for pressure and level monitoring from control room.
- o) Shock-protected by a frame
- p) ASME U Stamped.
- q) Separator Piping: The separator should be complete with all process piping and accessories installed and connected to the vessel and anchored or rigidly attached to the skid. The inlet and outlet (Oil & Gas) piping are to be taken out and placed at the end of the skid. The ends must be fitted with union half/ flanges, such that these can be easily connected to the field lines at the well site.

C.2.1.7 STRUCTURAL SKID:

- a) The unit along with all the mounting and accessories should be placed on a rugged oilfieldtype skid with adequate working space. Suitable Overhead Platform with Cage Ladder to be provided for servicing/testing of vessel accessories. The top of the skid should be fitted with 3/16" thick chequered plates. Primary member will be adequately cross-braced to prevent flexing or distortion of skid during lifting, transportation and installation. Suitable lifting lugs shall be provided for lifting the unit for transportation.

For vertical vessels, all mountings should be on one side of the vessel while the other side should have a "Vertical Support member". This will facilitate tilting the vessel by 90 deg to be supported in lying condition on the "vertical support member" which will in turn facilitate easy transportation of the vessel to prevent damage of the separator's connections/ fittings/instruments.

b) While designing the skid, party should ensure that skid is of sufficiently rugged design. Any bend / deformation during transit / placement of separator at site due to poor workmanship or improper selection of cross beam sizes/ materials, skid will be rejected and in that case vendor shall have to replace the skid without any cost implication.

c) All the inlet and outlet pipes as specified should be terminated at the skid level on the skid- edge.

d) Overall equipment along with skid should not exceed 9.0m (L) x 2.5m (B) x 2.75m (H) for ease of transportation. For vertical vessels, it will be transported keeping the vessel in horizontal positions, therefore height of the vessel along with skid should not exceed the max length of 9.0 m.

e) Skid should be equipped with provisions for Earthing-strip anchoring / fixing.

C.2.1.8 CODE OF PRACTICE AND STANDARDS TO BE FOLLOWED:

The unit should be manufactured conforming to the following code of practices and standard.

- a) Separator: API standard 12J & ASME section VIII, Div. I (Latest Edition)
- b) Piping: ASME B 31.3, Petroleum Refinery Piping
- c) Flanges: ASME B 16.5
- d) Valves: API standard 600
- e) Safety Relief Valves: ASME section VIII, Div-I
- f) Structural: IS 226
- g) Material of construction: As per Point No C.2.1.3 II (e) and above codes.
- h) Welding - As per ASME section IX.

C.2.1.9 ACCESSORIES TO BE PROCURED FROM THE FOLLOWING VENDORS:

- i. Control Valves: Fisher / Invalco / Kimray
- ii. Pneumatic Level Controller- Fisher / Norriseal / Kimray/ V-Automat
- iii. Pneumatic Pressure Controller: Fisher / OMC/ ABB
- iv. Temperature Controller (Thermostatic Valve): Samson/ Brightech/ Kimray
- v. Level Gauge Glass: Pratolina/ Levcon/ Daniel/Chemtrol/ Pune Tectrol
- vi. Safety Relief Valve: Farris/ Crosby / Fisher/ Brightech/ Nirmal
- vii. Temperature & Pressure Gauge: WIKA / ODIN / Murphy/ General Instruments
- viii. Pressure/ Temperature Transmitter: Emerson/ Honeywell/ Yokogawa/ ABB
- ix. Level transmitter: Emerson/ Honeywell/ Yokogawa/ ABB
- x. SS Tubes and fittings: Swagelok, Parker, Sandvik
- xi. Flow Cum Pressure Recorder: Procon/ Cameron
- xii. Multivariable flow transmitter for gas: Emerson / Yokogawa/ Honeywell/ ABB

C.3 PAINTING FOR VESSEL/EQUIPMENT/PIPELINE/STRUCTURE:

RECOMMENDED PAINTING SCHEMES

PAINTING SYSTEMS USING Cu-SLAG BLASTING TO Sa 2.5 (Min. Profile 50 microns) AS SURFACE PREPARATION

A FOR EXTERNAL SURFACE OF VESSEL, EQUIPMENT, PIPING, & ALL STRUCTURE UP TO 100 °C TEMP.

Paint Type	Generic name of the paint	DFT (Microns)	Method of Application
P1	Inorganic Zinc Ethyl Silicate Primer	1 x 65	Air Spray / Airless
F1	High build two pack polyamide cured epoxy	2 x 100	Spray / Brush
U1	Aliphatic acrylic modified high solids weather resistant re-coatable two pack polyurethane (finish coat)	1 x 40	Spray / Roller/Brush
	Total DFT	305	

B FOR INSULATED EQUIPMENT/VESSELS/PIPELINES UP TO 200 °C TEMP (INDIRECT WATER BATH HEATER & HOT WATER CIRCULATION LINES)

Paint Type	Generic name of the paint	DFT (Microns)	Method of Application
T8	Two component high solid High temperature (up to 200deg C dry heat) Phenolic CUI (corrosion under insulation) epoxy coating.	2 x 125	Spray /Brush
	Total DFT	250	

C DETAILED PAINT SPECIFICATIONS: LIST OF PRIMERS & FINISH PAINTS:

SR. NO.	PRIMER	PAINT TYPE	SPECIFIED VOL.SOLIDS
1	Inorganic Zinc ethyl silicate primer (Minimum 85% Zinc dust by weight in the dried film)	P1	60 ± 2 %
	FINISH PAINTS		
2	High build two pack polyamide cured epoxy	F1	60 ± 2%
	HIGH TEMPERATURE PAINTS		
3	Two component high solid, high temperature phenolic CUI (corrosion under insulation Epoxy coating (UP TO 200 DEG. C)	T8	67 ± 2%
	POLYURETHANE PAINTS		
4	Acrylic Aliphatic weather resistant recoatable polyurethane paint	U1	50 ± 2%

D PAINT SPECIFICATIONS
PDS: PRODUCT DATA SHEETS

I. PRIMER

Inorganic Zinc Ethyl Silicate Primer (P1)

Colour	:	Grey
Finish	:	Matt
Type	:	2 pack inorganic ethyl silicate
Application	:	By brush or Airless spray
Dry film thickness/coat	:	60 – 70 µm
Pigment (main)	:	Minimum 85% Zinc dust by weight in the dried film
Volume solids	:	60 ± 2%
Area coverage (theoretical)	:	6 to 7 sq. m/liter
Surface dry	:	2 hrs.
Hard dry	:	24 hrs.
Over coating	:	As per Manufacturer's PDS
Recoatibility	:	As per Manufacturer's PDS
Full cure	:	As per Manufacturer's PDS
Shelf life	:	As per Manufacturer's PDS
Temperature Resistance	:	400 °C

II. FINISHED PAINTS

High Build Two Pack Polyamide Cured Epoxy (F1):

Colour	:	White/Grey
Finish	:	Semi-Gloss / Matt
Type	:	Two Packs
Application	:	By brush or Air/Airless spray
Dry film thickness/coat	:	100-150 µm
Volume solids	:	60 ± 2%
Area coverage (theoretical)	:	8 to 10 sq. m/ liter
Surface dry	:	4 hrs.
Hard dry	:	24 hrs.
Over coating	:	As per Manufacturer's PDS
Recoatibility	:	As per Manufacturer's PDS
Full cure	:	As per Manufacturer's PDS
Shelf life	:	As per Manufacturer's PDS

III. HIGH TEMPERATURE PAINTS

Two Component High Solid, High Temperature Phenolic CUI (Corrosion under Insulation) Epoxy Coating (T8):

Colour	:	Buff, light grey
Finish	:	Matt
Type	:	Two pack
Application	:	By brush or Airless spray
Dry film thickness/coat	:	80-125 µm
Volume solids	:	67± 2 %

Area coverage (theoretical)	:	5-8 sq. m/liter
Surface dry	:	6 hrs.
Hard dry	:	16 hrs.
Recoat ability	:	As per Manufacturer's PDS
Full cure	:	As per Manufacturer's PDS
Shelf life	:	As per Manufacturer's PDS
Dry heat	:	up to 200 deg C

IV. Acrylic Aliphatic Weather Resistant Polyurethane Paint: (U1)

Colour	:	As per the table below
Finish	:	Glossy
Type	:	Two packs
Application	:	By brush or Air/Airless spray
Dry film thickness/coat	:	40– 50 µm
Volume solids	:	50 ± 2%
Area coverage (theoretical)	:	7 to 11 sq. m/ liter
Surface dry	:	1.5 hrs
Hard dry	:	6 hrs.
Over coating	:	As per Manufacturer's PDS
Recoat ability	:	As per Manufacturer's PDS
Shelf life	:	As per Manufacturer's PDS

EQUIPMENT	COLOR-SHADE	RAL CODE
SEPARATORS, MANIFOLD, OIL DIVERter	BLUE	5002
ALL SKIDS	GREY	7046
CRUDE TANKS	CAMOUFLAGE	DARK GREEN, LIGHT GREEN, DARK MEDIUM BROWN
FIRE WATER TANK	RED	3020
PUMPS, COMPRESSORS, GENSETS	AS PER OEM COLOR	
LAB CABIN/CREW HUT/SECURITY HUT	BLUE	5007
PIPELINE		
OIL/GAS LINES	DARK ADMIRAL GREY	7016
AIR LINES	SKY BLUE	5015
FIRE WATER LINE	RED	3002
SOURCE WATER	SEA GREEN	6018
VALVE		
OIL LINE VALVE	LIGHT BROWN	8024
GAS LINE VALVE	CANARY YELLOW	1012
WATER LINE VALVE	FRENCH BLUE	5012
VALVES IN MANIFOLD	BRILLIANT GREEN	6038
SAFETY RELIEF VALVE	RED	3002

E Approved manufacturers of Paints as given below:

1. Akzo Nobel paints
2. Asian Paints PPG Ltd
3. Berger paints Ltd
4. CDC Carboline Ltd
5. Goodlass Nerolac Paints Ltd
6. Growel India (old - Bombay Paints)
7. Hempel paints
8. Jotun coatings
9. Kirloskar corrocoats
10. PPG Ind USA (Sigma Coatings & Amercoat)
11. Shalimar paints Ltd.

E All painting job to be certified by TPI. TPI to ensure the following for painting jobs

- i. Surface preparation
- ii. Paint procedure/method of application as per specs.
- iii. Paint quality
- iv. Thickness of paint for each coating
- v. Nos. of coating as per specs.

C.4 SEPARATOR MARKING: Separator shall be provided with name plate with the following information:

- i. Manufacturer's Name
- ii. Manufacturer's Serial No.
- iii. Year of manufacture
- iv. Weight empty, Kg
- v. Shell size OD X Length
- vi. Shell & dished end thickness,
- vii. Maximum design pressure, Kg/Sq. Cm
- viii. Maximum design temperature, Deg C
- ix. Liquid flow rate, normal & maximum, KLPD
- x. Gas flow rate, normal and maximum, SCUM per day at design pressure
- xi. API Design Standard

D. TANKS

D.1 CRUDE OIL STORAGE TANKS (6 NOS.)

Skid mounted, rectangular, 37.37 KL capacity, dimensions 7500 mm x 2500 mm x 2150 mm, crude oil storage tank, with roof. The tank should be made of minimum 6 mm thick IS: 226 MS plates, with all welded-on structure and complete with manholes, ladder, and other accessories. The tanks must be equipped with the following:

- a) Extended neck clean-out door shall be fitted in a frame of minimum 2" height, using 50 x 50 x 6 mm angle plates welded to the tank wall, such that all bolts to the cover can be accessed from outside.
- b) 4" inlet with extension of 12". The openings shall be Fig 104.
- c) 4" outlet with extension of 12". The openings shall be Fig 104. Long bend shall be provided to the inside end of the tank outlet, so that the dead volume level can be lowered by another 4".
- d) 4" NB coupling with plug shall be provided at the center of the middle cover (tank top) to facilitate riser attachment / flame arrestor.
- e) DIP HATCH: A dip hatch with suitable opening / closing facility shall be provided at the center of the rectangular tank Top, nearest to the outlet connection of the tank. An additional MS plate of size 8" x 8" x 6 mm shall be welded to the tank bottom plate, where the dip bob will hit during dipping.
- f) Level indicator to be included with facility for cleaning when required. Spare gauge glass should be provided along with supply. (non-stick glass)

- g) VALVES: The tanks shall be complete with API 600, ASME 150 class gate valves with companion Fig 104 union half.
- h) GUARD RAILING: The tanks shall be provided with guard railing of minimum 1m height.
- i) WALKWAY AT TOP SURFACE: There shall be a 7.5 m long & 0.6 m wide antiskid walkway surface at top surface of the tank, from ladder area to opposite end of the tank. The walkway surface shall be coated with slip resistant surface Polymer/ Ceramic base coating having hard wearing aggregates.
- j) One dipstick per tank with metallic calibration chart displayed on tank body.
- k) Suitable inlet and outlet manifolds interconnecting all the above tanks.
- l) The crude oil tanks should have arrangement of hot water coils for heating of the crude.
- m) Provision for hot water manifold with isolating valves should be there at the inlet of heating coils for selective heating of tanks. (Please refer to 'Process Flow Diagram' of Annexure IV).
- n) PAINTING: The painting of the tanks shall be carried out as below:
 - i. INTERNAL LINING: The tank internal including the roof shall be coated with High temperature resistant & chemical resistant anticorrosive solvent free ceramic reinforced composite/ amine cured phenolic epoxy resin (novolac) coating.
 - ii. EXTERNAL SURFACES OF TANK (EXCEPT WALKWAY SURFACE) & GUARD RAILINGS: All external surfaces of the tank (excluding the walkway at top surface), and guard railings shall be painted with one coat of red oxide primer and followed by two coats of three colours combination-dark green, light green & dark medium brown (Camouflage combination) synthetic enamel paint.
 - iii. SKID: Skid shall be painted with surface resistant high solids, high build, fast drying, polyamide cured epoxy mastic coating designed to protect steel.

D.2 FIRE WATER TANK (2 NOS.):

Skid mounted, rectangular, 37.37 KL capacity, dimensions 7500 mm x 2500 mm x 2150 mm, fire water storage tank, with roof. The specification of the tanks should be as per specifications of Crude Oil Storage Tanks as described in clause D.1 above except,

- i. Flame arrestor not required.
- ii. Hot water circulation coil not required.
- iii. All External surfaces of the tank should be of "red colour".

D.3 WATER SINTEX TANK: Overhead Water Sintex tank of minimum 500L capacity, mounted on portable stand, for drinking and other utilities.

E. PUMPS

E.1 BOWSER LOADING PUMPS:

02 (Two) nos. of flame proof electric motor driven centrifugal pump suited for intermittent/on demand load, portable, moderately abrasive fluids and suspended solids. The pumps should be skid mounted for ease of transportation and should be provided with shed/roof.

- a) Type: Horizontal type, single suction Centrifugal Pump conforming to API Standard 610 / IS 15657 / ISO 13709(Pump Design) and IS 9137 Hydraulic Parameters of the Pump / Other applicable IS Codes. Bidders to confirm the same categorically in their bid.
- b) Service: - Continuous
NOTE: #Continuous duty# means pump having service operation on full load for a period of 8 hours to 24 hours per day as per Hydraulic Institute Standard application.
- c) No. of Stage: 1 (One)
- d) Capacity: 40 KLPH (minimum).
- e) Delivery head: 5-6 Kg/Sq. Cm.
- f) Speed: To be decided by the manufacturer based on required Capacity & Head of pump
- g) Liquid to be handled: Crude Oil & water
- h) Lubrication: Oil lubricated.
- i) Cooling gland: Internal gland cooling
- j) Stuffing box shall be water sealed type of ample depth complete with gland packing.
- k) Dynamic balancing of the impellers assembly is required. Heavy duty double bearing should be provided at the non-driving end (NDE) with oil/grease lubrication (Make of the bearing: SKF/FAG)
- l) ACCESSORIES: Base Frame (Skid), Coupling, Coupling Guard, Foundation Nuts & Bolts.
- m) Inlet hook up to the manifold of Storage Tank for direct suction and delivery to loading bay.
- n) Fitted with strainer in inlet
- o) The MOC of the pump should conform to:
(i) API 610: Clause 2.11 with special attention on Appendix-G and Appendix-H.
OR
(ii) IS-15657: Clause 5.12 with special attention on Annex - G and Annex-H.
The MOC of the pump should be clearly mentioned by the bidders in their offer.

DETAILS OF MOTOR/ PRIME MOVER:

The electric motor shall be totally enclosed flameproof (explosion proof) Ex-d type, squirrel cage induction motor, horizontal foot mounted with bi-directional cooling fan at NDE, suitable for operation on 415 V, 3 phase, 50 Hz AC supply at 45 Degree C Ambient temperature.

- a. Type of motor: Squirrel cage Induction motor.
- b. Make: Kirloskar / Crompton / Siemens / Bharat Bijlee / ABB / NGEF / Marathon Electric
- c. The motor shall conform to latest version of IS/IEC 60079-0: 2011, IS/IEC: 60079-1: 2007, IS 12615 - 2018 and IS/IEC: 60034 for performance and service.

- d. Rating: KW/HP- To be calculated by supplier/OEM of pump set as per pump requirement (Both pump capacity and motor capacity calculation sheets to be attached with the bid). The motor rating should be limited to Maximum 7.5 KW/ 10 HP
- e. Voltage: 415 \pm 10%.
- f. Frequency: 50 Hz AC.
- g. Phase: 3 Phase AC
- h. Painting: Epoxy DA grey
- i. RPM: To be decided by supplier/OEM of pump set, matching with pump design speed
- j. Duty: continuous duty
- k. Class of Insulation: Class 'F' but temperature rise limited to that of class 'B'.
- l. Type of enclosure: Totally enclosed fan cooled (TEFC) with IP - 55 protection
- m. Maximum permissible temperature rise of the motor: As per IS 325/1961
- n. Mounting: Horizontal, Foot mounted
- o. Frame size: As per load requirement
- p. Drive: Direct coupled with flexible coupling
- q. Method of Starting: DOL
- r. Shaft extension: To match the driven pump
- s. Markings: Rust proof SS Name plate details with name of Manufacturer, Manufacturer's Serial No., Year of manufacture, P.O. No., frame size, rated voltage, rated output, current, frequency, type of duty, class of insulation, no. of phases, speed in rpm at rated output, degree of protection, winding connections, ambient temp, bearing sizes, lubricant, lubrication material and year of manufacture.

PARTICULARS OF TERMINAL BOX:

- a. Connection: Six terminals brought out to terminal box (for connection in star/delta configuration, suitably rated brass links shall be supplied for making star connection) Motor should have single shaft extension with standard flat key. Suitable Cable gland is to be provided along with the terminal box.
- b. Flameproof Motor terminal box with six nos. of terminal studs of adequate current carrying capacity, suitable for use in oil and gas mines, fitted with 01 (One) no. double compression FLP cable glands. The glands shall be suitable for entry of 4 cores, 10 sq.mm, PVC insulated, PVC sheathed, multi-stranded aluminium cable armoured with GI strip/wire.
- c. Earthing: 1 (one) no. inside terminal box and 2 (two) nos. on the body of the Motor
- d. Lifting eye: 1 No.
- e. The flameproof electrical motor shall be conforming to requirements of relevant Indian or International Standards and duly tested and certified by Government Accredited Indian or International Test Houses or Laboratories. Bidder shall submit copy of valid test certificate(s) approving the appliances for use in hazardous area zone-1, gas group IIA & IIB along with the bid. Bids not accompanying required test certificates for the FLP motor will not be considered for technical evaluation.

E.2 FIRE WATER PUMP:

E.2.1 General Features:

- a. The Trailer Fire Pump should consist of a centrifugal pump of capacity 2250 LPM at 8.8 Kg/cm² driven by diesel engine, with 100 mm (4") round threaded male suction and 2 x 63 mm (2½") instantaneous female delivery outlet.
- b. The combined unit shall be mounted on a two-wheeled trailer with the centrifugal pump at the rear and should be capable of being towed by a vehicle.
- c. The functional requirements, overall dimensions of the complete unit, mass of complete unit, material of construction of trailer chassis frame, axle, pump casing, impeller ring and impeller neck ring, pump shaft, engine cover and pump panel etc. shall conform to IS: 944-1979 or latest.
- d. Trailer Fire Pump shall be of proven design, compact and robust for operation under adverse / extreme tropical condition.
- e. The operation and maintenance of the Trailer Fire Pump shall be user friendly.
- f. All statutory requirements of Regional Transport Authorities (RTA) shall be met without any exception.
- g. All dimensions mentioned in the bid documents such as technical drawing, etc. shall be in metric system.

- h. Any other accessories not covered in the specification, but necessary for smooth operation of the unit for the intended purpose shall also be provided along with the unit. Additional cost, if any, in this regards shall be borne by the bidder and included in the priced bid.
- i. Trailer Fire Pump shall be designed, constructed & tested in accordance with the latest applicable codes / standards but not limited to the following:

S.N.	BIS No.	Description
1	IS : 5	Colours for ready mixed paints & enamels.
2	IS : 318	Leaded Tin Bronze ingots & castings.
3	IS : 444	General Purpose Rubber water hose
4	IS : 902	Specification for suction hose couplings for firefighting purposes
5	IS : 903	Specification for fire hose delivery couplings, branch pipes, nozzles and nozzle spanner
6	IS : 907	Specification for suction strainers, cylindrical type for firefighting purposes
7	IS : 944	Functional Requirements of Trailer Pump for Fire Brigade Use
8	IS : 2482	The performance and other requirement of suction hose
9	IS : 4928	Specification for Delivery valve for Centrifugal Fire Pump outlet
10	IS : 6603	Stainless Steel bars and flats
11	IS : 9137	Code for acceptance test for centrifugal, mixed flow and axial pumps – Class C

- j. Fire Pump shall be designed in accordance with NFPA-20 / EN standard. The pump shall have UL Listed / CE Mark.

E.2.2 ENGINE:

- a. Four stroke, four cylinder, water cooled diesel engine (as prime mover) with electrical starter or starting mechanism and adequate for smooth running of the pump shall be provided.
- b. The diesel engine shall be capable of generating minimum 75 BHP at rated RPM to give rated performance of the pump.
- c. The Engine shall be Kirloskar / Cummins / Volvo / Caterpillar / Ashok Leyland / Tata / Mahindra & Mahindra / Eicher make complying emission norms CEV – Stage IV or higher emission norms as applicable at the time of delivery of the Trailer Fire Pump. Documents supporting emission norms of the offered engine shall be submitted along with the bid.
- d. Suitable radiator with sucker fan for proper cooling of the coolant shall be provided.
- e. Engine shall have push button type battery starting provision in addition to ignition switch.
- f. The Engine & Pump shall be properly mounted on the trailer chassis through suitable anti-vibration mountings.
- g. Engine exhaust is also to be fitted with CCE/PESO approved spark arrestor suitable for use in Oil & Gas hazardous areas. Documents in this regard shall be shown at the time of inspection & to be submitted along with supply.
- h. The Make, Model, emission norms & other technical specifications of the offered Engine shall be mentioned and submitted along with the technical bid.
- i. A standard alternator of sufficient power rating to charge the battery shall be provided.
- j. An open type cooling system with suitable heat exchanger may be provided by the bidder, if required. This is necessary to maintain the correct engine operating temperature as specified by the engine manufacturer.
- k. In addition to above, the engine shall be fitted with all standard fittings & accessories, necessary for its operation.

E.2.3 FUEL SYSTEM & FUEL TANK:

- a. Stainless steel fuel tank of adequate capacity to run the pump continuously for at least 4 Hrs. without refueling shall be provided.
- b. Suitable drain plug shall be provided in the tank.
- c. Graduated dip stick for measuring the level of fuel (Diesel) in the tank shall be provided.
- d. The fuel tank shall be located in such a place that it is not affected by the heat of the engine and to allow refilling without having to stop the engine to facilitate non-stop pumping

operation. The fuel tank shall be located in upper portion of the unit to facilitate the gravity feed to the Fuel Injection Pump, preferably near the inlet manifold.

- e. The bidder shall mention the estimated fuel consumption per hour with full load condition in the technical bid. The bidder shall also mention the fuel tank capacity in the technical bid.

E.2.4 PUMP:

- a. Pump should be a single/multi stage centrifugal type of minimum discharge capacity of 2250 liters/min at 8.8 kg/cm² of suitable Make & Model of M/s. Firefly or M/s. Kirloskar or M/s. Godiva or M/s. Mather & Platt or M/s. Greaves or M/s. Rosen Bauer or M/s. Lubi make.
- b. The pump is required to be coupled to the engine using clutch arrangement for engaging and disengaging of engine.
- c. The impeller shall be dynamically balanced and designed in such a way to offer easy access to the same.
- d. A self-adjustable mechanical seal shall be provided.
- e. There should be a drain plug with valve at the bottom of the volute casing.
- f. The Make, technical specifications and characteristics of the offered pump shall be mentioned and submitted along with the technical bid.
- g. Offered engine and pump characteristics are to be compatible with each other.
- h. There should be a 100 mm round threaded male suction eye, with suitable strainer and metal type blank cap with chain attached with pump body.
- i. Two numbers 63 mm instantaneous female delivery with suitable screw down type valves and metal type blank cap with chain attached should also be provided with the pump.
- j. While testing the pump allowance for output and lift will be as per clause 4.3.3 of IS: 944-1979 or latest.
- k. The performance data shall be observed at test condition of 3 meters of suction lift and suction inlet of 100 mm at all other NTP conditions.
- l. The pump shall not show any sign of leakage when subjected to a hydraulically pressure of 21 Kg/cm².

m. PRIMER:

- i. The pump should be fitted with automatic primer both type (Water Ring and Exhaust Ejector Type) and should be capable of lifting water from depth of 7.0 meters in 24 seconds at NTP conditions.
- ii. Priming tank (suitable capacity) also be provided for water ring primer.
- iii. The lever of the exhaust ejector primer shall be near to the panel.
- iv. The Primers and its other body material and connecting pipe shall be of SS.

E.2.5 TRANSMISSION:

- a. Power transmission from Engine to Pump shall be through Engine OEM's clutch system, so that, at disengaged (de-clutching) position, the pump should not run.
- b. Suitable hand lever near the operator's control panel shall be provided for smooth engaging/disengaging of the clutch.
- c. The make of offered Engine (prime mover) and the offered Clutch System/ assembly shall be the same. The Make and technical specifications of the offered Engine OEM's clutch system shall be mentioned and submitted along with the technical bid.
- d. The Part Nos. of the Engine and Engine OEM's Clutch System / assembly shall be provided by the supplier along with the supply.
- e. The engine and pump should be mounted on anti-vibration mounting so as to reduce vibration to a minimum.

E.2.6 CHASSIS:

- a. The chassis of the trailer shall be made from suitable M.S. rolled steel channel of height not less than 70 mm. The central longitudinal member shall serve as Draw Bar with towing eye arrangement. Extension of the Draw Bar shall be minimum 1000 mm from the trailer for smooth negotiation of sharp turning during transportation.
- b. The towing eye shall have an internal diameter of 75 mm and shall be of high quality forged steel of not less than 63 MN/m² ultimate tensile stress or other suitable material capable of giving suitable performance. The details should be provided along with the technical bid.

- c. Two jack legs in the rear and two jack legs in the front capable of bearing lowered into position and adequately secured to provide a suitable base for the unit, when pumping or standing unattached shall be provided. The legs shall have 200 mm round mild steel plates, welded to the base of the pipe legs to prevent penetration into the earth while standing unattached. The legs shall be capable of being positively locked in the "housed" position.
- d. The center of gravity of the whole unit shall be slightly forward of the wheel axle when the towing eye is 66 cm above the ground level. The trailer shall not tilt backward when resting on front legs. No part of the trailer shall have a clearance less than 23 cm when the trailer is tilted so as to raise the height of the eye 65 cm or to lower it to 45cm. In towing position, the height of the towing eye shall normally be 55 cm, above ground level.
- e. Suitable hand brake operating on both the wheels shall be provided. The hand lever situated at an accessible position at the front of the trailer frame shall be provided for operating the brake when the trailer is disconnected from the towing vehicle.
- f. Suitable leaf spring suspension with shock absorber & spring hanger (with grease nipple) shall be provided in between the chassis & the axle. Axle shall be of square cross section.
- g. 02 Nos. pneumatic wheels (Tyre: 7.00 x 16 or higher tyre size having adequate ply) with Tyres & Tubes of reputed make, suitable for bearing the weight of the unit shall be fitted in the trailer. The bidder shall mention make and load rating of the tyres of the unit in their offer.
- h. Boxes with locking arrangement are to be fabricated with sufficient space to accommodate 4(four) Nos. of Delivery Hoses, Foam Generator, 2(two) Multi-purpose nozzles, Suction Spanner, etc. It should also be fitted with brackets for carrying two lengths of suction hose in 4.5 meters lengths.
- i. A reflective stripe(s) shall be affixed to the perimeter of the Trailer Fire Pump's body.
- j. Suitable metallic canopy type body with hinge type doors (at appropriate locations for maintenance purpose) etc. shall be provided.
- k. The overall maximum length & height (along with spot light) of the Trailer Fire Pump shall be approximately 3.5 meters and 1.6 meters respectively, & the wheel track shall be maximum 1.4 meters approximately.
- l. The bidder shall submit tentative GA (General Arrangement) drawing of the offered complete unit along with technical bid.

E.2.7 ELECTRICAL SYSTEM:

- a. The fire pump shall be provided with an ignition switch for self-starter in addition to push button starting provision.
- b. The pump shall be fitted with LED Flood Light of minimum 20 watts.
- c. Electrical system for engine starting, charging, lighting etc. shall be of 12V battery.
- d. Maintenance free Battery of 12 V of Make - Exide/ Cummins/ Bosch/ Lucas or equivalent shall be provided for self-starter operation.
- e. The battery cut-off switch is also to be provided at suitable location.

E.2.8 CONTROL AND INSTRUMENTS:

The control panel should include the following:

- a. Ignition switch
- b. Throttle Control: Wheel type throttle lever (acceleration) with adequate clearance or suitable lever for operation.
- c. Fuel gauge meter to indicate amount of fuel available in the tank
- d. Lube oil pressure gauge
- e. Gauges (all gauges should be of liquid filled type):
 - i. Compound gauge calibrated as follows:
 - a) Vacuum: 0 to 75 cm hg
 - b) Pressure: 0 to 5 kg/cm²
 - ii. Pressure gauge (on delivery) 0-16 kg/cm² (Glycerin filled type)
 - iii. Temperature gauge
 - iv. Oil pressure gauge
- f. Pump and pump panel light
- g. Engine Stop Switch
- h. Ignition indicator light
- i. Operating Instruction: Marked on Aluminium Plate (1 No. spare plate also to be provided)
- j. Hour Meter
- k. Ammeter

E.2.9 TECHNICAL PARAMETERS:

- a. Type of fluid to be pumped - Fresh & Salty Water
- b. Duty Point Capacity - 2250 LPM or more
- c. Differential Head - 88 meters or more

E.2.10 PERFORMANCE PARAMETERS:

- a. Minimum Performance for Trailer Fire Pump shall be 2250 LPM output at 8.8 Kg/Cm² pressure with 3.0 meter suction lift.
- b. The primers of the Pump shall be capable of lifting water from at least 7.0 m (measured vertically from water level to the center of suction eye of the pump NTP) in not more than 24 seconds allowances for output & lift shall be as per IS: 944.
- c. The pump shall run continuously for a period of 4 hours delivering rated output at 3 meter lift and at 8.8 kg/cm².

