

OIL INDIA LIMITED

(A Government of India Enterprise)

P.O. Duliajan, Pin – 786602

Dist-Dibrugarh, Assam

CORRIGENDUM

Addendum No. 3 dated 06.09.2014
to IFB No. . CDG3685P15

This Addendum No. 3 dated 06.09.2014 to IFB No. CDG3685P15 for Supply, Installation and Commissioning of Natural Gas Engine Based Power Plant at Kumchai in Arunachal Pradesh to be owned by Oil India Limited and subsequent Operation & Maintenance of the Plant for 10(Ten) years, is issued to modify the bid document to include the changes subsequent to the pre-bid conference as furnished in Annexure-T1 given herein below:

All other Terms and Conditions of the Bid Document will remain unchanged.

(M Ali)
Head-Contracts
For Resident Chief Executive

To ADDENDUM NO. 3 DATED 06.09.2014

IFB No. CDG3685P15 for Supply, Installation and Commissioning of Natural Gas Engine Based Power Plant at Kumchai in Arunachal Pradesh to be owned by Oil India Limited and subsequent Operation & Maintenance of the Plant for 10(Ten) years

Sl No	ORIGINAL CLAUSE		Original Clause	Modified Clause
	Forwarding Letter			
	Clause	Page		
SECTION II , SCOPE OF WORK, TERMS OF REFERENCE AND TECHNICAL SPECIFICATIONS				
1	Clause 1.0) <u>Details of the Site/Location</u>	57		
	Point i		i. The proposed location map of the site is attached. as OIL Drawing No. OIL/0529 -. The site is in two plots, Plot A and Plot B. The Power plant shall be installed at Plot B of the site. The contours of Plot B is shown in OIL Drawing No. OIL/9984. The broad requirement for installing the Power Plant at the site are as below:	ii. The proposed location map of the site is attached. as OIL Drawing No. OIL/0529 -. The site is in two plots, Plot A and Plot B. The Power plant shall be installed at Plot B of the site. The contours of Plot B is shown in OIL Drawing No. OIL/9984. The broad requirement for installing the Power Plant at the site are as below:
	Point ii		Width of the Road between plots A & B to be maintained as is 30 feet.	of the Road between plots A & B to be maintained as is 30 feet.
	Point iii		Provision of Green Belt (Minimum 10 feet) shall be maintained along the periphery inside the plot B.	Provision of Green Belt (Minimum 10 feet) shall be maintained along the periphery inside the boundary wall of the plot B.
	Point iv		Earth Filling of Plot B is required	Earth Filling of entire Plot B is required

	Point v		<p>The boundary wall of the Plot B, where the Power plant shall be installed is to be constructed The extreme boundary wall of the proposed Power Plant should maintain approximately 90 meter distance from the nearest Well head .</p>	<p>The boundary wall along the periphery of the Plot B, where the Power plant shall be installed is to be constructed The extreme boundary wall of the proposed Power Plant should maintain approximately 90 meter distance from the nearest Well head.</p>
2	Clause 2.0) Scope of Supplies and Services Phase II	58	<p>Operation and Maintenance of the power plant set up as per phase i above: Operation & Maintenance of the Installed Power House for the next Ten (10) years. The Operation and Maintenance of the Power Plant shall start immediately on commissioning of the Power Plant. The well natural gas for the proposed plant shall be made available by the Owner (from the existing early production setup at Kumchai) to a point within the periphery of the Power plant. The Contractor should design the power plant to utilize the Natural Well Head gas made available by the owner to produce electrical power. The Power from the said plant shall be evacuated by the customer through their existing 33kvdistribution line. The integration of the power produced from the power plan t to the existing 33 KV network of the consumer is within the scope of this Contract. The power produced from the power plant should also cater to</p>	<p>Operation and Maintenance of the power plant set up as per phase I above: Operation & Maintenance of the Installed Power House for the next Ten (10) years. The Operation and Maintenance of the Power Plant shall start immediately after the completion of operability run on commissioning of the Power Plant. The natural gas from the well head for the proposed plant shall be made available by the Owner (from the existing early production setup at Kumchai) to a point within the periphery of the Power plant. The Contractor should design the power plant to utilize the Natural Well Head gas made available by the owner to produce electrical power. The Power from the said plant shall be evacuated by the customer through their existing 33KV kv distribution line. The battery limit of the power station (and hence scope of supply, installation and commissioning under this tender) will be up to the 33 kV outgoing breakers only, with all the breaker auxiliaries, as shown in the attached drawing. Consumer shall connect to their own overhead line from the outgoing 33 kV breakers with suitable cable/s and protective devices on overhead line such as lightning arrestors etc. The integration of the power produced from the power plant to the existing 33 KV network of the consumer is within the scope of this Contract as shown in the attached drawing.</p>

			the captive need of Owner at the Kumchai EPS and to the power plant.	
Point i	58/59	<p>i) Lump sum turnkey (LSTK) contract with Single point responsibility including but not limiting to design, engineering, procurement, manufacture, packing, supply, transportation, customs clearance and insurance Gas Engine Generator Portable Power plant with of Gas engine driven generating set of install capacity in the range of 7 MW with combination of 3 x 2MW + 1 x 1MW , complete with Gas Receiving and Conditioning station, Gas Booster station, electrical Switchgear, water treatment plant & cooling system and all other systems/facilities required for installation & commissioning, Operation & Maintenance of the said power plant within for ten years, including supply of Spares and consumable of above Gas Engine power Plant as described under article Terminal points and Annexure-1.</p> <p>All associated civil & structural works, fire detection and protection, complete mechanical, electrical & instrumentation jobs & testing and successful commissioning</p>	<p>ii) Lump sum turnkey (LSTK) contract with Single point responsibility including but not limiting to design, engineering, procurement, manufacture, packing, supply, transportation, customs clearance and insurance Gas Engine driven power plant of installed capacity of 7 MW comprising of portable type gas engine driven generator set of 3 x 2MW (Minimum) + 1 x 1MW (Min) , complete with Gas Receiving and Conditioning station, Gas Booster station, electrical Switchgear, water treatment plant & cooling system and all other systems/facilities required for the completeness of the work including installation & commissioning, Operation & Maintenance of the said power plant for the next ten years with effect from the commissioning date, with supply of Spares and consumable of above Gas Engine power Plant as described under article Terminal points and Annexure-1.</p> <p>All associated civil & structural works, fire detection and protection, complete mechanical, electrical & instrumentation jobs with proper safety & Environment Management System & testing and successful commissioning and establishing the successful performance during the performance guarantee tests of the plant including all other incidental services required for the satisfactory completion and performance of the plant as per applicable codes and standards shall form part of the contract.</p>	

			and establishing the successful performance during the performance guarantee tests of the plant including all other incidental services required for the satisfactory completion and performance of the plant as per applicable codes and standards shall form part of the contract.	
	Point ii	59	The scope of the work further includes integration of the power plant with the Existing Electrical Distribution Network of Arunachal Government which is located adjacent to the site of above new Power plant.	The scope of the work further includes delivery of the electrical power Existing Electrical Distribution Network (33 KV) of Arunachal Government which is located adjacent to the site of above new Power plant. The same is shown in the attached drawing.
	Point vi	59	The scope includes Complete Operation of the said plant for 10 years including but not limiting to Spares, Consumable, Minor and Major overhaul to achieve a plant availability of at least 95%.	The scope includes Complete Operation of the said plant for 10 years including but not limiting to Spares, Consumable, Minor and Major overhaul to achieve a plant availability of 100 % for deliverable output of 5.5 MW of 40% electrical efficiency of at least 95%. Individual equipment availability should be at least 90 % .
3	2.1 Battery Limit Mechanical 1. Gas	60	The owner shall terminate the untreated natural Gas line near the power plant with Isolation valve without counter flange. The and necessary treatment including the further distribution shall be in the scope of the Contractor.	The owner shall terminate the untreated natural Gas line near the power plant with Isolation valve without counter flange . The and necessary treatment/ conditioning of the natural gas including the further distribution shall be in the scope of the Contractor.
4	2.2.2 Inspection before	61	All the Equipments shall be inspected & certified by Company Engineers at Manufacturer's works	All the Equipments shall be inspected & certified by Company Engineers at Manufacturer's works before dispatch. The Contractor is to notify the Company atleast two months

	Shipment		before dispatch. The Contractor is to notify the Company atleast 15 days advance prior to dispatch of the materials to depute OIL's Engineers in time	advance prior to dispatch of the materials to depute OIL's Engineers in time
5	7.0 Warranty	62/63	<p>The Warranty has to be furnished on forms approved by the Company (OIL) and shall be signed by the Contractor and if needed, also by his sub-contractor(s).</p> <p>The above Warranty shall be valid for a period of twelve (12) calendar months commencing from the date of taking over of the fully commissioned Plant. This period of the Warranty shall be called the "Warranty Period". During this period, the Contractor's liability shall be limited to the replacement of any defective parts that may develop in plant of his own manufacture or those of his associate(s) and sub-contractor(s) under the conditions provided for by the Contract under proper use and arising solely from faulty design, materials or workmanship provided always that such defective parts as are not repairable at site, and are not essential in the meantime in the commercial use of the plant, are promptly returned to the Contractor's works unless otherwise arranged. All such replacements of defective parts mentioned above shall be made free of cost at site by the Contractor and</p>	<p>The Warranty has to be furnished on forms approved by the Company (OIL) and shall be signed by the Contractor and if needed, also by his sub-contractor(s).</p> <p>The above Warranty shall be valid for a period of twelve (12) calendar months commencing from the date of taking over of the fully commissioned Plant. This period of the Warranty shall be called the "Warranty Period". During this period, the Contractor's liability shall be limited to the replacement of any defective parts that may develop in plant of his own manufacture or those of his associate(s) and sub-contractor(s) under the conditions provided for by the Contract under proper use and arising solely from faulty design, materials or workmanship provided always that such defective parts as are not repairable at site, and are not essential in the meantime in the commercial use of the plant, are promptly returned to the Contractor's works unless otherwise arranged. All such replacements of defective parts mentioned above shall be made free of cost at site by the Contractor and the return of the defective parts to the Contractor's works shall be the Contractor's responsibility and shall be made at his expense.</p> <p>In the case of these defective parts, which are not repairable at site but are essential for the commercial operation of the equipment, the Contractor & the Company (OIL) shall mutually agree to a programme of replacement or, renewal which will minimize interruption to the max. extent in the operation of the equipment.</p> <p>The cost of any special or, general overhaul rendered necessary during maintenance period due to defects in the Plant or defective work carried out by the contractor, the same shall be borne by the Contractor. The Company (OIL) will, however, render such assistance in this matter as will expedite the</p>

			<p>the return of the defective parts to the Contractor's works shall be the Contractor's responsibility and shall be made at his expense. In the case of these defective parts, which are not repairable at site but are essential for the commercial operation of the equipment, the Contractor & the Company (OIL) shall mutually agree to a programme of replacement or, renewal which will minimize interruption to the max. extent in the operation of the equipment.</p> <p>The cost of any special or, general overhaul rendered necessary during maintenance period due to defects in the Plant or defective work carried out by the contractor, the same shall be borne by the Contractor. The Company (OIL) will, however, render such assistance in this matter as will expedite the same. In the case of defective parts not repairable at the Site but essential in the meantime for the commercial use of the Plant, the Contractor shall replace at the Site, free of cost of the Company (OIL) the said defective parts before the defective parts are removed to his works.</p>	<p>same. In the case of defective parts not repairable at the Site but essential in the meantime for the commercial use of the Plant, the Contractor shall replace at the Site, free of cost of the Company (OIL) the said defective parts before the defective parts are removed to his works.</p>	
6	<p><u>Clause 10.0</u> <u>DETAILS OF</u> <u>THE SCOPE OF</u> <u>WORK UNDER</u></p>	66 to 68			