E.2.11 WORKMAN SHIP AND FINISH:

- a. The trailer fire pump should be painted #FIRE RED# on the outside. The Fire Service insignia of 10 cm lettering #OIL INDIA LIMITED / OIL Fire Service# in a single line to be painted on both sides in Gold & Black.
- b. The stability of the appliance, total weight (without equipment), towing eye and drawbar arrangement should be as per IS-944-1979 or latest.
- c. Material of Construction:

Sl. No	DESCRIPTION	MATERIALS
1	Pump Casing, Impeller	Gun Metal
2	The Pump Shaft	SS-316
3	Mechanical Seal	Carbon: Resin - Impregnated Carbon Graphite
4	Male & Female Coupling of Pump	SS-304
5	Pipes and Fittings	SS-304
6	Base Frame of Pump & Engine	Mild Steel
7	Pressure Gauge	SS-304
8	Primers and its connections	SS-304
9	Suction pipe Male and Female Couplings	SS-304
10	Valves & Lever	SS-304
11	High Tensile Springs	SS-304
12	Nuts/Bolts/Studs (High Tensile)	SS-304
13	Suction Strainer & Foot valve	SS-304
14	Suction Wrenches	SS-304
15	Delivery Valves	SS-304
16	Control Panel	SS-304 & SS Sheet
17	Fuel Tanks	SS-304
18	Trailer Chassis Frame	Suitable Mild Steel Sections
19	Engine Cover & Pump Cover	SS-304 & SS Sheet
20	Axle	Carbon, Steel, or Mild Steel (as per IS: 944)
21	Female Blank Cap & Chain	SS-304

E.2.12 MARKING:

The trailer pump should be clearly and permanently marked (Embossed on Brass Plate) with the following information:

- (a) Manufacture's Name and Trade Mark
- (b) The output capacity of the pump in liters/min

- (c) Year of Manufacture for -
 - i. Pump
 - ii. Engine
 - iii. Chassis
- (d) Model & Serial No for -
 - i. Pump
 - ii. Engine
 - iii. Chassis
- (e) Purchase Order No. & Date
- (f) Weight of Unit
- (g) BHP of Engine

E.2.13 DRAWING & QUALITY ASSURANCE PLAN (QAP):

- i) Drawing: Vendor shall submit detailed drawing along with material of construction & obtain approval of OIL before start of fabrication.
- ii) Quality Assurance Plan (QAP): Vendor shall submit detailed Quality Assurance Plan (QAP) & obtain approval of OIL before start of fabrication of Trailer Fire Pump.

E.2.14 INSPECTION & ACCEPTANCE TEST:

The appliance may be tested as per IS: 944-1979 & Purchase Order at suppliers' works by OIL's representative.

E.2.15 DOCUMENTATION:

Sale Certificate, Emission Norms Certificate, Initial Certificate of Compliance with Safety Standards & Road-Worthiness in Form 21 & 22/22(A), Invoice, Transit Insurance etc. shall be submitted by the supplier for each unit along with the supply in the name of M/s. Oil India Limited, Duliajan, Assam-786602 for onward registration as per Motor Vehicle Act, 1988.

E.2.16 EQUIPMENT AND ACCESSORIES (To be provided with each TFP):

Electric tail-lamp with number plate.

- a) A tool kit for normal maintenance of the appliance.
- b) One set of wheel wrench.
- c) One no. search light fitted at suitable location for night operation.
- d) Hard Suction Hose: Dutron Kanaflex PVC hard suction hose made up of adequate reinforcement (100 mm X 4.5 mtrs. length each) with round threaded 100 mm Gun Metal or SS-304 male and female coupling on both sides as per IS:902. (The couplings must be fitted by wire windings to make it leak proof). - 2 Nos.
- e) Suction Strainer with NRV along with Basket Strainer - 01 No.
- (h) Suction Wrench - 01 Pair
- (i) Metal Strainer for Shallow Water Level (Low level Strainer) - 01 Nos.
- (j) Multi-purpose Nozzle (2Nos.): 2.5"BICM Valve W/GRIP, SEL 110/230/360/470/570 LPM @ 7 bar Spinning Teeth having a 63mm instantaneous male inlet of make TFT/Elkhart/Akron.

E.2.17 MANDATORY SPARES:

The following mandatory spares must be supplied by the supplier along with the supply:

- a) Pump Impeller & Impeller Shaft - 02 Nos. with total P.O. quantity.
- b) Complete set of Mechanical Seal along with "O" Ring - 04 Nos. with each Trailer Fire Pump.
- c) Circlip of Pump Housing - 02 Set with each Trailer Fire Pump.
- d) Complete Set of Oil Seal - 02 Nos. with each Trailer Fire Pump.
- e) Pump Bearings - 01 Set with each Trailer Fire Pump.
- f) Pressure Gauge - 01 No. with each Trailer Fire Pump.
- g) Compound Gauge - 01 No. with each Trailer Fire Pump.
- h) Primer Oil/Rubber Seal - 01 No. with each Trailer Fire Pump.

- i) Circlip of Primer Housing - 02 Set with each Trailer Fire Pump.
- j) Primer Impeller - 02 Nos. with total P.O. quantity.
- k) Primer Shaft - 01 No. with each Trailer Fire Pump.
- l) Engine Fuel Filter - 10 Nos. with each Trailer Fire Pump.
- m) Engine Lube Oil Filter - 10 Nos. with each Trailer Fire Pump.
- n) Engine Air Filter - 10 Nos. with each Trailer Fire Pump.
- o) Engine Radiator Hose - 01 Set with each Trailer Fire Pump.
- p) Fan Belt - 02 Nos. with each Trailer Fire Pump.

E.3 HOT WATER CIRCULATION PUMP:

02 (Two) nos of Flameproof, Electric Motor Driven, Centrifugal type transfer pump of rated capacity shall be supplied with all accessories to circulate hot water between Indirect Bath Heater and circulating coil of crude oil storage tanks. The pump should be skid mounted to facilitate easy transportation and should be provided with shed/roof.

- a) Type: Horizontal type, single suction Centrifugal Pump conforming to API Standard 610 / IS 15657 / ISO 13709(Pump Design) and IS 9137 Hydraulic Parameters of the Pump / Other applicable IS Codes. Bidders to confirm the same categorically in their bid.
- b) Service: - Continuous
NOTE: #Continuous duty# means pump having service operation on full load for a period of 8 hours to 24 hours per day as per Hydraulic Institute Standard application.
- c) No. of Stage: 1 (One)
- d) Capacity: 25 KLPH (minimum).
- e) Delivery head: 4-5 Kg/Sq. Cm.
- f) Speed: To be decided by the manufacturer based on required Capacity & Head of pump
- g) Liquid to be handled: Hot Water
- h) Lubrication: Oil lubricated.
- i) Cooling gland: Internal gland cooling
- j) Stuffing box shall be water sealed type of ample depth complete with gland packing.
- k) Dynamic balancing of the impellers assembly is required. Heavy duty double bearing should be provided at the non-driving end (NDE) with oil/grease lubrication (Make of the bearing: SKF/FAG)
- l) ACCESSORIES: Base Frame (Skid), Coupling, Coupling Guard, Foundation Nuts & Bolts.
- m) Inlet hook up to the manifold of Storage Tank for direct suction and delivery to loading bay.
- n) Fitted with strainer in inlet
- o) The MOC of the pump should conform to:
 - (i) API 610: Clause 2.11 with special attention on Appendix-G and Appendix-H (Material Class: I2).
 - OR
 - (ii) IS-15657: Clause 5.12 with special attention on Annex - G and Annex-H.
 The MOC of the pump should be clearly mentioned by the bidders in their offer.

DETAILS OF MOTOR/ PRIME MOVER:

The electric motor shall be totally enclosed flameproof (explosion proof) Ex-d type, squirrel cage induction motor, horizontal foot mounted with bi-directional cooling fan at NDE, suitable for operation on 415 V, 3 phase, 50 Hz AC supply at 45 Degree C Ambient temperature.

- a. Type of motor: Squirrel cage Induction motor.
- b. Make: Kirloskar / Crompton / Siemens / Bharat Bijlee / ABB / NGEF / Marathon Electric
- c. The motor shall conform to latest version of IS/IEC 60079-0: 2011, IS/IEC: 60079-1: 2007, IS 12615 - 2018 and IS/IEC: 60034 for performance and service.
- d. Rating: KW/HP- To be calculated by supplier/OEM of pump set as per pump requirement (Both pump capacity and motor capacity calculation sheets to be attached with the bid). The motor rating should be limited to Maximum 7.5 KW/ 10 HP
- e. Voltage: 415 \pm 10%.
- f. Frequency: 50 Hz AC.
- g. Phase: 3 Phase AC
- h. Painting: Epoxy DA grey
- i. RPM: To be decided by supplier/OEM of pump set, matching with pump design speed
- j. Duty: continuous duty

- k. Class of Insulation: Class 'F' but temperature rise limited to that of class 'B'.
- l. Type of enclosure: Totally enclosed fan cooled (TEFC) with IP - 55 protection
- m. Maximum permissible temperature rise of the motor: As per IS 325/1961
- n. Mounting: Horizontal, Foot mounted
- o. Frame size: As per load requirement
- p. Drive: Direct coupled with flexible coupling
- q. Method of Starting: DOL
- r. Shaft extension: To match the driven pump
- s. Markings: Rust proof SS Name plate details with name of Manufacturer, Manufacturer's Serial No., Year of manufacture, P.O. No., frame size, rated voltage, rated output, current, frequency, type of duty, class of insulation, no. of phases, speed in rpm at rated output, degree of protection, winding connections, ambient temp, bearing sizes, lubricant, lubrication material and year of manufacture.

PARTICULARS OF TERMINAL BOX:

- a. Connection: Six terminals brought out to terminal box (for connection in star/delta configuration, suitably rated brass links shall be supplied for making star connection) Motor should have single shaft extension with standard flat key. Suitable Cable gland is to be provided along with the terminal box.
- b. Flameproof Motor terminal box with six nos. of terminal studs of adequate current carrying capacity, suitable for use in oil and gas mines, fitted with 01 (One) no. double compression FLP cable glands. The glands shall be suitable for entry of 4 cores, 10 sq.mm, PVC insulated, PVC sheathed, multi-stranded aluminium cable armoured with GI strip/wire.
- c. Earthing: 1 (one) no. inside terminal box and 2 (two) nos. on the body of the Motor
- d. Lifting eye: 1 No.
- e. The flameproof electrical motor shall be conforming to requirements of relevant Indian or International Standards and duly tested and certified by Government Accredited Indian or International Test Houses or Laboratories. Bidder shall submit copy of valid test certificate(s) approving the appliances for use in hazardous area zone-1, gas group IIA & IIB along with the bid. Bids not accompanying required test certificates for the FLP motor will not be considered for technical evaluation.

E.4 TRANSFER PUMP:

01 (One) No. of Flame Proof Electric Motor driven Centrifugal Pump suited for intermittent/ on-demand load, portable, moderately abrasive fluids, and suspended solids. The pump should be skid mounted for ease of transportation and should be provided with shed/roof.

- a) Type: Horizontal type, single suction Centrifugal Pump conforming to API Standard 610 / IS 15657 / ISO 13709(Pump Design) and IS 9137 Hydraulic Parameters of the Pump / Other applicable IS Codes. Bidders to confirm the same categorically in their bid.
- b) Service: - Continuous
NOTE: #Continuous duty# means pump having service operation on full load for a period of 8 hours to 24 hours per day as per Hydraulic Institute Standard application.
- c) No. of Stage: 1 (One)
- d) Capacity: 25 KLPH (minimum).
- e) Delivery head: 4-5 Kg/Sq. Cm.
- f) Speed: To be decided by the manufacturer based on required Capacity & Head of pump
- g) Liquid to be handled: Crude Oil & Formation Water
- h) Lubrication: Oil lubricated.
- i) Cooling gland: Internal gland cooling
- j) Stuffing box shall be water-sealed type of ample depth complete with gland packing.
- k) Dynamic balancing of the impellers assembly is required. Heavy duty double bearing should be provided at the non-driving end (NDE) with oil/grease lubrication (Make of the bearing: SKF/FAG)
- l) ACCESSORIES: Base Frame (Skid), Coupling, Coupling Guard, Foundation Nuts & Bolts.
- m) Inlet hook up to the manifold of Storage Tank for direct suction and delivery to loading bay.
- n) Fitted with strainer in inlet
- o) The MOC of the pump should conform to:
 - (i) API 610: Clause 2.11 with special attention on Appendix-G and Appendix-H.
 - OR
 - (ii) IS-15657: Clause 5.12 with special attention on Annex - G and Annex-H.
 The MOC of the pump should be clearly mentioned by the bidders in their offer.

DETAILS OF MOTOR/ PRIME MOVER:

The electric motor shall be totally enclosed flameproof (explosion proof) Ex-d type, squirrel cage induction motor, horizontal foot mounted with bi-directional cooling fan at NDE, suitable for operation on 415 V, 3 phase, 50 Hz AC supply at 45 Degree C Ambient temperature.

- a. Type of motor: Squirrel cage Induction motor.
- b. Make: Kirloskar / Crompton / Siemens / Bharat Bijlee / ABB / NGEF / Marathon Electric
- c. The motor shall confirm to latest version of IS/IEC 60079-0: 2011, IS/IEC: 60079-1: 2007, IS 12615 - 2018 and IS/IEC: 60034 for performance and service.
- d. Rating: KW/HP- To be calculated by supplier/OEM of pump set as per pump requirement (Both pump capacity and motor capacity calculation sheets to be attached with the bid). The motor rating should be limited to Maximum 7.5 KW/ 10 HP
- e. Voltage: 415 \pm 10%.
- f. Frequency: 50 Hz AC.
- g. Phase: 3 Phase AC
- h. Painting: Epoxy DA grey
- i. RPM: To be decided by supplier/OEM of pump set, matching with pump design speed
- j. Duty: continuous duty
- k. Class of Insulation: Class 'F' but temperature rise limited to that of class 'B'.
- l. Type of enclosure: Totally enclosed fan cooled (TEFC) with IP - 55 protection
- m. Maximum permissible temperature rise of the motor: As per IS 325/1961
- n. Mounting: Horizontal, Foot mounted
- o. Frame size: As per load requirement
- p. Drive: Direct coupled with flexible coupling
- q. Method of Starting: DOL
- r. Shaft extension: To match the driven pump
- s. Markings: Rust proof SS Name plate details with name of Manufacturer, Manufacturer's Serial No., Year of manufacture, P.O. No., frame size, rated voltage, rated output, current, frequency, type of duty, class of insulation, no. of phases, speed in rpm at rated output, degree of protection, winding connections, ambient temp, bearing sizes, lubricant, lubrication material and year of manufacture.

PARTICULARS OF TERMINAL BOX:

- a. Connection: Six terminals brought out to terminal box (for connection in star/delta configuration, suitably rated brass links shall be supplied for making star connection) Motor should have single shaft extension with standard flat key. Suitable Cable gland is to be provided along with the terminal box.
- b. Flameproof Motor terminal box with six nos. of terminal studs of adequate current carrying capacity, suitable for use in oil and gas mines, fitted with 01 (One) no. double compression FLP cable glands. The glands shall be suitable for entry of 4 cores, 10 sq.mm, PVC insulated, PVC sheathed, multi-stranded aluminium cable armoured with GI strip/wire.
- c. Earthing: 1 (one) no. inside terminal box and 2 (two) nos. on the body of the Motor
- d. Lifting eye: 1 No.
- e. The flameproof electrical motor shall be conforming to requirements of relevant Indian or International Standards and duly tested and certified by Government Accredited Indian or International Test Houses or Laboratories. Bidder shall submit copy of valid test certificate(s) approving the appliances for use in hazardous area zone-1, gas group IIA & IIB along with the bid. Bids not accompanying required test certificates for the FLP motor will not be considered for technical evaluation.

F. HUTS

F.1 LAB CABIN & MATERIAL STORE: Containerized Chemical Laboratory Cabin cum store of minimum sizes 8000mm x 2000mm with 2 compartments complete with insulation, paneling, electric fittings, furniture and other equipment.

F.1.1 LAB CABIN:

- i. One compartment shall be for chemical laboratory of size 4500mm x 2000mm, fully furnished with working platforms for accommodating the following equipment
 - a) Gas gravitometer (electricity) for gas gravity
 - b) Hydrometer for oil gravity
 - c) Refractometer for Salinity
 - d) BS&W content- Electric/ hand centrifuge with 100 ml tubes
 - e) pH meter, pH paper - for pH measuring
 - f) Pour Point Meter- for Pour Point measurement.
- ii. U-shaped laboratory working platforms with marble top, wooden closets with sliding shutters and three nos. of revolving chair to be provided. All wooden materials shall be of white ant proof and will be able to withstand climatic condition.
- iii. The entire flooring of the lab room should have 19mm BWR marine Plywood board confirming to IS 710 manufactured by Kitply /Greenply / Swastik / Sudarshan /ITC / equivalent shall be fixed with self-tapping screws/Pop Rivet to the base of 1.5mm M. S. Plate which is continuously welded on the base frame. The bottom is scaled with caulking compound and painted with bituminous paint. The top inside layer of the plywood is covered with 2mm Tk. PVC marble tile of reputed make Vinyl.
- iv. Wash Basin with running water facility to be provided.
- v. **Electrical System:** The following electrical items shall be provided in the Bunk House:
 - a) One no. 63 amp SPN Main Switch, metallic enclosure with side handle shall be mounted outside the cabin, provided with suitable Canopy for protection against rain. Make: Havells / GE / Siemens / L&T / Schneider / ABB
 - b) One no. 8 way SPN MCB DB with 63 Amp, 30 mA RCBO as incomer, 6 nos. 6 amps MCB and 2 nos. 20 amps MCB as outgoing shall be provided inside the cabin. All MCBs shall be 10 kA, C curve. DB shall be complete with 63 amps bus bars. Protection level of the DB minimum IP-21. All circuits, incomer & outgoing shall be properly marked on DB. MCB, RCBO & DB Make: Legrand / Merlin Gerin / Siemens / L&T / Schneider / ABB.
 - c) The following Electrical facilities shall be provided inside the cabin:
 - i. LED Batten (20W LED Tube light fitting) # 03 nos. (Specifications of LED Batten: Surface mounting Powder coated, Aluminum extrusion housing, IP20 Diffused Acrylic glass fitted 4ft LED Batten LM-79 certified luminaire & LM-80 certified LED complete with integrated electronic driver and all mounting accessories. The product should have an even light distribution with system lumen greater than 2000 Lumen with 22 +/-10% W system wattage and CCT 6500k, CRI >80 and system efficacy >100 lm/W. Lifetime should be at least 40,000 hours. The product should have an Electronic constant current driver with Open & Short circuit protection, reverse polarity protection and surge protection, PF >0.9, THD <10%. Make: Bajaj / Syska / Havells / Philips / Osram)
 - ii. Four nos. 8 module switchboard complete with two nos. 15/5 Amps switch socket evenly spread out, 1 feet above the working platform to power all the lab equipment. Modular switchboards shall be white colour, horizontal, surface mounted, complete with PVC Surface Box along with modular double plates (base & cover plate) and screws etc. Make: Legrand / Schneider / Indoasian / Crabtree / Siemens
 - iii. One no. 20 amps metal-clad socket shall be provided in the room. The sockets shall be mounted in metallic enclosures and have suitably rated MCBs as switches. Matching plugs for the sockets should also be provided. Make: Legrand / Merlin Gerin / Siemens / Schneider / L&T.
 - iv. Two nos. of wall mounted fans shall be provided in the cabin. Wall mounted fans shall have 300 mm sweep and be equipped with in-built speed regulator with OFF position. Make: Usha / Compton Greaves / Bajaj / Orient. Model: Mist Air Ultra / Mist Air ZX (Usha) / Bajaj Midea BW-01-12.

F.1.2 MATERIAL STORE:

- i. Second Compartment shall be a store room of size 3500mm x 2000mm with racks for materials on three walls.
- ii. The entire flooring of Store Room shall be of MS chequered plate.
- iii. Electrical System: The electrical system should include
 - a) LED Batten (20W LED Tube light fitting) # 02 nos. (Specifications of LED Batten: Surface-mounting Powder coated, Aluminum extrusion housing, IP20 Diffused Acrylic glass fitted 4ft LED Batten LM-79 certified luminaire & LM-80 certified LED complete with integrated electronic driver and all mounting accessories. The product should have an even light distribution with system lumen greater than 2000 Lumen with 22 +/-10% W system wattage and CCT 6500k, CRI >80 and system efficacy >100 lm/W. Lifetime should be at least 40,000 hours. The product should have an Electronic constant current driver with Open & Short circuit protection, reverse polarity protection and surge protection, PF >0.9, THD <10%. Make: Bajaj / Syska / Havells / Philips / Osram)

BASIC STRUCTURE OF THE CABIN CUM MATERIAL STORE:

- i. The main fabrication of the structural framework should be of integral and all welded type to comprise of the bottom frame, overall framework, internal and external cladding with insulation and other peripherals, sloping self-draining roof and desired door-window etc. The main corner vertical support posts should be formed into a press component from 5 mm thick MS tested quality plates as per IS specifications and all the corner posts should be suitably welded at the top with a heavy gauge MS plate which should be able to hold steel forged lifting hooks or corner casting arrangement with 50 mm holes.
- ii. The main bottom (Base) frame should be fabricated and welded out of tested quality MS pressed steel channel sections of size: ISMC 125 x 65 mm and all the inter connecting cross members should also be steel channels duly welded lengthwise & breadth-wise and conveniently equally spaced and covered with 16 gauge MS sheet continuously welded to the bottom frame.
- iii. The under structure / base frame of bunk house is to be mounted on the skid consisting of 03 (three) nos. of Indian Standard Medium Beam - ISMB 200 x 100 mm hot rolled #I# section and the end having 115 mm dia. class #B# steel pipe. The #I# section beam should be placed at equal distance and connected with same size beam at 2000 mm apart & the pipe of MS on both ends in welded construction. Base frame and skid should be made in such a way that no foundation is needed for placement of bunk house.
- iv. The exterior cladding of the shell should be of COR-TEN A / JIS G3125 SPA-H/SAILCOR/IRSM 41 of 3 mm thick & should be welded to the bottom MS channel frame, corner posts, top frame & roof frame. Due to their chemical compositions, COR-TEN A steel, when utilized unprotected, exhibits increased resistance to atmospheric corrosion compared to unalloyed steels. This is because, it forms a protective layer on its surface under the influence of the weather. All gaps should be sealed at edges & at seams, bottom sills & will prevent ingress of insects, moisture etc.
- v. The roof should be of sloping type from the center forwards the walls for efficient drain of rainwater. The roof should be made of 3 mm thick COR-TENA / JIS G3125 SPA-H/SAILCOR/IRSM 41 steel sheets and is provided with adequately pressed reinforced sections from inside for additional strength and this should be able to comfortably resist loads up to 20 lbs/sq. feet. All the structural steel used should be of standard quality as per IS specifications or equivalent and all steel component / section, machine pressed for rigidity to optimize strength to weight ratio.
- vi. All door & windows should be provided with weather shed suitable size.
- vii. 75 MM thick thermo cool / mineral glass wool / fiber glass resin bonded wool conforming to IS 8185 of 1976 should be provided on all side walls, end walls, roof with special weather proof adhesives. This insulation should be hot proof, fire retardant, non- hygroscopic and vermin proof and besides having excellent thermal efficiency and acoustic performance.
- viii. 6 mm ply plus 1 mm laminate (Pre laminated boards) should be screwed on the side wall on the internal #Z# sections / square tubes. All vertical & horizontal corners should be neatly finished with aluminum anodized heavy gauge aluminum angles & flats and the vertical joints of the panels should be mixed with decorative PVC bidding patties /

aluminum patties to match with the colour of panels to suit the aesthetic appearance. The internal paneling of the roof should be of 6 mm pre laminated boards with aluminum anodized bidding patties. The ceiling of the roof should be suspended from inside on suitable #Z# section / angle framework.

- ix. Door should be of 6.5 feet (H) x 3 feet (W), with folding 1.5 mtr. x 1 mtr. Shed flush mounted double skin construction. The shutter should be open from outside. The main door should be made from higher grade aluminum extruded section fully insulated of 40 mm thickness for eliminating heat transmission and shock. The external side should be clad with 2 mm MS sheet and the internal side should be with plywood hot pressed and phenol bonded with decorative laminated sheets similar to interior finish. The door should be fixed with heavy gauge brass / stainless steel piano & Hydraulic door closer corrosion proof and all rubber gaskets packing all around door frame for complete weather proof.
- x. Windows of width 2.5 feet x 3 feet(H) wherever required to ensure cross ventilation should be made from high quality aluminum anodized extruded section of suitable size and should be of sliding type fitted with clear fiber glasses. Metallic mosquito nets should be provided on suitable framework & MS decorative grills should also be provided.
- xi. The surface preparation for all steel surfaces should be pre-treated with anticorrosive chemicals including degreasing and de-rusting and phosphating, coated with red-oxide, zinc chromate, primer conforming to IS 2074. The external surface of the bunk houses should be finally painted with two coats of corrosion resistant rubbers chlorinated marine paint or polyurethane paint.
- xii. The under frame should be painted with bituminous paint of reputed make. The colour shades and grade should be decided at the time of inspection and the highest level of aesthetic should be maintained and necessary marking / logo should be provided.
- xiii. Certified Lifting Lugs shall be provided for lifting with slings.
- xiv. Two cabin earth points (on the skid or body, outside) shall be provided diagonally for final termination of earth wires.
- xv. Two nos. earth electrode and 10-meter length of (30 mm x 6 mm) GI straps to be provided for earthing purpose. The earthing scheme shall be as per IS 3043. Each Earth Electrode shall be of 02 m length, made from 50mm dia, Galvanized pipe. Detailed drawing of the earth electrode need to be approved from OIL before manufacturing/fabrication.

F.2 SECURITY HUT: Containerized security Cabin of minimum size 2800mm x 2000mm complete with insulation, paneling, electric fittings, furniture and other equipment to be provided as detailed below.

- i. The cabin shall be for security guard, fully furnished with chair and Table.
- ii. Throughout the front side of the cabin there shall be a foldable veranda/corridor/platform with foldable weather shed/canopy, both with locking arrangement in folded position for convenience in transportation.
- iii. The fabrication of the security cabin should be of integral and all welded type, comprising of the skid, base frame, main shell framework, external & internal cladding with insulation and other peripherals like sloping self-draining roof, desired doors and windows, etc.
- iv. The entire flooring of the security cabin shall be of MS chequered plate.
- v. 1 no. Steel Personnel Locker. The locker shall be fixed on the floor & wall with suitable clamp/ bolts.
- vi. Certified Lifting Lugs shall be provided for lifting with slings
- vii. Electrical System: As the security cabin may be used within Hazardous Zone demarcated areas of mines, the electrical fittings and accessories used in the cabin shall be flameproof and weatherproof, suitable for use in Zone 1 and Zone 2 Hazardous areas of oil mines, Gas groups IIA and IIB.

F.3 CREW HUT CUM CONTROL ROOM: Control cabin of size 8000mm x 2000mm complete with G.I. Rock wool insulation, paneling, electric fitting, furniture and other equipment to provide accommodation for office and the Instrumentation PLC system. The cabin shall be used as portable modules and shall be deployed at any place.

1. The main fabrication of the structural framework should be of integral and all welded type to comprise of the bottom frame, overall framework, internal and external cladding with insulation and other peripherals, sloping self-draining roof and desired door-window, A/C opening etc. The main corner vertical support posts should be formed into a press component from 5 mm thick MS tested quality plates as per IS specifications and

all the corner posts should be suitably welded at the top with a heavy gauge MS plate which should be able to hold steel forged lifting hooks or corner casting arrangement with 50 mm holes.

2. The main bottom (Base) frame should be fabricated and welded out of tested quality MS pressed steel channel sections of size: ISMC 125 x 65 mm and all the inter connecting cross members should also be steel channels duly welded lengthwise & breadth-wise and conveniently equally spaced and covered with 16 gauge MS sheet continuously welded to the bottom frame.
3. The under structure / base frame of bunk house is to be mounted on the skid consisting of 03 (three) nos. of Indian Standard Medium Beam - ISMB 200 x 100 mm hot rolled #I# section and the end having 115 mm dia. class #B# steel pipe. The #I# section beam should be placed at equal distance and connected with same size beam at 2000 mm apart & the pipe of MS on both ends in welded construction. Base frame and skid should be made in such a way that no foundation is needed for placement of bunk house.
4. 19 mm plywood / particle board / cement bonded Particle boards conforming to IS 710 manufactured by Anchor / swastika / Kitply / Sudarshan / ITC should be fixed with self-tapping screws to the base of MS plate which is welded to the bottom frame. The bottom should be sealed with caulking compound and painted with bituminous paint. The top inside layer of the plywood should be covered with PVC sheet of Bhor / Royal Touch / Premier Vinyl.
5. The exterior cladding of the shell should be of COR-TEN A / JIS G3125 SPA-H/SAILCOR/IRSM 41 of 3 mm thick & should be welded to the bottom MS channel frame, corner posts, top frame & roof frame. Due to their chemical compositions, COR-TEN A steel, when utilized unprotected, exhibits increased resistance to atmospheric corrosion compared to unalloyed steels. This is because, it forms a protective layer on its surface under the influence of the weather. All gaps should be sealed at edges & at seams, bottom sills & will prevent ingress of insects, moisture etc.
6. The roof should be of sloping type from the center forwards the walls for efficient drain of rainwater. The roof should be made of 3 mm thick COR-TEN A / JIS G3125 SPA-H/SAILCOR/IRSM 41 steel sheets and is provided with adequately pressed reinforced sections from inside for additional strength and this should be able to comfortably resist loads up to 20 lbs/sq. feet. All the structural steel used should be of standard quality as per IS specifications or equivalent and all steel component / section, machine pressed for rigidity to optimize strength to weight ratio.
7. All door & windows & air conditioner opening should be provided with weather shed suitable size.
8. 75 MM thick thermo cool / mineral glass wool / fiber glass resin bonded wool conforming to IS 8185 of 1976 should be provided on all side walls, end walls, roof with special weather proof adhesives. This insulation should be hot proof, fire retardant, non- hygroscopic and vermin proof and besides having excellent thermal efficiency and acoustic performance.
9. 6 mm ply plus 1 mm laminate (Pre laminated boards) should be screwed on the side wall on the internal #Z# sections / square tubes. All vertical & horizontal corners should be neatly finished with aluminum anodized heavy gauge aluminum angles & flats and the vertical joints of the panels should be mixed with decorative PVC bidding patties / aluminum patties to match with the colour of panels to suit the aesthetic appearance. The internal paneling of the roof should be of 6 mm pre laminated boards with aluminum anodized bidding patties. The ceiling of the roof should be suspended from inside on suitable #Z# section / angle framework.
10. Door should be of 6.5 feet (H) x 3 feet (W), with folding 1.5 mtr. x 1 mtr. Shed flush mounted double skin construction. The shutter should be open from outside. The main door should be made from higher grade aluminum extruded section fully insulated of 40 mm thickness for eliminating heat transmission and shock. The external side should be clad with 2 mm MS sheet and the internal side should be with plywood hot pressed and phenol bonded with decorative laminated sheets similar to interior finish. The door should be fixed with heavy gauge brass / stainless steel piano & Hydraulic door closer corrosion proof and all rubber gaskets packing all around door frame for complete weather proof.
11. Windows of width 2.5 feet x 3 feet (H) to ensure cross ventilation should be made from high quality aluminum anodized extruded section of suitable size and should be of sliding type fitted with clear fiber glasses. Metallic mosquito nets should be provided on

suitable framework & MS decorative grills should also be provided. Quantity in number of windows should be as per our drawing. Fancy curtain rods and sockets should be provided with curtain.

12. The surface preparation for all steel surfaces should be pre-treated with anticorrosive chemicals including degreasing and de-rusting and phosphating, coated with red-oxide, zinc chromate, primer conforming to IS 2074. The external surface of the bunk houses should be finally painted with two coats of corrosion resistant rubbers chlorinated marine paint or polyurethane paint.
13. The under frame should be painted with bituminous paint of reputed make. The colour shades and grade should be decided at the time of inspection and the highest level of aesthetic should be maintained and necessary marking / logo should be provided.
14. **ELECTRICAL SYSTEMS:** The following electrical items shall be provided in the Bunk House:
 - a) One no. 63 amp SPN Main Switch, metallic enclosure with side handle shall be mounted outside the cabin, provided with suitable Canopy for protection against rain. Make: Havells / GE / Siemens / L&T / Schneider / ABB
 - b) One no. 8 way SPN MCB DB with 63 Amp, 30 mA RCBO as incomer, 6 nos. 6 amps MCB and 2 nos. 20 amps MCB as outgoing shall be provided inside the cabin. All MCBs shall be 10 kA, C curve. DB shall be complete with 63 amps bus bars. Protection level of the DB minimum IP-21. All circuits, incomer & outgoing shall be properly marked on DB. MCB, RCBO & DB Make: Legrand / Merlin Gerin / Siemens / L&T / Schneider / ABB.
 - c) The following Electrical facilities shall be provided inside the cabin:
 - i. LED Batten (20W LED Tube light fitting) # 04 nos. (Specifications of LED Batten: Surface mounting Powder coated, Aluminum extrusion housing, IP20 Diffused Acrylic glass fitted 4ft LED Batten LM-79 certified luminaire & LM-80 certified LED complete with integrated electronic driver and all mounting accessories. The product should have an even light distribution with system lumen greater than 2000 Lumen with 22 +/-10% W system wattage and CCT 6500k, CRI >80 and system efficacy >100 lm/W. Lifetime should be at least 40,000 hours. The product should have an Electronic constant current driver with Open & Short circuit protection, reverse polarity protection and surge protection, PF >0.9, THD <10%. Make: Bajaj / Syska / Havells / Philips / Osram)
 - ii. LED Batten (10W LED Tube light fitting) # 02 nos. (Specifications of LED Batten: surface mounting Powder coated, Aluminum extrusion housing, IP20 Diffused Acrylic glass fitted 4ft LED Batten LM-79 certified luminaire & LM-80 certified LED complete with integrated electronic driver and all mounting accessories. The product should have an even light distribution with system lumen greater than 1000 Lumen with 11 +/-10% W system wattage and CCT 6500k, CRI >80 and system efficacy >100 lm/W. Lifetime should be at least 40,000 hours. The product should have an Electronic constant current driver with Open & Short circuit protection, reverse polarity protection and surge protection, PF >0.9, THD <10%. Make: Bajaj / Syska / Havells / Philips / Osram)
 - iii. Two nos. 8 module switchboard complete with two nos. 15/5 Amps switch socket. Modular switchboards shall be white colour, horizontal, surface mounted, complete with PVC Surface Box along with modular double plates (base & cover plate) and screws etc. Make: Legrand / Schneider / Indoasian / Crabtree / Siemens
 - iv. One no. 20 amps metal-clad socket shall be provided in the room. The sockets shall be mounted in metallic enclosures and have suitably rated MCBs as switches. Matching plugs for the sockets should also be provided. Make: Legrand / Merlin Gerin / Siemens / Schneider / L&T.
 - v. Three nos. of wall mounted fans shall be provided in the cabin. Wall mounted fans shall have 300 mm sweep and be equipped with in-built speed regulator with OFF position. Make: Usha / Compton Greaves / Bajaj / Orient. Model: Mist Air Ultra / Mist Air ZX (Usha) / Bajaj Midea BW-01-12.

- d) Two cabin earth points (on the skid or body, outside) shall be provided diagonally for final termination of earth wires.
- e) One 1.5-ton window AC unit shall be supplied and installed in the bunkhouse at a suitable location to be decided during drawing approval. A.C. unit shall be of rotary compressor type. Following points are to be considered for the ACs
 - i. Make of AC shall be Voltas / LG / Godrej / Blue star / Samsung.
 - ii. AC should be minimum 3 Star rated by BEE, GOI for energy efficiency.
 - iii. Warrantee minimum 1 year; Guarantee certificate, test certificate etc. shall be provided.
 - iv. Operation & Maintenance manual of the AC shall be provided.
- f) Two nos. earth electrode and 10-meter length of (30 mm x 6 mm) GI straps to be provided for earthing purpose. The earthing scheme shall be as per IS 3043. Each Earth Electrode shall be of 02 m length, made from 50mm dia, Galvanized pipe. Detailed drawing of the earth electrode need to be approved from OIL before manufacturing/fabrication.
- g) **SPECIFICATIONS OF MATERIALS (ELECTRICAL):**
 - i. All wiring from MCB DB to switchboards/ points/ sockets etc. shall be concealed type inside the paneling, running through PVC conduit.
 - ii. Medium grade, ISI approved, FR PVC conduits shall be used for wiring. Conduit size and no. of wires in conduit shall be as per IS. Corners shall be rounded elbow type for ease of insertion of wires. Make: AKG / PLAZA / Finolex / Polycab.
 - iii. The wiring cable shall be PVC insulated, 1100 V grade, fire-retardant low smoke type, multi-stranded flexible copper conductor and approved by ISI, Fire Insurance Authority & Tariff Advisory Committee.
 - iv. All wires shall be colour coded as Red for Phase, Black for neutral and Green for earth. All wire ends in DB, Main Switch and Socket outlets shall have copper lugs of Dowell's or equivalent make.
 - v. All points shall have individual switches and independent neutral wire. Separate switchboards shall be provided for crew room, store room & workshop / battery room. All light and fan points shall be suitably distributed in the switchboards with individual switches. In addition, each switchboard shall be provided with one no. 6 Amps switch-socket. For ease of operation, two or more switch board shall be provided in the crew room. Switchboards shall be made of 1.6 mm thick MS boxes having 3.0 mm thick white coloured, ISI approved Hylam sheet.
 - vi. All switches and switch-sockets shall be flush type.
- h) **CABLE SIZES:**
 - i. 1.5 sq mm copper cable with earth wire of 1.5 sq mm for point wiring.
 - ii. 2.5 sq mm copper cable with 2.5 sq mm earth wire for circuit wiring from DB to switchboard.
 - iii. 4.0 sq mm cable for power sockets.
 - iv. The main switch outgoing shall be wired to the DB with 10 sq mm, 4 core (for phase, neutral and earth) PVC insulated, 1100 V grade, fire-retardant, multi-stranded flexible copper conductor and approved by ISI, Fire Insurance Authority & Tariff Advisory Committee.
- i) **Following shall comprise the electrical scope of work:**
 - i. Bidder shall submit electrical schematic with earthing scheme & indicative bill of materials within 15 days after placement of PO, for OIL's approval.
 - ii. After placement of order, party has to submit detailed electrical drawings, bill of materials and specification of all materials, light fittings, fans etc. at least 15 (fifteen) days before start of work. All modifications in the work plan and item description as required by OIL shall have to be agreed by the party.
 - iii. The electrification job shall start only after approval of drawings and sample of material by Head-Electrical in writing.

- iv. Entire electrical installation work has to be done by licensed electrician as per IE Rules and NEC codes. Party will submit the copy of the valid licenses of their work persons to OIL before start of the work.
- v. Party shall notify OIL for inspection of wiring work before fixing of panels, at least 15 (fifteen) days in advance.
- vi. Test report of the entire electrical work as per IE Rules will have to be submitted to OIL after completion of the job.
- vii. The electrical work shall be treated as complete once installation, testing & commissioning of electrical works are accepted by OIL's Electrical Department and submission of test report for electrical works, as installed drawings & list of electrical items used, spares for lighting system by the party.
- viii. Electrical works inside the bunk house shall be offered for Stage inspection by OIL's Electrical Engineer during the fabrication period, before final completion of the electrical works. All the points/observations/technical recommendations made by OIL during the stage inspection shall be incorporated/ implemented in the PCR without any additional cost to OIL.

15. FURNITURE ITEMS:

All offered furniture should be of executive class. Bidder should forward catalogue, drawing (with specification) of all items without which the bid will be liable for rejection. The Bill of Material provided below is for per Bunk House.

- a. Steel Wardrobe (size: 6 feet x 3 feet x 18 inch+), Make: Godrej - 1 no.
- b. Personal Locker (2 nos.)
- c. Office table - Godrej make model-WT 718\716 # 1 no.
- d. Office Chairs - Godrej make model-PCH 7003D # 6 nos.
- e. Tea table - Godrej make wooden top design # 01 no.
- f. Executive class shelves / racks made of water proof ply board
- g. Curtains: Executive Class curtains are to be provided for all the windows and partition curtains should be of full length (door height) double layer two pieces.
- h. Wash basin with mirror and soap tray - 1 set
- i. Utility table should be of marble top - 1 No.
- j. Refrigerator of capacity not less than 190 L, of reputed make available in Indian Market-1 No.
- k. Double berth for resting of work person.

G. GENERATING SET (Qty. 2nos.)

Diesel Engine Driven Generating Set complete with Diesel Engine, Alternator, Electric Control Panel and Acoustic Enclosure.

Rating and output of Generator Set: 62.5/63 KVA, 415 Volts 3 phase, 0.8 pf (lag), 50 Hertz, prime duty and G2 performance as per ISO 8528 with 10% overload capacity.

The DG Set shall meet the requirements of latest CPCB norms, in respect of "emission norms" for the engine and "noise norms" for DG sets.

ALTERNATOR:

- a) Brushless type alternator of suitable KVA rating when coupled to suitable Diesel Engine shall develop 62.5/ 63 KVA at 3 phases, 0.8 power factor, 415 Volt, 50 Hz when running at 1500 rpm
- b) Conformance to: IS: 4722, IS: 13364 with latest amendments
- c) Alternator Enclosure Protection: IP 23
- d) Alternator Terminal Box Protection: IP 54

Make of the Alternator:

KIRLOSKAR / NGEF / STAMFORD / CROMPTON GREAVES / CATERPILLAR / KATO / GENERAL ELECTRIC, USA.

CONTROL PANEL: The panel should be designed and manufactured as per IS-8623.

Change over switch panel (COSP) should be provided.

PRIME MOVER: The Diesel Engine shall be 4-stroke In-line with individual cylinder head for each cylinder, developing BHP (not less than 80 BHP gross) at 1500 RPM and rated for Prime Duty and G2 performance as per ISO: 8528-5 standard. The diesel engine should conform to standards ISO3046/ BS5514/ IS: 13018 (for turbocharged Diesel Engine) and IS: 10000 series (with latest Amendments).

Make of Prime Mover (Diesel Engine): Kirloskar/Cummins/ Caterpillar/Eicher.

ACOUSTIC ENCLOSURE: The Acoustic enclosure shall be designed and manufactured conforming to relevant standards suitable for outdoor installation exposed to weather conditions, and to limit overall noise level as per latest CPCB norms under free field conditions.

H. AIR COMPRESSOR (Qty: 2 nos.)

Skid Mounted Electrical Motor Driven Reciprocating Air Compressor.

- Single acting, two stages, reciprocating air compressor with prime mover of suitable capacity electrical motor, complete with air receiver horizontal type tank, pressure gauges and switches, safety valves, pressure actuated-automatic electrical motor start-stop control switch and all other accessories.
- Performance Data: Minimum discharge pressure: 150 PSI, Minimum actual air delivery requirement: 30 cfm
- The Air compressor should be tested as per Standard ISO 1217.
- Make of the Air Compressor: INGERSOLL RAND / ELGI / KIRLOSKAR PNEUMATIC / ATLAS COPCO.
- Prime Mover:
Electric Motor: The Electrical Motor conforming to the specification of three phase induction motor: IS Code: 325-1996 (Reaffirmed-2007), or IEC 34 and as applicable with following features:
 - a) Non-FLP, squirrel cage, 3 phase Induction Motor.
 - b) Motor Rating: As suited for the driven Air Compressor
 - c) Voltage: 415 Volt +/-6%, Frequency: 50 +/- 3%Hz
 - d) Enclosure: TEFC / IP: 55 as per IS: 4691 of 1985
 - e) Insulation class: F and temperature rise limited to Class-B
 - f) Make of electrical motor: CROMPTON GREAVES/ BHARAT BIJLEE/ SIEMENS/ KIRLOSKAR ELECTRIC/ NGEF/LEROY SOMER.
- Motor Starter: The motor must be supplied along with a Stand-alone DOL or Star-Delta starter with Overload, Single Phasing, Short Circuit protections.
- Air Receiver: Horizontal type skid mounted receiver, of min. capacity of 270 Ltrs, hydro tested as per IS or equivalent standards and manufactured according to standards: IS: 2825-1969/ ASME VIII Standard/ BS-5169-1975, Performance Guarantee Test as per: IS: 5456-1985.
- Drive Arrangement: The transmission of power from the Electric Motor to the Air Compressor should be facilitated through V-belt and pulley. All the exposed moving components of compressor must be covered by strongly built safety guards.

I. FIRE SAFETY EQUIPMENT

I.1 FIRE EXTINGUISHER

I.1.1 STORED PRESSURE TYPE 9 KG DCP EXTINGUISHER WITH ISI MARKED – 14 NOS. (MAKE: KANNEX/ FIRE SAFETY DEVICE/ SAFEX/ VINTEX)

i. General

- a. Standard Code Conforming to IS 15683:2006 (latest revisions as on bid due date)
- b. Marking IS: 15683
- c. Type Portable Stored Pressure Type
- d. Fire Rating 34B
- e. Classification Class B & Class C

ii. Material of Construction

- a. Body Carbon Steel as per # IS: 513 (latest revision), EDD grade with no vertical weld joint on the body.
- b. Neck Ring Seamless Mild Steel Tube conforming to IS: 1239 (Part1) - Latest Revision.
- c. Valve Assembly SS-316 or Forged Brass as per IS:6912 grade FLB (Latest Revision)
- d. Siphon Tubes SS-316 or Brass as per IS:407
- e. Discharge Nozzle SS-316 or Forged Brass as per IS:319 (Latest Revision)
- f. Discharge Hose EPDM Rubber (length 500 mm).
- g. Wall Mounting Bracket Mild Steel (Powder coated), as per Annexure
- h. Safety Pin SS-316/ ASTM 201/ SUS 201
- i. Pressure Gauge / Indicator, as per IS:15683(latest revision)
- j. Fire extinguisher shell including dished ends shall have minimum 1.8 mm thickness.
- k. Fire Extinguisher shall be fabricated out of sheet of minimum 2mm thickness.

iii. Extinguishing Media

Dry Chemical Powder Potassium bi-carbonate (min 90 % of total composition of the chemicals) based ISI marked Dry Chemical Powder confirming to IS: 4308 (latest revision).

iv. Propellants

Expellant Gas: Dry Nitrogen gas as per IS 15683(latest revision)

v. Dimensions

- a. Diameter of body 175 ± 10 mm
- b. Overall Height Less than 650 mm

vi. General Operating

Operating Temperature: 0 Deg C to +55 Deg C

vii. Painting/Marking

- a. Anticorrosive Treatment Phosphating by hot dipping process to thickness not less than 0.012 mm both internally & externally.
- b. Painting Epoxy polyester powder coating of minimum 50-micron thickness to all metallic external parts.
- c. Fluorescent Tape Two bands of yellow colored fluorescent adhesive tape of minimum 20 mm Width on the body.
- d. Marking: Colored, Oil India Limited Logo along-with Name of the Company (Minimum 40 mm size) shall be printed on the extinguisher body. All other markings as per IS:15683
- e. Finish Post Office Red as per Shade 538 of IS: 5.

viii. Drawing & Quality Assurance Plan (QAP)

- a. Drawing: Vendor shall submit detailed drawing along with material of construction & obtain approval of OIL before start of fabrication.
- b. QAP: Vendor shall submit detailed Quality Assurance Plan & obtain approval of OIL before start of fabrication.

ix. Spares: Following Spares shall be provided along with Fire Extinguishers:

- a. Matching Pressure Gauge - 5 Nos.
- b. Discharge Tube - 5 Nos.
- c. Syphon Tube - 5 Nos.
- d. PVC base cover (if applicable) - 5 Nos.
- e. Complete Valve Assembly - 5 Nos.
- f. "O" Ring - 100 Nos.
- g. Safety Pin - 20 Nos.

I.1.2 6.5/6.8 KG CO2 EXTINGUISHER WITH ISI MARKED – 5 NOS. (MAKE KANNEX / FIRE SAFETY DEVICE / SAFEX / VINTEX)

i. Equipment Particulars

- a. Name: CO2 Fire Extinguisher
- b. Type: Portable, High Pressure type
- c. Capacity: 6.5 Kg of CO2
- d. Classification: Class B & Class C
- e. Fire Rating: 55B
- f. Operating Temperature: -30°C to +55°C
- g. Standard Applicable: IS-16018

ii. Design Particulars

- a. Body: 9.8 liters water capacity; IS-7285
- b. Discharge Valve: Wheel type; IS-3224
- c. Safety Device: Inbuilt rupture disc; IS-5903
- d. Siphon Tube: Adequate length; IS-738
- e. Hose: 1 m long, as per SAE 100R1, with burst pressure of not less than 275 kg/cm2.
- f. Discharge Horn: Non-conductive type
- g. CO2 Gas: 99.5% pure, Gas filling ratio-0.667; IS-15222 Maximum moisture 0.015%
- h. Paint: IS-2932
- i. Accessories (Trolley): As per IS-16018

iii. Material of Construction

- a. Body: Manganese Steel DS 658 (Seamless)
- b. Valve: Brass
- c. Syphon Tube: Aluminium
- d. Hose: Wire Braided
- e. Discharge Horn: Plastic (Polyethylene)
- f. Safety Pin: SS-316
- g. Trolley with wheel: Mild Steel (Powder coated), solid rubber

iv. Painting

- a. Primer: Two coats of epoxy primer (Powder coated)
- b. Finish: Post Office Red Shade 538 of IS-5
- c. Band: Black
- d. OIL logo: Colored with Company's Name (minimum 40mm size)

v. Markings / Stamping

- a. Standard Operating Instruction Sticker
- b. Name of Manufacturer
- c. Year of Manufacture
- d. Test Pressure
- e. Bearing ISI mark, IS-16018

vi. Inspection & Testing

- a. Inspection: As per Quality Assurance Plan (QAP) approved by OIL
- b. Testing: As per IS-16018
- c. Discharge duration test: 95% Discharge in 8-20 Seconds

vii. Documents to be submitted

- a. Approval Certificate: CCoE (PESO) & BIS Certificates
- b. Material Certificate: Manufacturing Certificates
- c. Test Certificate: As per applicable IS
- d. Drawing: Detailed Drawing
- e. Catalogue: Complete catalogue containing O&M Manual

Note: IS Codes mentioned above shall be latest revision as on bid due date.

I.2 PORTABLE FIRE WATER MONITORS (4 NOS.) - STAND POST TYPE FOAM CUM WATER MONITOR:

- i. Monitor waterways 63mm size made out of M.S. (ASTM-A-106 Gr. B)-Seamless pipe, hot dip galvanized
- ii. 80mm NB flanged inlet, Flange Dimension: O.D. 200mm, PCD 160mm, four 19 mm dia holes
- iii. Gunmetal swivel joints & S.S. ball bearing with S.S. locking arrangement
- iv. Permitting of 360 degrees horizontal rotation in either direction & vertical rotation of minimum 135° (90° upward and 45° downward)
- v. Duly equipped with Non Aspirating Aqua Foam Nozzle, aluminium alloy with foam pick-up tube with wire braided PVC pipe 3.0 meters long, suitable for a discharge of 1750 LPM at 7kg/cm² pressure and conforming to IS:8442 of 2008 or latest.
- vi. Having Horizontal throw of minimum 53 mtrs. at 30 deg. angle in still air with Water and throw of minimum 45 mtrs. at 30 deg. angle in still air with Foam.
- vii. Bearing IS: 8442 ISI marked.
- viii. The entire assembly shall be hydraulically tested to a pressure of 23 kg/cm² for 5 min and there shall be not be any leakage. The test certificate shall be submitted along with supply of material.
- ix. The unit/equipment shall be clearly and permanently marked with the following:
 - a. Manufactures name and its trade mark
 - b. Year of manufacture, and
 - c. Discharge capacity in lpm.
- x. The Monitor shall be painted with fire red or post office red colour conforming to shade No. 536 or 538 of IS 5. The paint shall conform to IS 2932.
- xi. The party should also include the supply of additional spare parts / accessories as mentioned below:
 - a. Non-Aspirating Aqua Foam Nozzle - Jet & Spray type, made of Aluminium alloy, flow capacity of 1750 LPM, having Horizontal throw of 53mtr. Water & 45mtr. Foam at 30 deg. angle in still air condition. (Quantity: 1 No. with each monitor)
 - b. Wire Braided Transparent Pick-up Tube 3mtrs. long, duly fitted with SS dip pipe for the above Aqua Foam Nozzle. (Quantity: 1 No. with each Aqua Foam Nozzle)
 - c. MS-Nozzle Spanner, hexagonal (Quantity: 1 No. with each monitor)
 - d. MS-Matching Flange with each Monitor. (Quantity: 1 No. with each monitor)
 - e. 'O' Rings for Swivel joint (02 Nos.) with each monitor.
 - f. Set of Nuts, Stud Bolts and Gasket for Matching Flange.
 - g. 02 Nos. Extra MS-Handle with each monitor.
 - h. 02 Pairs of Extra Lock-handles with each monitor.

I.3 FIRE FIGHTING DELIVERY HOSE (TYPE 3) (15 METERS LENGTH)

Non-percolating firefighting delivery Hose completely composite construction circularly woven three layered synthetic jacketed fully encapsulated with a specially formulated elastomer, resistant against grease, oils, acids and alkalis, heat, fungus, ozone and other chemicals with outer design to facilitate a good grip, completely flexible and light weight, no maintenance with Burst Pressure 42.0 Kg per sq. cm and Proof Pressure 22 Kg/cm² bearing ISI Marked IS: 636 Type "3" in dia 63mm (2 & 1/2 inch) and fitted with instantaneous Male & Female Coupling Stainless Steel bearing ISI marked under IS: 903.

I.4 RING LINE: Ring line for the SPF of diameter 4" with connection points for trailer firefighting pump. Ring line should be complete with 4 nos. of fire water monitors and 2 nos. of hydrant points with isolating valves. The ring line should be easy to assemble and dismantle for portability of the SPF.

I.5 FIRE SIREN: Fire Siren dynamically balanced. Range – 300 meters. Two (2) nos. fire sirens are to be provided, one manual and one electrical.

I.6 HI-VISIBILITY WIND SOCK

Hi-visibility Reflective Wind Sock made from Red and White parachute cloth in which each red strap is added with the reflective (fluorescent clothing) tape, to facilitate the direction of Wind sock even during night hours. Logo of Oil India Limited printed on the white cloth. The sock has eyelets at equal distance with PP rope attachment at ring end.

i. Size:

Diameter at Ring end = 2 feet

Diameter at loose end = 1 feet

Length of the sock = 6 feet

ii. The logo size of company printed on the white cloth 1 feet x 1 feet

iii. No. of impressions of logo on each sock = 6 Nos.

iv. Wind Sock Stand: Wind sock stand, made out of Stainless-Steel material of 1.5 meter (Approx. 5 feet) length rod with 610 mm Dia size circle bracket of SS 304/316 material at the top of the pole having Ball Bearing (SKF/TATA/NBC), to be fitted such that, a circle rotates on the axis of the pole.

J. OTHER EQUIPMENT

- **BOWSER LOADING SYSTEM:** Suitable portable Bowser Loading Arrangement to load 12/16/20 KL capacity Bowsers. Provision shall be such that 2(two) nos. of bowsers can be loaded simultaneously.

- **OIL DIVERTER MANIFOLD:**

01 (One) no. five-way oil diverter manifold of ASME 300 class, with five valve configuration. All valves of the diverter manifold should conform to API 6D.

- **CHOKE MANIFOLD:**

01 (One) no. of choke manifold of 5000 psi pressure rating to be provided between Test Header of Manifold & the Indirect Water Bath Heater.

Technical Specification:

Choke Manifold, 52.39 mm (2.1/16"), 352 Kg/ Cm. Sq. (5000 psi) W.P., double arm, conforming to API specification 6A (latest edition), as detailed below:

Material: Minimum 60 K API Forged / Cast Alloy Steel

Product specification level : PSL 1

Performance Rating : PR 1

Material Class : AA

Temperature Rating : U

Working pressure : 352 Kg/ Cm. Sq. (5,000 psi)

Test Pressure : 528 Kg/ Cm. Sq. (7,500 psi)

1.0 The Choke manifold shall consist of following items.

1 (a) CROSS PIECE: (Qty. 01 no.)

Cross Piece, full bore, double arm, 352 Kg/ Cm. Sq. (5,000 psi) working pressure. Studded, API 6B Type, 52.39 mm (2.1/16"), RX 24 ring grooved. Cross piece shall be complete with studs & nuts, and tapped ½" NPT in the center, plugged with suitable blind plug.

Assembly instruction: After the master valve [item 1(b) (i)].

1 (b) (i) MASTER VALVE, (ii) SIDE VALVE: (Qty.: 03 nos.)

Gate Valves (One master valve, two side valves), forged Steel, 52.39 mm (2.1/16"), 352 Kg/ Cm. Sq. (5,000 psi) working pressure, flanged end, RX 24 ring grooved, full bore through conduit, complete with hand wheel.

Internal construction: Replaceable gate and seat assembly, parallel solid slab gate construction with floating seat, back seat arrangement on the stem, non-rising stem supported on two thrust bearings, with plastic packing and grease injecting ports.

Assembly instruction: One no master valve [item 1(b)(i)] on inlet of cross piece [item 1(a)]. Two nos. side valves [item 1(b)(ii)] on side outlets of cross piece [item 1(a)] in each arm of Choke Manifold.

1 (b) (iii) ARM VALVE: (Qty.: 02 nos.)

Gate Valves, forged Steel, 52.39 mm (2.1/16"), 352 Kg/ Cm. Sq. (5,000 psi) working pressure, Screwed end, full bore through conduit, complete with hand wheel.

Internal construction: Replaceable gate and seat assembly, parallel solid slab gate construction with floating seat, back seat arrangement on the stem, non-rising stem supported on two thrust bearings, with plastic packing and grease injecting ports.

Assembly instruction: Two nos. arm valves [item 1(b) (iii)] after positive choke assembly [item 1(c)(i)] / adjustable choke assembly [item 1(c)(ii)] in each arm Choke Manifold.

1(c) (i) POSITIVE CHOKE ASSEMBLY: (Qty.: 01 no.)

Positive Choke assembly, full bore, 352 Kg/ Cm. Sq. (5,000 psi) working pressure, complete with Honest John Bean adapter and cap for changing bean. Inlet connection shall be flanged, API 6B Type, 52.39 mm (2.1/16"), RX 24 ring grooved. Outlet connection threaded, 2" LP female thread.

Assembly instruction: In between side valve [item 1(b) (ii)] and spacer nipple [item no 1(d) (i)] in one arm of Choke Manifold.

1(c) (ii) ADJUSTABLE CHOKE ASSEMBLY: (Qty.: 01 no.)

Adjustable Choke assembly, full bore, 352 Kg/ Cm. Sq. (5,000 psi) working pressure, choking range 1/16" to 1". With stainless steel stem & seat, Teflon stem packing, and having indicator & locking arrangement. Inlet connection shall be flanged, API 6B Type, 52.39 mm (2.1/16"), RX 24 ring grooved. Outlet connection threaded, 2" LP female thread.

Assembly instruction: In between side valve [item 1(b) (ii)] and spacer nipple [item no 1(d) (i)] in one arm of Choke Manifold.

1(d) (i) & (ii) SPACER NIPPLE: (Qty.: 04 nos. per set)

Spacer nipple, full bore, 352 Kg/ Cm. Sq. (5,000 psi) working pressure, tapped 1/2" NPT at the center plugged with ½" NPT blind plug, length 304.8 mm (12"). Both end threaded, 2" API line pipe thread.

Assembly instruction: Two nos. spacer nipple [item 1(d)(i)] between positive choke assembly [item 1(c)(i)] / adjustable choke assembly [item 1(c)(ii)] and arm valve [item no 1(b)(iii)], and two nos. spacer nipple [item 1(d)(ii)] between arm valve [item 1(b)(iii)] and Tee [item 1(e)] in each arm of Choke Manifold.

1(e) TEE PIECE: (Qty.: 02 nos.)

Tee Piece, full bore, 352 Kg/ Cm. Sq. (5,000 psi) working pressure. Studded, API 6B Type, 52.39 mm (2.1/16"), Threaded, 2" API Line pipe thread.

Assembly instruction: After Spacer spool [item 1(d)(ii)], which is installed after arm valve [item 1(b)(iii)] and Inter connecting spool [item 1(f)] in each arm of the Choke Manifold.

1 (f) INTERCONNECTING NIPPLE: (Qty.: 02 nos.)

Interconnecting nipple, full bore, 352 Kg/ Cm. Sq. (5,000 psi) working pressure. Both end threaded, 2" API line pipe thread.

Assembly instruction: Between two Tee Piece [item 1(e)], connected by wing union [item 1(g)].

1 (g) WING UNION: (Qty.: 01 no.)

Wing union, full bore, 352 Kg/ Cm. Sq. (5,000 psi) working pressure. Threaded, 2" API line pipe thread.

Assembly instruction: Between two interconnecting nipple [item 1(f)].

1 (h) BULL PLUG: (Qty.: 02 nos.)

Bull plug, 352 Kg/ Cm. Sq. (5,000 psi) working pressure. Threaded, 2" API line pipe thread.

Assembly instruction: Two nos. of bull plug [item 1(h)] after Tee piece [item 1(g)] in each arm of the Choke Manifold.

1(i) BLIND FLANGE: (Qty.: 01 no.)

Blind flange, 352 Kg/ Cm. Sq. (5,000 psi) working pressure, API 6B Type, 52.39 mm (2.1/16"), RX 24 ring grooved.

Assembly instruction: On cross piece [item 1(a)] on the opposite side of master valve [item 1(b)(i)].

1(j) STUDS WITH HEXAGONAL NUTS: (Qty.: requisite nos.)

Studs & Nuts of various sizes as required for assembling of Choke Manifold.

1(k) RING JOINT GASKETS: (Qty.: requisite nos. per set)

Ring Joint Gaskets, RX Type, of various sizes as required for assembling of the Choke Manifold.

1(l) SKID: (Qty.: 01 no.)

Skid with chequered plate top and lifting lugs, 1 ft. high, dimension as required to accommodate the Choke Manifold without any overhang, with provision for proper support and clamping for hold the Choke Manifold securely.

Assembly instruction: Under the Ground X Mass Tree providing support and securely clamped.

2. ACCESSORIES /SPARES

2(a) Needle valve, straight type, 12.70 mm (1/2") X 352 Kg/ Cm. Sq. (5,000 psi) working pressure, 1/2" NPT Pin & Box threads: (Qty.: 03 nos.)

2(b) Pressure gauge, range: 0-352 Kg/ Cm. Sq (0-5000 psi), bottom entry, 1/2" NPT Pin: (Qty.: 03 nos.)

2(c) Flow Beans, Honest John type, of assorted sizes: 1.5 mm, 2.0 mm, 2.5 mm, 3.0 mm, 3.5 mm, 4.0 mm, 4.5 mm, 5.0 mm, 5.5 mm, 6.0 mm, 6.5 mm, 7.0 mm, 7.5 mm, 8.0 mm, 8.5 mm, 9.0 mm, 9.5 mm, 10.0 mm, 11 mm, 12 mm (total 20 nos.): (Qty.: 01 set. per set)

2(d) Bean & Bean Adapter Wrench: For Flow Bean [item no 2(d)] & Bean adapter installed in positive choke assembly [item 1(f)]: (Qty.: 01 set)

• **LAB EQUIPMENT:**

a) **CONSTANT TEMPERATURE WATER BATH: (Qty: 01 No.)**

Technical Specification:

1. Heating temperature: From 5 deg C to 100 deg C
2. Dimension (inside working space) L x B x H: 750mm x 555mm x 375mm (approx.)
3. Bath volume: 130 L.
4. Heating Power: Minimum 2 kW
5. Pump: Minimum delivery (suction): Minimum 20L/min Minimum delivery pressure: 0.5 bar
6. Spare heaters: 6 nos. (Sp. clause 1)
7. Temperature display: +/- 0.1deg C
8. Power supply requirement: 220-230V/50Hz
9. Temperature uniformity: +/- 1degC
10. Temperature accuracy: +/- 1degC
11. Temperature resolution: +/- 0.1degC
12. Safety features: Low-level alarm/over temp cutoff.

b) **HYDROMETER: (Qty: 3 Set)**

1. Density Hydrometer (Range 0.800 -0.850 g/ml), Shot & wax poised, adjusted for use at 15°C.
2. Density Hydrometer (Range 0.900-0.950 g/ml), Shot & wax poised, adjusted for use at 15°C
3. Density Hydrometer (Range 0.850-0.900 g/ml), Shot & wax poised, adjusted for use at 15°C
4. Density Hydrometer (Range 0.750-0.800 g/ml), Shot & wax poised, adjusted for use at 15°C

c) **SALINITY MEASUREMENT APPARATUS: (Qty: 1 No)**

- Type of Meter / Analyzer: Handheld / Bench Type
- Functional nomenclature: Multi Parameter Water Quality Analyzer
- Ingress Protection (Main Unit): IP 67 or, NA in Bench Top
- Calibration: Automatic
- Dissolved Oxygen (DO): Yes, or No
- DO % Saturation: Yes, or No
- Conductivity: Yes
- Resistivity: Yes
- Salinity: Yes
- Total Dissolved Solids (TDS): Yes
- pH: Yes
- Oxidation Reduction Potential (ORP): Yes
- Temperature: Yes
- Atmospheric Pressure: Yes, or No
- Highest Measurement Value for Temperature (°C): 100 or more
- Salinity measurement principle Conductivity: Conversion
- Measurement Range (in parts per thousand or g/l or PSU): 0-70
- TDS measurement principle: Conductivity Conversion
- TDS Measurement Range (in parts per thousand or g/l): 0-400
- pH measurement principle: Electro chemical
- Sensor / Probe / Electrode Type: Hydrogen (Platinum) Electrode
- Number of Sensors / Electrodes: Single Electrode
- pH Measurement Range: 0-14
- Lowest Measurement Value for Temperature (°C): 0 or, lesser
- Highest Measurement Value for Temperature (°C): 55
- Measurement Method: NA
- Depth Measurement Range (in meters): NA
- Salinity Correction: Automatic
- Barometric Pressure correction: Automatic
- Minimum Operating Temperature: 0 degree Celsius or, lesser

- Maximum Operating Temperature: 50 degree Celsius or more
- Operating Humidity, Rh at 40 deg C: 85 percent
- Warranty on Equipment: 2 year
- Warranty on Probe / Electrode: 6 month
- Warranty on Cables for Connecting Probe: 1 year

d) BS&W CONTENT MEASUREMENT APPARATUS OR CENTRIFUGE: (Qty: 1 No.)