PHASE I for SETTING UP OF THE POWER PLANT			
Note (i)		The capacity defined above is specified for minimum capacity only. The bidder may offer their Generating Sets of higher capacity but the total number of Generating Sets should be minimum four numbers, three numbers to be in operation and one number to be in stand-by mode at any time during operation of the Power Plant. The average peak power output demand on the Plant shall be 5 MW initially in the first phase. On expansion of the Plant, the peak demand shall be 10 MW.	The capacity defined above is specified for minimum capacity only. The bidder may offer their Generating Sets of higher capacity but the total number of Generating Sets should be minimum four numbers, The capacity of Gensets shall be compatible to the H.T. Switchgear accordingly three numbers to be in operation and one number to be in stand-by mode at any time during operation of the Power Plant. The average peak power output demand on the Plant shall be 5.5 MW initially in the first phase. On expansion of the Plant, the peak demand shall be 10 MW.
Note (ii)		The Generating Sets shall be Industrial type Natural Gas Engine Driven complete with accessories, Control Panels as per specifications. The Generating Sets shall be rated for 11000 Volts, 3 Phase, 50 Hz, 1500 RPM (Conforming to ISO 8528 Standard and the rated output shall be available at the generator output terminals at site ambient condition.	The Generating Sets shall be Industrial type Natural Gas Engine Driven complete with accessories, Control Panels as per specifications. The Generating Sets shall be rated for 11000 Volts, 3 Phase, 50 Hz, 1500 RPM (Maximum) Conforming to ISO 8528 Standard and the rated output shall be available at the generator output terminals at site ambient condition.
Note (iii)		The Generating Sets shall be the primary source of power for Continuous Operation.	The Generating Sets shall be the primary source of power for Continuous Operation. The Gensets shall be capable of base load operation . However, these shall also be capable of

				load cycling	
	Point (ix)		<p>The Generating Set should be designed to satisfy the following design parameters:</p> <p>Net Power output of the plant : 6.3 MW (Minimum) Minimum Electrical efficiency at unity p. f. should be 38%</p>	<p>The Generating Set should be designed to satisfy the following design parameters:</p> <p>Gross Power output of the plant : 6.3 MW (Minimum) of electrical efficiency of 40% Minimum Electrical efficiency at unity p. f. should be 38 %</p>	
	Point (ix)		<p>Minimum load throw off Capacity should be 60% of full load.</p>	Minimum load throw off Capacity should be 20% of full load.	
7	A.2) A.2.1: Prime Movers	68	<p>PRIME MOVERS : The prime movers of the Generating sets shall be, four stroke, spark-ignited, naturally aspirated or turbo-charged, vertical inline or V-type, water cooled Natural Gas Engines rated for continuous power and overload power in accordance with IS 3046/BS 5514/IS:1000 or equivalent Internationally approved/accepted standards, and capable of developing BHP sufficient to deliver 7 minmium 6.3 MW net output power continuously at the installation site conditions when operated at 1500 RPM (maximum) and equipped with all engine-mounted parasitic loads. The natural Gas Engine shall be complete with all ancillary equipment necessary for starting and running of the set, including cooling systems, instrumentation, control and protection arrangements, spares and special</p>	<p>PRIME MOVERS : The prime movers of the Generating sets shall be, four stroke, spark-ignited, naturally aspirated or turbo-charged, vertical inline or V-type, water cooled Natural Gas Engines rated for continuous power and overload power in accordance with IS 3046/BS 5514/IS:1000 or equivalent Internationally approved/accepted standards, and capable of developing BHP sufficient to deliver minmium 6.3 MW gross output power continuously at the installation site conditions when operated at 1500 RPM (maximum) and equipped with all engine-mounted parasitic loads. The natural Gas Engine shall be complete with all ancillary equipment necessary for starting and running of the set, including cooling systems, instrumentation, control and protection arrangements, spares and special tools as per specifications.</p> <p>The Engines should be rated for Continuous Power applications. The engine shall meet all the performance requirements of the set under the specified operating conditions and shall be suitable for operation without knocking and able to deliver the rated power when operating on well head natural gas. Any deviation in the performance requirement of the engine or the generating set shall be within the standard tolerable limits. Engines shall start, achieve rated generator voltage and frequency and transient response to Block Loading shall</p>	

			<p>tools as per specifications.</p> <p>The Engines should be rated for Continuous Power applications. The engine shall meet all the performance requirements of the set under the specified operating conditions and shall be suitable for operation without knocking and able to deliver the rated power when operating on well head natural gas. Any deviation in the performance requirement of the engine or the generating set shall be within the standard tolerable limits.</p> <p>Engines shall start, achieve rated generator voltage and frequency and transient response to Block Loading shall conform to ISO 8528 requirements. Single Block Load capacity shall not be less than 30% of its rated capacity</p>	<p>conform to ISO 8528 requirements. Single Block Load capacity shall not be less than 12 % of its rated capacity.</p>
8	<p>A.2) <u>SPECIFICATION OF ENGINE SUB SYSTEM:</u></p>	68 to 69		
	Point 1.	68	<p><u>Cooling System:</u> The cooling system of water cooled engine shall comprise of an engine mounted water pump, with either an industrial type heavy duty radiator with blower fan suitable for operation in ambient temperature of 48°C or Cooling System with</p>	<p><u>Cooling System: (With Remote Cooling tower / Radiator)</u> The cooling system of water cooled engine shall comprise of an engine mounted water pump, with either an industrial type heavy duty radiator with blower fan suitable for operation in ambient temperature of 35 ° C or Cooling System with Cooling Tower.</p>

			Cooling Tower.	
	Point 3	69	Cooling by Radiator/cooling tower : Heat rejected to the engine jacket water shall be discharged to the atmosphere through a close coupled radiator or through cooling tower. The radiator/cooling tower shall be sized to cool the engine continuously while operating at full rated load and at site conditions of 48°C ambient.	Cooling by Radiator/cooling tower : Heat rejected to the engine jacket water shall be discharged to the atmosphere through a close coupled radiator or through cooling tower. The radiator/cooling tower shall be sized to cool the engine continuously while operating at full rated load and at site conditions of 35°C ambient.
	Point 4		Blower Fan: The radiator cooling fan shall be a blower type driven from the engine/ motor . Air shall be drawn from the engine side and exhausted through the radiator. core with no more than 12.7MM (0.5 Inch) of water column external restriction in addition to core restrictions.	Blower Fan: The radiator cooling fan shall be a blower type driven from the engine/ motor . Air shall be drawn from the engine side and exhausted through the radiator. core with no more than 12.7MM (0.5 Inch) of water column external restriction in addition to core restrictions.
9	6.0 Air Intake System	69	The air intake system shall comprise of a heavy duty-engine air cleaner mounted on the engine with a vacuum indicator and air intake manifold with dry element . requiring replacement no more frequently than 300 hours or once each year. <u>Level of suspended particulate matter in ambient air at site is 75µg/m³ (maximum.)</u> .	The air intake system shall comprise of a heavy duty-engine air cleaner mounted on the engine with a vacuum indicator and air intake manifold with dry element . requiring replacement no more frequently than 300 hours or once each year. Level of suspended particulate matter in ambient air at site is 75µg/m³ (maximum.) .
10	7. Electric Starting	69/70	Electric Starting System (24 volt negative ground):	Electric Starting System (24 volt negative ground): The engine shall be started by 24 V starter motor(preferably of

	<u>System (24 volt negative ground)</u>		The engine shall be started by 24 V starter motor(preferably of LUCAS TVS/DELCO REMY make) engaging with the flywheel ring gear and disengaging automatically when the engine starts. The equipment shall include an adequately rated lead/acid battery (rating of 180 Ampere- Hour) together with an engine mounted belt driven battery charging alternator or AC charger with an automatic voltage regulator. It shall be suitable for heavy duty applications with a rating of 24 volts. The battery shall be capable of providing at least six starting cycles within a period of 5 minutes. Batteries shall be housed in a hard rubber or polypropylene case with provision for venting. Required cables shall be furnished and sized to satisfy circuit requirements.	LUCAS TVS/DELCO REMY make) engaging with the flywheel ring gear and disengaging automatically when the engine starts. The equipment shall include an adequately rated lead/acid battery (rating of 180 Ampere- Hour) together with an engine mounted belt driven battery charging alternator or AC charger with an automatic voltage regulator. It shall be suitable for heavy duty applications with a rating of 24 volts. The battery shall be capable of providing at least six starting cycles within a period of 5 minutes. Batteries shall be housed in a hard rubber or polypropylene case with provision for venting. Required cables shall be furnished and sized to satisfy circuit requirements.
11	8. Battery Charger(Mains energized):	70	<u>Battery Charger(Mains energized):</u> The Battery charger shall be an automatic mains energized battery charger. The charger shall have a continuous output rating sufficient to recharge the battery from 1.8 V/cell to a fully charged condition in a period of 8 hours.	<u>Battery Charger(Mains energized):</u> The Battery charger shall be an automatic mains energized battery charger with AC power or engine driven alternator. The charger shall have a continuous output rating sufficient to recharge the battery from 1.8 V/cell to a fully charged condition in a period of 8 hours.
12	11. Gaseous Fuel System Point ii	70	Governor (Preferably WOODWARD make). The governor of the engine shall be hydraulic/electronic type and be capable of fine governing of	Governor (Preferably WOODWARD make). The governor of the engine shall be hydraulic/electronic type and be capable of fine governing of speed to Class A2 of BSS 5514/1977, ISO 3046/IV. It shall be an isochronous governor and shall control

			speed to Class A2 of BSS 5514/1977, ISO 3046/IV. It shall be an isochronous governor and shall control engine speed and transient load response within ISO 8528 tolerances. It will be selected, installed, and tested by OEM of the engine. Speed droop shall be externally adjustable from 0 (isochronous) to 4% from no load to full rated load. Steady state frequency regulation shall be + / - 0.5 percent.	engine speed and transient load response within ISO 8528 tolerances. It will be selected, installed, and tested by OEM of the engine. Speed droop shall be externally adjustable from 0 (isochronous) to 4% from no load to full rated load. Steady state frequency regulation shall be + / - 0.5 percent.
	Point iii	71	Gas pressure regulators (preferably VANAZ/FISHER) to regulate gas pressure to the carburetor intake point. (Bidders shall note that Natural Well Head Gas at pressure of 4.5 kg/cm ² & -1.5 kg/cm ² shall be available at site for taping.) The Contractor is to make their own Gas conditioning & filtration plant to suit their engine design.	Gas pressure regulators (preferably VANAZ/FISHER) to regulate gas pressure to the carburetor intake point. (Bidders shall note that Natural Well Head Gas at pressure of 4.5 kg/cm² & -1.5 kg/cm ² shall be available at site for taping.) The Contractor is to make their own Gas conditioning & filtration plant to suit their engine design.
13	<u>Clause 16. Compliance of CPCB Norms for Emission and Noise Limits</u>	73	<u>Compliance of CPCB Norms for Emission and Noise Limits:</u> The engine shall meet the latest Emission Limits and the Gen Set a unit shall meet the latest Emission & Noise Limits set by Central Pollution Control Board (CPCB), Delhi. It may kindly be noted that the Govt. Of India is in the process of notifying the CPCB norms for Noise Limit & emission for Natural Gas Engines and	<u>Compliance of CPCB Norms for Emission and Noise Limits:</u> The engine shall meet the latest Emission Limits and the Gen Set a unit shall meet the latest Emission & Noise Limits set by Central Pollution Control Board (CPCB), Delhi. It may kindly be noted that the Govt. Of India is in the process of notifying the CPCB norms for Noise Limit & emission for Natural Gas Engines and Natural Gas Engine Driven Generating Sets. As and when the norms are notified, the Engines and the generating Set should comply all the terms of the notifications. Bidders should note the same. Individual / Combination type stage height of 30 Mtr is to be maintain to reduce the emission from the genset .