ELECTRIC CENTRIFUGE MACHINE

Electric Centrifuge Machine complete with one swing out rotor of 4x10 ml or 8x10 ml tubes and all other necessary accessories for direct commissioning.

Technical Specifications (Description):

The Equipment shall contain the following Special Features:

- a) See through acrylic lid.
- b) Easy Lid lock.
- c) Step less speed Regulator.
- c) Safety fuse.
- d) Elegant front Panel.
- e) Digital speed meter for continuously indicating the speed in revolution per minute.
- f) 0-60 minutes' automatic timer.

Technical Data:

Maximum Speed	: RPM 4000
Max. Relative Centrifugal	: g 2350
Max. Capacity	: ml 200
Max. Tube size	: ml 50
Width	: mm 330
Depth	: mm 375
Height	: mm 300
Weight	: Kg. 15
Connected Load	: KVA 0.15
Supply	: 220/230 VAC, Single Phase, 50 Hz.

e) pH METER: (Qty: 1 No.)

Features:

- a) Bench top Microprocessor controlled digital pH meter
- b) Can measure pH, ORP and temperature simultaneously
- c) Fast and accurate measurements
- d) User friendly operation
- e) Automatic buffer reorganization
- f) Single key press automatic calibration
- g) GLP compliant
- h) Automatic temperature compensation for pH measurement
- i) Minimum three-point calibration with choice of pH calibration buffer types
- j) Calibration data with date and time should be displayed
- k) Reminder Alarm for calibration

Specification:

- Display: LCD/LED display with backlight
- Power Supply: 220-230V/50Hz, AC with Alkaline/Rechargeable battery for portable use
- Operating Temperature: +10°C to + 45°C
- Operating Humidity: 15-95% RH
- Data Storage: Minimum 200 data storage capacity for result, date, time & sample identifications
- Interfaces: USB

- Operation Mode: Soft touch pad keys
- Parameters: The equipment should be capable to measure pH, ORP and temperature simultaneously and display these parameters along with time and date.
- pH Measurement:
 - Range: 0-14.00
 - Resolution: 0.01
 - Accuracy: +/- 0.01
 - Repeatability: +/- 0.01
- **mV Measurement:**
 - Range: -1200- +1200 mV
 - Resolution: 0.1
 - Accuracy: +/- 0.5
 - Repeatability: +/- 0.5
 - Temperature Measurement:
 - Range: -5°C to +100°C
 - Resolution: 0.1 °C
 - Accuracy: +/- 0.1°C
 - Repeatability: +/- 0.1°C

Accessories & Consumables: The bidder has to supply a set of following accessories and consumables along with each equipment.

- a) Sensors: Combined pH glass electrode with temperature & ORP sensor
- b) Stand rod of adequate length with Clamping ring
- c) Electrode Holder
- d) Calibration standards:
 - I. Minimum 250 ml pH buffer solution of pH 4 with two years' shelf life
 - II. Minimum 250 ml pH buffer solution of pH 7 with two years' shelf life
 - III. Minimum 250 ml pH buffer solution of pH 10 with two years' shelf life
- e) Minimum 250 ml storage solution for pH electrode.
- f) Set of 6 nos. of beakers of adequate size for calibration with judicious use of buffers
- g) Dust cover
- h) Power cable/adaptor, USB cable, alkaline/ rechargeable battery with charger and any other accessories required for immediate commissioning of the equipment after receiving.
- k) Documents:
 - I. Calibration certificate: Factory test certificate/calibration certificate for the equipment traceable to NABL Laboratories along with the supply.
 - II. One set of operational and maintenance manual (hard copy as well as soft copy) along with the supply.

f) POUR POINT APPARATUS (MANUAL): (Qty: 1 No.)

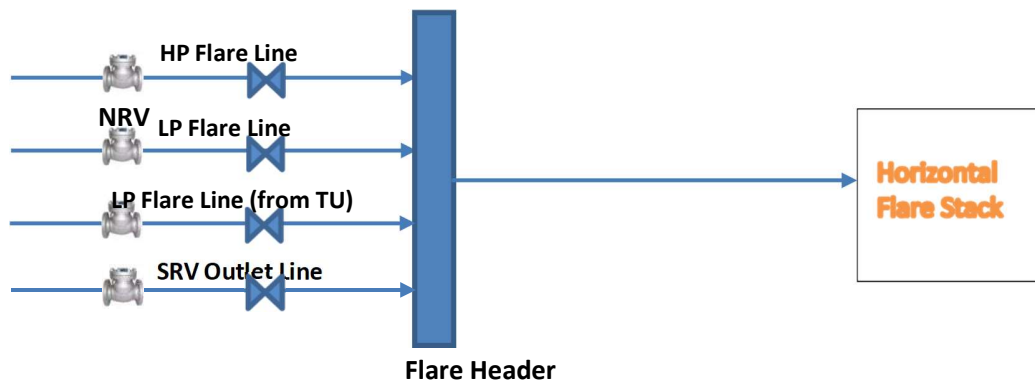
1. The Pour Point Apparatus should consist of the following components:
 - a) A main cooling bath for holding the cold mixture.
 - b) The bath has to be double walled in construction. The inner and outer walls of the bath have to be made of 304 quality Stainless steel sheets with insulation of PUF in between.
 - c) The Bath should have a filling aperture for pouring freezing mixture from the top and easy opening facility for cleaning.
 - d) The bath should also have a drain out cock for draining out the cold water.
 - e) The apparatus should have provision for carrying out four (04) tests simultaneously and the inner working area of the bath should hold four (4) nos. of Metal Jackets (having dimensions as specified in IS 1448 [P:10/Sec 2]).
 - f) 4 nos. of Metal jackets with bottom discs and gaskets as specified in the standard IS 1448 [P: 10/Sec 2].
 - g) 4 nos. of test jars. The test jars must be made from Borosilicate Glass and should come with cork having thermometer port and all other parts having dimensions as specified in IS 1448 [P:10/Sec 2]
 - h) 4 nos. of thermometers conforming to IP 1C (-38°C to 50°C)

2. The following spares and consumables for item no. 1 are also to be provided: a) Spare metal jacket with disc and gasket as specified in 1(f): 4 Nos.
- b) Spare glass test jar with cork as specified in 1(g): 4 Nos.
- c) Thermometers as specified in 1(h): 4 Nos.

g) CONSUMABLE / GLASSWARE

1. Measuring cylinder-2000 ml, 04 nos.
 2. Measuring cylinder-1000 ml, 04 nos.
 3. Measuring cylinder-500 ml, 04 nos. etc.)
- Reagents, other consumables etc. for above lab equipment.

- **FLARE STACK:** Portable Horizontal Flare Stack with single head burner and pilot burner facility shall be provided with total flaring capacity of 300,000 SCUMD. The distance of the flare from the SPF shall be considered as 150-Meter minimum or as per guideline of OISD/Oil mines Regulation for calculating piping requirement. Pilot burner should be compatible for use with both natural gas and LPG, and should be equipped with high energy ignition system/ sparking system provided for remote ignition of the burner. Ignition control panel should be flameproof and the heat resistant cable should be rated for the 24 hrs exposure to flame heat of flare/burner capacity. The pilot burner should be designed for 24 hours uninterrupted flame. Following accessories to be included:
 - a) NRV & Isolation Valve for each line
 - b) Air Supply for Atomization
 - c) Water Line for Cooling
 - d) Skid Mounted with certified Lifting arrangement.
 - e) Surface Connections with Quick union arrangement (Fig 100 or equivalent).



- **PIPE AND PIPE RACK:**

- i. Sizes: As per Design Requirement generally of size 2", 4"
- ii. Working Pressure: 1500/3000/5000 psig
- iii. Test Pressure: 1.5 times of working pressure
- iv. Length (m): 0.5/1/2/3/4
- v. Temperature Range: -20 to 250 °F
- vi. Service: Standard
- vii. Connections: Fig 100/200/300/400/600/602 standard Union
- viii. Connections of sizes 2"/4"/6"
- ix. Requirement: Selection of Fig connection shall be done as per system requirement, Interchangeability and pressure rating shall be considered as per design consideration for easy and quick connections and dismantling.
- x. Pipe Rack skid: Pipe Rack shall be designed suitably for stacking of pipes considering safe and effective handling and storing. Individual rack/section shall be provided for specific sizes of pipes.

- **FLOWLINES & UNIONS:**

FLOW LINES FOR 01 (ONE) SET OF SPF				
Type	Location		Length	
	From	To	Size: 4"	Size: 2"
C-Oil Line	Manifold (GH)	Indirect Heater	30	
	Manifold (TH)	Indirect Heater	30	
	Indirect Heater	GU I	25	
	Indirect Heater	TU	25	
	GU I	Surge Tank	25	
	TU	Surge Tank	25	
	HPMS	Surge Tank	25	
	Surge Tank	C-Oil Tank	25	
	Manifold (GH)	Surge Tank Line (LP well production)	100	
	Tank Production Manifold		20	
	Tank Dispatch Manifold		20	
	Tank Dispatch Manifold	Bowser Loading Pump	40	
	Bowser Loading Pump	Loading Pad	10	
Gas- Line	GU I	HPMS	25	
	Test Separator	HPMS	25	
	HPMS	Gas Distribution line	25	
	HPMS	Flare Header	20	
	Test Separator	Flare Header	50	
	Surge Tank	Flare Header	20	
	SRV Outlet Line of Vessels	Flare Header	50	
	Flare Header	Flare Pit	120	
	Fuel line for Bath Heater			150
Hot Water Line	Bath heater	Hot Water Pump	5	
	Hot Water Pump	C-Oil Tank		80
	Hot Water Inlet Manifold for C-Oil Tank			20
Cold Water Line	Cold Water Outlet Manifold for C-Oil Tank			20
	C-Oil Tank	Bath heater		80
	Source Water Pump	Bath heater		50
	Source Water Pump	Fire Water Tank		100
	Fire Water Tank	Fire Pump	10	
Fire Line	Fire ring line		100	
Total length of flow lines			850	500

WING UNIONS FOR 01 (ONE) SET OF SPF		
4" Union Calculation		
a) API Wing Union, Weco Fig 602, 4" dia, 6000 psi		
d) Total length of flow line = 850 m (approx.)		
Length of each piece of flow line	% of total length	Qty. of Union (Nos.) for CO line
4 m Length	40	80
3 m Length	30	80
2 m Length	20	80
1 m Length	7	56
0.5 m Length	3	48
Contingency Nos.		56
Total 4" unions	100	400
2" Union Calculation		
a) Wing Union, 1000 PSI, Size : 2"		
d) Total length of flow line = 500 m (approx.)		
Length of each piece of flow line	% of total length	Qty. of Union (Nos.) for CO line
4 m Length	40	50
3 m Length	30	50
2 m Length	20	50
1 m Length	7	35
0.5 m Length	3	30
Contingency		35
Total 2" unions	100	250

- **TIE DOWN SLING:**

Adequate quantity of tie down sling as per below specs with U-bolt & Shackles to safely anchor all the quick connecting hydrocarbon process pipelines:

Nominal Dia of rope	:	10 mm
Construction	:	6x19- Preformed
Strand Construction	:	12/6-1
Grade	:	1770
Wire Finish	:	Ungalvanized
Min Breaking Force	:	54 KN

K. INSTRUMENTATION AND CONTROL SYSTEM: ANNEXURE II
L. ELECTRICAL POWER CONTROL EQUIPMENT: ANNEXURE III

SURFACE PRODUCTION FACILITY (SPF) – INSTRUMENTATION SYSTEM
INSTRUMENTATION & CONTROL SYSTEM FOR SURFACE PRODUCTION FACILITY (SPF):

The following instrumentation & control system components shall be provided along with the SURFACE PRODUCTION FACILITY (SPF). However, the supplier has to include, but not limited to all the items as per the instruments specified below, such that the supplied system is functionally and operationally complete in all respect.

A. INSTRUMENTS IN MANIFOLD AREA:

A.1 Pressure Gauges: (Qty.: 7 Nos.) at main header, test header and one each at the inlet in each of the well connections

- i. Dial Size: 150 mm (6") Minimum
- ii. Scale: Kg/Cm² or psig
- iii. Range: As per design pressure
- iv. Pressure Element: SS Bourdon tube
- v. Material of construction: All SS
- vi. Accuracy: 1% of reading
- vii. End Connection: 1/2" NPT
- viii. Isolation Valves: Required (Needle Valve) as per gauge rating

A.2 Instrument to be provided at the outlet line of Main & Test Header:

A.2.1 Temperature transmitter (HART) (Qty.: 2 No.) with Temperature Sensor and Thermowell

- i. Range: As per design temperature, must be adjustable by HART communicator
- ii. Input: Universal input, RTD Pt-100 (3-wire)/ Thermocouple, must be configurable by HART communicator
- iii. Process Temperature: As per design
- iv. Type: SMART Transmitter (HART based)
- v. Housing: Aluminium Alloy
- vi. Mounting: 2" Yoke Electrical
- vii. Area Classification: IEC Zone-1 Gr. IIA/IIB/IIC T4
- viii. Enclosure: Weatherproof NEMA 4 and IP65
- ix. Intrinsically Safe: Yes
- x. Power Supply: 24VDC
- xi. Cable Entry: 1/2" NPTF
- xii. Accuracy: +/- 0.075% of Span
- xiii. Response Time: 250 ms or less
- xiv. Output: 4 - 20 mA plus Digital Signal superimposed
- xv. Accessing Protocol: HART
- xvi. LCD display with front facing capacity for programming in any engineering units.

Accessories:

- i. Mounting bracket for 2" pipe - 1 no.
- ii. Flameproof double compression SS Cable gland 1/2" - 2 nos and 3/4" - 1 no
- iii. Temperature sensor with thermowell as per design.

A.2.2 Pressure transmitter (HART) (Qty.: 2 Nos.) (Remote seal)

- i. Range: 50 psi to 4000 psi
- ii. Process Temperature: As per design
- iii. Type: SMART Transmitter (HART based)
- iv. Housing: Aluminium Alloy
- v. Mounting: 2" Yoke Electrical
- vi. Area Classification: IEC Zone-1 Gr. IIA/IIB/IIC T4
- vii. Enclosure: Weatherproof NEMA 4 and IP65
- viii. Intrinsically Safe: Yes
- ix. Power Supply: 24VDC
- x. Cable Entry: 1/2" NPTF
- xi. Accuracy: +/- 0.075% of Span
- xii. Response Time: 250 ms or less
- xiii. Output: 4 - 20 mA plus Digital Signal superimposed
- xiv. Accessing Protocol: HART
- xv. Diaphragm Material: SS316/Hastelloy C
- xvi. Sensor Fill Fluid: Silicone
- xvii. Process Connection: 1/2" NPTF SS
- xviii. Over Range Protection: 150%
- xix. Rangeability: 100:1
- xx. Stability: +/- 0.15%
- xxi. Process: Hydrocarbon Fluid
- xxii. Indicator: LCD display with front facing capacity for programming in any engineering units

Accessories:

- i. Mounting bracket for 2" pipe - 1 no.
- ii. Flameproof double compression SS Cable gland 1/2" - 1 no.

B. INSTRUMENTS IN INDIRECT BATH HEATER:

B.1 Instrument to be provided in Indirect Heater Shell & Process Coil:

B.1.1 Temperature Gauges with Thermowell (Qty.: 5 Nos.) at Inlet & Outlet of 2 nos. of process coils & Water Bath Body

- i. Type: Direct Reading
- ii. Mounting: Field Mounting
- iii. Case:
 - a) Material :304 SS
 - b) Rotation: 360 Deg. rotatable on stem and adjustable to every angle.
- iv. Dial: 150mm (6 inch), White aluminium with black lettering.
- v. Scale Range: as per design
- vi. Pointer: Black aluminium
- vii. Connection: Bottom
- viii. Window: Laminated Safety Glass Lens
- ix. Nominal Accuracy: +/-1% of full scale
- x. Sensing Element: Bi-metal strip coiled
- xi. Stem:
 - a) Material: 316 SS
 - b) Diameter: 08 mm
 - c) Length: as per design
 - d) Connector: 1/2" NPTM, SS
- xii. Ring Material: 304 SS
- xiii. Thermowell:
 - a) Material: 316 SS
 - b) Instrument Connection: 1/2" NPT(F), SS

- c) Process Connection: 1/2" NPT(M), SS
- d) Bore size: Suit to the stem diameter
- xiv. Service: Natural Gas/Crude Oil/Water
- xv. Over temperature surge: 15% of full scale
- xvi. Protection: IP 65
- xvii. Feature Required: Adjustable pointer.

B.1.2 Pressure Gauges (Qty.: 4 Nos.) Inlet & Outlet line of two nos. of process coils.
(Details as per A.1 above)

B.1.3 Level Gauge (Qty.: 1 No.): Water bath body

One No. Reflex type liquid level gauge complete with cocks & glass gauge suitably protected from external damage,
WORKING PRESSURE: As per vessels design pressure.

B.1.4 Temperature transmitter (HART) (Qty.: 3 Nos.) with Temperature Sensor and Thermowell at Outlet line of two nos. of process coils & Water Bath Body.
(Details as per A.2.1 above)

B.1.5 Pressure transmitter (HART) (Qty.: 2 Nos.) at outlet line of two nos. of process coils.

- i. Range: As per design
- ii. Process Temperature: 5 to 60 deg C
- iii. Type: SMART Transmitter (HART based)
- iv. Housing: Aluminium Alloy
- v. Mounting: 2" pipe mounted
- vi. Area Classification: IEC Zone-1 Gr. IIA/IIB/IIC T4
- vii. Enclosure: Weatherproof NEMA 4 and IP65
- viii. Intrinsically Safe: Yes
- ix. Power Supply: 24VDC
- x. Cable Entry: 1/2" NPTF
- xi. Accuracy: +/- 0.075% of Span
- xii. Response Time: 250 ms or less
- xiii. Output: 4 - 20 mA plus Digital Signal superimposed
- xiv. Accessing Protocol: HART
- xv. Diaphragm Material: SS316/Hastelloy C
- xvi. Sensor Fill Fluid: Silicone
- xvii. Process Connection: 1/2" NPTF SS
- xviii. Over Range Protection: 150%
- xix. Rangeability: 100:1
- xx. Stability: +/- 0.15%
- xxi. Process: Hydrocarbon Fluid
- xxii. Indicator: LCD display with front facing capacity for programming in any engineering units

Accessories:

- i. Mounting bracket for 2" pipe - 1 no.
- ii. Flameproof double compression SS Cable gland 1/2" - 1 no.

B.1.6 Burner Management System (BMS) for Multi fuel fire (Natural Gas & Diesel) burner (Qty.: 1 No.):

Burner Management System (BMS) is to control and safe shutdown of burner for Bath Type, Field Indirect Heater of heating capacity 0.88×10^6 watts (3.0 MM BTU/HR.) for heating water to a temperature of about 80 degrees centigrade for indirect heating of 5000 bbls/day of Crude oil passes through two nos. of process coils in the heater and also for circulation of hot water to the heating coil in the Storage Tank with the help of a hot water circulation pump. Two fuel train shall be provided with controlling option from one/two control unit and shall be user selectable. In case of natural gas fired, the fuel train shall be connected through 1" union with the

existing natural gas line and for diesel fired type, fuel train shall be connected with a diesel tank which shall be supplied by vendor and shall be mounted in the indirect heater skid. The diesel tank shall be equipped with suitable level gauge for indication. Both fuel train shall be equipped with all associated instruments suitable for the mentioned heating capacity.

Control Philosophy:

As per design requirement to achieve the following control Philosophy to carry out the following functions:

- a. A hand operated Pilot igniter to start and monitor the pilot flame and provide a supply for the main burner SDV once pilot is confirmed. All the systems for this remote ignition shall be in Flame proof enclosure.
- b. The main burner Shut-off valve shall be opened only after establishment of the pilot burner flame.
- c. Main flame shall be shut down in case of Pilot flame failure.
- d. Temperature Control of the water bath shall be through controller and control valve.

B.1.7 Temperature Controller (Thermostatic Valve)

B.1.8 High-Temperature & Low-Level cut off Switch in the Water Bath Heater for Burner Management System

B.1.9 Level transmitter (Cage type or guided wave type)

C. INSTRUMENTS IN SEPARATORS:

Instrument to be provided for each separator: Group Unit (Two phase liquid & gas separator), High Pressure Master separator (HPMS), Surge tank and Test Unit:

C.1 **Pressure Gauges** (Qty.: 2 Nos. per separator)

(Details as per A.1 above)

C.2 **Level Gauge** (Qty.: 1 No. per separator i.e. Group Unit, Test Unit & HPMS and Qty.: 2 Nos. for Surge Tank)

(Details as per B.1.2)

C.3 **Temperature Gauges with Thermowell** (Qty.: 1 No. per separator i.e. Group Unit, Test Unit, HPMS & Surge Tank)

(Details as per B.1.1)

C.4 **Pneumatic Level Controller** (Qty.: 1 No. per separator i.e. Group Unit, Test Unit & HPMS and Qty.: 2 nos. for Surge Tank) [Type a) or b)]

a) Caged displacer type liquid level controller

- i. Operative Mode: Pneumatic Throttling, Direct
- ii. Process connection: minimum 1" (Inch.)
- iii. Max. Working Pressure: As per design
- iv. Working Temperature: As per design
- v. Enclosure: Weatherproof, IP54 or better.
- vi. Supply Pressure: 20 PSI
- vii. Displacer: vertical type suitable for crude oil.
- viii. Torque-Tube Material: SS 316/SS 304

ACCESSORIES: To be supplied with the Level controller

- i. Supply pressure gauge (0-30 Psi): 2 no.
- ii. Output pressure gauge (0-30 Psi): 2 no.
- iii. Air filter regulator (Input: 250 PSI (17.5Ksc), Output: adjustable.

OR

b) Internal Ball Float Type Level Controller:

The controller shall be mounted with 01 Set complete assembly comprising of Two spring loaded valves, Rocker arm (linkage assembly), Pilot relay assembly, Float rod, lever, Counter weight, chain, adjustable screw, travel stop, & necessary link, bolt & nuts etc. to give continuous output pressure proportional to rise or fall of liquid level inside the vessel and also reversible in action in field with following specifications:

- i. Material: Forged ASTM, A-105 steel.
- ii. Mounting: Right hand
- iii. Function: For controlling level of crude oil of degree API gravity 20 to 35
- iv. Control function: Proportional output type
- v. Output signal: 3 to 15 psig (0.2-1.1kg/cm²)
- vi. Rising Level: Increase out put
- vii. Material of Float: SS 316 / SS 304
- viii. Stuffing box: SS with PTFE or Graphite asbestos packing
- ix. Accessories: Air filter regulator [Input: 250 PSI (17.5Ksc), Output: adjustable]
- x. Mounting Flange size: As per design
- xi. Float size: 185 mm (7.75") OD rating
- xii. Pressure requirement: As per vessel's design pressure

C.5 Pneumatic Pressure Controller: (Qty.: 1 No. per separator i.e. Group Unit, Test Unit, HPMS & Surge Tank)

Pressure rating: As per design pressure

Type: Pneumatic, Indicating with Proportional & Reset Action

- i. General:
 - a. Function: Indicating Controller
 - b. Mounting: Vertical pipe mount 2"(50 mm) pipe
 - c. Housing Material: Glass fiber reinforced polyester/Polyester Plastic/ Die cast Aluminum with anti-corrosion and weatherproof protection
 - d. Enclosure: Minimum IP53
 - e. Maximum Dimension: 270mmX170mmX350mm (LXBXH)
 - f. Maximum Weight: 7 Kg
- ii. Controller Performance:
 - a. Control Mode: Proportional Integral (PI)
 - b. Action: Direct/Reverse Action (Controller action should be Field Reversible without anychange of parts.)
 - c. Auto/Manual Switch: To be provided
 - d. Set Point Adjustment: Manual
 - e. Supply pressure: 20 psig (1.4 kg/cm²)
 - f. Output: 3 to 15 psig (0.2 to 1.1 kg/cm²)
 - g. Proportional Band: 10 to 100% of process scale span
 - h. Reset: 0.05 to 15 repeats per minute
 - i. Repeatability: 0.5% of output span
 - j. Unit of process variable display scale: psig or Kg/cm²
- iii. General Components:
 - a. Sensing Element Type: Bourdon Tube 316 Stainless steel/Bellows
 - b. Range: Adj. Range as per requirement

iv. Process:

- a. Process Fluid: Natural Gas / Hydrocarbon liquid
- b. Process connection: ¼ inch NPT (F) (Bottom Entry)
- c. Air Consumption: 20 scfh maximum
- d. Input connection: ¼" NPT (F) bottom entry.
- e. Output connection: ¼" NPT (F) bottom entry.
- f. Controller Delivery Capacity: 3 to 15 psig (0.2 to 1.1 kg/cm2)

v. Accessories:

(To be supplied with PNEUMATIC PRESSURE CONTROLLER)

- a. Pressure gauge :(Two Numbers)
Dial size 2 ", connection ¼"(NPT (M) back
connection, Range: 0-30 psig (0- 2 kg/cm2)
- b. Air Filter cum pressure Regulator: Range 0-250 psig (0- 17.5 kg/cm2)

Note: The bidder to confirm in Technical Bid that connections inside the housing of the pressure controller i.e. between bourdon tube, relay, proportional band, bellows, flapper nozzle assembly are of SS tubing.

C.6 Multivariable Flow transmitter (HART) Differential Pressure type (Qty.: 1 No. per separator i.e. Group Unit, Test Unit, HPMS & Surge Tank)

- i. Range: As per design pressure
- ii. Process Temperature: As per design
- iii. Type: SMART Transmitter (HART based)
- iv. Housing: Aluminium Alloy
- v. Mounting: 2" Yoke Electrical
- vi. Area Classification: IEC Zone-1 Gr. IIA/IIB/IIC T4
- vii. Enclosure: Weatherproof NEMA 4 and IP65
- viii. Intrinsically Safe: Yes
- ix. Power Supply: 24VDC
- x. Cable Entry: 1/2" NPTF
- xi. Accuracy: +/- 0.075% of Span
- xii. Response Time: 250 ms or less
- xiii. Output: 4 - 20 mA plus Digital Signal superimposed
- xiv. Accessing Protocol: HART
- xv. Diaphragm Material: SS316/Hastelloy C
- xvi. Sensor Fill Fluid: Silicone
- xvii. Process Connection: 1/2" NPTF SS
- xviii. Over Range Protection: 150%
- xix. Rangeability: 100:1
- xx. Stability: +/- 0.15%
- xxi. Process: Hydrocarbon Fluid
- xxii. Indicator: LCD display with front facing capacity for programming in any engineering units
- xxiii. Temperature input: PT 100 RTD (Three wire)

Accessories:

- i. Mounting bracket for 2" pipe - 1 no.
- ii. Flameproof double compression SS Cable gland 1/2" - 1 no.
- iii. Manifold (5 Valve)
- iv. Senior orifice with flow profiler

C.7 Flow transmitter (Turbine Meter) for liquid flow measurement (Qty.: 1 No. each for Group Unit & Test Unit)

- i. Type: Turbine Flowmeter
- ii. Process: Crude Oil

- iii. Line Size: As per design
- iv. Process Temperature: 5 to 60 deg C
- v. Flange Connection: As per design
- vi. Linearity: 0.15%
- vii. Repeatability: 0.02%
- viii. MOC: Stainless Steel
- ix. Turndown Ratio: 10:1
- x. Electronics: 2 pickoff coils and Dual-Channel Preamplifier
- xi. Calibration Software: To be provided

Note: A bypass line need to be provided for maintenance of the flowmeter

C.8 Pressure transmitter (HART) (Qty.: 1 No. per separator i.e. Group Unit, Test Unit, HPMS & Surge Tank)

- i. Range: As per design
- ii. Process Temperature: 5 to 60 deg C
- iii. Type: SMART Transmitter (HART based)
- iv. Housing: Aluminium Alloy
- v. Mounting: 2" pipe mounted
- vi. Area Classification: IEC Zone-1 Gr. IIA/IIB/IIC T4
- vii. Enclosure: Weatherproof NEMA 4 and IP65
- viii. Intrinsically Safe: Yes
- ix. Power Supply: 24VDC
- x. Cable Entry: 1/2" NPTF
- xi. Accuracy: +/- 0.075% of Span
- xii. Response Time: 250 ms or less
- xiii. Output: 4 - 20 mA plus Digital Signal superimposed
- xiv. Accessing Protocol: HART
- xv. Diaphragm Material: SS316/Hastelloy C
- xvi. Sensor Fill Fluid: Silicone
- xvii. Process Connection: 1/2" NPTF SS
- xviii. Over Range Protection: 150%
- xix. Rangeability: 100:1
- xx. Stability: +/- 0.15%
- xxi. Process: Hydrocarbon Fluid
- xxii. Indicator: LCD display with front facing capacity for programming in any engineering units

Accessories:

- i. Mounting bracket for 2" pipe - 1 no.
- ii. Flameproof double compression SS Cable gland 1/2" - 1 no.

C.9 Level transmitter (Qty.: 1 No. each for Group Unit, Test Unit & HPMS and Qty.: 2 Nos. for Surge Tank)

- Preferably cage type or guided wave type.
- Make: Fisher DLC3010 Digital Level Controller in Combination with a 249W Sensor or reputed equivalent model.

C.10 Pressure Relief Valves (Qty.: 2 Nos. per vessel i.e. Group Unit, Test Unit, HPMS & Surge Tank)

As per requirement of vessels with rated capacity.

C.11 Flow cum Pressure Recorder (Qty.: 1 Nos. each in Test Unit, HPMS & Surge Tank)

D. INSTRUMENTS IN HP FLARE LINE:

D.1 Pneumatic Pressure Controller: (Qty.: 1 No.)
(Details as per C.5 above)

D.2 Multivariable Flow transmitter (HART) Differential Pressure type (Qty.: 1 No.)
(Details as per C.6 above)

D.3 Flow cum Pressure Recorder (Qty.: 1 No. in HPMS gas outlet, HP flare)

E. INSTRUMENT IN TANKS:

• **Level Gauge**

QUANTITY: 8 Nos. (6 Nos. for Crude Oil Storage Tanks and 2 Nos. for Fire Water Tank)

Reflex type level gauge complete with cocks & glass gauge suitable protected from external damage

WORKING PRESSURE: As per design pressure

F. INSTRUMENT IN AIR COMPRESSOR:

F.1.1 Pressure Gauge in air receiver (Qty.: 1 no. per receiver)
(Details as per A.1 above)

F.2 Pressure transmitter in air receiver (1 no. per receiver)
(Details as per A.2.2 above)

- i. Range: As per design
- ii. Process Temperature: 5 to 45 deg C
- iii. Type: SMART Transmitter (HART based)
- iv. Housing: Aluminium Alloy
- v. Mounting: 2" pipe mounted
- vi. Area Classification: IEC Zone-1 Gr. IIA/IIB/IIC T4
- vii. Enclosure: Weatherproof NEMA 4 and IP65
- viii. Intrinsically Safe: Yes
- ix. Power Supply: 24VDC
- x. Cable Entry: 1/2" NPTF
- xi. Accuracy: +/- 0.075% of Span
- xii. Response Time: 250 ms or less
- xiii. Output: 4 - 20 mA plus Digital Signal superimposed
- xiv. Accessing Protocol: HART
- xv. Diaphragm Material: SS316/Hastelloy C
- xvi. Sensor Fill Fluid: Silicone
- xvii. Process Connection: 1/2" NPTF SS
- xviii. Over Range Protection: 150%
- xix. Rangeability: 100:1
- xx. Stability: +/- 0.15%
- xxi. Process: Air
- xxii. Indicator: LCD display with front facing capacity for programming in any engineering units

Accessories:

- i. Mounting bracket for 2" pipe - 1 no.
- ii. Flameproof double compression SS Cable gland 1/2" - 1 no

G. DATA ACQUISITION SYSTEM:

G.1 PLC SYSTEM:

The PLC based control panel shall be suitably located for a clear view. The control panel shall be manufactured of a corrosion resistant material and shall include permanent labelling of all controls and instrumentation. The control panel shall include an HMI- Human Machine Interface (colour TFT display) with touch screen and alarm/ shutdown set point shall be configurable via HMI. The display/monitoring panel shall be an anti-reflective glass panel for increased visibility in intense sunlight.

There shall have the following features:

- (a) All analog signals from field instruments shall come to analog input card via optical isolators/ barriers.
- (b) The PLC panel should accommodate an electric hooter which shall operate in case of any process alarm.
- (c) The 230 V AC power from generator shall be fed to the panel through an isolation transformer.
- (d) The PLC should operate with 24 VDC power supply.
- (e) Redundant 24 VDC power supply shall be provided for the panel.
- (f) Panel power supply shall be fed through an UPS with 30 minutes backup with sufficient spike resistant capacity.
- (g) The PLC panel shall have TEST, ACCEPT & RESET button for testing LEDs, Accepting & Resetting process alarms.
- (h) The PLC shall be provided with programming software having valid license of lifetime validity.
- (i) The PLC program shall be editable. There should not be any password lock.
- (j) A laptop of latest configuration (Make: Dell/ HP/ Lenovo) and fully loaded with licensed programming software shall be provided. Communication between the laptop and the PLC shall be Ethernet.
- (k) The PLC shall have 20% spare loading capacity. Analog input cards shall also have 20% spare capacity available.
- (l) Data from Multivariable flow transmitters like instantaneous flow, pressure, temperature shall be displayed in the PLC HMI. There shall be provision for display of cumulative gas flow data in the HMI. HART splitter shall be provided if required.
- (m) Instantaneous data from Turbine Flowmeter shall also be displayed in the HMI. There shall be provision for display of cumulative crude oil flow data in the HMI.
- (n) A hard copy of the PLC program shall be handed over to OIL after successful commissioning of the system.
- (o) All wiring inside the PLC panel shall be done neatly with proper tagging, ferruling etc. Terminal blocks of superior quality shall be used.
- (p) The design of the panel shall be such that rodent cannot enter.
- (q) Superior quality hinges shall be provided.
- (r) Panel earthing shall be done in a proper way.

G.2 Power Supply Unit

i. Input data:

a. Nominal input voltage	:	100 V AC ... 240 V AC
b. AC input voltage range	:	85 V AC ... 264 V AC
c. DC input voltage range	:	90 V DC ... 350 V DC
d. Short-term input voltage	:	300 V AC
e. AC frequency range	:	45 Hz ... 65 Hz
f. DC frequency range	:	0 Hz
g. Current consumption	:	Approx. 2.3 A (230 V AC)
h. Inrush surge current	:	< 20 A (typical)
i. Power failure bypass	:	> 20 ms (230 V AC)

- j. Input fuse : 12 A (slow-blow, internal)
- k. Protective circuit/component : Varistor

ii. Output Data:

- a. Nominal output voltage: 24 V DC $\pm 1\%$
- b. Setting range of the output voltage: 18 V DC to 29.5 V DC (> 24 V constant capacity)
- c. Output current: 20 A (-25°C to 60°C, $U_{OUT} = 24$ V DC)
- d. Magnetic fuse tripping: B16/C6
- e. Maximum power dissipation idling: 8W

iii. General data:

- a. Insulation voltage input/output: 4 kV AC (type test)
- b. Insulation voltage input/output: 2 kV AC (routine test)
- c. Degree of protection: IP20
- d. Mounting position: Horizontal DIN rail NS 35, EN 60715

G.3 Intrinsically Safe barrier:

- i. Application: Intrinsically safe Power supply for SMART transmitters and transfer of the measurement signal to the output
- ii. Supply voltage: 20-35 VDC
- iii. Power Consumption: 1.9 watt
- iv. Input: EEx ia IIC; $U_o = 25.4$ V
- v. Output: Galvanically isolated 4-20 mA
- vi. Ingress Protection: IP20
- vii. Mounting: DIN rail

I. CABLING PHILOSOPHY:

- I.1 Signal /multi core cables for shall be armored and stranded copper conductor of minimum 1.5 Sq.mm or higher according to power loading calculations.
- I.2 Power cables shall be three core armored cables. It will be of stranded copper conductor of minimum 1.5 Sq.mm or higher according to power loading calculations.
- I.3 Control cables shall be four core armored cables. It will be of stranded copper conductor of minimum 1.5 Sq.mm or higher according to power loading calculations.

J. SPECIAL NOTE:

- i) The bidder must submit detailed technical specifications along with all relevant technical catalogues, statutory certificates etc. for all instrumentation items of their offered model for technical evaluation.
- ii) Bidder shall submit necessary documents along with the offer for all electronic/electrical instruments and equipment used in zone "1" or zone "2" hazardous area as per the Regulation 107(2) of OMR 2017.
- iii) Successful bidder must take approvals of the following from OIL:
 - a) P & ID
 - b) Data sheets of all the instruments.
 - c) Loop diagram & loop details
- iv) Test and calibration certificates for each instrument must be provided along with the supply.

Annexure-II (b)**BILL OF MATERIAL (BOM):**

The following BOM is proposed tentative only. It is bidder's responsibility to include or modify any items that will be required for complete installation & commissioning of the entire system. The bidder has to submit the detailed BOM as per their design along with Make, Model No, part No, and range/rating etc. with offered Quantity for all items along with the bid.

Sl No	Location	Instruments Description	Range	Quantity	Unit
1	Manifold Area	Pressure Gauges	As per Design	7	Nos
		Temperature Transmitter (HART) with sensor and thermo-well	As per Design	2	Nos
		Pressure Transmitter (HART) with accessories	As per Design	2	Nos
2	Indirect Bath Heater (Shell)	Temperature Gauges with Thermo well	As per Design	1	No
		Level Gauge	As per Design	1	No
		Burner Management System (BMS) for Multi-fuel fire (Natural Gas & Diesel) burner	As per Design	1	No
		Temperature Transmitter (HART) with sensor and thermo-well	As per Design	1	No
		Temperature Controller	As per Design	1	No.
		Level Transmitter	As per Design	1	No.
3	Inlet line of Indirect Heater	Temperature Gauges with Thermo well	As per Design	2	Nos
		Pressure Gauges	As per Design	2	Nos
4	Outlet line of Indirect Heater	Pressure Gauges	As per Design	2	Nos
		Temperature Gauges with Thermo well	As per Design	2	Nos
		Pressure Transmitter (HART) with accessories	As per Design	2	Nos
		Temperature Transmitter (HART) with sensor and thermo-well	As per Design	2	Nos
5	Hot Water Circulation System	Pressure Gauge in the outlet line of Hot Water Circulation Pump	As per Design	1	No

		Temperature Gauge with Thermo well in the outlet line of Hot Water Circulation Pump	As per Design	1	No
		Temperature Gauge with Thermo well in the return line from Storage Tank	As per Design	1	No
6	High Pressure Separators: (GROUP UNIT-I, High Pressure Master Separator (HPMS) and Test Separator)	Pressure Gauges (2x3)	As per Design	6	Nos
		Level Gauge (1x3)	As per Design	3	Nos
		Temperature Gauges with Thermo well (1x3)	As per Design	3	Nos
		Level Controller with accessories (1x3)	As per Design	3	Nos
		Pneumatic Pressure Controller with accessories (1x3)	As per Design	3	Nos
		Pressure Relief Valves (2x3)	As per Design	6	Nos
		Flow Transmitter (HART) Differential Pressure type (MVT) with accessories (1x3)	As per Design	3	Nos
		Flow cum Pressure Recorder	As per Design	2	Nos
		Level Transmitter	As per Design	3	Nos
		Pressure Transmitter (HART) with accessories (1x3)	As per Design	3	Nos
		Flow Transmitter (Turbine Meter) with accessories (GU & TU)	As per Design	2	Nos
7	Low Pressure Separator (Surge Tank)	Pressure Gauges	As per Design	2	Nos
		Level Gauge	As per Design	2	Nos
		Temperature Gauges with Thermo well	As per Design	1	No.
		Level Controller with accessories	As per Design	2	Nos
		Pneumatic Pressure Controller with accessories	As per Design	1	No
		Pressure Relief Valves	As per Design	2	Nos

		Flow transmitter (HART) Differential Pressure type (MVT) with accessories	As per Design	1	No.
		Level Transmitter	As per Design	2	Nos.
		Pressure Transmitter (HART) with accessories	As per Design	1	No.
		Flow cum Pressure Recorder	As per Design	1	No.
		High & Low Level Alarm	As per Design	2	Nos
8	Flare line (HP)	Pneumatic Pressure Controller with accessories	As per Design	1	No
		Flow cum Pressure Recorder	As per Design	1	No
		Flow Transmitter (HART) Differential Pressure type (MVT) with accessories	As per Design	1	No
9	Crude Oil Tanks	Level Gauges	As per Design	6	Nos
10	Fire Water Tank	Level Gauges	As per Design	2	Nos
11	Air Compressor	Pressure Gauge (in Air Receiver)	As per Design	2	Nos
		Pressure Transmitter (in Air receiver)	As per Design	2	Nos
12	Data Acquisition System	PLC System	As per Design	1	No
		Power Supply Unit	As per Design	1	No
		Intrinsically Safe barrier	As per Design	As per IO's	
		Control Panel (Box type -Wall Mounted)	As per Design	1	No
		UPS	As per Design	1	No
13	Erection Hardware	Cable, Trays, JBs, Glands, Tubes, Fittings, Isolation valves etc	As per Design	1	Lot
14	Installation & Commissioning		As per Design	1	Activity

SURFACE PRODUCTION FACILITY (SPF) – ELECTRICAL SYSTEM

Technical Specification of Skid Mounted Electrical Power Control Room (PCR) for Surface Production Facility (SPF).

Scope of Supply:

Design, manufacture, supply, testing and commissioning of oil field skid mounted Power Control Room (PCR) consisting of following:

- (a) Design, design approval from OIL, manufacturing and supply of an oil field skid mounted Power Control Room (PCR) complete with inbuilt electrical items and facilities described in this specification.
- (b) Supply of electrical components (inbuilt in the PCR) for example, Online Changeover Switch(125A), Isolation transformer (1 X 70 kVA), Neutral Grounding Resistors (NGR) & NGR monitoring System, lighting transformer (1 X 15 kVA), Electrical switchgears, panels, and all the other electrical items, etc. as required for the electrical system (inbuilt in the PCR) described in the Single Line Diagram [Annexure – III(b)] and List of Items [Annexure – III(d)]
- (c) Supply of all the loose electrical items listed in the Annexure III (d) along with the PCR, properly stored in the storage section of the PCR.

PCR shall be portable bunk house like, weather proof module suitable for outdoor deployment/use at any oil/gas production site, which shall be provided with suitable lifting and handling facility for transportation & deployment at various sites. The electrical system to have a socket board for incoming and outgoing power cables and the entire system shall be plug and use type. The scope of supply covers all the points stated under various heads below.

1.0

SKID & HOUSING:

All the equipment of the system like transformer, NGR, NGR monitor & control/ alarm, switchgear, meters, socket boards, SDF, MCCBs, RCBOs, DBs etc. shall be housed on a suitably designed cabin/housing, which shall be mounted on oil-field skid. The skid & housing should be strong enough to bear the load of the equipment and handling & transportation at oil field. The cabin should be designed in such a way that all the equipment inside are protected from rain, storm etc. The following guideline should be followed for construction of the skid & housing.

1.1 Indicative limiting dimensions of the skid & housing: Dimension of the PCR shall be as small as possible. The indicative and limiting dimensions of the skid with housing is given below (including protrusions).

Length: 8000 mm; Width: 2400 mm; height: 2500 mm

1.2 Main Shell: The fabrication of the structural framework should be of integral and welded type to comprise of the bottom frame, overall framework and other peripherals like Sloping self- draining roof, desired doors and air ventilation. The main corner vertical support post should be strong enough for supporting the housing. The entire welding process is to be executed by certified welder using ISI quality electrode.

1.3 Skid: The house is to be mounted on the skid consisting of 2 (two) nos. of ISMB 200mm X 100 mm hot rolled "I" section. The dimensions should be as mentioned in point (1.1) above. At the end portion of the "I" section structure on both the sides, steel pipe of size 142mm (dia.) NBX 9.5 mm wall thickness should be inserted and welded properly. The "I" section beam should be placed at the ends and connected with two same size beams at equal interval and the pipe of MS on both

ends in welded construction. The skid & housing should be made in such a way that no foundation is needed for the placement of the same at well site. Also, 200 mm dia. x 10 mm thick MS plates should be welded properly at ends of the end pipes as stopper for sling used while loading / unloading.

1.4 Base floor:

The skid floor base should be of 6 mm thick checkered MS plate which is to be welded to the bottom skid frame. Checkered plate should cover the complete skid frame and should be welded continuously at joints. The bottom should be painted with bituminous paint. The provision for mounting of 70KVA transformer, panel, NGR, switchgear, socket board etc. should be provided.

1.5 Side and end Walls:

The exterior cladding of the shell should be of MS pressed steel vertical sheets of 3 mm thick and should be welded to the bottom MS angle frame, corner posts, top frame and roof frame. Suitable supporting structure/stiffener should be used to provide adequate strength to the walls and roof. Air ventilation should be provided at the suitable places of the housing. The holes or slits for such ventilation shall be well covered with suitable steel wire mesh/net to prevent entry of insect / lizard etc. to the housing. Also, the slit opening for such ventilation should be designed in such a way that no rain water can enter the housing. Minimum Two exhaust fans should be provided at suitable place of the housing.

1.6 Roof:

The roof should be of sloping type from the center toward the sides for efficient drainage of water. The roof should be made of 3 mm thick MS steel sheets as per IS and is provided with adequately pressed reinforced sections from inside for additional strength and this should be able to comfortably resist loads up to 20 lbs/sq. feet. All the structural steel used should be of standard quality as per IS specification and all steel components / sections, machine pressed for rigidity to optimize strength to weight ratio.

1.7 Insulation: 75 MM thick resin bonded mineral glass wool of 2 LBS / CFT density conforming to IS 8183 should be filled in voids within the external wall and inner walls, end walls, roof with special weather proof adhesives. This glass wool slab should help in reduction in heat transmission up to 64% and should be 100% inorganic asbestos free, non-toxic and non- flammable, non-hygroscopic & vermin proof. The Side walls / end walls insulation is not required at part of the Store Room where earth electrodes, cable etc. will be stored. However, heat insulation must be provided at the part of store room where electronic / sophisticated electrical items will be stored.

1.8 Inner Paneling: 12 MM ply wood boards as per IS 5509 manufactured by reputed manufacturer namely Kitply, Greenply, ITC or equivalent plus 1 mm decorative laminate (Pre-laminated boards) should be screwed on the side wall on the internal 'Z' sections / square tubes. All vertical & horizontal corners should be neatly finished with aluminum anodized heavy gauge aluminum angles & flats and the vertical joints of the panels should be fixed with decorative PVC bidding patties / aluminum patties to match with the colour of panels for better aesthetic appearance. The internal paneling of the roof should be of 6 mm pre-laminated boards with aluminum anodized bidding patties. The ceiling of the roof should be suspended from inside on suitable 'Z' section / angle framework.

1.9 Doors:

Minimum two doors should be provided for entry of people to the house during day to day operation. One of these doors shall be dedicated to switchgear section and the other shall be dedicated to storage section. The indicative dimension of the door is 1981mm (h) X 900mm (w). The door should be flush mounted and should be open from outside. One more Bolted type doors of suitable dimensions should be provided in the PCR for placement (entry/exit) of heavy/oversized items like transformer etc. in the PCR. Actual number of door required shall be finalized during detailed engineering/design stage. All doors shall have suitable heavy duty lock and key arrangement.

At one end of the PCR socket board shall be installed. Socket boards shall be provided with suitable

Doors and canopy system. The other end of the PCR should have heavy duty suitable door which will be used for materials entry/exit, cable coiling/uncoiling etc. especially during installation, commissioning & decommissioning of the SPF.

1.10 Socket board:

Socket boards should be provided at one end of the house for incoming and outgoing power cables. Detailed specification for the electrical items are given below under electrical specification. The NGR alarm and indication panel (remote), MCCBs for power sockets, electrical meters etc. should be fixed near to this board at the same end of the house. Suitable door should be provided for covering all the items with locking facility. One canopy (foldable) should be provided to protect the items from rain etc.

1.11 Storage Section:

All the electrical items as listed in Annexure-III (a) shall have to be accommodated in the storage section of the PCR. Storage section should have adequate nos. of fixed racks and bin for safe storage of the electrical items. Layout of the storage bins will be finalized during detailed engineering stage. Vertical space in the PCR shall be utilized for storage of materials as much as possible. Size of the bins shall be different depending on the type of materials. 30% extra space (no. of bins) shall be provided/kept free to accommodate additional materials in future.

1.12 Layout diagram:

An indicative layout diagram is shown in the attached drawing. Actual drawing showing all the dimensions, compartments, layouts of inside equipment, storage bins etc. shall be developed by the supplier in consultation with OIL. Before manufacturing the PCR supplier must obtain approval of drawings from OIL.

1.13 Legend/ Markings on the walls of the hut:

The writing of the name plate on the skid & housing should be as per following:

- i) "Power Control Room for Surface Production Facility", "Oil India Limited" with OIL logo & PO number should be written on a proper metal plate and should be fixed on either sides of the hut. The writings should be of proper size and good contrasting color so that it is visible from distance. The logo dimensions shall be provided by Oil India Limited.
- ii) Weight & dimensions of the hut should be written in two diagonally opposite corners of the hut near the lifting point.
- iii) Lifting point should be properly marked.

1.14 Pretreatment & Painting of the skid & housing:

All steel surfaces should be sand or shot blasted for degreasing and de-rusting followed by pre-treatment with anticorrosive chemicals. Coating should be applied with red-oxide, zinc chromate, primer conforming to IS 2074. The internal and external surface of the housing/hut should be finally painted with two coats of corrosion resistant rubbers chlorinated marine paints or polyurethane paints.

The under frame should be painted with bituminous paint of reputed make as per IS. The colour shade and grade will be decided at the time of construction by OIL and the highest level of aesthetic should be maintained and necessary marking/ logo should be provided as per the advice of OIL.

1.15 Lifting & Handling

The skid assembly should be designed for bottom lifting.

1.16 Earthing Point for the Hut

Four earthing points should be provided on four sides of the house with bolt size M8 for body earthing of the hut.

2.0 ELECTRICALS

2.1 Electrical Drawings:

a) Drawings & documents to be supplied for Oil India's approval before manufacture (one set):

- i. Final Skid and housing diagrams showing various dimensions.
- ii. Layout diagram of the transformer hut showing various items/equipment and storage facility.
- iii. Electrical Schematic diagram showing various equipment and ratings.
- iv. Bill of Materials (BOM) pertaining to electrical systems indicating part number, specification etc.
- v. Socket board layout diagram.
- vi. Electrical wiring diagram (schematic) for light, exhaust fan, fan etc.

b) Drawings (as built) to be submitted with supply:

- i. Successful bidder shall provide 3 sets (against each PCR unit) of all the drawings as mentioned in 2.1 (a) suitably cover bounded after successful commissioning, incorporating all changes made during commissioning.
- ii. Final Bill of materials (3 copies) pertaining to electrical scope of supply indicating part number, specification etc.
- iii. Original copy of NGR manuals (3 copies)
- iv. Technical details of Transformers and Various Switchgear Components (3 copies)

Note: Installation & Commissioning shall be considered successful only after submission of all requisite documents.

2.2 Electrical Items of PCR:

All the electrical items as mentioned in the Annexure – III (d) are to be supplied as PCR components, suitably installed/stored in the PCR. Electrical components shall be installed/wired up in the PCR as per attached Single Line Diagram (SLD) in the Annexure-III (b). Technical specifications of the PCR components are given in the Annexure-III (a) itself. However technical specifications of the major electrical components are given below.

2.3 Isolation Transformer 70KVA:

The transformer shall be used for hazardous area power supply at 415V AC, 50Hz, 3ph, 3 wire at oil well site. Neutral of the transformer shall be grounded through Neutral Grounding Resistors (NGR) and neutral shall not be used for other purposes like single phase power supply. Transformer should be wheel mounted properly fixed on the floor inside the hut.

Capacity- 70 kVA, (each), continuous rating

Dry Type, copper wound, air cooled

Voltage - 415/415 volts, Dyn11

Frequency - 50 Hz

Phases - 3 phase

Impedance - 4%

Vector Group - Dyn11, Star connected secondary, neutral should be grounded through NGR

Enclosure - IP23 type, with provision for natural circulation of cooling air.

Ambient temperature - 55 Deg C Temperature rise

above ambient - 90 Deg C Insulation - Class F

Rated power freq. withstand - 3 kV (rms) or better

Standard - Indian standard IS: 11171

2.4 Primary and secondary side terminations:

The termination of the Transformer primary and secondary right from Socket board should be done with 3 core, 50 mm² cable. Neutral connection on secondary side shall also be of 1 No 50 mm² cable to connect to the NGRs and earth electrode.

Stand-off copper termination (termination using copper flats) / Stud type connections as per standard design of manufacturer shall be provided. All cable lugs shall be terminated using removable nut and bolts.

2.5 Neutral Grounding Resistors:

The NGR unit shall consist of two parts:

- A) the resistor grid enclosed in a metallic enclosure, and
- B) The NGR monitoring system, enclosed in a separate panel.

A) Resistor and resistor enclosure

Resistor assembly

The resistive element/grid material shall be low temperature coefficient, resistor grade stainless steel / resistor grade 1JR (or Cu-Ni, Ni-Cr or Fechrall) of sufficient mass to withstand the rated current and prescribed duty. Alternately, the resistive element shall be made of unbreakable, corrosion proof joint less element wire wound around a ceramic (or micanite) core supported on a through-rod.

The resistors shall be mounted in heavy gauge corrosion resistant support frames, using stainless-steel hardware. The entire resistor assembly shall be mounted and supported on glazed insulators rated for the system voltage. All resistor terminals and interconnections between resistor units shall be stainless-steel using stainless steel hardware including lock washers. High current connections shall be spot or TIG welded as appropriate. Connections between resistors and bushings shall be solid copper or stainless steel bars. The unit shall be designed to permit the expansion of supporting rods when submitted to high operating temperatures.

Resistor grid assembly should be suitably mounted at the floor of the skid so that it should be able to withstand vibration and stress without damage during faults and transit.

Neutral cable shall be brought to one terminal of the NGR unit. The other end of the NGR unit shall be suitable for connection to ground through earth electrode. These end connections of the resistor unit will be brought out to terminal box or through top or side mounted high voltage bushings. Standoff / support insulators shall be ceramic or epoxy resin cast.

The resistor grid shall be suitable for:

- i. System Voltage: 415 V, 3ph, 50 Hz, star connected.
- ii. System Frequency: 50 Hz
- iii. Rated Current: 750 mA
- iv. Rated Resistance: 330 Ohms (1K Ohm three numbers in parallel)
- v. Wattage: 225 W each
- vi. Time Rating: Continuous
- vii. Temperature Rise: 375 Deg. C.
- viii. Location: Indoor
- ix. Tolerance: + / - 10 %
- x. Degree of Protection: IP -33
- xi. Applicable Standard: IEEE -32: 1972 (IEEE Standard Requirements, Terminology, and Test Procedures for Neutral Grounding Devices)

B) NGR monitoring system:

Monitoring of the NGR shall include the following considerations:

- i. Monitoring the NGR connections to the neutral and to the ground bus- for continuity
- ii. Monitoring the neutral/NGR current through a residual current CT provided in the NGR path
- iii. Monitoring the neutral-to-ground voltage
- iv. Audio- visual annunciation of ground fault and NGR fault
- v. The NGR monitor shall measure changes in NGR resistance, current in the neutral and neutral-to- ground voltage. The NGR monitor shall coordinate these three measurements and operate output contacts when an NGR fault or a ground fault is detected. NGR monitor shall respond to fundamental-frequency current and voltage, and it is not influenced by harmonics. System voltage is 415V, 50 Hz, 3 ph, star connected.
- vi. The output contacts shall be used to operate alarms (buzzer) and visual annunciation devices. Potential free output contacts (minimum 02 pairs) shall also be provided for future use, such as tripping of main breakers etc.

- vii. Main components of the NGR monitoring system shall include, but not limited to, the following:
 - * Monitor for Ground Fault & NGR (with band pass filter for frequencies other than 50 Hz)
 - * Coupling device/sensing resistor for NGR Monitor
 - * Residual current sensing C. T. for NGR Monitor
 - * Output relay with sufficient nos. of potential free NO and NC contacts
 - * Alarm indicator & operator panel with visual annunciation for NGR fault and ground fault and buzzer
 - * Remote Indicator & Alarm Panel
 - * Power supply to monitor panel
- viii. NGR monitoring system shall be housed in an enclosure made of heavy gauge sheet steel, self-supporting, cubicle type, indoor, dust and vermin protected. The enclosure shall be supported on steel support angles/channels, suitable for fixing (with nuts and bolts) on wall of housing. Front of the monitoring panel shall be hinged on the left side for easy access to the components inside and fitted with clamps and special non-deteriorating neoprene gaskets. Lifting lugs shall be provided on the top of panels. Suitable earthing studs are to be provided on two sides.
- ix. The buzzer and indication lights/test/reset buttons shall be mounted on the front door. Monitor windows for remote indicator alarm and operator panel shall be mounted near socket board so that it can be monitored or operated from outside the hut.
- x. As the components of NGR monitoring system shall be wired up to the NGR, conduits shall be used to run the control cables from NGR to monitoring panel. It may be noted that residual current transformer (for sensing NGR current) and coupling device/sensing resistor may be required to be installed in the NGR panel for maximum effectiveness. Conversely, neutral cable shall be first routed through the monitoring panel and then to NGR. In such a case, the monitoring panel shall be provided with suitable bushings/ terminalbox (as given in the description for NGR panel) for termination of the neutral cable.
- xi. Elements connected to the NGR are subject to line-to-neutral ground-fault voltages and must be evaluated in all failure modes. Coupling devices must not transfer hazardous voltages to associated monitoring equipment.
- xii. The measurements made by an NGR monitor can be useful when evaluating system problems. Analog signal can be used to provide local earth-leakage-current metering. An NGR monitor with a communications interface can allow data access with a local PC or with a network.
- xiii. NGR Monitor panel Indicative Limiting Dimensions (L X B X H) = 600 mm x 500mm x 600 mm.

2.6 Technical data for NGR monitoring panel components:

- i. Components like NGR monitor, coupling device and current transformer shall be of one make only for compatibility, from any of the following manufacturers:
 - a) Bender, USA, b) Startco, Canada, c) i-Gard, Canada
- ii. Monitor: Model nos.: Bender- "RC48N" / Startco- "SE-330" / i-gard- "Sigma". In case bidder wants to offer any other model, complete technical details of the same to be enclosed along with the bid for evaluation.
 - a. Supply voltage 230-250 VAC, 50 Hz
 - b. Response value, voltage measurement adjustable from 20 V to 400 V
 - c. Response value, residual current adjustable from 0.1 A to 10 A
 - d. Response delay adjustable 0.1 s to 2 s
 - e. Switching elements (alarm relay) 2 Form C contacts
 - f. Rated contact voltage AC 250 V / DC 300 V
 - g. Limited making capacity AC/DC 5 A

- h. Switching elements (GFA, NRA) 1 N/O contact each
- i. Rated contact voltage AC 250 V / DC 300 V
- j. Limited making capacity AC/DC 5 A
- iii. Coupling device/sensing resistor for NGR Monitor: As per manufacturers design and catalogue.
- iv. Residual current sensing C. T. for NGR Monitor: as per design requirement.
- v. Output relay with sufficient nos. of potential free NO and NC contacts

The relay shall be used for initiating audio-visual alarm (or shutdown of the main breaker of generator or transformer). Relay shall be contactor type. No plug-in type relay shall be used.

The make of the relay shall be Telemecanique (model TeSys, D or K model)/ GE / Siemens/Legrand/L & T/ABB/Indo-Asian

- vi. Suitable alarm indicator and operator panel with LED indication lamps for Ground fault and NGR fault annunciation and push buttons for test and reset functions along with buzzer shall be installed near the socket board accessible from outside without entering into the house. Visual annunciation for NGR fault and ground fault will be through LEDs (labeled "NGR Fault" and "Ground Fault"). Audio annunciation will be through a buzzer mounted near the socket board. Buzzer shall be suitably rated for continuous duty. Buzzer supply shall be of suitable AC voltage. LEDs and Buzzer shall be mounted on the front door of the monitor panel. Test and reset buttons on the front door of monitor panel shall be provided for testing of the NGR and GFA test circuits from the NGR monitor. Test and reset buttons make- Siemens/Schneider/BCH/L & T.
- vii. Reset button will silence the buzzer, but the LEDs will remain on till the time fault is detected and cleared. The indication LEDs and test and reset push buttons shall be in addition and external to the G/F & NGR monitor (which may have these functions built-in).
- viii. Lighting and exhaust fan for the house:
 - a. One suitable size exhaust fan should be mounted at the house/hut for driving out the hot air from the hut.
 - b. LED lights for inside the hut and one near the socket board for illumination.
 - c. Wiring should be carried out suitably for the above. Individual switches in a switch board to be provided for the items. 230V AC power supply is to be taken from an external source, which will be available at site, through a suitable rating RCD. One suitable rating socket should be provided for this power supply.

2.7 Socket Panel:

Power Socket board should be provided at one end of the hut. This should be covered with suitable canopy. Doors (double palla) should also be provided as mentioned earlier with lockable facility.

Incoming and outgoing power cables of the various electrical components as per SLD shall be connected through this socket board. Rating of each socket and quantities shall be as under:

- A. Socket Panel should have 4 distinct Sections as under.
 - (a) Generator incomers
 - (b) 3 Ph. 4 wire (TPN) outputs
 - (c) 3 Ph. 3 wire (TP) outputs
 - (d) Ph-Ph 240V, Lighting. DB outputs
- B. No. of Sockets shall be as under:
 - (a) Generator incomers
 - i) Gen. Incomers, 125A: 02 Nos.

- (b) 3 Ph. 4 wire (TPN) outputs
 - i) 100A, 3ph: 1 No. (From main SDF-1)
 - ii) 32A, 3ph: 04 Nos. (From TPN DB-1)
 - iii) 20A, 1ph: 06 Nos. (From TPN DB-1)
 - iv) 10A, 1ph: 12 Nos. (From TPN DB-1)
- (c) 3 Ph. 3 wire (TP) outputs
 - i) 63A, 3ph: 01 No. (From 3 ph. 3 wire DB)
 - ii) 32A, 3ph: 06 Nos. (From 3 ph. 3 wire DB)
- (d) Ph-Ph 240V, Lighting. DB outputs
 - i) 10A: 12 Nos. (From Lighting DB)
 - ii) 20A: 6 Nos. (From Lighting DB)

2.8 Electrical Wirings inside PCR:

- i. Following electrical items shall be provided in the PCR hut –
 - a. Two exhaust fan (with suitable rain protection) shall be provided for the hut.
 - b. Min six numbers of 20W LED batten lights shall be provided at the different sections of the PCR for proper illumination inside the PCR and socket panel section
 - c. Metallic sockets – 2 nos (one 5 Amps, the other 20 Amps)
 - d. Switch board, Main Switch, DB as required.
 - e. Power supply for the internal electrification of the PCR may be tapped from the TPN DB-1 as shown in the SLD
- ii. All wiring for the transformer huts from MCB DB to switchboards/ points/ sockets etc. shall be running through PVC conduit. Since neutral is not available in the transformer hut, external Ph- Neutral supply shall be used for internal power supply of the huts for lights, fan etc.
- iii. Medium grade, BIS compliant, PVC conduits shall be used for wiring. Conduit size and no. of wires in conduit shall be as per IS. Corners shall be rounded elbow type for ease of insertion of wires.
- iv. The wiring cable shall be PVC insulated, 1100 V grade, FRLS, BIS compliant multi-stranded flexible copper conductor.
- v. All wires shall be colour coded as Red for Phase, Black for neutral and Green for earth. All wire ends in DB, Main Switch and Socket outlets shall have copper lugs. Wiring of the hut shall be done as per IS: 732(1989).
- vi. All points shall have individual switches and independent neutral wire. Separate switchboard shall be provided. All light and fan points shall be suitably distributed in the switch boards with individual switches.
- vii. Earth points for socket outlets, fans etc. shall be individually wired with insulated wires to switchboards and then to MCB DB earth bus. MCB DB earth bus shall be connected to two earth points (welded studs) on the bunk house skid/metallic outside shell. No earth connection shall be made directly to any point of the metallic shell of the bunk house.
- viii. Switchboards, and all sockets shall be made of 1.6 mm thick MS boxes having 3.0 mm thick white coloured, BIS compliant Hylam sheet. Switchboards shall be flush mounted with the inside wall/panel of the hut. Suitable arrangement for mounting of the board shall be made for the purpose.
- ix. All switches and switch-sockets shall be flush type.
- x. Indicative makes of Electrical Items: The electrical items used should have a proven track record of good performance. The indicative makes of electrical items are as follows:
 - i. MCB DB: Legrand / Havells / Merlin Gerin / Siemens/Schneider.
 - ii. Lights: Philips / Crompton Greaves / GE /Bajaj/ Havells.
 - iii. LED Lights: Philips / Compton Greaves / GE /Bajaj/ Havells/Syska.
 - iv. Metal Clad Wall Plug & socket: Legrand / Merlin Gerin / Siemens.
 - v. Wall switches & socket (Bakelite): Anchor (BIS marked)

- vi. PVC conduit: AKG/PLAZA / Richa/Payal
- vii. Wires & cables: Finolex / Havells / Polycab.