			Natural Gas Engine Driven Generating Sets. As and when the norms are notified, the Engines and the generating Set should comply all the terms of the notifications. Bidders should note the same.	
14	A.2.3 Spares Parts Of Engines	73	<p><u>SPARE PARTS FOR ENGINE:</u> The following shall be furnished by the supplier:</p> <p>a) List of spares, consumables for the initial two years normal operation of the engine shall be included in the offer. (Item wise breakdown price of spare parts and consumables shall also be provided but which will not be considered for evaluation).</p> <p>⊃) List of spares, consumables required for normal operation and periodic servicing of the Engine</p> <p>b) All the spares required for maintenance/overhauling should be procured from OEM or their authorizes dealer only . AS and when spares will be procured , invoices of spares to be submitted to OIL for record.</p>	<p><u>SPARE PARTS FOR ENGINE:</u> The following shall be furnished by the supplier:</p> <p>a) List of spares, consumables for the initial two years normal operation of the engine shall be included in the offer. (Item wise breakdown price of spare parts and consumables shall also be provided but which will not be considered for evaluation).</p> <p>⊃) a) List of spares, consumables required for normal operation and periodic servicing of the engine for one year but the same will not be considered for evaluation.</p> <p>b) All the spares required for maintenance/overhauling should be procured from OEM or their authorizes dealer only . AS and when spares will be procured, invoices of spares to be submitted to OIL for record.</p>
15	A.2.4 <u>COMPOSITION OF FUEL GAS</u>	73/74	The engine shall be capable of developing required BHP with the fuel composition (tentative) as given below. Chromatograph analysis of two samples of Natural Well Head	The engine shall be capable of developing required BHP with the fuel composition (tentative) as given below. Chromatograph analysis of two samples of Natural Well Head Gas produced from Kumchai EPS is furnished below -

		<p>Gas produced from Kumchai EPS is furnished below -</p> <p>CONSTITUTION RANGE BY % VOLUME</p> <table border="1"> <thead> <tr> <th>Sample 1</th> <th>Sample 2</th> </tr> </thead> <tbody> <tr> <td>Methane 7.43</td> <td>86.43</td> </tr> <tr> <td>Ethane 6.57</td> <td>6.94</td> </tr> <tr> <td>Propane 2.55</td> <td>2.64</td> </tr> <tr> <td>Nitrogen 0.21</td> <td>0.21</td> </tr> <tr> <td>Carbon-dioxide 0.15</td> <td>0.21</td> </tr> <tr> <td>Iso-Butane 0.69</td> <td>0.69</td> </tr> <tr> <td>N-Butane 0.82</td> <td>0.81</td> </tr> <tr> <td>Iso-Pentane 0.38</td> <td>0.40</td> </tr> <tr> <td>N-Pentane 0.27</td> <td>0.28</td> </tr> <tr> <td>Hexane 0.92</td> <td>1.45</td> </tr> <tr> <td>Gravity 0.6712</td> <td>0.6869</td> </tr> <tr> <td>Gross Calorific Value(Kcal/SCUM) 10391.8</td> <td>10606</td> </tr> <tr> <td>Net Calorific Value 9407.4</td> <td>9607.1</td> </tr> </tbody> </table>	Sample 1	Sample 2	Methane 7.43	86.43	Ethane 6.57	6.94	Propane 2.55	2.64	Nitrogen 0.21	0.21	Carbon-dioxide 0.15	0.21	Iso-Butane 0.69	0.69	N-Butane 0.82	0.81	Iso-Pentane 0.38	0.40	N-Pentane 0.27	0.28	Hexane 0.92	1.45	Gravity 0.6712	0.6869	Gross Calorific Value(Kcal/SCUM) 10391.8	10606	Net Calorific Value 9407.4	9607.1	<p>CONSTITUTION Range by % VOLUME</p> <table border="1"> <thead> <tr> <th>Sample 1</th> <th>Sample2</th> <th>Recent data</th> </tr> </thead> <tbody> <tr> <td>87.43</td> <td>86.43</td> <td>87.14</td> </tr> <tr> <td>Ethane</td> <td>6.57</td> <td>6.25</td> </tr> <tr> <td>Propane</td> <td>2.55</td> <td>2.64</td> </tr> <tr> <td>Nitrogen</td> <td>0.21</td> <td>0.36</td> </tr> <tr> <td>Carbon-dioxide</td> <td>0.15</td> <td>0.25</td> </tr> <tr> <td>Iso-Butane</td> <td>0.69</td> <td>0.65</td> </tr> <tr> <td>N-Butane</td> <td>0.82</td> <td>0.78</td> </tr> <tr> <td>Iso-Pentane</td> <td>0.38</td> <td>0.39</td> </tr> <tr> <td>N-Pentane</td> <td>0.27</td> <td>0.28</td> </tr> <tr> <td>Hexane</td> <td>0.92</td> <td>1.52</td> </tr> <tr> <td>Gravity</td> <td>0.6712</td> <td>0.6816</td> </tr> <tr> <td>Gross Calorific Value (Kcal/SCUM)</td> <td>10391.8</td> <td>10464.2</td> </tr> <tr> <td>Net Calorific Value</td> <td>9407.4</td> <td>9607.1</td> </tr> </tbody> </table> <p>Note : The Genset is to be designed considering the worst scenario .</p>	Sample 1	Sample2	Recent data	87.43	86.43	87.14	Ethane	6.57	6.25	Propane	2.55	2.64	Nitrogen	0.21	0.36	Carbon-dioxide	0.15	0.25	Iso-Butane	0.69	0.65	N-Butane	0.82	0.78	Iso-Pentane	0.38	0.39	N-Pentane	0.27	0.28	Hexane	0.92	1.52	Gravity	0.6712	0.6816	Gross Calorific Value (Kcal/SCUM)	10391.8	10464.2	Net Calorific Value	9407.4	9607.1	
Sample 1	Sample 2																																																																									
Methane 7.43	86.43																																																																									
Ethane 6.57	6.94																																																																									
Propane 2.55	2.64																																																																									
Nitrogen 0.21	0.21																																																																									
Carbon-dioxide 0.15	0.21																																																																									
Iso-Butane 0.69	0.69																																																																									
N-Butane 0.82	0.81																																																																									
Iso-Pentane 0.38	0.40																																																																									
N-Pentane 0.27	0.28																																																																									
Hexane 0.92	1.45																																																																									
Gravity 0.6712	0.6869																																																																									
Gross Calorific Value(Kcal/SCUM) 10391.8	10606																																																																									
Net Calorific Value 9407.4	9607.1																																																																									
Sample 1	Sample2	Recent data																																																																								
87.43	86.43	87.14																																																																								
Ethane	6.57	6.25																																																																								
Propane	2.55	2.64																																																																								
Nitrogen	0.21	0.36																																																																								
Carbon-dioxide	0.15	0.25																																																																								
Iso-Butane	0.69	0.65																																																																								
N-Butane	0.82	0.78																																																																								
Iso-Pentane	0.38	0.39																																																																								
N-Pentane	0.27	0.28																																																																								
Hexane	0.92	1.52																																																																								
Gravity	0.6712	0.6816																																																																								
Gross Calorific Value (Kcal/SCUM)	10391.8	10464.2																																																																								
Net Calorific Value	9407.4	9607.1																																																																								
16	A.2.5 Ambient Condition	74 AMBIENT CONDITION: The generating set shall be suitable for operation and deliver its rated output at the following site	AMBIENT CONDITION: The generating set shall be suitable for operation and deliver its rated output at the following site condition:																																																																							

			<p>condition:</p> <p>Maximum Ambient Temperature 48°C</p> <p>Minimum Ambient Temperature: 05°C</p> <p>Maximum Humidity at 21°C: 100 % at 35C: 95 % at 41°C: 70%</p> <p>Maximum Altitude above sea level : 205 metres</p>	<p>Maximum Ambient Temperature -35°C</p> <p>Minimum Ambient Temperature: 05°C</p> <p>Maximum Humidity at 21°C: 100 % at 35C: 95 % at 41°C: 70% : 70 %</p> <p>Maximum Altitude above sea level : 205 metres</p>	
17	<p>A.3 Electrical Equipment and accessories</p> <p><u>General Principles of Design Concept of electrical System</u></p> <p><u>4rd/5th PARA</u></p>	74	<p>Proprietary design software such as ETAP is to be used for designing the system electrical parameters and the design data shall be forwarded to owner for their records/analysis/comments.</p>	<p>Proprietary design software such as ETAP is to be used for designing the system electrical parameters and the design data shall be forwarded to owner for their records/analysis/comments.</p> <p>The software shall be procured under the name of owner (Oil India Limited) and licensed accordingly for two computers. It shall be pre-loaded in a new laptop computer (with latest hardware and operating system) dedicated for this purpose. The laptop computer shall be exclusively used for the purpose. The same shall be handed over to owner once the installation and commissioning of the plant is complete.</p>	
18	A.3.3.1 Alternator	76	New Clause	Short Circuit Ratio : As per mfr standard	
19	A.3.3.2 Generator Operational Requirement	78	x) Line charging capability (MVAR): Not less than 35% of the rated MVA at zero power factor leading.	x) Line charging capability (MVAR): Not less than 35% of the rated MVA at zero power factor leading.	
20	A.3.4 HT Switchgear (11	80	(Refer the single line diagram.) HT switchgear for the plant shall be placed in a separate HT switchgear room/s. The 11 kV	(Refer the single line diagram.) HT switchgear for the plant shall be placed in a separate HT switchgear room/s. The 11 kV generators shall be connected to the 11 kV bus through 11 KV VCB type switchgears,	

	<p><u>kV/33 kV):</u></p>	<p>generators shall be connected to the 11 kV bus through 11 KV VCB type switchgears, through proper protective relays, protection/metering CT/PTs and protective gear such as surge diverters and filters. Two spare incomer VCB panels shall also be provided, one panel rated for an additional 2 MW generator and the other rated for an additional 1 MW generator. A bus coupler shall also be placed in the incomer 11 kV bus.</p> <p>Two nos. 11 kV outgoing breakers shall be used to feed two nos. 10 MVA 11/33 KV step up transformers. The transformers shall be used to step up voltage from the generator for connection to the grid. One spare 11 KV breaker will also be provided, with similar ratings of the breakers feeding the transformers. One 11 KV additional breaker shall be provided for feeding the station auxiliary transformer 500 KVA, 11/0.415 KV rated.</p> <p>Output from the 11/33 KV step up transformers will be terminated on a 33 KV bus through 33 KV individual VCB units. There will be bus coupler in the 33 KV bus also. Four nos. 33 KV outgoing VCB units shall be provided for</p>	<p>through proper protective relays, protection/metering CT/PTs and protective gear such as surge diverters and filters. Two spare incomer VCB panels shall also be provided, one panel rated for an additional 2 MW generator and the other rated for an additional 1 MW generator. A bus coupler shall also be placed in the incomer 11 kV bus.</p> <p>Two nos. 11 kV outgoing breakers shall be used to feed two nos. 10 MVA 11/33 KV step up transformers. The transformers shall be used to step up voltage from the generator for connection to the grid. One spare 11 KV breaker will also be provided, with similar ratings of the breakers feeding the transformers. One 11 KV additional breaker shall be provided for feeding the station auxiliary transformer 500 KVA, 11/0.415 KV rated.</p> <p>Output from the 11/33 KV step up transformers will be terminated on a 33 KV bus through 33 KV individual VCB units. There will be bus coupler in the 33 KV bus also. Four nos. 33 KV outgoing VCB units shall be provided for evacuation of power from the power plant. One spare 33 KV outgoing VCB shall be provided as spare unit.</p> <p>The HT switchgear (for all levels) shall have single front, single tier, fully compartmentalized, metal clad construction complying with clause No. 3.102.1 of IEC-60298, comprising of a row of free standing floor mounted panels. Each circuit shall have a separate vertical panel with distinct compartments for circuit breaker/contactors truck, cable termination, main busbars and auxiliary control devices. Each breaker shall have sufficient current carrying capacity and breaking/making capacity, according to system short circuit kVA calculation.</p>
--	---------------------------------	--	---

			<p>evacuation of power from the power plant. One spare 33 KV outgoing VCB shall be provided as spare unit.</p> <p>The HT switchgear (for all levels) shall have single front, single tier, fully compartmentalized, metal clad construction complying with clause No. 3.102.1 of IEC-60298, comprising of a row of free standing floor mounted panels. Each circuit shall have a separate vertical panel with distinct compartments for circuit breaker/contactors, cable termination, main busbars and auxiliary control devices. Each breaker shall have sufficient current carrying capacity and breaking/making capacity, according to system short circuit kVA calculation.</p>	<p>Successful bidder shall design the system and submit to OIL for approval.</p> <p>All bus bars shall be aluminum.</p>
21	<u>A.3.16</u> <u>Uninterruptible</u> <u>Power Supply</u> <u>System</u>	87	<p>The uninterruptible power supply (UPS) system furnishes a reliable and interruption free source of required voltage, three/single phase power to equipment / instrument vital for plant control and emergency shutdown. The UPS is to be of Microprocessor based. Battery would be similar to unit batteries as mentioned above.</p> <p>One (1) UPS unit (1x100%) will be furnished for each unit of the Power Plant sized to feed essential</p>	<p>The uninterruptible power supply (UPS) system furnishes a reliable and interruption free source of required voltage, three/single phase power to equipment / instrument vital for plant control and emergency shutdown. The UPS is to be of Microprocessor based. Battery would be similar to unit batteries as mentioned above.</p> <p>One (1) UPS unit (1x100%) will be furnished for each unit of the Power Plant sized to feed essential AC loads like DCS and other C&I equipment. The DC supply for the UPS system will be sourced from station DC system. However, separate converter system for the UPS may also be provided in place of station DC supply. The UPS system will be provided with two (1) nos.</p>

			<p>AC loads like DCS and other C&I equipment.</p> <p>The DC supply for the UPS system will be sourced from station DC system. The UPS system will be provided with two (1) nos. 100% capacity inverter.</p> <p>An alternative 240 V A.C. single-phase source through by pass transformer and stabilizer is provided through a static transfer switch to feed the vital A.C. loads during the failure of both the inverters.</p>	<p>100% capacity inverter.</p> <p>An alternative 240 V A.C. single-phase source through by pass transformer and stabilizer is provided through a static transfer switch to feed the vital A.C. loads during the failure of both the inverters.</p>
22	<u>Alternator Specifications:</u> <u>Alternator:</u> <u>Point 18</u>	92	<p>1) Type of AVR: Electronic, In the event of any fault due to over voltage/high bearing temperature/high winding temperature, or an external fault, the AVR shall remove the excitation voltage to the alternator. An emergency trip PB shall also be provided.</p>	<p>2) Type of AVR: Electronic, In the event of any fault due to over voltage/high bearing temperature/high winding temperature in the alternator, or an external fault, the AVR shall remove the excitation voltage to the alternator. An emergency trip PB shall also be provided.</p>
23	<u>A.5.1 Central Control Room / Control Equipment Room</u>	99	<p><u>Central Control Room / Control Equipment Room :</u></p> <p>Central Control Room (CCR) is envisaged from where complete operation of the plant is performed. This control room will house all CRT/LCD consoles, back-up unit control panel housing annunciator, emergency push button etc., unit / station auxiliaries, bus transfer panel, transformer and switchgear control panel, generator relay</p>	<p><u>Central Control Room / Control Equipment Room :</u></p> <p>Central Control Room (CCR) is envisaged from where complete operation of the plant is performed. This control room will house all CRT/LCD consoles, back-up unit control panel housing annunciator, emergency push button etc., unit / station auxiliaries, bus transfer panel, transformer and switchgear control panel, generator relay panel, Synchronizing panel, fire and smoke detection panel etc., with all control, auxiliary and power cables along with associated cable trenches, ducts etc. An Uninterruptible Power Supply (UPS) will be employed to supply AC power to essential control, safety and information system such as annunciators, protection system, control panels etc. The</p>

			<p>panel, Synchronizing panel, fire and smoke detection panel etc., with all control, auxiliary and power cables along with associated cable trenches, ducts etc. An Uninterruptible Power Supply (UPS) will be employed to supply AC power to essential control, safety and information system such as annunciators, protection system, control panels etc. The building shall include all the required closed spaces including but not limiting to Office Room, store room, Owner's office, Toilets etc. There should be conference room to accommodate at least 10 (ten) people at a time with adequate furniture. The conference room should have the facilities for connecting PCs and projectors. The control room shall be a brick building with air conditioning and ventilation system.</p>	<p>building shall include all the required closed spaces including but not limiting to Office Room, store room, Owner's office, Toilets etc. There should be conference room to accommodate at least 10 (ten) people at a time with adequate furniture. The conference room should have the facilities for connecting PCs and projectors. The control room shall be equipped with a brick building with air conditioning and ventilation system.</p>
24	<u>A.6.1 Air Compressor System</u>	100	<p><u>Air Compressor System:</u> Generating Sets with electrical starting system there should be at least two numbers of Air Compressor in the Power Plant. One unit to be in operation and the second unit to be in stand by mode. The Air compressors should be electrical motor driven with capacity sufficient to cold start the Main Generating Set Units.</p>	<p><u>Air Compressor System:</u> Generating Sets with electrical air starting system there should be at least two numbers of Air Compressor in the Power Plant. One unit to be in operation and the second unit to be in stand by mode. The Air compressors should be electrical motor driven with capacity sufficient to cold start the Main Generating Set Units.</p> <p>In addition to the Electrical Motor driven units there should be at least one number Diesel Engine Driven Unit to be used in case of Power failure or for cold starting of the Units. The Diesel Engine driven Air compressor should be designed for</p>

			<p>In addition to the Electrical Motor driven units there should be at least one number Diesel Engine Driven Unit to be used in case of Power failure or for cold starting of the Units. The Diesel Engine driven Air compressor should be designed for cold start the Units.</p> <p>The Air Compressors should conform to IS: 6206 standard. The design of the drive motors and Diesel Engine should be governed by the same principles as laid down under the criteria for the Main Generating Sets Units save the capacity. The Air vessels should be constructed as per the OISD safety standard no. 128.</p>	<p>could start the Units.</p> <p>The Air Compressors should conform to IS: 6206 standard. The design of the drive motors and Diesel Engine should be governed by the same principles as laid down under the criteria for the Main Generating Sets Units save the capacity. The Air vessels should be constructed as per the OISD safety standard no. 128.</p> <p>The compressor system can also be utilized for pneumatic system of the plant if required .</p>
25	<u>A.6.4 Power Pack Container</u>	108	New Clause	<p>A.6.4 The individual genset should be placed inside the power pack containers or potable acoustic enclosures . The sound level from the genset should be 75 db from the distance of 1 Mtr in all direction . All the genset should be</p> <p>Placed under a shed as described under the tender clause “CIVIL AND STRUCTURAL WORKS”, equipped with overhead crane facility .</p> <p>Alternatively all the gensets (without acoustic)should be placed inside the Shed and the shed should be acoustically enclosed from all sides .The sheds should have overhead crane facility .</p>
26	<u>A.6.4. 6. General</u>	103	<u>General Arrangement Drawing</u> The maximum permissible sound	<u>General Arrangement Drawing: Details of Acoustic Enclosure:</u>

	Arrangement Drawing:-		level shall be 75dB (A) at one metre from the enclosure surface.	The maximum permissible sound level shall be 75dB (A) at one metre on all sides from the enclosure surface.
27	A.6.4.3		New Clause	Technical details of Acoustic Enclosure Enclosed as Annexure 1.
28	A.6.4.4		New Clause	A 6.4.4 : Specification for overhead crane Enclosed as Annexure 1I
29	B.1 Fire Protection System Introduction	124	<p>The fire protection system for the proposed power plant is to provide for early detection, alarm, containment and suppression of fires. An adequate fire protection system has been planned to meet the above objective and all statutory and insurance requirement of LPA. A multitude of systems will be provided to combat various types of fires in different areas of the plant and all such systems for various areas will form a part of a centralized protection system for the entire power plant. The complete fire protection system will comprise of the following.</p> <ul style="list-style-type: none"> • Fire hydrant system (External and Internal) • Portable fire extinguishers • Gas leak detectors 	<p>The fire protection system for the proposed power plant is to provide for early detection, alarm, containment and suppression of fires. An adequate fire protection system has been planned to meet the above objective and all statutory and insurance requirement of LPA. A multitude of systems will be provided to combat various types of fires in different areas of the plant and all such systems for various areas will form a part of a centralized protection system for the entire power plant. The complete fire protection system will comprise of the following.</p> <ul style="list-style-type: none"> • Fire hydrant system (External and Internal) • Portable fire extinguishers • Gas leak detectors • Static Water storage system
30	B.1 Fire Protection System Introduction System Description Note (i)	104	<p>Note: (i) A ring line is to be constructed all around the periphery of the plant, from which water for fire- fighting can be drawn in case of fire. The hydrants are to be placed in this ring line. The ring line is to under pressure round the clock. For</p>	<p>Note: (i) A ring line is to be constructed all around the periphery of the plant, from which water for fire- fighting can be drawn in case of fire. The hydrants are to be placed in this ring line. The ring line is to under pressure round the clock. For this adequate water storage arrangement for at least two hours of firefighting is to be arranged. The static water tank storage system either be a RCC reservoir or Rectangular MS tank. A firefighting pump is to be provided</p>