2.9 Electrical Schematic Diagram:

An indicative Single Line Diagram [Annexure – III (b)] is attached herewith showing various electrical items and indicative ratings. The party should provide their own design showing all equipment and the ratings. Internal electrification of the PCR has not been captured in the indicative SLD. Supplier should obtain prior approval of the SLD, complete in all respect before starting the fabrication job.

2.10 Indicative make of Power Sockets, transformer etc.

The electrical items used should have a proven track record of good performance. The indicative makes of important electrical items are as follows:

- a) 100 KVA Transformer : BHEL / CG / BB / Siemens/Quantum/Arya
- b) NGR system : Bender- "RC48N" / Startco- "SE-330" / i-gard- "Sigma"
- c) Power Sockets (125A): Appleton / BCH / Pyle National/ Amphanol
- d) MCCBs with RCD : ABB/ L&T/ LeGrand / Merlin Gerin / Siemens/Schneider
- e) Digital Multifunction Meter : Schneider / Rishabh
- f) Analog ammeter : AE/ Rishabh/Meco
- g) Analog voltmeter: AE/ Rishabh/Meco

3.0 Others

3.1 Mandatory Spares

Following mandatory spares should be provided along with the supply. The party should quote for the mandatory spares. The spares should have same make and models used in the system.

- i. Resistor element for NGR system as built: 2 sets
- ii. Digital Multifunction meter as built: 1 no.
- iii. Analog voltmeter as built: 1 no.
- iv. Analog ammeter as built: 1 no.
- v. Plug and Sockets: 50% of total quantity against each type, minimum one number.

3.2 Testing:

- i. 100 KVA transformer
Type test and routine test should be carried out as per IS 11171. Report of the same should be provided to OIL representative at time of Pre-Dispatch Inspection.
- ii. Transformer hut / Power Control Room (PCR):
Dye Penetration test of the welding should be carried out. Report of the same should be provided to OIL representative at time of Pre-Dispatch Inspection.
- iii. Electrical wirings and socket board: Power Socket board with switch gears should be tested as per IS 8623. Electrical housing wiring for the hut should be tested as per IS 732.

Note: All the above standards should be of latest edition.

3.3 Warranty & Guarantee:

The Power Control Room (PCR), including painting & all the bought-out items, should have minimum onsite warranty of one year from the date of installation and commissioning.

This guarantee shall cover all items of the package, including (but not limited to) the skid, housing, all the internal components and any spares supplied. Any repairs / replacements required during this Warrantee period shall be carried out by the party, on site, at no cost to Oil India.

3.4 Notes:

- i. Type of Earthing:
IT system of neutral grounding with maximum ground fault current limited to 750 mA using suitable NGR as per CEA (Measures Relating to Safety and Electric Supply) Regulations, 2010 is to be used. All breakers, MCCBs shall be suitable for IT system as per IEC 947-2. The 70KVA isolation transformer secondary neutral shall not be served.

ii. NGR System

The NGR system shall be installed in the 70 KVA secondary output of the transformer. The neutral point of the transformers shall be earthed through a Neutral Grounding resistance as mentioned above. The entire system shall conform to CEA (Measures relating to safety and Electricity Supply) Regulations, 2010 (Rule # 100). NGR maximum earth fault current limited to 750 mA.

iii. For Electrical Power Supply to any mining area and hazardous area, compliance to all the applicable statutory rules and regulations (e.g. OMR-2017, CEA Regulations 2010, OISD standard etc.) is a must. Accordingly, in the electrical switchgear part the following statutory requirements shall be taken care especially.

- a. Safety requirement for mines and oil-fields as per CEA regulation 2010, Rule 100 which mandates use of Neutral Grounding Resistance (NGR) to restrict fault current to 750mA. Accordingly, use of isolation transformer, NGR and NGR monitoring system has been adequately addressed in this specification.
- b. Safety requirement for mines and oil-fields as per CEA regulation 2010, Rule 102 (ii) (b) which mandates use of 415V/230V lighting transformer.

iv. PCR shall be installed at a safe location (non-hazardous area) near the 63 kVA gensets. PCR will have provision to hook up gensets with plug/socket type arrangements for easy and quick commissioning of the SPF.

The socket board (with suitable canopy & covers) shall be accessible from outside the PCR for all the outgoing & incoming cables. All the items like lights, earth electrodes etc. shall be available in the PCR. Electrical items as required at a SPF will be used from the PCR. During inter location movement dismantled items will be stored back inside the PCR storage section.

v. All standards referenced above should be of the latest editions. All electrical items/components shall be as per respective Indian Standard (BIS) and brand new. OIL shall have the right to reject any non-standard or inferior quality item. OIL's approval shall be obtained against all the electrical components/Bill of Materials (BOM) indicating make, model no. etc. before any procurement at the end of the supplier.

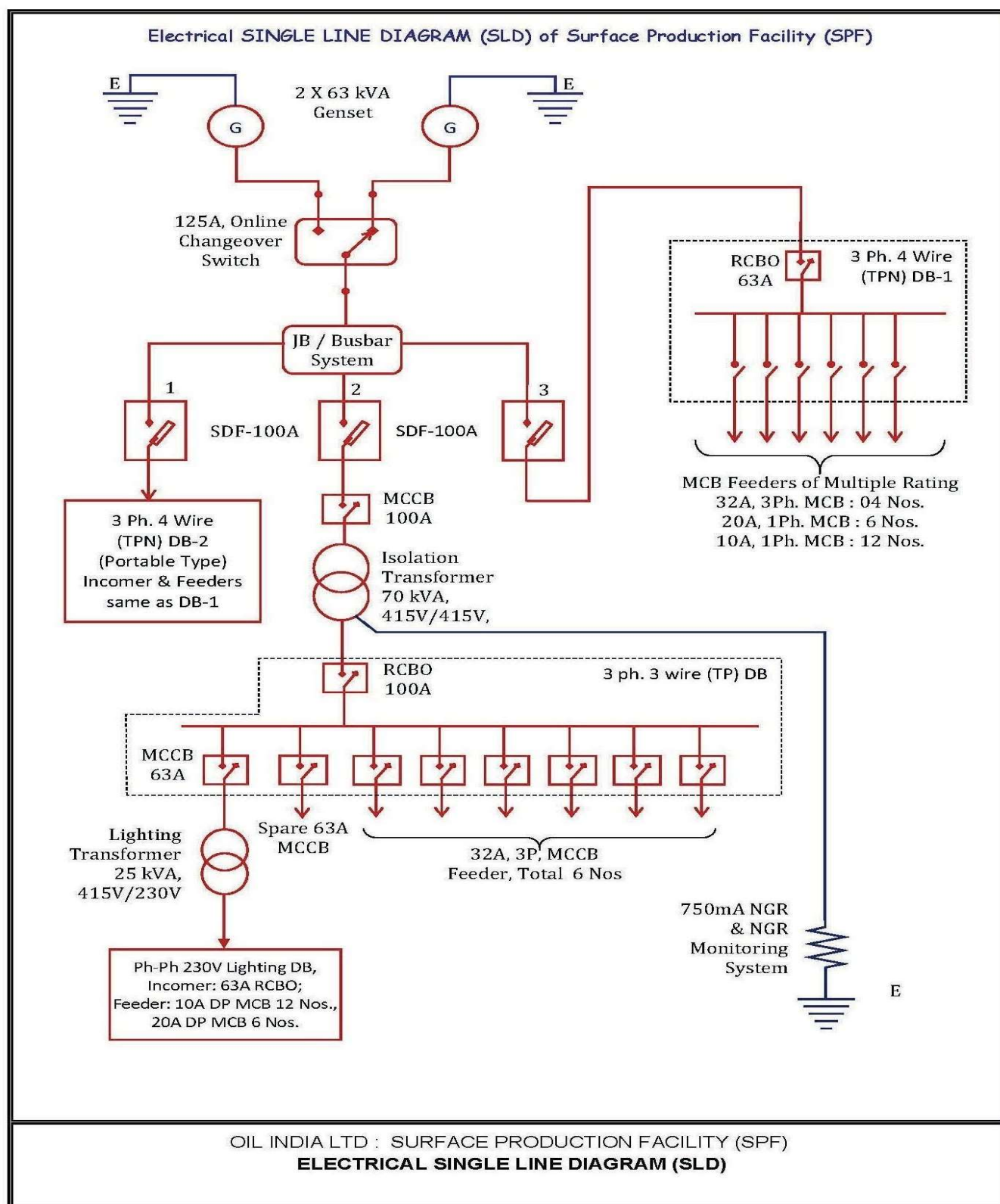
vi. All electrical equipment/item which to be used in the hazardous area should fulfill the following:

- (a) Shall be of a type and specification confirming to the relevant standards as specified in the Regulation 107(2) of **Oil Mines Regulation-2017** and complying the provisions therein.

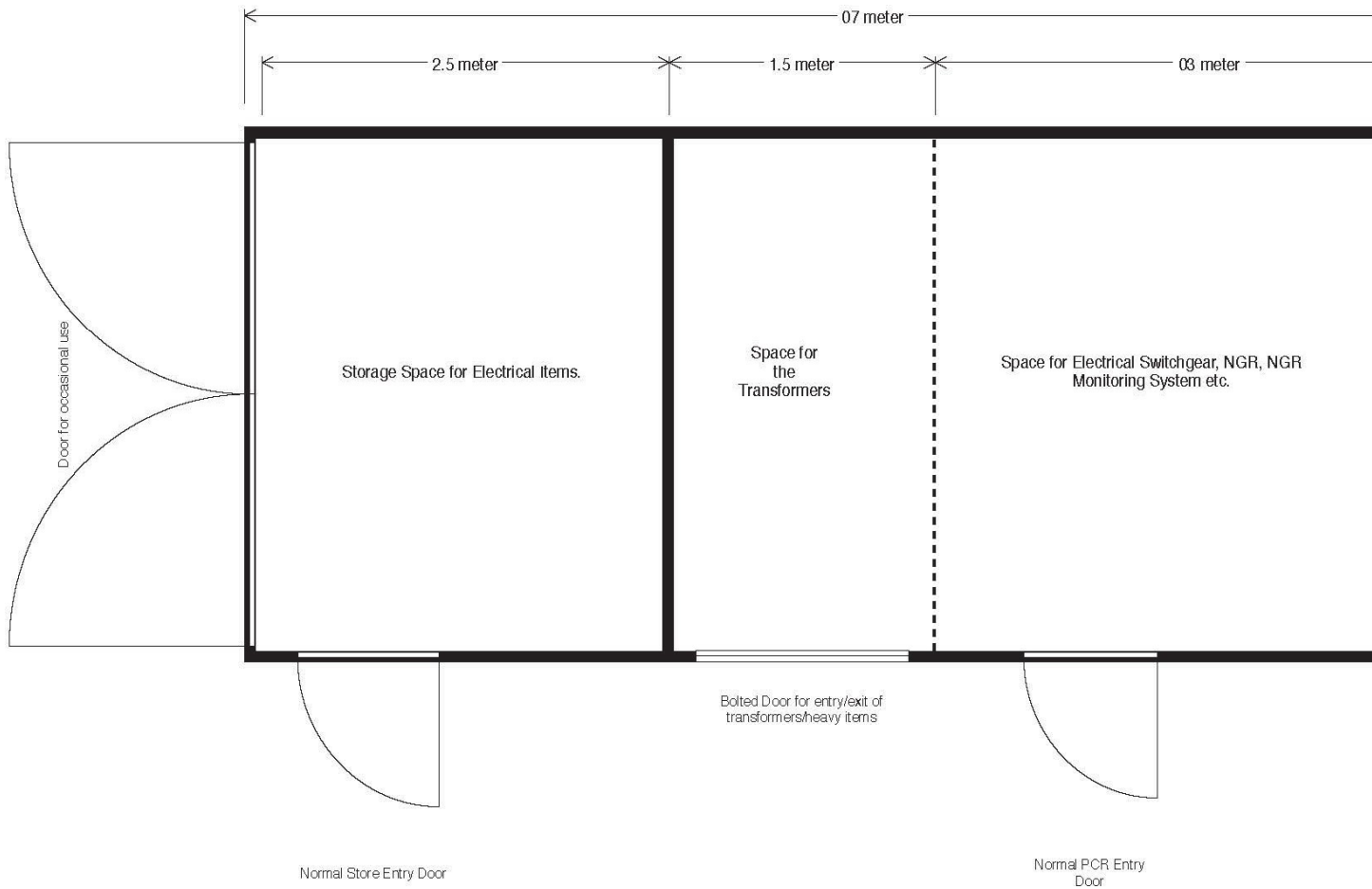
In this regard, Bidder may refer OMR-2017, Notification dated 18th October 2017, published in the Gazette of India (No. 898) on 2nd November 2017, under Ministry of Labour and Employment, Directorate General of Mines Safety.

- (b) All the flameproof equipment, items and enclosures shall be conforming to the requirements of the latest version of IS/IEC 60079-1: 2007, IS/IEC 60079-0:2011 and shall have type test certificate from CIMFR or any other NABL accredited Indian Government Laboratory or IECEx accredited laboratory or ATEX notified body, which is not a part of manufacture's facilities. Copies of test certificates must be provided to OIL along with materials.

- vii. After placement of PO, within 15 days, supplier shall submit GA drawing of the PCR, electrical schematic drawing, earthing scheme, electrical single line diagram, electrical bill of materials along with specification of the selected electrical materials/components for OIL's approval. All modifications in the work plan and items as required by OIL shall have to be agreed by the party.
- viii. The electrification job shall start only after approval of drawings and Bill of material by OIL in writing.
- ix. Entire electrical installation work has to be done by licensed electrician as per IE Rules and NEC codes. Party will submit the copy of the valid licenses of their work persons to OIL before start of the work.
- x. Test report of the entire electrical work as per IE Rules will have to be submitted to OIL after completion of the job.
- xi. The electrical work shall be treated as complete once installation, testing & commissioning of electrical works are accepted by OIL's Electrical Department and submission of test report for electrical works, as installed drawings & list of electrical items used, spares for lighting system by the party
- xii. PCR shall be offered for Stage inspection by OIL's Electrical Engineer during the fabrication period, before final completion of the electrical works. All the points/observations/technical recommendations made by OIL during the stage inspection shall be incorporated/ implemented in the PCR without any additional cost to OIL. Party shall notify OIL for inspection of wiring work before fixing of covers, at least 15 (fifteen) days in advance
- xiii. Pre-despatch inspection will be carried out by OIL after complete fabrication of the PCR and installation/storage of all the listed electrical items in the PCR.



Electrical System - PCR Layout Diagram



Electrical System - List of items				
(A) Electrical Switchgear, Lighting Transformer, Isolation Transformer, DBs etc. which would remain permanently installed inside PCR				
S/N	Item	Qty.	Technical Specifications	Remarks
1	On Load Change Over Switch, 125A, 4 pole, 415V	01 No.	On Load Change Over Switch, 125A, 4 pole, 415V Make: Schneider / ABB / L&T	<input type="checkbox"/> This item shall remain fixed and suitably installed inside Switchgear Section of PCR. <input type="checkbox"/> 4 core output cables of two nos. 63kVA, 415V, three phase generators will terminate to this 125A changeover switch. <input type="checkbox"/> For easy connection/ disconnection male/ female type industrial plug socket of suitable rating shall be provided at the socket panel, internally connected to the changeover switch through cable of suitable rating.
2	Busbar Assembly, with provision of one incomer cable connection and 3 nos. outgoing cable connections.	01 No.	Busbar Assembly, with provision of one incomer cable connection and 3 nos. outgoing cable connections, Non Flameproof (FLP) type, Bus bar Ratings 300A, Aluminium, Busbar assembly shall be accommodated in CRCA Sheet Steel, powder coated enclosure, conform to IS 8623-1 & 3, IEC 61439-1&3. Suitable double compression type Cable glands, gland plate shall be used for cable entry and exit to the Busbar enclosure. Busbars shall be supported on insulators. Following indications and measuring instruments to be provided on the enclosure of the Busbar assembly: <ul style="list-style-type: none"> ➤ 3 Nos. Power ON, LED Indication Lamps (R, Y, B), ➤ Analog type Ammeter – 1 No., ➤ Analog type Voltmeter – 1 No., ➤ Digital Multifunction Meter 1 No, Make Schneider, Model EM6400NG, CT, PT etc. as required for above indication and metering are included in the scope of supply.	<input type="checkbox"/> This item shall remain fixed and suitably installed inside Switchgear Section of PCR. <input type="checkbox"/> 3 outputs from the Busbar assembly shall terminate to the 3 nos. separate isolator/SDF as per SLD

3	Isolator / Switch – Disconnecter Fuse (SDF) Unit	03 Nos.	Switch – Disconnecter Fuse (SDF), 160A, AC, conforming to IS/IEC 60947-3, complete with bolted fuse link, terminal shrouds on both sides and phase barriers, door interlock and padlock facility. Make : L&T, Schneider, ABB, Legrand	<input type="checkbox"/> This item shall remain fixed and suitably installed inside Switchgear Section of PCR. <input type="checkbox"/> 1 No. SDF to feed power to the 70kVA Isolation Transformer <input type="checkbox"/> 1 No. SDF to feed power supply to the TPN DB-1 as per SLD <input type="checkbox"/> 1 No. SDF to feed power supply to the TPN DB-2 as per SLD
3	Three Phase 4 wire, TPN DB, complete with earth leakage protection. Incomer: 63A RCBO, Outgoing: <ul style="list-style-type: none"> • 32A, 3 ph MCB feeder: 4 Nos. • 20A, 1 ph MCB feeder: 6 Nos. • 10A, 1 ph MCB feeder : 12 Nos. 	02 Nos.	Three Phase 4 wire, TPN DB, complete with earth leakage protection. Incomer: 63A RCBO, Outgoing: <ul style="list-style-type: none"> • 32A, 3 ph MCB feeder: 4 Nos. • 20A, 1 ph MCB feeder: 6 Nos. • 10A, 1 ph MCB feeder: 12 Nos. TPN DB shall conform to IS 8623-1 & 3, IEC 61439- 1&3, double door, in CRCA Sheet Steel, powder coated enclosure, complete with circuit identification levels. Make of components and DB : L&T, ABB, Schneider, Legrand	<input type="checkbox"/> One TPN DP Shall remain fixed and suitably installed inside Switchgear Section of PCR. <input type="checkbox"/> The other one shall be portable type for use at distant safe location at the SPF (outside PCR) with cable connection from the PCR <input type="checkbox"/> Suitable canopy along with supporting stand to be provided along with the portable DB, for installation/use outside PCR <input type="checkbox"/> Inside Storage Section of PCR, suitable storage facility/space shall be made available to accommodate the portable type DB.
4	Isolation Transformer, 415V/415V, DYn11, 70kVA	01 No.	Isolation Transformer, 415V/415V, DYn11, 70kVA. Detailed specifications given separately.	<ul style="list-style-type: none"> • This item shall remain fixed and suitably installed inside transformer Section of PCR.
5	750mA, NGR and NGR Monitoring System	01 No.	750mA, NGR and NGR Monitoring System. Detailed specifications given separately.	<input type="checkbox"/> This item shall remain fixed and suitably installed inside Switchgear Section / Transformer Section of PCR. <input type="checkbox"/> Isolation transformer neutral on the secondary side will be earthed through NGR, to comply CEARegulation 2010, rule 100(1)

6	<p>Three Phase 3 wire DB, Complete with earth leakage protection: Incomer: 100A MCCB with microprocessor release, with ELR, CBCT: 02 Nos.</p> <p>Outgoing:</p> <ul style="list-style-type: none"> • 63A, 3 ph MCCB Feeder: 2 Nos. • 32A, 3 ph MCCB feeder : 6 Nos. 	01 No.	<p>Three Phase 3 wire DB, Complete with earth leakage protection:</p> <p>Incomer: 100A MCCB with microprocessor release, with ELR, CBCT: 02 Nos.</p> <p>Outgoing:</p> <ul style="list-style-type: none"> • 63A, 3 ph MCCB Feeder: 2 Nos. • 32A, 3 ph MCCB feeder: 6 Nos. <p>TPN DB shall conform to IS 8623-1 & 3, IEC 61439-1&3, double door, in CRCA Sheet Steel, powder coated enclosure, complete with circuit identification levels.</p> <p>Make of electrical components: L&T, ABB, Schneider, Legrand</p>	<ul style="list-style-type: none"> • This item shall remain fixed and suitably installed inside Switchgear Section of PCR.
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7	<p>Lighting Transformer, 415V/240V, 20kVA</p>	01 No.	<p>Lighting Transformer, 415V/240V, 20kVA</p> <ol style="list-style-type: none"> a) Capacity- 20 kVA, (each), continuous rating b) Dry Type, copper wound, air cooled c) Voltage - 415/415 volts, Dyn11 d) Frequency - 50 Hz e) Phases - 3 phase f) Vector Group - Dyn11, Star connected secondary, g) Enclosure - IP23 type, with provision for natural circulation of cooling air. h) Ambient temperature - 55 Deg C i) Temperature rise above ambient - 90 Deg C j) Insulation - Class F k) Rated power freq. withstand - 3 kV (rms) or better l) Standard - Indian standard IS: 11171 	<ul style="list-style-type: none"> • This item shall remain fixed and suitably installed inside transformer Section of PCR.
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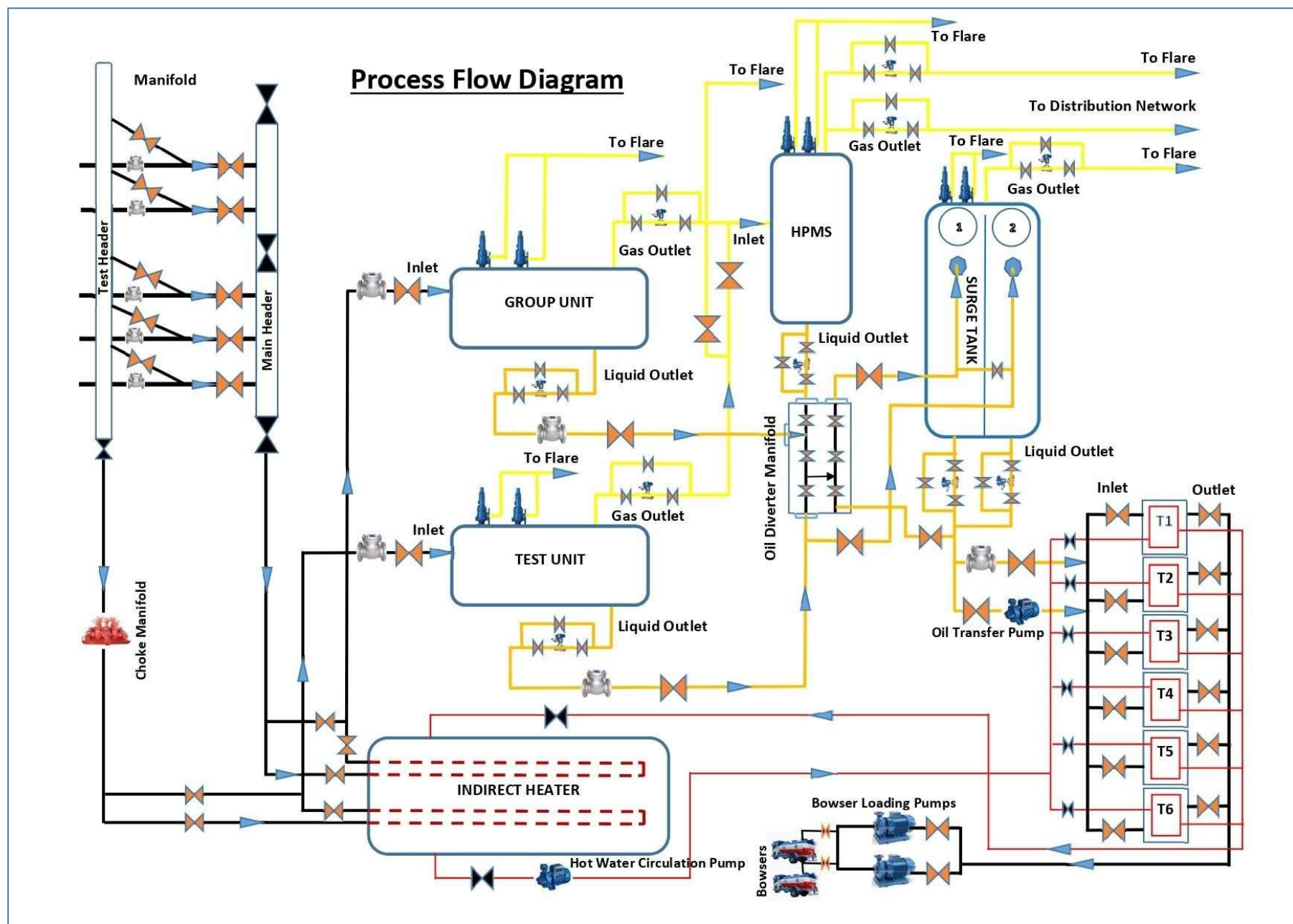
8	Phase to phase 240V lightning DB: Incomer: 63A RCBO Outgoing: • 10A, DP, MCB Feeder: 12 Nos. • 20A, DP, MCB Feeder : 6 Nos.	01 No.	Phase to phase 240V lightning DB: Incomer: 63A RCBO Outgoing: • 10A, DP, MCB Feeder: 12 Nos. • 20A, DP, MCB Feeder: 6 Nos. TPN DB shall conform to IS 8623-1 & 3, IEC 61439-1&3, double door, in CRCA Sheet Steel, powder coated enclosure, complete with circuit identification levels. Make of electrical components: L&T, ABB, Schneider, Legrand	<input type="checkbox"/> This item shall remain fixed and suitably installed inside switchgear Section of PCR. <input type="checkbox"/> All the outgoing feeders shall suitably terminate to the socket panel, of the PCR using suitably rated PVCA aluminium cables.
9	Wall mounted Fan	02 Nos.	Wall mounted Fan, sweep 400mm, Oscillating, Power input around 60W, Air delivery approx. 65 cu. meter/min. Conforming to IS:1169 Make : Crompton/Usha/Havells	<ul style="list-style-type: none"> • This item shall remain fixed and suitably installed inside switchgear Section of PCR.
12	Socket & Plug Panel	01 Set	Socket & Plug Panel : (A) Gen. Incomers, 125A: 02 Nos. (B) 3 Ph. 4 wire (TPN) outputs: a. 100A, 3ph: 1 No. (from main sw.) b. 32A, 3ph: 04 Nos. (from DB-1) c. 20A, 1ph: 06 Nos. (from DB-1) d. 10A, 1ph: 12 Nos. (from DB-1) (C) 3 Ph. 3 wire (TP) outputs: a. 63A, ph: 01 No. b. 32A, 3ph: 06 Nos. (D) Ph-Ph 230V, Ltg. DB outputs: a. 10A: 12 Nos. b. 20A : 6 Nos.	<input type="checkbox"/> This item shall remain fixed and suitably installed at one end of the PCR. <input type="checkbox"/> Socket Panel should have 4 distinct Sections asunder. (a) Generator incomers Section (b) 3 Ph. 4 wire (TPN) outputs (c) 3 Ph. 3 wire (TP) outputs (d) Ph-Ph 230V, Lighting. DB outputs <input type="checkbox"/> All the 4 sections and every sockets shall have suitable identification tags, level plate.
13	Misc. electrical items : MCCB, Switch board, LED Lights etc.	01 Set	Contingencies to be finalised during design stage	<ul style="list-style-type: none"> • This item shall be suitably installed/stored in the PCR.

(B) Electrical Items like Light Fittings, Earth Electrodes, Cables etc. required for commissioning of a SPF, which shall be supplied along with PCR				
14	FLP type DOL Starter, suitable for motors upto 15HP complete, free standing type with stand and canopy	06 Nos.	<p>Flameproof (FLP) type DOL Starter complete with contactor, ON/OFF push button switch.</p> <p>After placement of order, approval of GA drawing & electrical schematic drawing to be obtained from OIL before fabrication. Make & Model: To be decided after placement of the PO, jointly by OIL & PCR Supplier, during fabrication of the PCR</p>	<p>□ Inside Storage Section of PCR, suitable storage facility/space/bin shall be made available to accommodate the portable type DOL Starters.</p> <p>□ Portable type, for installation near motor.</p> <p>□ Suitable stand with canopy for installation to be provided.</p>
15	FLP, LED Well Glass Fittings, 75W, complete with bracket etc.	20 Nos.	<p>FLP, LED Well Glass Fittings, 75W, complete with bracket etc.</p> <p>Make & Model: To be decided after placement of the PO, jointly by OIL & PCR Supplier, during fabrication of the PCR</p>	<p>• Inside Storage Section of PCR, suitable storage facility/ bins shall be made available to accommodate all the LED well glass fittings.</p>
16	FLP, LED 120W COB type Flood Light, complete with bracket etc.	20 Nos.	<p>FLP, LED 120W COB type Flood Light, complete with bracket etc.</p> <p>Make & Model: To be decided after placement of the PO, jointly by OIL & PCR Supplier, during fabrication of the PCR</p>	<p>• Inside Storage Section of PCR, suitable storage facility/ bins shall be made available to accommodate all the LED Flood Light Fittings.</p>
17	FLP, 4 way JB, ¾ ET, with glands	20 Nos.	<p>FLP, 4 way JB, ¾ ET, with glands</p> <p>Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.</p>	<p>• Inside Storage Section of PCR, suitable storage facility/ bins shall be made available to accommodate all the JBs.</p>
18	Fixed type cable drum / reels, for storage/coiling/recoiling of the electrical cables	08 Nos.	<ul style="list-style-type: none"> 6 nos. for coiling about 2000 m, 4 sq.mm, 3 core PVC screened copper cable 02 nos. for coiling about 500 m, 25 sq.mm, 4 core, PVCA, copper cables <p>Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.</p>	<ul style="list-style-type: none"> • Inside Storage Section of PCR, suitable facility shall be made available to accommodate all the cable drums / reels. • Drums shall be metallic. • Shall be suitably mounted on the PCR for ease of rolling
19	FLP Cable Gland, ¾ ET, double compression	150 Nos.	<p>FLP Cable Gland, ¾ ET</p> <p>Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.</p>	<p>• Inside Storage Section of PCR, suitable facility shall be made available to accommodate all the cable glands.</p>

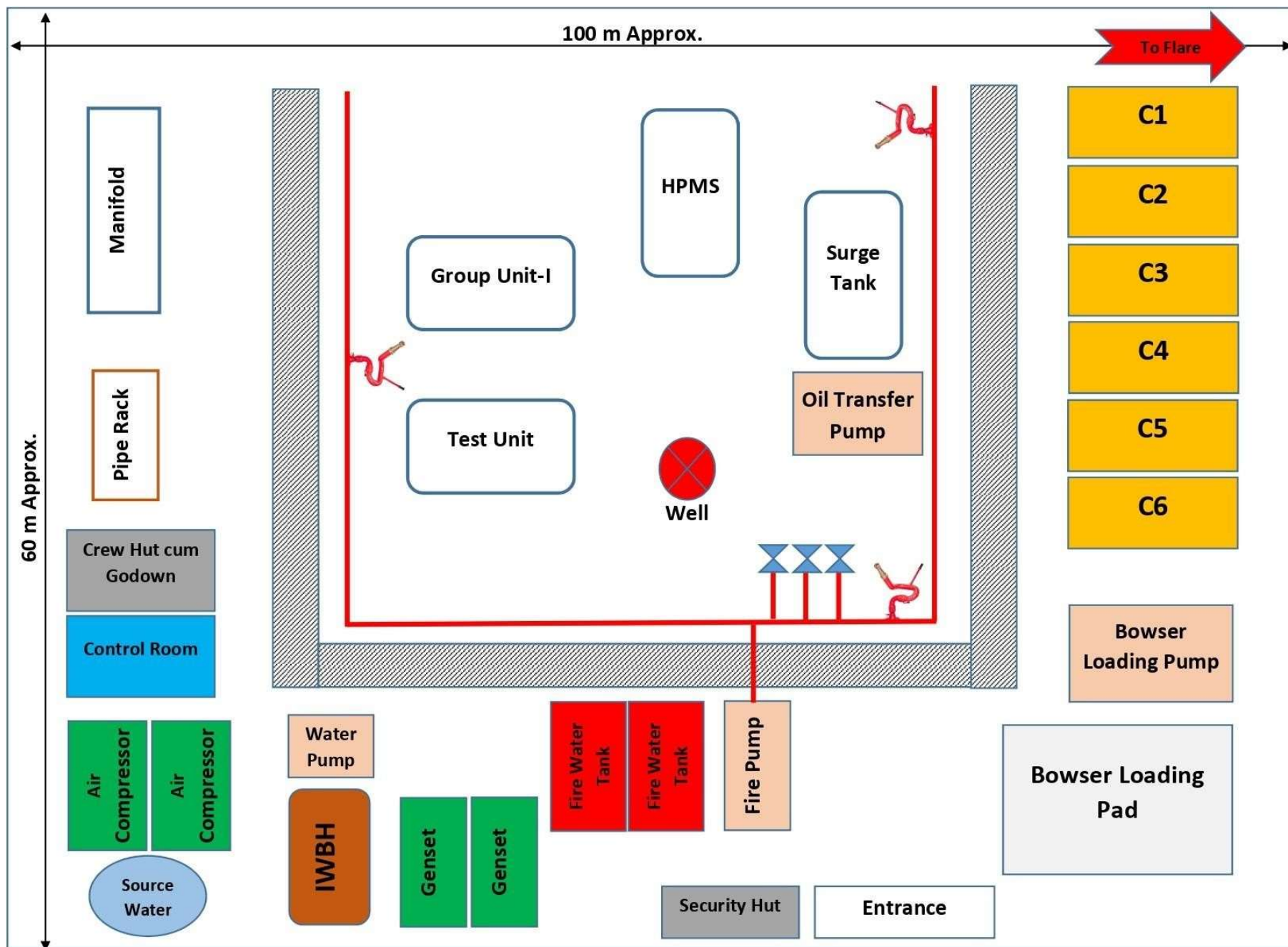
20	Adaptors : FLP Appleton plug type power outlets 1 phase, incomer divided into 3 outlets	05 Nos.	Adaptors: FLP Appleton plug type power outlets 1 phase,incomer divided into 3 outlets. Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.	<ul style="list-style-type: none"> Inside Storage Section of PCR, suitable facility shall be made available to accommodate all these items.
21	Adaptors : FLP Appleton plug type power outlet 3 phase, incomer divided into 2 outlets	03 Nos.	Adaptors: FLP Appleton plug type power outlet 3 phase,incomer divided into 2 outlets Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.	<ul style="list-style-type: none"> Inside Storage Section of PCR, suitable facility shall be made available to accommodate all these items.
22	Earth Electrodes 02 m length, 50mm dia, Galvanised pipe	30 Nos.	Earth Electrodes 02 m length, 50mm dia, Galvanised pipe,complete Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.	<ul style="list-style-type: none"> Inside Storage Section of PCR, suitable facility shall be made available to accommodate all these items.
23	25x5x5000mm GI Stripes	50 Nos.	25x5x5000mm GI Stripes	<ul style="list-style-type: none"> Inside Storage Section of PCR, suitable facility shall be made available to accommodate all these items.
24	Cable Trays FRP fibre each 4mlength	50 Nos.	Cable Trays FRP fibre each 4m length Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.	<ul style="list-style-type: none"> Inside Storage Section of PCR, suitable facility shall be made available to accommodate all these items.