			<p>this adequate water storage arrangement for at least two hours of firefighting is to be arranged. A firefighting pump is to be provided near the entrance gate of the plant for energizing the ring line in case of fire.</p>	<p>near the entrance gate of the plant for energizing the ring line in case of fire.</p>
31	<u>B.2 Effluent Collection and Disposal System</u>	104 / 105	<p><u>General</u></p> <p>The waste collection and treatment system receives, segregates, and transfers all liquid waste streams to plant water management and ensures conformance to the statutory government guidelines prevailing in the state.</p> <p>The power plant effluents are of the following two kinds. They are:</p> <ul style="list-style-type: none"> • Water Waste • Sanitary waste <p>The effluent disposal system will consist of trenches, sumps/pit and pumps to collect the plant wastes and transport them for off-site disposal. In general, sump pumps will be submersible centrifugal type with adequate capacity as required.</p> <p><u>Water Waste</u></p> <p>The plant water waste effluents are generated from the Service water shall be collected in a local pit before disposal through a dispersion trench. The pit should</p>	<p><u>General</u></p> <p>The waste collection and treatment system receives, segregates, and transfers all liquid waste streams to plant water management and ensures conformance to the statutory government guidelines prevailing in the state.</p> <p>The power plant effluents are of the following two kinds. They are:</p> <ul style="list-style-type: none"> • Water Waste • Sanitary waste <p>The effluent disposal system will consist of trenches, sumps/pit and pumps to collect the plant wastes and transport them for off site disposal. In general, sump pumps will be submersible centrifugal type with adequate capacity as required.</p> <p><u>Water Waste</u></p> <p>The plant water waste effluents are generated from the Service water shall be collected in a local pit before disposal through a dispersion trench. The pit should be constructed in such way that all the water including the rain water are drawn to the sump for further disposal.</p> <p><u>Sanitary Waste</u></p> <p>Sanitary waste from plant sewage and canteen will be allowed to soak in a septic tank and the overflow will be disposed off through a dispersion trench.</p> <p><u>B.3 Sewage Disposal</u></p>

			<p>be constructed in such way that all the water including the rain water are drawn to the sump for further disposal.</p> <p>Sanitary Waste Sanitary waste from plant sewage and canteen will be allowed to soak in a septic tank and the overflow will be disposed off through a dispersion trench.</p> <p>Sewage Disposal The Sanitary Sewage system will be conveyed through underground pipe lines by gravity and designed accordingly. Manholes will be provided at all bends, intersections and in straight stretches for more than 100 metres long. Sanitary system within the buildings will be provided as per standards and connected to common sanitary sewage system.</p>	<p>The Sanitary Sewage system will be conveyed through underground pipe lines by gravity and designed accordingly. Manholes will be provided at all bends, intersections and in straight stretches for more than 100 metres long. Sanitary system within the buildings will be provided as per standards and connected to common sanitary sewage system.</p> <p>B.3 Pollution Control Measures</p> <ol style="list-style-type: none"> Disposal of Hazardous Wastes: Facility for disposal of Hazardous wastes like Oily Sludge and spent oil i.e. Burnt lube oil etc is to be provided. Waste water produced during the production activities would be disposed by segregating it. Provision of Oil Water Separator to be kept. Provision of online monitoring of pollution parameters to be kept. Provision of ETP based on study of generation of effluent. Provision of process drain and storm water drain separately. Provision for discharge of treated effluent as per MINAS. 	
32	<u>B.4 Air Pollution</u>	106	<p><u>B.4 Air Pollution</u> As per the Environmental Protection Act, stipulated by the central pollution control board, the criteria prescribed are:</p> <ol style="list-style-type: none"> Nitrogen oxides (NOx) emissions : 100PPMV @15%O₂dry (Adherence with Nox levels mandated by the statutory authority shall be ensured) 	<p><u>B.4 Air Pollution</u> As per the Environmental Protection Act, stipulated by the central pollution control board, the criteria prescribed are:</p> <ol style="list-style-type: none"> Nitrogen oxides (NOx) emissions : 100PPMV @15%O₂dry (Adherence with Nox levels mandated by the statutory authority shall be ensured) height <u>As per CPCB norms</u> 30 Mtr Green belt area : 10 feet <u>along the</u> 	

			Stack height As per CPCB norms Green belt area : 10 feet through the periphery wall of the project site	through the periphery wall of the project site (inside the boundary wall).
33	CIVIL & STRUCTURAL WORK	108 to 118	Tender Clause Revised	Revised Clause enclosed as Annexure III
34	<u>E.O</u> <u>INSPECTION AND TESTING FOR Equipment</u>	117	All tests and inspections will be carried out at works according to the approved quality assurance plan unless otherwise instructed by the company (OIL). a) Inspection of all items shall be carried out at the manufacturers'/supplier's premises by OIL/ authorized representative of OIL. Bidders shall submit the quality assurance plan they propose to follow for all the equipment to be supplied along with their offers. b) The QAP shall contain detailed inspection/testing plan for all phases of equipment manufacture individually. c) The plant and materials will be subjected for inspection during manufacture at OIL's discretion but such inspection shall not relieve the supplier of his responsibility to ensure that the equipment supplied is	All tests and inspections will be carried out at works according to the approved quality assurance plan unless otherwise instructed by the company (OIL). f) Inspection of all items shall be carried out at the manufacturers'/supplier's premises by OIL/ authorized representative of OIL. Bidders shall submit the quality assurance plan they propose to follow for all the equipment to be supplied along with their offers. g) The QAP shall contain detailed inspection/testing plan for all phases of equipment manufacture individually. h) The plant and materials will be subjected for inspection during manufacture at OIL's discretion but such inspection shall not relieve the supplier of his responsibility to ensure that the equipment supplied is free from all manufacturing and other defects and conform to correct specifications. The contractor will be notified in advance, if it is intended to inspect the equipment. The inspection and witness testing shall be at no extra cost to OIL. However cost towards boarding, lodging and to and from transportation for inspection for OIL's representative/s shall be borne by OIL. The bidder shall make their offer with this in view. i) Any modification suggested during inspection/testing shall be carried out by contractor at no additional cost.

		<p>free from all manufacturing and other defects and conform to correct specifications. The contractor will be notified in advance, if it is intended to inspect the equipment. The inspection and witness testing shall be at no extra cost to OIL. However cost towards boarding, lodging and to and from transportation for inspection for OIL's representative/s shall be borne by OIL. The bidder shall make their offer with this in view.</p> <p>d) Any modification suggested during inspection/testing shall be carried out by contractor at no additional cost. Contractor shall affect dispatch of the unit only on receipt of OIL's dispatch advice.</p> <p>e) All other appliances, apparatus, labor etc. necessary for the tests shall have to be provided by the supplier at his cost.</p> <p>The above inspection/testing plan as part of QAP is applicable for all the equipment. However, inspection/testing plan for generating set shall be as below.</p> <p>Generating set: Shall be</p>	<p>Contractor shall affect dispatch of the unit only on receipt of OIL's dispatch advice.</p> <p>j) All other appliances, apparatus, labor etc. necessary for the tests shall have to be provided by the supplier at his cost.</p> <p>The above inspection/testing plan as part of QAP is applicable for all the equipment. However, inspection/testing plan for generating set shall be as below.</p> <p>Generating set: Shall be inspected/tested as a completed unit. Alternatively, individual components like engine, alternator and engine/alternator control panel may be offered for inspection/testing separately at OEM/supplier's works. The contractor has to indicate the same in their QAP for OIL's approval.</p> <p>All the routines tests and inspection shall be as per Indian Standards.</p> <p>All the routine tests as per IS and load tests of the alternator/gen set and the control panel shall be witnessed by OIL's Engineer at OEM/supplier's works. The routine test of the alternator will include the following minimum tests/measurements:</p> <ol style="list-style-type: none"> 1. Measurement of winding resistances for generator armature, field, exciter armature and exciter field. 2. Measurement of insulation resistance (before and after HV tests) for generator armature and field, exciter armature and field. 3. High voltage (HV) test. 4. Phase sequence test. 5. Voltage regulation test. 6. Vibration measurement. 7. Measurement of noise level.
--	--	---	---

		<p>inspected/tested as a completed unit. Alternatively, individual components like engine, alternator and engine/alternator control panel may be offered for inspection/testing separately at OEM/supplier's works. The contractor has to indicate the same in their QAP for OIL's approval.</p> <p>All the routines tests and inspection shall be as per Indian Standards.</p> <p>All the routine tests as per IS and load tests of the alternator/gen set and the control panel shall be witnessed by OIL's Engineer at OEM/supplier's works. The routine test of the alternator will include the following minimum tests/measurements:</p> <ol style="list-style-type: none"> 1. Measurement of winding resistances for generator armature, field, exciter armature and exciter field. 2. Measurement of insulation resistance (before and after HV tests) for generator armature and field, exciter armature and field. 3. High voltage (HV) test. 4. Phase sequence test. 5. Voltage regulation test. 6. Vibration measurement. 	<p>8. Overload test. 9. Measurement of open circuit and short circuit characteristics.</p> <p>All the routine tests and load tests of the panel shall be witnessed by OIL engineers at manufacturer's works. The routine test of the panels will include the following minimum tests/measurements:—</p> <ol style="list-style-type: none"> 1. Physical checks & Operation check of all components 2. HV tests 3. Insulation tests (before and after HV tests). <p>The complete unit of alternator along with control panel shall be inspected and tested at manufacturer's works / factory by a team of OIL's Engineers prior to dispatch. Amongst others, all routine tests of the alternator and control panel shall be witnessed during the inspection. Intimation for inspection of complete unit must be sent to OIL at least 30 days in advance.</p> <p>All routine tests of the alternator and control panel shall be witness during the inspection at respective manufacturer's works. Prior information is to be given to OIL.</p> <p>Inspection/testing charges, if any, shall be quoted separately which shall be considered for evaluation of the offers. To and fro fares, boarding/ lodging and other en route expenses of OIL's Inspection team for carrying our inspection shall be borne by OIL.</p>
--	--	--	---

		<p>7. Measurement of noise level. 8. Overload test. 9. Measurement of open circuit and short circuit characteristics.</p> <p>All the routine tests and load tests of the panel shall be witnessed by OIL engineers at manufacturer's works. The routine test of the panels will include the following minimum tests/measurements: -</p> <ol style="list-style-type: none">1. Physical checks & Operation check of all components2. HV tests3. Insulation tests (before and after HV tests). <p>The complete unit of alternator along with control panel shall be inspected and tested at manufacturer's works / factory by a team of OIL's Engineers prior to dispatch. Amongst others, all routine tests of the alternator and control panel shall be witnessed during the inspection. Intimation for inspection of complete unit must be sent to OIL at least 30 days in advance.</p> <p>All routine tests of the alternator and control panel shall be witness during the inspection at respective manufacturer's works. Prior</p>	
--	--	---	--

			<p>information is to be given to OIL.</p> <p>Inspection/testing charges, if any, shall be quoted separately which shall be considered for evaluation of the offers. To and fro fares, boarding/ lodging and other en-route expenses of OIL's Inspection team for carrying our inspection shall be borne by OIL.</p>	
35	12.0 <u>Scope of Services</u>	119	<p>Contractor's scope shall cover furnishing of all labour, supervision, consumable materials, tools & tackle and services necessary for receiving, unloading, unpacking, storing, in-plant transportation, intermediate handling, preassembly/assembly at site as required, complete erection, testing and commissioning of all items included in the entire power plant as specified in this Bid Document along with their associated various ancillary and auxiliary equipments, vessels, pumps, drives, lubrication system, associated tanks, integral system piping, fittings, valve accessories, electrical, instrumentation and control etc.</p>	<p>Contractor's scope shall cover furnishing of all labour, supervision, consumable materials, tools & tackle and services necessary for receiving, unloading, unpacking, storing, in-plant transportation, intermediate handling, preassembly/assembly at site as required, complete erection, testing and commissioning of all items included in the entire power plant as specified in this Contract Bid Document along with their associated various ancillary and auxiliary equipments, vessels, pumps, drives, lubrication system, associated tanks, integral system piping, fittings, valve accessories, electrical, instrumentation and control etc.</p>
36	14.1 <u>Operability Run</u> <u>1st Para & 3rd</u>	129	<p>The duration of operability Run of the complete Plant in the</p>	<p>The duration of operability Run of the complete Plant in the automatic position of control system under varying</p>

	<u>Para</u>		<p>automatic position of control system under varying load shall be forty five (45) days.</p> <p>The plant will be put on reliability run for one year when the Company (OIL) is fully satisfied that the offered Plant has been proven with regard to its safety.</p> <p>The total outage during the Reliability Run should not be more than twenty (48) hours with a single outage of maximum duration of six (6) hours.</p>	<p>load shall be 100 hours forty five (45) days. However the duration of operability run of individual equipments /Machines shall be 72 (Seventy Two) hours.</p> <p>The plant will be put on reliability run for one year when the Company (OIL) is fully satisfied that the offered Plant has been proven with regard to its safety & operational efficiency.</p> <p>The total outage during the Reliability Run should not be more than forty eight (48) hours with a single outage of maximum duration of six (6) hours.</p>
37	15.0 <u>CDM project</u>	130 /131	<p>CDM project:</p> <ul style="list-style-type: none"> • Assessment of CDM eligibility based on the revised guidelines of UNFCCC. • Preparation of Project Concept Note (PCN) and Project Design Document (PDD) applying the latest methodology of UNFCCC as applicable for the project activity. • Approval of Project Concept Note and Project Design Document, and registration with UNFCCC • Scrutinizing of monitoring data and reports submitted with supporting evidence prior to submission to DOE for 	<ul style="list-style-type: none"> • Assessment of CDM eligibility based on the revised guidelines of UNFCCC. • Preparation of Project Concept Note (PCN) and Project Design Document (PDD) applying the latest methodology of UNFCCC as applicable for the project activity. • Approval of Project Concept Note and Project Design Document, and registration with UNFCCC • Scrutinizing of monitoring data and reports submitted with supporting evidence prior to submission to DOE for verification • Validation & Certification by Designated Operational Entity (DOE) and Endorsement by Indian Designated National Authority (DNA). • Transaction of CERs • Making a presentation of the project with Ministry of Environment and Forest (MOEF) Govt of India New Delhi & UNFCCC as and when required. <p>Any other information / documentation required for</p>

		<p>verification</p> <ul style="list-style-type: none"> • Validation & Certification by Designated Operational Entity (DOE) and Endorsement by Indian Designated National Authority (DNA). • Transaction of CERs • Making a presentation of the project with Ministry of Environment and Forest (MOEF)-Govt of India New Delhi & UNFCCC as and when required. • Any other information / documentation required for successful completion of the CDM project 	<p>successful completion of the CDM project</p> <p>15.1 Base Line Survey and Carbon Emission Mapping of the Project : Calculating the carbon footprints or the amount of carbon emitted in the atmosphere is to be estimated.</p> <p>15.2. Emission Reduction: The project would help in the emission reduction of estimated 25,000 SCMD approx of gas daily, exact evaluation for the same is to be done.</p> <p>15.3 CER's (Certified Emission Reduction) Accrued: Calculation of CER's is to be done by calculating the amount of Co₂ emissions generated over a period of time.</p> <p>Co₂ Emissions (Tonns Co₂) for speciefied time = Total Net Electricity Generated X Baseline Emission Factor (Tonnes Co₂/MW)</p> <p>15. 4 Project's contribution to Sustainable development:</p> <ul style="list-style-type: none"> • The project would help in minimizing environmental pollution due to emissions of CO₂ and other air pollutants (SPM, SO₂, NO_x) otherwise released by flaring of the gas in the atmosphere thus conserving fossil fuels and reducing the GHGs. • The project would positively benefit the people around the plant by contributing to local skilled employment opportunities, reduction in flaring related emissions and provide better occupational health and safety (OHS) at workplace. • The longevity of the project is expected to provide benefits related to emission reductions over a long period of time ie 10-12 years.
--	--	--	--

38	<u>Deemed Availability (refer Exhibit C)</u>	133	<p><u>Deemed Availability (refer Exhibit C):</u> In case the Owner advises the Contractor to shut down fully / partially any of the engine(s)</p> <p>(a) due to any reason attributable to the Owner or</p> <p>(b) due to a condition of force majeure or</p> <p>(c) due to warranty or insurance repairs and the engine so effected shall be deemed to have run during the affected hours at its Guaranteed Operational Level.</p> <p>In addition to above, hours of non-operation of the plant due to grid failure effecting evacuation of power from the plant, would be accounted as Deemed Generation.</p>	<p><u>Deemed Availability (refer Exhibit C):</u> In case the Owner advises the Contractor to shut down fully / partially any of the equipments engine(s)</p> <p>(a) due to any reason attributable to the Owner or</p> <p>(b) due to a condition of force majeure or</p> <p>(c) due to warranty or insurance repairs and the equipment engine so effected shall be deemed to have run during the affected hours at its Guaranteed Operational Level. In addition to above, hours of non-operation of the plant due to grid failure effecting evacuation of power from the plant, would be accounted as Deemed Generation.</p>
39	<u>Extraordinary Expense:</u>	134	<p><u>Extraordinary Expense:</u> Any expense or expenditure, incurred by Contractor in the performance of the Work and not covered in a budget that has been approved in advance by Owner, including but not limited to, (i) provision of additional maintenance services requested by Owner not covered by this agreement, (ii) the direct cost of subcontract labor, materials or maintenance services needed to perform the services</p>	<p><u>Extraordinary Expense:</u> Any expense or expenditure, incurred by Contractor in the performance of the Work and not covered in a budget that has been approved in advance by Owner, including but not limited to, (i) provision of additional maintenance services requested by Owner not covered by this agreement, (ii) the direct cost of subcontract labor, materials or maintenance services needed to perform the services under (i) above, (iii) expenses incurred under Change of Law (iv) expenses towards technical upgradation as advised by OEMs, and agreed by the Owner (v) any other item of expense occasioned by an approved directive from Owner.</p>

			under (i) above, (iii) expenses incurred under Change of Law (iv) expenses towards technical upgradation as advised by OEMs, (v) any other item of expense occasioned by an approved directive from Owner.	
40	Euro	134	Euro: The lawful currency of European Union.	DELETED
41	<u>Guaranteed Operational Level:</u>	134	Guaranteed operational level shall mean that the power plant shall be available for a minimum period of 8100 hours in a year @ 95% average minimum loading of each of the individual equipments of the plant, Gas Gensets at 49 Hz, so as to deliver 131.6817 Million kWh per annum at the switch yard inlet subject to the site conditions.	Guaranteed operational level shall mean that the power plant shall be available for a minimum period of 8100 hours in a year @ 95% average minimum loading of each of the individual equipments of the plant, Gas Gensets at 49 Hz, so as to deliver 5.5 MW power (Minimum) at all the times at the switch yard inlet subject to the site conditions. The above is the Guranteed Operational Level of individual equipments only. The Plant is to be operated round the clock 24 hours a day, seven days a week throughout the year
42	SBI PLR	137	SBI PLR: Primer Lending Rate of the State Bank of India for Medium Term Lending as notified from time to time.	DELETED
43	<u>Maintenance services</u> <u>2.2.1</u>	138	Establish a system for recording an inventory of spare parts, tools and tackles, equipments, consumables and supplies for the Plant maintenance.	Establish a system for recording an inventory of spare parts, tools and tackles, measuring instruments , equipments, consumables and supplies for the Plant maintenance.
44	<u>Maintenance services</u> <u>2.2.2</u>	138	Prepare and submit to Owner the Annual Maintenance Plan for next year at least 60 (sixty) days before the end-of each year	Prepare and submit to Owner the Annual Maintenance Plan for next year at least 60 (sixty) days before the beginning end of each year
45	<u>Maintenance</u>	138	Prepare and record at the Plant	Prepare and record at the Plant accurate and up-to-date .

	<p><u>services</u> <u>2.2.3</u></p>		<p>accurate and up-to-date maintenance logs, records and Monthly reports regarding the maintenance of the Plant, which Monthly reports shall detail repairs performed and status of equipments. All such records are to be for a minimum of sixty (60) months after the creation of such record or data and for any additional length of time required by regulatory agencies having jurisdiction over the Parties. Upon the expiration of such period, neither Party shall dispose of or destroy any such records without thirty (30) Days prior notice to the other Party. The Party receiving such notice may receive such records in lieu of such disposal or destruction by giving the notifying Party notice ten (10) Days prior to the expiration of the thirty (30) Day period.</p>	<p>maintenance logs, records and Monthly reports regarding the maintenance of the Plant, which Monthly reports shall detail repairs performed and status of equipments. All such records are to be kept till end of the Contract Period, for a minimum of sixty (60) months after the creation of such record or data and for any additional length of time required by regulatory agencies having jurisdiction over the Parties. Upon the expiration of such period, neither Party shall dispose of or destroy any such records without thirty (30) Days prior notice to the other Party. The Party receiving such notice may receive such records in lieu of such disposal or destruction by giving the notifying Party notice ten (10) Days prior to the expiration of the thirty (30) Day period. At the end of the Contractual period, such records are to be handed over to the Owner.</p>	
46	<p><u>Maintenance services</u> <u>2.2.6</u></p>	139	<p>Regularly update and implement an equipment repair and preventive maintenance program that meets the specifications the equipment manufacturers and the recommendations of the equipment suppliers</p>	<p>Regularly update and implement an equipment repair and preventive maintenance program that meets the specifications and recommendation of the equipment manufacturers and the recommendations of the equipment suppliers</p>	