25	Tool Box, complete with tools	1 No.	<p>Tool Box, complete with tools</p> <p>Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.</p>	<ul style="list-style-type: none"> Inside Storage Section of PCR, suitable facility shall be made available to accommodate all these items.
26	Mini Vice, for minor fabrication work	1 No.	<p>Mini Vice, for minor fabrication work</p>	<ul style="list-style-type: none"> Inside Storage Section of PCR, suitable facility shall be made available to accommodate all these items.
27	<p>Electrical measuring Tools:</p> <ul style="list-style-type: none"> ❖ Earth Testing Megger: 01 No. ❖ Insulation Megger: 01 No. ❖ Multi Meter: 01 No. ❖ Clamp Meter: 01 No. ❖ Portable hand drill machine :01 No. 	1 Set	<p>Electrical measuring Tools:</p> <ul style="list-style-type: none"> ❖ Earth Testing Megger: 01 No. ❖ Insulation Megger: 01 No. ❖ Multi Meter: 01 No. ❖ Clamp Meter: 01 No. ❖ Portable hand drill machine: 01 No. <p>Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.</p>	<ul style="list-style-type: none"> Inside Switchgear Section of PCR, suitable facility shall be made available to accommodate all these items.
28	Fixed type stand drill machine	1 No.	<p>Fixed type stand drill machine.</p> <p>Detailed Specification: To be decided after placement of PO, during fabrication of the PCR, jointly by OIL & PCR Supplier.</p>	<ul style="list-style-type: none"> Inside Switchgear Section of PCR, suitable facility shall be made available to accommodate all these items.

Process Flow Diagram & Plan Layout



Note: * Electrical and Instrumentation Items to be incorporated by the bidder, as applicable



Note: * Electrical and Instrumentation Items to be incorporated by the bidder, as applicable

SPECIAL NOTES TO BIDDERS**1. GENERAL/COMMON NOTES:**

- i. **OEM of Equipment**: The bidder should submit the complete list of OEMs of major individual equipment of the SPF as per Table-1 below:

Table-1

Sl. No.	Equipment	OEM
1	5-point Manifold	
2	Indirect Bath Heater	
3	High Pressure Horizontal Gas Oil separator (GU)	
4	Test Separator (Test Unit)	
5	HPMS	
6	Surge Tank	
7	Crude Oil Tank	
8	Oil Diverter Manifold	
9	Choke Manifold	
10	EMD Bowser Loading Pumps	
11	DED Fire Water Pump	
12	EMD Hot Water Circulation Pump	
13	EMD Oil Transfer Pump	
14	DED Generating Set	
15	EMD Air Compressor	
16	Burner & Burner Management System of Indirect Heater- To specify OEM of each component and should adhere to OEM of component already specified for certain parts/component.	
17	Flare Stack	
18	Remote Ignition System of Flare Stack.	
19	PLC System	
20	Instrumentation Items- To specify for individual items as per list in Annexure II-b and should adhere to OEM of component already specified for certain parts/component.	
21	Electrical Items - To specify for individual items as per list in Annexure III-d and should adhere to OEM of component already specified for certain parts/component.	
22	Laboratory Items- To specify for individual items as per lab equipment list.	
23	Make of item, component of item individually specified against the items-Bidder to adhere to supply such items from the OEM already mentioned.	
24	Pipe lines and Fittings	
25	Paints – Bidder to adhere to the list of paint manufacturer already specified.	

- a) Bidder should submit certificates from the OEMs of respective equipment given above guaranteeing supply of the equipment and after sales service to the bidder in the event of an order on the bidder.
 - b) Change of OEM at the time of PO execution will not be acceptable.
 - c) Makes of equipment should be as per technical specifications, wherever specified.
- ii. The bidder shall confirm that the all equipment & materials for the SPF to be supplied shall be brand new, of recent make, of the best quality & workmanship. The bidder shall confirm that the materials shall be guaranteed for a period of 12 months from the date of commissioning of the SPF unit at Fields, against defects arising from faulty materials, workmanship or design. Defective goods/ materials or parts notified by OIL to the Seller shall be replaced immediately by the Seller on FOR destination basis including payment of all taxes and duties at Seller's expense. This guarantee shall survive and hold good notwithstanding inspection, payment for and acceptance of the goods.
- iii. Manufacturer's working drawings for all equipment and layout diagram should be sent to OIL for review along with Quality Assurance Plan (QAP) prior to the commencement of manufacture/ fabrication of the equipment. The Bidder shall confirm the same in their technical Bid. All the welding (separators, manifold, bath heaters, tanks etc.) shall be done as per ASME section IX and will be done by welders who are qualified under ASME boiler and pressure vessel code section- IX regulations. The Bidder shall confirm the same in their technical Bid.
- iv. Stress relieving of the fabricated Equipment i.e. pressure vessels, manifold, fire tubes in bath heaters etc. shall be required. Stress relieving operations are to be conducted in automatic temperature-controlled furnace. The Bidder shall confirm the same in their technical Bid.
- v. All the equipment should be hydraulically tested to the pressure specified in the submitted and reviewed drawings & technical specification. The Bidder shall confirm the same in their technical Bid. The hydraulic test certificates should be submitted along with supply.
- vi. All welding joints in all equipment should be tested as per requirement of ASME Section VIII. The Bidder shall confirm the same in their technical Bid.
- vii. Radiographic test report should be produced to OIL's inspectors during inspection and subsequently to be provided with supply of the materials. The supplier has to keep available a radiographic viewer at the manufacturing site for viewing of film.

viii. QUALITY ASSURANCE PLAN:

a) Quality Control (QC), shall mean all the tests, measurement, checks and calibration which are to be carried out in Bidder's shop in order to compare the actual characteristics of the equipment/unit/system with the specified ones, along with furnishing of the relevant documentation (certificates/records) containing the data or result of these activities. The bidders are required to furnish a detailed & comprehensive list of the inspection facilities available at their shop along with the bids.

b) As a minimum the following points shall be included in the Quality Control Plan to supplement QAP Sample provided in the Tender:

- i) Review of material certificates and verification of the materials of construction for conformity with requisition requirements.
- ii) Review of material certificates and verification for heat marks for pipes and flanges for conformity to the specification.
- iii) Verification for the Vendors welding procedure and procedure qualification for the equipment in accordance with the design code.
- iv) Dimensional check in accordance with approved "final" drawings.
- v) Painting and lining requirement as detailed in this specification shall be inspected.
- vi) Final release

ix. CERTIFICATION OF FLAMEPROOF ITEMS:

Against all flameproof items (Motor, Cable Gland etc.) bidder shall furnish (along with the offer) test certificates conforming to the latest version of IS/IEC 60079-0:2011, IS/IEC 60079-0:2007 and IS/IEC 60079-1:2007 standard from CIMFR (Central Institute of Mining and Fuel Research) or any other NABL (National Accreditation Board for Testing Laboratories, India) accredited Indian Government Laboratory or IECEx accredited laboratory or ATEX notified body, which is not a part of manufacturer's facility.

In case such certificates not available at the time of bidding, then the bidder has to provide a declaration that on placement of order, within 15 days, all the essential test certificates will be produced for OIL's review/scrutiny before finalization of the selected make/model of the flameproof item/equipment. In such cases, OIL may ask for a change in the selection, if produced test certificate is not found in order. Hard copies of all the test certificates has to be supplied along with the materials. Despatch clearance will not be given to supplier unless above (1) test certificates and (2) bill of electrical materials are duly approved by OIL.

Bids/offers not accompanying the above test certificates/declaration will not be considered for technical evaluation

- x. In the event of order, supplier to submit API certificates of valves if asked for.
- xi. The Vendor has to build facility set up for flaring of produced gas. The company will provide requisite land and ROW/ROU for setting up flare pit at a suitable distance as per statutory norms.

- xii. The Vendor shall make themselves available for a joint discussion with OIL at Duliajan to formulate pre-job planning, if required, as and when found necessary after the award of Order. Cost of attending such joint discussion for bidder's personnel is to be borne by the successful bidder.
- xiii. The bidder must submit a written undertaking along with the technical bid that they would be able to supply all the requisite spares and consumables (including bought out items) for a period of 6(Six) years for Electronic/Electrical/Instrumentation Items and 10 (Ten) years for Mechanical items from the date of receipt of the items at site.
- xiv. MARKING: Each equipment shall be supplied with a name plate with each containing Manufacturer's name, Manufacturer's Identification and/or Serial number, Manufacturing Standard, Date of Manufacturing, Testing Parameters i.e. date, pressure etc., OIL's Purchase Order No., all Operating Parameters i.e. capacity, pressure etc. Vessels should be U-stamped as per ASME standard.
- xv. PAINTING: All items of the SPF shall be painted as detailed in Clause **C.3, D.1, D.2, F.1, F.2 & F.3**. TPI certificates for all the painting jobs to be provided along with order.

TPI to ensure the following for painting jobs

- i. Surface preparation
- ii. Paint procedure/method of application as per specs.
- iii. Paint quality
- iv. Thickness of paint for each coating
- v. Nos. of coating as per specs.

2. PORTABILITY OF EQUIPMENT:

- i. Overall dimensions of individual equipment should not exceed 9m x 2.5m x 2.75m (Length x Breadth x Height).
- ii. The overall weight of individual equipment should not exceed 18 MT.
- iii. For a skid of 2.5m width, there should be at least four longitudinal main sections, preferably each one of single length and should have a smooth finish underneath and curve finish at both the end, so that the skid can roll over the loading roller and body of the truck without any obstruction.
- iv. The skid so designed should be sufficiently strong and properly welded at joints and should be able to withstand any 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.
- v. As far as possible the length of the skid should be at least 1(one) meter longer than the overall length of the equipment mounted on it, and also equally distributed on either ends. The C.G of the load should preferably be located at the middle of the equipment.
- vi. As far as possible the roof and the side walls of the portable equipment/tools hut/godown/ office etc. should be fabricated from M.S. plates and welded instead of using joint bolts which work loose due to vibrations. Roof ends and corners should be rounded off so that these do not pull the telephone/guard lines, should these come in contact with them during transportation. The use of C.I. sheets should be completely avoided.
- vii. To withstand vibrations and jerks, suitable supports should be provided on the vertical posts and below extended fittings/pipe connections of the equipment which are skid mounted.

3. BID ENCLOSURES:

The bidders must furnish the following information as enclosures in their bids for each equipment:

- i. Relevant technical literature/ catalogue showing technical details for each individual equipment is to be provided.
- ii. Typical layout drawing showing all the equipment quoted including general layout & P&I diagram.
- iii. Typical Sectional drawing showing the internals of the indirect heater, separators, crew hut etc.
- iv. The list of all the bought-out items/ components indicating OEM's part nos., as well as, certificates from the OEMs of the respective items/ components guaranteeing supply of the equipment to the bidder in the event of an order on the bidder.

4. PACKING & DISPATCH

The completed units shall be dispatched to Oil India's designated site at Duliajan, Assam, India. The units shall be sent from manufacturer's works fully fitted, and ready to be commissioned at well sites. The units should be packed suitably to avoid ingress of rain, moisture and dust; and to withstand the rigors of travel, as well as storage before final commissioning.

5. DOCUMENTS WITH SUPPLY

In the event of an order, the bidder must submit the following documents with supply, as per standard of manufacturing & QAP. The Bidder shall confirm the same in the technical bid.

- i. Chemical & mechanical test certificate of raw materials for fabricated items (tanks, manifolds, separators, heater etc.) as per standard specified in technical specification.
- ii. Hydraulic test certificate, radiographic test certificate, certificate of Quality & Standard of welding for fabricated items (tanks, manifolds, separators, heater etc.).
- iii. Certificate of NDT, visual inspection & measurement of dimensions for fabricated items (tanks, manifolds, separators, heater etc.).
- iv. Operation and maintenance manual of each equipment/ instrument.
- v. SOPs for operation of the SPF as required.
- vi. List of all recommended spares with OEM part nos. required for maintenance of the SPF (Cost of such recommended spares will not be considered for price evaluation).
- vii. Detailed P&ID with Bill of Materials.

6. THIRD PARTY INSPECTION:

OIL will/may arrange for Third Party Inspection of the materials (at any stage of order execution) at Bidder's/Manufacturer's plant by any of its approved third party inspection agency. Scope of Third party Inspection will include but not limited to the following:

- i. To carry out stage wise inspection from procurement of raw materials to assembly to ensure that proper technique and procedure as per Purchase order and relevant API, ASME and other standard/specification whichever is applicable are followed by the manufacturer.
- ii. To review qualification of the welder and welding procedure specifications (WPS) as per ASME code.
- iii. Verification of physical and chemical properties of raw materials as per ASME code and heat treatment chart.
- iv. Inspection of radiography films and reports of welded joints. The Inspection Agency must have minimum valid Level-II certification or qualified radiographer to interpret and certify radiography films as per ASME section VIII. Radio isotopes shall be approved by statutory agencies. Documentary evidence in support of the same is to be furnished by the bidder.
- v. Review of post weld stress relieving job for fabricated items.
- vi. Inspection of Hydraulic testing of each equipment and pressure vessels i.e. separators, manifold, bath heaters, tanks etc. The hydraulic test certificates report and recorder charts are to be sent to OIL.
- vii. Inspection of bought-out items including instrumentation, electrical, electronic items etc.
- viii. Inspection of certificates in respect of raw materials, bought-out items, radiography etc.
- ix. Inspection of Painting, both External & Internal, of each and every equipment and components. All items of the SPF shall be painted as detailed in Clause **C.3, D.1, D.2, F.1, F.2 & F.3**. TPI certificates for all the painting jobs to be provided along with order.
- x. To ensure that all the equipment inspected are fully marked/ embossed as per purchase order.
- xi. To carry out visual & dimensional inspection to ensure that all the equipment are manufactured as per submitted drawing/ PO. To document, review and issue all inspection certificates to be provided along with material supply.
- xii. TPI has to ensure and certify the Quality Assurance Plan of the bidder.
- xiii. To review Operating & Maintenance Manuals for the package.
- xiv. The above inspection is for general guide line only. If third party desire to carry out any additional inspection as per ASME code / API specification and the same should be included under intimation to Oil India Limited.

The scope of TPI may change without any prior notice to the successful bidder. While submitting offer, the bidder should not include cost of Third Party Inspection as the same will be arranged by OIL.

All cost towards the engagement of Third Party Inspection Agency shall be borne by OIL. BIDDER SHALL NOT QUOTE/INCLUDE THE COST OF THIRD PARTY INSPECTION IN THEIR OFFER. However, Bidder shall extend all necessary facility to the satisfaction of Third Party Inspection Agency for smooth conduct of the inspection. For the purpose of Third Party Inspection:

- a) Bidder shall clearly indicate in the technical bid the place/plant where Third Party Inspection of the materials shall be conducted, in the event of an order.
- b) Supplier shall convey to OIL the production schedule within 02(two) weeks from the date of Letter of Award (LOA)/Purchase order so that OIL can deploy the TPI agency to carry out inspection at bidder's/manufacturer's premises accordingly. Additionally, Supplier shall send a notice in writing/e-mail to the OIL at least 15 days in advance specifying the exact schedule and place of inspection (TPI) as per the Purchase Order and OIL upon receipt of such notice shall notify to the supplier the date and time when the materials would be inspected by OIL nominated TPI Agency.
- c) The supplier shall provide, without any extra charge to OIL, all materials, tools, labour and assistance of every kind which the OIL nominated TPI Agency may demand for any test or examination required at supplier's premises. The supplier shall also provide and deliver sample from the material under inspection, free of charge, at any such place other than their premises as the TPI Agency may specify for acceptance tests for which the supplier does not have the facilities for such tests at their premises. In the event of testing outside owing to lack of test facility at supplier's premises, the supplier shall bear cost of such test, if any.
- d) The supplier shall not be entitled to object on any ground whatsoever to the method of testing adopted by the OIL nominated TPI Agency.
- e) Unless otherwise provided for in the Purchase Order, the quantity of materials expended in test will be borne by supplier.
- f) The decision of the Third Party Inspection Agency nominated by OIL regarding acceptance/rejection of material shall be final and binding on the supplier.
- g) Upon successful completion of the TPI and acceptance of the TPI reports by OIL, Bidder/Supplier shall be intimated by OIL for dispatch of the materials. The materials should be despatched only after receipt of dispatch clearance from OIL.
- h) Acceptance of the TPI reports and receipt of dispatch intimation from OIL do not absolve the bidder from any warranty obligations or waive the bidder from OIL's right for rejection of the materials after receipt at site.
- i) Notwithstanding clauses contained herein above, in the event the materials under inspection fails to conform to purchase order specification and are rejected by OIL nominated Third Party Inspection agency, OIL may recover all cost incurred for re-inspection of the materials from the supplier.

7. PRE-DISPATCH INSPECTION BY OIL:

- i. **Stage Inspection:** OIL's representative may carry out Stage Wise Inspection throughout the manufacturing process of all the equipment of the SPF prior to dispatch at vendor's works. Three weeks' prior notice to be given to OIL for every stage inspection. Stage inspection may be carried out for the following:
 - a) Electrical Power Control Room / Packages of Transformer huts with NGR.
 - b) Inspection of Crew Cabin, Chemical Lab and Security hut after completion of structure work and internal painting.
 - c) Inspection of the inside of vessels after installation of all internal equipment and internal surface painting.
 - d) Inspection of tanks before painting.
 - e) Radiographic films and test reports
 - f) Any other stage inspection as decided necessary by OIL during execution of PO.
- ii. **Pre-dispatch Inspection:** OIL's representative shall visit vendor's works for a final inspection before dispatch of the equipment. The following aspects, but not limited to, will be inspected by OIL's team during the final inspection:
 - a) Review of TPI reports
 - b) Radiographic films and test reports and other NDT reports
 - c) PWHT reports
 - d) Witness hydraulic testing
 - e) Functional tests of various equipment
 - f) Complete Electrical PCR packages and various electrical items in the PCR to be tested according to manufacturer's standard test procedures and Relevant IS standard, to demonstrate conformance with all required specifications etc.
 - g) Representatives from Oil India shall witness these tests, and record results thereof. All test reports, certificates, approvals etc. pertaining to the system should be furnished during final pre-dispatch inspection. Three weeks' prior notice to be given to OIL for final pre-dispatch inspection.
- iii. It is to be noted that such inspection, as detailed above, shall not relieve the supplier of his responsibility to ensure that the equipment/systems supplied are free from all manufacturing and other defects and conforms to correct specifications & performances. Manufacturer shall facilitate above inspections without any cost to OIL. However, Cost of travel, accommodation and other expenses of OIL's PDI team will be borne by OIL.

8. INSTALLATION & COMMISSIONING:

- i. The supplier shall inform OIL at least 3 month in advance about its readiness to ship the equipment. Supplier shall provide the block layout, foot print area of individual equipment, Process flow diagram along with the shipping information, so that OIL can ensure readiness of the plinth on arrival of the equipment. OIL will provide security of the equipment at its plinth. OIL can defer the shipping at its own discretion.
- ii. In case bidder desire to keep the equipment in own premises, bidder has to arrange its own security.
- iii. In case of early dispatch of equipment, earlier than 3 months' notice to OIL, bidder has to keep the equipment at their own arrangement with their own security.
- iv. The shipping shall be considered complete only upon receipt of all the items and equipment of the package. For convenience, the bidder has to complete shipping of the entire package within 7 days of the arrival of first shipment at OIL's site which will be considered as shipping in single lot.
- v. The supplier has to depute their installation & commissioning team along with Project Manager and Engineer within 20 days of official intimation from OIL for installation and commissioning of the SPF's.
- vi. The successful bidder shall have the responsibility to commission the complete SPF system and to carry out functional test of the unit to the satisfaction of OIL. All piping works related to connection of wells to the SPF unit and preparation of foundation shall be in the scope of OIL.
- vii. Lifting arrangements, security arrangements, boring of deep tube well etc. during the installation /commissioning job shall be done by OIL.
- viii. Commissioning of the Instrumentation and Electrical equipment shall be in the scope of the supplier.
- ix. Installation & commissioning of all the Equipment of the SPF unit will be carried out as one job and the supplier has to depute their representative(s)/ Service engineer(s) as per requirement.
- x. The Supplier shall have to supply and use their own tools & equipment/facilities etc. to undertake the installation and commissioning job.
- xi. The Supplier shall have to arrange at his own expense for food, lodging and transportation service for their personnel for installation and commissioning of the SPF Unit.
- xii. Supply of Tool/Equipment/Manpower/Consumables required for ensuring trouble free efficient operation for the installation and commissioning is the sole responsibility of the supplier.
- xiii. The representatives/Service Engineers will have to provide practical demonstration to operating personnel of OIL regarding safe operating procedure & maintenance procedure of all the equipment of the SPF unit at the time of installation and commissioning.

- xiv. On the job training has to be provided to OIL personnel for all critical equipment like BMS of Indirect Heater, PLC System, Surge Tank, All control systems, flare ignition system etc.
- xv. A 7 days class room training has to be provided to OIL personnel on the general operation and maintenance of the SPF setup including detailed session for the critical items like BMS of Indirect Heater, PLC System, Surge Tank, all control systems, flare ignition system etc.
- xvi. Bidder has to provide spare parts list of all critical items like BMS of Indirect Heater, PLC System, Surge Tank, All control systems, flare ignition system etc. along with part number.
- xvii. Bidder to clearly define service interval of all critical components.
- xviii. The supplier shall ensure the following during Installation and commissioning:
 - a. The unit shall be complete with all necessary tubulars, pipings, tubings, fittings etc.
 - b. Supply of necessary erection hardware like armoured power and signal cables, junction boxes, galvanized cable tray, instrument mounting post, canopy etc. as required is under supplier's scope.
 - c. All field instruments should be mounted suitably with canopy.
 - d. All the pressure gauge, transmitters shall be provided with isolation valves.
- xix. **Performance Guarantee Test Run (PGTR):** The supplier has to finally undertake commissioning of the complete SPF unit by carrying out functional test of all components of the unit as detailed below to the satisfaction of OIL.
 - a. Functional Test shall be carried out to evaluate the proper functioning of all equipment & all instrumentation system up to the satisfaction of Installation Manager/Project Manager of OIL.
 - b. Functional Test of the SPF unit shall be carried out for 15 days of continuous trouble-free operation for the complete SPF unit. Functional Test shall be started when the operation of individual equipment is stabilized under normal working conditions for 24 hours.
 - c. Before commencing of Functional Test of the SPF unit, Installation of the Equipment & accessories shall be complete in all respect and the Equipment shall be operated and controlled in accordance with set up procedures.
 - d. During Functional Test, if any defects are found in design, workmanship of any equipment or in any of the Mountings & Accessories, resulting in shutdown of Equipment or non-achievement of desired output as stipulated above in the point (a), supplier shall rectify the problem at its own cost.
 - e. The system shall be tested again for faultless running for 24 hours and Functional Test shall be carried out again as per 'Note xviii (b) of INSTALLATION & COMMISSIONING'.

- f. The supplier should complete the Installation and Commissioning job of each equipment including successful Functional Test within a period of 3 (three) months from the date of intimation for deputing installation and commissioning team.

9. REFERENCE STANDARDS:

The total design and service shall be governed by but not limited to, the following reference standards wherever applicable:

API Spec 5CT:	Specifications for tubulars and threads
APISpec 5L:	Specifications for Line pipe
API Spec 6A:	Specifications for valves and wellhead equipment
API Spec RP 17B:	Recommended practice for flexible pipes
API RP 44:	Recommended practice for sampling petroleum reservoir fluids.
API RP 520:	Recommended practice for sizing, selection and installation of pressure relieving devices.
API RP 521:	Recommended practice for pressure relieving and depressuring systems
ASME-Section-VIII:	Rules for construction of pressure vessels Div. I and II
ASME Section V:	Valves, Flanges etc.
ASME section IX:	Welding
API RP 7HU1:	Safe use of Hammer Unions for Oilfield
ANSI/ASME B 31.3:	Chemical plant and petroleum refinery piping.
API RP 54:	Recommended practice for Safety and health for oil & gas well drilling and servicing operation.
IS: 944-1979:	Functional Requirements of 1800-1/min Trailer Pump for Fire Brigade Use.

Relevant OISD, OMR, CPCB, APCB etc. standards.

Strict compliance with statutory regulations like Mines and related acts /legislation, IBR, OMR, OISD norms and Pollution Control Board (state/central) etc. are to be complied by the successful bidder.

10. SAFETY, HEALTH AND ENVIRONMENT:

Vendor shall comply with applicable environmental laws, statutory regulations as applicable to Oil Mines in India.

The Vendor is required to provide all its personnel with Personal Protective Equipment as per international practice, which may include, as appropriate, but without limitation the following during the installation and commissioning stage:

- a. Safety Helmet
- b. 100% cotton or fire proof overalls
- c. Safety Foot ware
- d. Safety Goggles
- e. Other P P E , including hand gloves, safety goggles/visor, hearing protection, safety belts etc.

BID EVALUATION / REJECTION CRITERIA:

The bids shall conform to the specifications and terms & conditions given in the Tender. Bids shall be rejected in case the items offered do not conform to the required parameters stipulated in the technical specifications and to the relevant international/national standards wherever stipulated. Notwithstanding the general conformity of the bids to the stipulated specifications and terms & conditions, the following requirements must be particularly met by the bidders, without which the offer shall be considered as non-responsive and rejected. All the documents related to BEC shall be submitted along with the technical bid.

Sl. No.	Bid Requirement	Bidder's Response (Complied/Not Complied. Reference to any document attached along with the bid)
TECHNICAL		
1.1	<p>The bidder shall have past experience of successful execution of minimum one (01) order/contract of “Supply, Installation & Commissioning” of Surface Production Facility (SPF) or Hydrocarbon Processing Facility (HPF) having minimum liquid (oil +water) handling capacity of 100 KLS per day and natural gas handling capacity of 20,000 SCUM per day, to an Exploration & Production (E&P) Company or to a Service Provider for ultimate use in an E&P Company in last seven (07) years from the original bid closing date of the tender</p> <p style="text-align: center;">OR</p> <p>The bidder shall have past experience of successful execution of minimum one (01) order/contract of “Providing Services including Supply & Continuous Operations for a minimum period of 1(one) year” of Surface Production Facility (SPF) or Hydrocarbon Processing Facility (HPF) having minimum liquid (oil +water) handling capacity of 100 KLS per day and natural gas handling capacity of 20,000SCUM per day, to an Exploration & Production (E&P) Company in last seven (07) years from the original bid closing date of the tender</p>	
1.2	<p>The bidder shall submit the following documents in support of successful execution of past supply/contract, as applicable under clause 1.1:</p> <p>a) Copy(ies) of Purchase Order(s)/ Contract document(s), and b) Any or combination of the following documents that confirms the successful execution of the order(s):</p> <ul style="list-style-type: none"> - Performance/Commissioning Report from the clients, - Tax invoice for supply as well as installation & commissioning and/or operation & maintenance - any other documentary evidence to the satisfaction of OIL that can substantiate the successful execution of each of the above Purchase Order(s)/ contract(s). 	