47	<u>Maintenance services 2.2.9</u>	139	Assist the Owner to Procure all requisite spare parts	Assist the Owner to Procure all requisite spare parts from OEM of the equipments and maintain the invoices as a proof of procurement of the spares from OEM
48	<u>Maintenance services 2.2.10</u>	139	Cause to handover the used parts spares to the Owner. The owner will have ownership on such parts.	DELETED
49	<u>Maintenance services 2.2.24</u>	140	Coordinate and manage procurement of spares from respective spare parts suppliers from Indian as well as foreign origin, and arrange on behalf of the owner, clearances (including customs clearances), all payment towards applicable duties and taxes, transportation, transit insurance, reimbursable by owner at actual, for such spare parts.	Coordinate and manage procurement of spares from respective spare parts suppliers from indigenous/ foreign sources with all, and arrange on behalf of the owner, clearances (including customs clearances), all payment towards applicable duties and taxes, transportation, transit insurance, reimbursable by owner at actual, for such spare parts.
50	<u>Maintenance services 2.2.25</u>	140	Ensure timely delivery/ receipt of spares of required specification and quantity from domestic and imported origin.. Arrange unloading and spare parts within plant premises.	Ensure timely delivery/ receipt of spares of required specification and quantity from domestic and imported origin.. Arrange unloading and proper storage of spare parts within plant premises.
51	<u>Maintenance services 2.2.26</u>	140	Coordinate with the fuel supplier for Fuel Supply for timely delivery and receive at site fuel of required specification and quantity. Cost of fuel shall be to Owner's account.	Coordinate with the fuel supplier for Fuel(HSD) Supply for timely delivery and receive at site fuel of required specification and quantity. Cost of fuel shall be to Owner's Contractor's account.
52	<u>Maintenance services 2.2.27</u>	140	Raise indent for lube oil requirement with sufficient advance notice to the Owner, coordinate with lube oil supplier, based on the purchase order	Raise indent for lube oil requirement with sufficient advance notice to the Owner, coordinate with lube oil supplier, based on the purchase order released by the Owner for Lube Oil Supply, for timely delivery and receive at site the lube oil of required specification and quantity. Cost of lube oil shall be

			released by the Owner for Lube Oil Supply, for timely delivery and receive at site the lube oil of required specification and quantity. Cost of lube oil shall be to Owner's Contractor's account. Arrange unloading and proper storage of lube oil within plant premises.	to Owner's Contractor's account. Arrange unloading and proper storage of lube oil within plant premises.
53	<u>Maintenance services 2.2.28</u>	140	Receipt, storage, issue and accounts at General Stores. Issue receipt, provide storage, record reconciliation with budget and provide adequate security.	Receipt, storage, issue and accounts at General Stores. Issue receipt, provide storage, record reconciliation with budget and provide adequate security.
54	<u>Maintenance services 2.2.31</u>	141	Arrange to procure, store and provide chemicals & consumables as required for maintenance of the plant. Cost of the same is included in Maintenance Fee.	Arrange to procure, store and provide chemicals & consumables as required for maintenance of the plant. Cost of the same is included in Maintenance Cost Fee .
55	<u>Maintenance services 2.2.32</u>	141	Arrange to provide / bring required tooling for maintenance. Cost of the same is included in Maintenance Fee.	Arrange to provide / bring required tooling for maintenance. Cost of the same is included in Maintenance Cost Fee .
56	<u>Maintenance services 2.2.33</u>	141	Meet necessary office and allied expenses of the Contractor. Cost of the same is included in Maintenance Fee.	Meet necessary office and allied expenses of the Contractor. Cost of the same is included in Maintenance Cost Fee .
57	<u>Maintenance services 2.2.37</u>	141	Provide training to employees of Owner at plant site during the last 90 days prior to the expiry or prior termination of this agreement in day-to-day maintenance of the Plant, subject to the cap of 5 employees.	Provide training to employees of Owner at plant site during the last 90 days prior to the expiry or prior termination of this agreement in day-to-day maintenance of the Plant, subject to the cap of 5 employees .
58	<u>Maintenance services 2.2.41</u>	141	Provide minor repairs to the Plant civil works.	Provide minor repairs to the Plant civil works.

59	<u>Maintenance services 2.5</u>	142	<p>Amongst / Apart from other exclusions as outlined in various parts of this Agreement, following are excluded from Contractor's scope:</p> <p>(a) Supply of natural gas and start up fuel for the plant.</p> <p>(b) Procurement / supply of fuel, lube oil, spares, raw water and drinking water.</p> <p>(c) Reimbursement of expenses towards Fuel/ Lube / Water analysis / stack emission analysis / noise level measurement.</p> <p>(d) Liaising with Governmental/Municipal authorities for Owner's responsibilities under this Agreement.</p>	<p>Amongst / Apart from other exclusions as outlined in various parts of this Agreement, following are excluded from Contractor's scope:</p> <p>(a) Supply of natural gas and start up fuel for the plant.</p> <p>(b) Procurement / supply of fuel, lube oil, spares, raw water and drinking water.</p> <p>(c) Reimbursement of expenses towards Fuel/ Lube / Water analysis / stack emission analysis / noise level measurement.</p> <p>(d) Liaising with Governmental/Municipal authorities for Owner's responsibilities under this Agreement.?</p>
ARTICLE 3: OWNER'S RESPONSIBILITIES				
60	<u>3.1 Owner's Responsibilities</u> <u>3.1.7</u>	143	Dispose off all Hazardous Substance, contamination, discharge and waste generated by the Plant in accordance with applicable regulations and law from the earmarked location / place, where the Contractor has placed such material;	DELETED
61	3.1.9	143	Pay all taxes related to the Plant,	Pay all taxes related to the Plant, such as sales tax, service

			such as sales tax, service tax, works contract tax import and customs duties, if any, except for any taxes imposed on Contractor's net income and payroll taxes imposed on Contractor's personnel.	tax, works contract tax import and customs duties, if any, except for any taxes imposed on Contractor's net income and payroll taxes imposed on Contractor's personnel.
ARTICLE 3: OWNER'S RESPONSIBILITIES				
63	<u>DIVISION 2</u> <u>POST START-UP</u> <u>SERVICES</u> 2. <u>Plant</u> <u>Maintenance</u>	146	(b) <u>Interface with Supply Contractors:</u> Contractor acknowledges that for a period of time after the Effective Date, Supply Contractor's personnel may be present at the Plant to perform punch-list or warranty work or to continue to work to achieve Supply Contractors' performance guarantees. Contractor agrees to cooperate with Supply Contractors and to allow the Supply Contractors to schedule such work to the extent it does not 'interfere with Contractor's performance of the Services hereunder.	(b) <u>Interface with Supply Contractors:</u> Contractor acknowledges that for a period of time after the Effective Date, Supply Contractor's personnel may be present at the Plant to perform punch-list or warranty work or to continue to work to achieve Supply Contractors' performance guarantees. Contractor agrees to cooperate with Supply Contractors and to allow the Supply Contractors to schedule such work to the extent it does not 'interfere with Contractor's performance of the Services hereunder.
65	(h) <u>Warranty and insurance Claims:</u> 9i0	147	Contractor shall promptly notify Owner, in writing, of any defect or other deficiencies in the Plant discovered by. Contractor and, if requested by Owner, Contractor shall assist Owner in connection with asserting and prosecuting warranty claims against suppliers or vendors of parts, equipment, materials and services for the Plant. In	Contractor shall promptly notify Owner, in writing, of any defect or other deficiencies in the Plant discovered by. Contractor and, if requested by Owner, Contractor shall assist Owner in connection with asserting and prosecuting warranty claims against suppliers or vendors of parts, equipment, materials and services for the Plant. In addition, Contractor shall assist Owner in connection with any related claims against insurance companies for liabilities, or losses incurred in connection with the Plant or maintenance including, but not limited to, any warranty claims against Supply Contractor or any of its

		<p>addition, Contractor shall assist Owner in connection with any related claims against insurance companies for liabilities, or losses incurred in connection with the Plant or maintenance including, but not limited to, any warranty claims against Supply Contractor or any of its subcontractors, suppliers or vendors.</p> <p>(ii) Contractor shall promptly notify Owner, in writing, if Contractor becomes aware of any conditions at the Plant which might reasonably be the basis for a claim or warranty enforcement action by Owner. In the event Contractor determines that any repair required to be made to any equipment or other materials at the Plant may be subject to a warranty claim against a vendor or supplier of such equipment or materials, Contractor shall notify Owner in writing thereof and shall make necessary repairs or otherwise proceed in accordance with Owner's instructions (or, in cases of an Emergency where Owner is not reasonably available to provide instructions, in accordance with Prudent Utility Practices).</p> <p>(iii) Any costs incurred by</p>	<p>subcontractors, suppliers or vendors.</p> <p>(ii) Contractor shall promptly notify Owner, in writing, if Contractor becomes aware of any conditions at the Plant which might reasonably be the basis for a claim or warranty enforcement action by Owner. In the event Contractor determines that any repair required to be made to any equipment or other materials at the Plant may be subject to a warranty claim against a vendor or supplier of such equipment or materials, Contractor shall notify Owner in writing thereof and shall make necessary repairs or otherwise proceed in accordance with Owner's instructions (or, in cases of an Emergency where Owner is not reasonably available to provide instructions, in accordance with Prudent Utility Practices).</p> <p>(iii) Any costs incurred by Contractor in connection with any (i) warranty work (ii) works/repairs covered by insurance, shall be reimbursed to the Contractor.</p>
--	--	---	--

			Contractor in connection with any (i) warranty work (ii) works/repairs covered by insurance, shall be reimbursed to the Contractor.	
66	<u>EXHIBITE</u> <u>PLANT DEFINITION</u>	148	<u>EXHIBITE</u> <u>PLANT DEFINITION</u> The Plant consists of the following, including: •Equipments, tools, apparatus, machines, supplied under the "Contract", at Site and within the premise of Boundary wall and the approach road from NH49 to boundary walls.	<u>EXHIBITE</u> <u>PLANT DEFINITION</u> The Plant consists of the following, including: •Equipments, tools, apparatus, machines, supplied under the "Contract", at Site and within the premise of Boundary wall and the approach road from NH49 to boundary walls.
67	Note just prior to end of Section II	155	<u>Note :</u> i) The power plant shall be upgraded to 10 MW in future. All the equipment / civil works / electrical works etc required for up gradation of the power plant shall have to be excited by the contractors at the same rate, terms & conditions of the contract. The additional cost be borne by the company (OIL).	<u>Note :</u> i) The power plant shall be upgraded to 10 MW in future. All the equipment / civil works / electrical works etc required for up gradation of the power plant shall have to be executed by the contractors at the same rate, terms & conditions of the contract. The additional cost be borne by the company (OIL). On up gradation to 10 MW capacity , the power additional units should have the same configuration as the original.
SECTION IV : SCHEDULE OF RATES & PAYMENT				
68	Table For progressive Payment S1 No H	167	<i>Upon erection/installation of 01 no 2 MW Gas engine driven generating set at site</i>	<i>Upon erection/installation of 01 no 2 1 MW Gas engine driven generating set at site</i>

69	III Under the Table for Progressive Payment	169	10 % of the quoted Total Capital Cost (except Civil Cost) will be released after successful commissioning of the power project after forty five days of operability run without any interruption.	10 % of the quoted Total Capital Cost (except Civil Cost) will be released after successful commissioning of the power project after forty five days of operability run without any interruption.	
70	Point a under table for progressive payment for Civil Cost	170	10 % of the quoted civil cost will be released after one year from the date of successful commissioning power project including forty five days operability run.	a) 10 % of the quoted civil cost will be released after one year from the date of successful commissioning power project including forty five days operability run.	

A.6.4.3 Technical details of Acoustic Enclosure:

- A) The acoustic enclosure should be of modular construction with the provision to assemble and disassemble easily at site. There should also be adequate provision/ space of taking out the equipment for maintenance / repairing jobs and reinstalling the same after necessary corrective action. Acoustically treated hinged doors on two sides will be provided for easy access for maintenance, repairs and operation. Special heat resistant neoprene rubber gaskets should be provided for better Acoustic/weather sealing
- B) The enclosure shall be not less than a 12 gauge cold rolled steel enclosure constructed with corner posts, uprights and headers. The roof shall aid in the runoff of water and include a drip edge. The weather- proof and corrosion resistant acoustic enclosure should be duly surface treated, phosphated and finally powder coated for long lasting finish. The sheet metal components should preferably be hot dip, seven tank pre-treated before powder coating with special pure polyester based powder.
- C) The sound proofing of the enclosure should be done with self extinguishing high quality rock wool / mineral wool conforming to IS 8183 (Rock wool: - Resin bonded slabs of minimum density 40 kg /cu. m.). The rock wool should be further covered with fiber glass tissue and perforated sheet. The silencer must be such that sound level is 75 dbA at 1 meter from the enclosure surface. Enclosure will conform to the noise control norms established by CPCB. Acoustic layers supported by suitable thickness perforated sheets should be riveted to the panels. Fire retardant Acoustic layers of adequate thickness of minimum 100 mm for maximum sound absorption should be provided. Special heat resistant neoprene rubber gaskets should be provided for better Acoustic sealing .
- D) Exhaust silencer shall be provided as per engine requirement and shall attenuate the sound to the level noted above. It shall be supplied with a flexible, seamless, stainless steel exhaust connection as well as with all internal pipe work. The exhaust silencer should be connected with the existing exhaust silencer of the engine and spares required for the same should be supplied with the enclosure. A rain cap will be supplied to terminate the exhaust pipe. These components must be properly sized to assure operation with minimum back pressure and sound when installed. The canopy should be finished in synthetic enamel paint incorporating rust inhibitors and aluminum sprayed silencers and spark arrestors to guarantee a superior and long lasting finish.

- E) There should be carefully designed inlet and outlet baffles / attenuators with corresponding weather louvers and bird mesh allowing sufficient air flow, for the set to operate even under the harshest ambient conditions whilst maintaining specified noise levels. Suitably sized blower should be incorporated to meet total air requirement.
- F) The temperature inside the enclosure should be suitable for human comfort.
- G) The enclosure should have the sufficient space in and around the generating set to facilitate maintenance and operation from all the sides and doors of the enclosures should be such that without any modification of engine foundation/ engine skid all the doors of the enclosures can be opened fully for maintenance activities. Mechanical hardware like locks, hinges, Handles, fasteners of reputed make etc should be provided .
- H) Generating set comprising of Engine, Alternator, and other auxiliaries should be housed inside the acoustic enclosure (approved by ARAI, Pune/ NPL, New Delhi/ NSTL, Visakapatnam / FCRI, Palghat / NAL, Bangalore) and the unit should be mounted on common base frame i.e skid. The set should have proper arrangement for easy loading /unloading to facilitate ease in transportation. Enclosure can be lifted with the help of lifting hooks from base.

4.0 ELECTRICAL PART OF ACOUSTIC ENCLOSURE

- i) Provision should be made in the acoustic enclosure to facilitate connection between control panel (outside of acoustic enclosure) and alternator and other components like lighting / blower of enclosure. The cables should be terminated using gland and tinned copper sweating sockets and run through guard pipe.
- ii). Separate circuit for a suitably sized blower and one tube light with proper switch shall be provided inside the enclosure. Power from the same should be provided from the control panel.
- iii) Connection from control panel to the alternator/blower/tube should be connected in such a way that genset and acoustic can be transferred separately.
- iv) . All the terminal boxes/Junction boxes etc, the battery and self starter connection terminals / and its components should be housed inside enclosure.

II . ENCLOSURE ILLUMINATION:

A separate circuit shall be provided for lighting. Power from the lighting circuit shall be taken from the incoming switch through back up HRC Fuse and neutral link of 16 amp rating. Enclosure should have 1 No. 160 W Tube Light well glass type luminaire suspended from enclosure top and wired with heavy duty PVC insulated and PVC sheathed armored, stranded copper cable. Light should be switched from individual 6 A, C curve, MCB mounted on switch panel cover mounted on the enclosure. 1 No. industrial type metallic plug socket of 20 A rating with 10 A SP MCB as Switch shall be provided which shall be mounted on the side of the enclosure and fed from lighting circuit fuse.

A 6.4.4 : Specification for overhead crane : *****

I. APPLICATION

- a. The subject crane is meant for the purpose of handling (within the lifting capacity of the crane) for lifting of equipments under the generating shed at Kumchai power plant
- b. The crane will be put to use for 365 Days' continuous duty
- c. The shop floor environment will be dust prone, humid, welding fume filled and ambient temperature going up to 35 deg C.

TECHNICAL SPECIFICATIONS:

(The dimensions/measurements given under section 4.01.00(v, vi, vii & viii) may not be accurate. Hence before submitting the offer the bidders may visit the OIL's site for obtaining all sizes/dimensional measurements pertaining to the crane specifications and based on which bidder can submit their offer.)

4.01.00 The crane shall be designed as per the given design parameters here under:

- i) Location : Kumchai power plant
- ii) Environment : 35 C & Indoor.
- iii) Safe working load : 1.5 times of the maximum block wt of the genset .
- iv) Class of crane as per IS: 3177 & IS 807
 - a) Structural & Mech. : Class II Duty.
 - b) Electrical : Class IV Duty.
- (Duty cycle for motor drive & mechanism for Hoist, LT & CT: 40%ED)
- v) Crane speed:
 - a) Hoist : variable
 - b) Cross travel : Variable
 - c) Long Travel : Variable

x) Design Testing & Inspection code : IS: 3177 & IS: 807

xi) Type of Drive:

- a) Hoist : Squirrel cage Induction motor and Reduction Gear Unit.
- b) Long Travel : ---- do-----
- c) Cross Travel: -----do-----

xii) The crane shall comply to relevant safety regulations under Factory Act & I.E. rules & other statutory regulations applied and the clearance enclosed.

xiii) The successful bidder shall be responsible for the material and workmanship of indigenous and imported equipment supplied by him including the shortcomings in the guaranteed qualities and performance.

xiv) All the drive shall have quick braking facilities.

4.02.00 Performance requirement, design and construction:

4.02.01 The crane shall meet the duty requirement and clearance dimensions as indicated under technical specifications.

4.02.02 All working parts shall be readily accessible for inspection, removal or repair and lubrication.

4.02.03 All materials used for the crane shall be tested for quality and conform to relevant codes and standards specified here after.

4.02.04 The components, plates, bars, angles and other steel section used as load carrying numbers shall be minimum 8mm thick.

4.02.05 The crane shall be designed for minimum head room above the highest hook position and closest approach of the hooks to each end stop.

4.03.00 Codes and Standards

4.03.01 The equipment to be supplied under the specification shall conform to the following codes and standards unless otherwise specified herein after.

4.03.02 The design, manufacture, erection and testing of the structural parts of cranes shall be as per the latest edition of IS: 807.

4.03.03 The mechanical, electrical, inspection and testing portions as related to design, manufacture, erection and testing of overhead travelling cranes shall be as per the latest edition of IS: 3177.

4.03.04 The drop forged steel hooks of standard shanks hook design shall conform to the latest edition of IS: 3815 or BS: 482 or equivalent.

4.03.05 Steel wire suspension ropes for hoist shall conform to the latest edition of IS: 2365.

4.04.00 Shafts

4.04.01 All shafts materials shall be of EN-24 grade.

4.05.00 Key & Key ways

4.05.01 All key material shall be of EN -8 grade.

4.06.00 Structural steel

4.06.01 The material of structural steel shall be as per the following standards unless otherwise specified:

a) All structural sections including bars: IS: 226

b) Plates up to 20mm thick : IS: 226

c) Plates above 20mm thick : IS:2062

d) Hand rail pipes : IS: 1239

4.06.02 No cast iron part, except for electrical equipment shall be used on the crane. No wood or other combustible material shall be used in any part of the hoist/crane. Deviations, if any, to this clause would be permitted only with the specific approval of the purchaser.

4.07.00 Design and Construction

4.07.01 Class of crane:

4.07.02 The class of crane shall be two (2) and the class of mechanism and electrical shall be four(4).

4.08.00 Bridge girder:

4.08.01 The crane bridge girders shall be welded plate box type construction. The bridge girder shall be suitable to resist the lateral loads for torsional forces and they shall be able to withstand the local bending stresses due to maximum wheel and their own weight.

4.09.00 End carriages:

4.09.01 End carriages shall be fabricated from rolled steel sections or plates, or both, welded together to form a solid box except for essential openings which shall be reinforced. If more than two wheels are required then bogies shall be provided or articulated end-carriages shall be used.

End carriages shall have ample strength to resist all stresses likely to be imposed on them under worst condition including collision with stops. The extreme ends of the end carriage shall be arranged to receive and support the bumpers. The length of the end carriages shall be such that no part of the crane projects beyond the fully compressed bumpers.

There shall be a heavy safety lug or strap across the bottom of each carriage near the track-wheel and 25mm above the top of rail to prevent excessive drop in-case of breakage of track wheel, axle or carriage.

These safety stops shall not interfere with removal of wheels.

The wheels base shall not be less than 1/5 of the span. One end carriages with more than two(2) wheels, the wheel base shall be taken as the distance between centreline of the two outside wheels.

End carriage shall be "L" type and so as to permit easy changing of the wheels.

Suitable jacking pads at a height of 300 mm from rail level shall be provided on each end carriage for changing the track wheels by jacking up the crane. Jacking pads shall not interfere with the replacement of track wheels.

4.10.00 ROPE DRUMS

4.10.01 Grooved rope drums shall be made of cast steel or fabricated from mild steel. Fabricated rope drums shall be stress relieved and grooves shall be of machined finished and shall as per IS: 3177.

The length of the rope drum shall be such that there would not be more than one layer of wire rope when the rope is in it's fully wound position. The drum length shall be sufficient to have not less than three (3) dead turns at each anchored end even when the hook is its lowest position and one spare groove for each rope lead when the hook is at its highest position. Each rope end shall be clamped with minimum two clamping wedges with at least numbers of bolts on each clamping arrangement.

The rope drum shall be mounted parallel to the runway rail.

4.11.0 HOIST ROPES

Flexible steel wire ropes 6 x 37 construction of best plough steel having tensile strength of 160- 170 kg/sq. mm shall be used. Left hand lay ropes shall be used unless absolutely necessary. Wire ropes shall be free from all defects like links, broken wire, crushed strands, etc. The factor of safety for wire ropes shall be as per IS 3177. Reverse bends shall be avoided as far as possible.

Where the load is supported by more than one fall of the rope, off the drum a bottom block complete with pulleys and guards are used.

The rope system shall be of equalizing sheaves or bars.

The bottom block and its guard shall be designed for maximum protection to operator's hand. Make of rope shall be any one of the following: USHA MARTIN, FORT WILLIAM or RA WIRE ROPE

4.12.0 ROPE SHEAVES

All sheaves shall be of cast or forged steel and grooves shall preferably be hardened and ground finished for getting increased rope life. All sheaves shall be identical; however exception may be made for equalizer sheaves. The equalizer sheaves/bar shall be