1.3	<p><u>Notes to bidder regarding experience criteria:</u></p> <ul style="list-style-type: none"> a) The date of purchase order(s)/contract(s) need not be within seven (07) years preceding the original bid closing date of the Tender, but execution/ supply of required quantity must be within seven (7) years preceding the original bid closing date of this tender. b) An E&P Company means Exploration & Production Company who is engaged in exploration & production of hydrocarbon (Crude Oil & Natural Gas). c) The service provider to an E&P shall mean a company who has procured the tender item and has provided service to an E&P Company utilizing the tender item. d) In case experience credentials is submitted for past supply to a service provider, the submitted documents (as per para 1.2) should clearly indicate name of the E&P Company for which the tender item has been utilized. On the contrary, a declaration from the service provider (on their official letter head with signature & stamp) is required to be submitted stating the name of the E&P company for which the tender item has been utilized for providing service. e) Copy(ies) of past Purchase Order(s)/ Contract document(s) should clearly state the items specifications so as to determine the SPF/HPF capacity (minimum liquid handling capacity of 100 KLPD and natural gas handling capacity of 20,000 SCUM per day). f) In case of extension to the scheduled Bid Closing date of this tender, if any, the Original Scheduled Bid Closing Date shall be considered for evaluation of Bids. g) Against all supporting documents submitted by the bidder along with the technical bid, originals must be kept ready and to be produced for verification of OIL, if called for. h) A job executed by a bidder for its own organization / subsidiary cannot be considered as experience for the purpose of meeting BEC. 	
2.0	<p>Delivery should be within 300 days from the date of placement of purchase order. The bidder should categorically confirm in their technical bid that the tendered items will be supplied within the delivery period, without which the bid will be rejected.</p> <p>OIL will take a maximum of 45 days, from the date of submission of the last document, for approval of the documents (mentioned elsewhere in the bid). For any additional time taken by OIL beyond 45 days (from the date of submission of the last document) for approval of documents, bidder will be allowed delivery extension by that additional number of days.</p>	

II) FINANCIAL		
1.0	The bidder shall have an annual financial turnover of minimum Rs. 10.37 Cr. during any of the preceding 3 (Three) financial/accounting years reckoned from the original bid closing date of the tender."	
2.0	"Net Worth" of the bidder should be positive for the financial/accounting year just preceding to the original bid closing date of the tender.	
3.0	Considering the time required for preparation of Financial Statements, if the last date of preceding financial / accounting year falls within the preceding six months reckoned from the original bid closing date and the Financial Statements of the preceding financial / accounting year are not available with the bidder, then the financial turnover of the previous three financial / accounting years excluding the preceding financial / accounting year will be considered. In such cases, the Net worth of the previous financial / accounting year excluding the preceding financial / accounting year will be considered. However, the bidder has to submit an affidavit/undertaking (refer PROFORMA-2) certifying that 'the balance sheet/Financial Statements for the financial year (As the case may be) has actually not been audited so far'.	
	<p>Note:</p> <p>a) For proof of Annual Turnover & Net worth any one of the following document must be submitted along with the bid:-</p> <p>i) A certificate issued by a practicing Chartered/Cost Accountant (with Membership Number and Firm Registration Number), certifying the Annual turnover & Net worth as per format prescribed in PROFORMA – 3.</p> <p>OR</p> <p>ii) Audited Balance Sheet along with Profit & Loss account.</p> <p>b) In case the bidder is a Central Govt. Organization/PSU/State Govt. Organization/Semi-State Govt. Organization or any other Central/State Govt. Undertaking, where the auditor is appointed only after the approval of Comptroller and Auditor General of India and the Central Government, their certificates may be accepted even though FRN is not available. However, bidder to provide documentary evidence for the same.</p>	
4.0	<p>In case the Bidder is subsidiary company (should be 100% owned subsidiary of the parent/ultimate parent/holding company) who does not meet financial criteria by itself and submits its bid based on the strength of parent/ ultimate parent/ holding company, then following documents need to be submitted:</p> <p>i) Turnover of the parent/ ultimate parent/ holding company should be in line with requirement.</p> <p>ii) Net Worth of the parent/ultimate parent/ holding company should be positive in line with Para 1.0 above.</p> <p>iii) Corporate Guarantee (as per PROFORMA-4) on parent / ultimate parent/ holding company's company letter head signed by an authorised official undertaking that they would financially support their wholly owned subsidiary company for executing the project/ job in case the same is awarded to them.</p> <p>iv) Document of subsidiary company being 100% owned subsidiary of the parent/ ultimate parent/ holding company.</p>	

Below is a tentative list (BOM) of minimum items/equipment required in 01 (One) set of SPF. Bidder may use their own discretion to include any additional equipment/item to make the set up complete. Bidder should quote the price inclusive of all the additional equipment/item for each SPF set up.

Sl. No.	Name of the Item	Qty.	Unit
1	5 point Manifold	1	No.
2	Indirect Bath Heater (Primary Heater)	1	No.
4	High Pressure Horizontal Gas Oil Separator (GU)	1	No.
5	Test Separator-HP	1	No.
6	HPMS	1	No.
7	Surge Tank	1	No.
8	Crude Oil Tank	6	No.
9	Fire Water Tank	2	No.
10	Water Sintex Tank	1	No.
11	EMD Bowser Loading Pumps	2	No.
12	DED Fire Water Pump	1	Set
13	EMD Hot Water Circulation Pump	2	No.
14	EMD Oil Transfer Pump	1	No.
15	Lab Cabin and Material Store	1	No.
16	Security Hut	1	No.
17	Crew Hut cum Control Room	1	No.
18	Generating Set	2	Set
19	Air Compressor	2	Set
20	DCP Fire Extinguisher	14	No.
21	CO2 Fire Extinguisher	5	No.
22	Portable Fire water monitors	4	No.
23	Fire Fighting Delivery Hose (15 m)	1	No.
24	Fire Siren (Manual)	1	No.
25	Fire Siren (Electrical)	1	No.
26	Wind Sock with stand	1	No.
27	Bowser Loading System	1	No.
28	Oil Diverter Manifold	1	No.
29	Choke Manifold	1	No.
30	Flare Stack	1	No.
31	Flowlines including fire ring line		
	4-inch pipe Line	850	Meters
	2-inch pipe line	500	Meters
32	Union		
	4-inch	400	Nos.
	2-inch	250	Nos.
33	Laboratory Item	1	Lot
A	Constant Temperature Water Bath	1	No
B	Hydrometer	3	Set
C	BS&W (Electric Centrifuge Machine)	1	No

D	Salinity Measurement Apparatus	1	No
E	pH Meter	1	No
F	Pour Point Apparatus (Manual)	1	No
G	Consumables/Glassware-Glasswares' 1. Measuring cylinder-2000 ml, 04 nos. 2. Measuring cylinder-1000 ml, 04 nos. 3. Measuring cylinder-500 ml, 04 nos. etc.) Reagents, other consumables etc. for above lab equipment	1	Set
34	Electrical Items	1	
A	On Load Change Over Switch, 125A, 4 pole, 415V	1	No
B	Busbar Assembly, with provision of one incomer cable connection and 3 nos. outgoing cable connections.	1	No
C	Isolator / Switch – Disconnecter Fuse (SDF) Unit	3	Nos
D	Three Phase 4 wire, TPN DB, complete with earth leakage protection.	2	Nos
	Incomer: 63A RCBO, Outgoing:		
	· 32A, 3 ph MCB feeder: 4 Nos.		
	· 20A, 1 ph MCB feeder: 6 Nos.		
E	Isolation Transformer, 415V/415V, DYn11, 70kVA	1	No
F	750mA, NGR and NGR Monitoring System	1	No.
G	Three Phase 3 wire DB, Complete with earth leakage protection: Incomer: 100A MCCB with microprocessor release, with ELR, CBCT: 02 Nos.	1	No
	Outgoing:		
	· 63A, 3 ph MCCB Feeder: 2 Nos.		
	· 32A, 3 ph MCCB feeder : 6 Nos.		
H	Lighting Transformer, 415V/240V, 20kVA	1	No
I	Phase to phase 240V lightning DB: Incomer: 63A RCBO	1	No
	Outgoing:		
	· 10A, DP, MCB Feeder: 12 Nos.		
	· 20A, DP, MCB Feeder : 6 Nos.		
J	Wall mounted Fan	6	Nos
K	Socket & Plug Panel	1	Set
L	Misc. electrical items : MCCB, Switch board, LED Lights etc.	1	Set
M	FLP type DOL Starter, suitable for motors upto15HP complete, free standing type with stand and canopy	6	Nos
N	FLP, LED Well Glass Fittings, 75W, complete with bracket etc.	20	Nos
O	FLP, LED 120W COB type Flood Light,	20	Nos
	complete with bracket etc.		

P	FLP, 4 way JB, ¾ ET, with glands	20	Nos
Q	Fixed type cable drum / reels, for storage/coiling/recoiling of the electrical cables	8	Nos
R	FLP Cable Gland, ¾ ET, double compression	150	Nos
S	Adaptors : FLP Appleton plug type power outlets 1 phase, incomer divided into 3 outlets	5	Nos
T	Adaptors : FLP Appleton plug type power outlet 3 phase, incomer divided into 2 outlets	3	Nos
U	Earth Electrodes 02 m length, 50mm dia, Galvanised pipe	30	Nos
V	25x5x5000mm GI Stripes	50	Nos
W	Cable Trays FRP fibre each 4m length	50	Nos
X	Tool Box, complete with tools	1	No
Y	Mini Vice, for minor fabrication work	1	No
Z	Electrical measuring Tools:	1	Set
	v Earth Testing Megger: 01 No.		
	v Insulation Megger: 01 No.		
	v Multi Meter: 01 No.		
	v Clamp Meter: 01 No.		
	v Portable hand drill machine : 01 No.		
AA	Fixed type stand drill machine	1	No
35	Instrument Items		
Manifold Area	Pressure Gauges	7	Nos
	Temperature Transmitter (HART) with sensor and thermowell	2	Nos
	Pressure Transmitter (HART) with accessories	2	Nos
Indirect Bath Heater (Shell)	Temperature Gauges with Thermo well	1	No
	Level Gauge	1	No
	Burner Management System (BMS) for Multifuel fire (Natural Gas & Diesel) burner	1	No
	Temperature Transmitter (HART) with sensor and thermowell	1	No
	Temperature Controller	1	No.
	Level Transmitter	1	No.
Inlet line of Indirect Heater	Temperature Gauges with Thermo well	2	Nos
	Pressure Gauges	2	Nos
Outlet line of Indirect Heater	Pressure Gauges	2	Nos
	Temperature Gauges with Thermo well	2	Nos
	Pressure Transmitter (HART) with accessories	2	Nos
	Temperature Transmitter (HART) with sensor and thermowell	2	Nos
Hot Water Circulation System	Pressure Gauge in the outlet line of Hot Water Circulation Pump	1	No
	Temperature Gauge with Thermo well in the outlet line of Hot Water Circulation Pump	1	No
	Temperature Gauge with Thermo well in the return line from Storage Tank	1	No

High Pressure Separators: (GROUP UNIT-I, High Pressure Master Separator (HPMS) and Test Separator)	Pressure Gauges (2x3)	6	Nos
	Level Gauge (1x3)	3	Nos
	Temperature Gauges with Thermo well (1x3)	3	Nos
	Level Controller with accessories (1x3)	3	Nos
	Pneumatic Pressure Controller with accessories (1x3)	3	Nos
	Pressure Relief Valves (2x3)	6	Nos
	Flow Transmitter (HART) Differential Pressure type (MVT) with accessories (1x3)	3	Nos
	Flow cum Pressure Recorder	2	Nos
	Level Transmitter	3	Nos
	Pressure Transmitter (HART) with accessories (1x3)	3	Nos
	Flow Transmitter (Turbine Meter) with accessories (GU & TU)	2	Nos
Low Pressure Separator (Surge Tank)	Pressure Gauges	2	Nos
	Level Gauge	2	Nos
	Temperature Gauges with Thermo well	1	No.
	Level Controller with accessories	2	Nos
	Pneumatic Pressure Controller with accessories	1	No
	Pressure Relief Valves	2	Nos
	Flow transmitter (HART) Differential Pressure type (MVT) with accessories	1	No.
	Level Transmitter	2	Nos.
	Pressure Transmitter (HART) with accessories	1	No.
	Flow cum Pressure Recorder	1	No.
	High & Low Level Alarm	2	Nos
Flare line (HP)	Pneumatic Pressure Controller with accessories	1	No
	Flow cum Pressure Recorder	1	No
	Flow Transmitter (HART) Differential Pressure type (MVT) with accessories	1	No
Crude Oil Tanks	Level Gauges	6	Nos
Fire Water Tank	Level Gauges	2	Nos
Air Compressor	Pressure Gauge (in Air Receiver)	2	Nos
	Pressure Transmitter (in Air receiver)	2	Nos
Data Acquisition System	PLC System	1	No
	Power Supply Unit	1	No
	Intrinsically Safe barrier	As per IO's	
	Control Panel (Box type -Wall Mounted)	1	No
	UPS	1	No
Erection Hardware	Cable, Trays, JBs, Glands, Tubes, Fittings, Isolation valves etc.	1	Lot

GENERAL NOTES TO BIDDERS:

SL No.	Bid Requirement	Bidder's Response (Complied/Not Complied. Reference to any document attached along with the bid)
1.0	Bidders shall submit their offer mentioning pointwise compliance / non-compliance to all the terms & conditions, BEC/BRC, Specifications etc. Any deviation(s) from the tender terms & conditions, BEC/BRC, Specifications etc. should be clearly highlighted specifying justification in support of deviation.	
2.0	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.	
3.0	The items covered in this Tender shall be used by Oil India Limited in the PEL/ML areas and hence concessional GST @5% (for indigenous bidder) will be applicable as per Govt. Policy in vogue. Successful bidder shall arrange to provide all necessary documents (invoice etc.) to OIL for applying Essentiality Certificate atleast 45 days prior to stipulated Delivery date. Further, Successful bidder shall affect dispatch only on receipt of relevant certificates/ shipment clearance from OIL, failing which all related liabilities shall be to Supplier's account.	
4.0	<p>Categorisation and various Criteria applicable to MSE bidders shall be guided by the Gazette Notification No. CG-DL-E-26062020-220191 dated 26.06.2020 and Amendment vide Gazette Notification no. CG-DLE-16062021-227649 dated 16th June, 2021 issued by Ministry of MICRO, SMALL AND MEDIUM ENTERPRISES. The existing enterprises registered under EM- Part-II or UAM till 30th June, 2020 shall continue to be valid only for a period up to the 31st day of December, 2021.</p> <p>The bidder claiming as MSE status (MSE-General, MSE-SCIST, MSE -Woman) against this tender has to submit the following documents for availing the benefits applicable to MSEs:</p> <p>Udyam Registration Number with Udyam Registration Certificate.</p> <p>OR</p> <p>Proof of registration with District Industry Centers or Khadi and Village Industries Commission or Khadi and Village Industries Board or Coir Board or National Small Industries Corporation or Directorate of Handicrafts and Handloom or Udyog Aadhar registration or registration with any other body specified by Ministry of MSME.</p> <p>Note: In case bidding MSE is owned by Schedule Caste or Schedule Tribe entrepreneur or Woman Entrepreneur, valid documentary evidence issued by the agency who has registered the bidder as MSE owned by SC/ST entrepreneur/ Woman Entrepreneurs should also be enclosed.</p>	

5.0	<p>Ministry of Finance of Govt. of India, Department of Expenditure, Public procurement Division vide office memorandum F. No. 6/18/2019-PPD dated 23rd July, 2020 (order-Public Procurement no.1) has proclaimed the insertion of Rule 144 (xi) in the General Financial Rules (GFRs), 2017 w.e.f. 23rd July, 2020 regarding restrictions on procurement from a bidder of a country which shares a land border with India on the grounds of defence of India on matters directly or indirectly related thereto including national security. Bidders are requested to take note of the office memorandum and submit their offers accordingly, wherever applicable. In this regard, bidders must submit duly sealed & signed undertaking as per format provided vide, “PROFORMA-1” along with the technical bid.</p>	
6.0	<p>Bidders to note that Ministry of Petroleum & Natural Gas, Government of India implemented PPLC Policy to provide Purchase Preference (linked with local content) by notification no. Ref. FP-20013/2/2017-FP-PNG dtd. 17.11.2020 and its amendment issued from time to time. PP-LC Policy (including its latest modifications/amendments) as may be prevailing on the date of Price Bid Opening shall be applicable against this tender. Bidders are requested to go through the policy and take note of the following while submitting their offer.</p> <p>As per the policy, the bidder must be incorporated in India and must maintain more than 20% local content (LC) for the offered items to be eligible to bid against this tender.</p> <p>1. <u>Certification and Verification</u></p> <p>Class I/Class II Local suppliers are eligible to bid only if they meet the local content norms, therefore whether or not they want to avail PP-LC benefit, it will still be mandatory for them to give adequate documentation as follows to establish their status as class-I or class-II local supplier:</p> <p>(i) <u>At bidding stage:</u></p> <p>a) Price Break-up:</p> <ul style="list-style-type: none"> • The bidder shall provide the percentage of local content in the bid. <p>b)</p> <ul style="list-style-type: none"> • The bidder shall submit an undertaking from the authorised signatory of bidder having the power of Attorney alongwith the bid stating the bidder meets the mandatory minimum LC requirement and such undertaking shall become a part of the contract. • In cases of procurement for a value in excess of Rs 10 crores, the undertaking submitted by the bidder shall be supported by a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practising chartered accountant (in respect of other than companies) giving the percentage of local content. • However, in case of foreign bidder, certificate from the statutory auditor or cost auditor of their own office or subsidiary in India giving the percentage of local content is also acceptable. In case office or subsidiary in India does not exist or Indian office/ subsidiary is not required to appoint statutory auditor or cost auditor, certificate from practising cost accountant or practising chartered accountant giving the percentage of local content is also acceptable. <p>(ii) <u>After Contract Award</u></p> <ul style="list-style-type: none"> • The bidder shall submit an undertaking from the authorised signatory of bidder having the power of Attorney alongwith the bid stating the bidder meets the mandatory minimum LC requirement and such undertaking shall become a part of the contract. • In cases of procurement for a value in excess of Rs 10 crores, the 	

	<p>undertaking submitted by the bidder shall be supported by a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practising chartered accountant (in respect of other than companies) giving the percentage of local content.</p> <ul style="list-style-type: none"> • However, in case of foreign bidder, certificate from the statutory auditor or cost auditor of their own office or subsidiary in India giving the percentage of local content is also acceptable. In case office or subsidiary in India does not exist or Indian office/ subsidiary is not required to appoint statutory auditor or cost auditor, certificate from practising cost accountant or practising chartered accountant giving the percentage of local content is also acceptable. <p>2. Each supplier shall provide the necessary local-content documentation to the statutory auditor, which shall review and determine that local content requirements have been met, and issue a local content certificate to that effect on behalf of procuring company, stating the percentage of local content in the good or service measured. The Auditor shall keep all necessary information obtained from suppliers for measurement of Local Content confidential.</p> <p>3. The Local Content certificate shall be submitted along with each invoice raised. However, the % of local content may vary with each invoice while maintaining the overall % of local content for the total work/purchase of the pro-rata local content requirement. In case, it is not satisfied cumulatively in the invoices raised up to that stage, the supplier shall indicate how the local content requirement would be met in the subsequent stages.</p> <p>4. As regards cases where currency quoted by the bidder is other than Indian Rupee, exchange rate prevailing on the date of notice inviting tender (NIT) shall be considered for the calculation of Local Content.</p> <p>5. The Procuring Company shall also have the authority to audit as well as witness production processes to certify the achievement of the requisite local content.</p>	
6.1	Percentage of Local Content (to mention by the bidder)	
6.2	<p>Bidder to categorically confirm under which policy i.e. PP-LC or MSME, they want to avail the purchase preference. Accordingly, bidder must submit requisite document/certificate in support to avail this benefit. The bids will be evaluated based on their declaration.</p> <p>In case bidder do not submit their preference among PP-LC & MSME and submit documents against both, then the offer will be evaluated by giving benefits under MSME policy and it will be binding on the bidder.</p>	
7.0	<p>TAX COLLECTIBLE AT SOURCE (TCS): Tax Collectible at Source (TCS) applicable under the Income-tax Law and charged by the SUPPLIER shall also be payable by OIL along with consideration for procurement of goods/materials/ equipment. If TCS is collected by the SUPPLIER, a TCS certificate in prescribed Form shall be issued by the SUPPLIER to OIL within the statutory time limit.</p> <p>Payment towards applicable TCS u/s 206C (1H) of Income Tax Act, 1961 will be made to the supplier provided they are claiming it in their invoice and on submission of following undertaking along with the invoice stating that:</p> <p>a) TCS is applicable on supply of goods invoiced to OIL as turnover of the supplier in previous year was more than Rs. 10 Cr. and</p> <p>b) Total supply of goods to OIL in FY (As applicable) exceeds Rs. 50 Lakh and</p> <p>c) TCS as charged in the invoice has already been deposited (duly indicating the details</p>	

	<p>such as challan No. and date) or would be deposited with Exchequer on or before the due date and</p> <p>d) TCS certificate as provided in the Income Tax Act will be issued to OIL in time.</p> <p>However, Performance Security deposit will be released only after the TCS certificate for the amount of tax collected is provided to OIL. Supplier will extend the performance bank guarantee (PBG), wherever required, till the receipt of TCS certificate or else the same will be forfeited to the extent of amount of TCS, if all other conditions of Purchase order are fulfilled.</p> <p>The above payment condition is applicable only for release of TCS amount charged by supplier u/s 206C (I H) of Income tax Act, 1961.</p>	
8.0	<p>APPLICABILITY OF BANNING POLICY OF OIL INDIA LIMITED:</p> <p>Banning Policy dated 6th January, 2017 as uploaded in OIL's website will be applicable against the tender (and order in case of award) to deal with any agency (bidder/contractor/supplier/ vendor/service provider) who commits deception, default, fraud or indulged in other misconduct of whatsoever nature in the tendering process and/or order execution processes. Applicability of the policy shall include but not limited to the following in addition to other actions like invoking bid security/performance security/cancellation of order etc. as deemed fit and as mentioned elsewhere in the tender:</p> <ol style="list-style-type: none"> Backing out by bidder within bid validity. Backing out by successful bidder after issue of LOA/Order/Contract Non/poor performance and order/contract execution default. <p>The bidders who are on Holiday/Banning/Suspension list of OIL on due date of submission of bid/ during the process of evaluation of the bids, the offers of such bidders shall not be considered for bid opening/evaluation/award. If the bidding documents were issued inadvertently/downloaded from website, the offers submitted by such bidders shall also not be considered for bid opening/evaluation/ Award of Work.</p>	
9.0	<p>At any time prior to the deadline for submission of bids, the Company may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the tender Documents through issuance of Corrigendum(s)/Addendum(s). Bidders are expected to take the Corrigendum(s)/ Addendum(s) into account in preparation and submission of their bid. No separate intimation for Corrigendum(s)/Addendum(s) published by OIL shall be sent to the Bidders.</p>	
10.0	<p>The Integrity Pact is applicable against this tender. OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide PROFORMA-5 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. 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. If any bidder refuses to sign Integrity Pact or declines to submit Integrity Pact with the offer, their bid shall be rejected straightway.</p> <p>OIL's Independent External Monitors at present are as under:</p> <p>SHRI RUDHRA GANGADHARAN, IAS (Retd.), Ex-Secretary, Ministry of Agriculture E-Mail ID: rudhra.gangadharan@gmail.com</p>	

SHRI SUTANU BEHURIA, IAS (Retd.),
E-mail ID: sutanu2911@gmail.com

SHRI OM PRAKASH SINGH, IPS (Retd.),,
Former DGP, Uttar Pradesh
E-mail: Ops2020@rediffmail.com

In case of a joint venture, all the partners of the joint venture should sign the Integrity Pact.

In the event of any dispute between the management and the contractor relating to those contracts where Integrity Pact is applicable, in case, both the parties are agreeable, they may try to settle dispute through mediation before the panel of IEMs in a time bound manner. If required, the organizations may adopt any mediation rules for this purpose. In case, the dispute remains unresolved even after mediation by the panel of IEMs, the organisation may take further action as per the terms and conditions of the contract.

PROFORMA – 1

Format for Undertaking by Bidders towards compliance of office memorandum F. No. 6/18/2019-PPD dated 23rd July, 2020 (Public Procurement no. 1) issued by Department of Expenditure, Ministry of Finance, Govt. of India

(To be typed on the letter head of the bidder)

Ref. No _____

Date: _____

Tender No. _____

Date: _____

OIL INDIA LIMITED
MATERIALS DEPARTMENT,
DULIAJAN, ASSAM, INDIA

Dear Sirs,

We have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; We certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. We hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered. [Where evidence of valid registration by the Competent Authority shall be attached.]”

We also agree that, during any stage of the tender/contract agreement, in case the above information/documents submitted by us are found to be false, Oil India Limited has the right to immediately reject our bid/terminate contract at any stage and carry out further legal action on us in accordance with law.

Yours faithfully,
For (type name of the firm here)

Signature of Authorised Signatory

Name :

Designation :

Phone No.

Place :

Date :

(Affix Seal of the Organization here, if applicable)

Note : This form should be returned along with offer duly signed.

PROFORMA-2

FORMAT FOR CERTIFICATE OF COMPLIANCE OF FINANCIAL CRITERIA

Ref: **Financial Criteria of the BEC**

Tender No.: _____

I the authorized signatory(s) of (Company or firm name with address) do hereby solemnly affirm and declare as under:-

The balance sheet/Financial Statements for the financial year _____ (as the case may be) has actually not been audited as on the Original Bid closing Date.

Place :.....

Date :.....

Signature of the authorized signatory

Note: This certificate is to be issued only considering the time required for preparation of Financial Statements i.e. if the last date of preceding financial / accounting year falls within the preceding six months reckoned from the original bid closing date.

PROFORMA-3

CERTIFICATE OF ANNUAL TURNOVER & NET WORTH

TO BE ISSUED BY PRACTISING **CHARTARD ACCOUNTANTS' FIRM** ON THEIR LETTER HEAD

TO WHOM IT MAY CONCERN

This is to certify that the following financial positions extracted from the audited financial statements of M/s.....(Name of the bidder) for the last three (3) completed accounting years upto **(as the case may be)** are correct

YEAR	TURN OVER In INR (Rs.) Crores	NET WORTH In INR (Rs.) Crores

Place:

Date:

Seal

Membership No:

Registration Code:

UDIN:

Signature

NOTE: As per the guidelines of ICAI, every practicing CA is required to mention Unique Document Identification Number (UDIN) against each certification work done by them. Documents certified by CA without UDIN shall not be acceptable.

PROFORMA-4

PARENT/ULTIMATE PARENT/ HOLDING COMPANY'S CORPORATE GUARANTEE TOWARDS FINANCIAL STANDING (Delete whichever not applicable)

(TO BE EXECUTED ON COMPANY'S LETTER HEAD)

DEED OF GUARANTEE

THIS DEED OF GUARANTEE executed at this day of by M/s.....(mention complete name) a company duly organized and existing under the laws of(insert jurisdiction/country), having its Registered Office at hereinafter called "the Guarantor" which expression shall, unless excluded by or repugnant to the subject or context thereof, be deemed to include its successors and permitted assigns.

WHEREAS M/s. Oil India Limited (hereinafter referred to as OIL) has invited offers vide their Tender No. _____ for _____ and M/s _____ (Bidder) intends to bid against the said tender and desires to have Financial support of M/s _____ [Parent/Ultimate Parent/Holding Company(Delete whichever not applicable)] and whereas Parent/Ultimate Parent/Holding Company(Delete whichever not applicable) represents that they have gone through and understood the requirements of subject tender and are capable and committed to provide the Financial support as required by the bidder for qualifying and successful execution of the contract, if awarded to the bidder.

Now, it is hereby agreed by the Guarantor to give this Guarantee and undertakes as follows:

1. The Guarantor confirms that the Bidder is a 100% subsidiary of the Guarantor.
2. The Guarantor agrees and confirms to provide the Audited Annual Reports of any of the preceding 03(three) financial/accounting years reckoned from the original bid closing date.
3. The Guarantor have an annual financial turnover of minimum INR _____ Cr or USD _____ during any of the preceding 03(three) financial/ accounting years reckoned from the original bid closing date.
4. Net worth of the Guarantor is positive for preceding financial/ accounting year.
5. The Guarantor undertakes to provide financial support to the Bidder for executing the project/job, in case the same is awarded to the Bidder.
6. The Guarantor represents that:

(a) this Guarantee herein contained shall remain valid and enforceable till the satisfactory execution and completion of the work (including discharge of the warranty obligations) awarded to the Bidder.

(b) the liability of the Guarantor, under the Guarantee, is limited to the 100% of the order value between the Bidder and OIL. This will, however, be in addition to the forfeiture of the Performance Guarantee furnished by the Bidder.

(c) this Guarantee has been issued after due observance of the appropriate laws in force in India.

(d) this Guarantee shall be governed and construed in accordance with the laws in force in India and subject to the exclusive jurisdiction of the courts of New Delhi, India.

(e) this Guarantee has been given without any undue influence or coercion, and that the Guarantor has fully understood the implications of the same.

(f) the Guarantor has the legal capacity, power and authority to issue this Guarantee and that giving of this Guarantee and the performance and observations of the obligations hereunder do not contravene any existing laws.

for and on behalf of
(Parent/Ultimate Parent/Holding Company)
(Delete whichever not applicable)

for and on behalf of
(Bidder)

Witness:

- 1.
- 2.

Witness:

- 1.
- 2.

PROFORMA-5

INTEGRITY PACT

Between

Oil India Limited (OIL) hereinafter referred to as "The Principal"

And

(Name of the bidder).....hereinafter referred to as "The bidder/
Contractor"

Preamble:

The Principal intends to award, under laid down organizational procedures, contract/s for The Principal values full compliance with all relevant laws and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder/s and Contractor/s.

In order to achieve these goals, the Principal cooperates with the renowned international Non-Governmental Organization "Transparency International" (TI). Following TI's national and international experience, the Principal will appoint an external independent Monitor who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section: 1 -Commitments of the Principal

(1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:

1. No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for him/herself or third person, any material or immaterial benefit which he/she is not legally entitled to.
2. The Principal will, during the tender process treat all Bidders with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidders the same information and will not provide to any Bidder confidential/additional information through which the Bidder could obtain an advantage in relation to the tender process or the contract execution.
3. The Principal will exclude from the process all known prejudiced persons.

(2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the relevant Anti-Corruption Laws of India, or if there be a Page 2 of 6 substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section: 2 -Commitments of the Bidder/Contractor

(1) The Bidder/Contractor commits itself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

1. The Bidder/Contractor will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or immaterial benefit which h e/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2. The Bidder/Contractor will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, Subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

3. The Bidder/Contractor will not commit any offence under the relevant Anticorruption Laws of India; further the Bidder/Contractor will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

4. The Bidder/Contractor will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

(2) The Bidder/Contractor will not instigate third persons to commit offences outlined above or be an accessory to such offences.

(3) The Bidder/Contractor signing Integrity Pact shall not approach the Courts while representing the matters to IEMs and he/she will await their decision in the matter.

Section 3 -Disqualification from tender process and exclusion from future Contracts

If the Bidder, before contract award has committed a transgression through a violation of Section 2 or in any other form such as to put his reliability or risibility as Bidder into question, the Principal is entitled to disqualify the Bidder from the tender process or to terminate the contract, if already signed, for such reason.

1. If the Bidder/Contractor has committed a transgression through a violation of Section 2 such as to put his reliability or credibility into question, the Principal is entitled also to exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressions within the company hierarchy of the Bidder and the amount of the damage. The exclusion will be imposed for a minimum of 6 months and maximum of 3 years.

2. The Bidder accepts and undertakes to respect and uphold the Principal's Absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining independent legal advice.

3. If the Bidder/Contractor can prove that he has restored/recouped the Damage caused by him and has installed a suitable corruption prevention system, the Principal may revoke the exclusion prematurely.

4. A transgression is considered to have occurred if in light of available evidence no reasonable doubt is possible.

5. Integrity Pact, in respect of a particular contract, shall be operative from the date Integrity Pact is signed by both the parties till the final completion of the contract **or as mentioned in Section 9- Pact Duration whichever is later**. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings. Any issue relating to execution of contract, if specifically raised before the IEMs shall be looked into by IEMs.

Section 4 -Compensation for Damages

1. If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover from the Bidder liquidated damages equivalent to Earnest Money Deposit / Bid Security.

(2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to Security Deposit / Performance Bank Guarantee.

3. The bidder agrees and undertakes to pay the said amounts without protest or demur subject only to condition that if the Bidder/Contractor can prove and establish that the exclusion of the Bidder from the tender process or the termination of the contract after the contract award has caused no damage or less damage than the amount or the liquidated damages, the Bidder/Contractor shall compensate the Principal only to the extent of the damage in the amount proved.

Section 5 -Previous transgression

1. The Bidder declares that no previous transgression occurred in the last 3 years with any other Company in any country conforming to the TI approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

2. If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section: 6 -Equal treatment of all Bidders/Contractor/Subcontractors

1. The Principal will enter into Pacts on identical terms with all bidders and contractors.

2. The Bidder / Contractor undertake(s) to procure from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the provisions laid down in this agreement/Pact by any of its sub-contractors/sub-vendors.

3. The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section: 7 -Criminal charges against violating Bidders/Contractors/ Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor, which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section: 8 -External Independent Monitor/Monitors

1. The Principal appoints competent and credible external independent Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

2. The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the Chairperson of the Board of the Principal.

3. The Contractor accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder/Contractor/Subcontractor with confidentiality.

4. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual

relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

5. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or heal the violation, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action. However, the Independent External Monitor shall give an opportunity to the bidder / contractor to present its case before making its recommendations to the Principal.

6. The Monitor will submit a written report to the Chairperson of the Board of the Principal within 8 to 10 weeks from the date of reference or intimation to him by the 'Principal' and, should the occasion arise, submit proposals for correcting problematic situations.

7. If the Monitor has reported to the Chairperson of the Board a Substantiated suspicion of an offence under relevant Anti-Corruption Laws of India, and the Chairperson has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8. The word 'Monitor' would include both singular and plural.

Section:9 -Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by Chairperson of the Principal.

Section:10 -Other provisions

1. This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e. New Delhi. The Arbitration clause provided in the main tender document / contract shall not be applicable for any issue / dispute arising under Integrity Pact.

2. Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

3. If the Contractor is a partnership or a consortium, this agreement must be, signed by all partners or consortium members.

4. Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

.....
For the Principal

Place.
Date .

.....
For the Bidder/Contractor

Witness 1:

Witness 2: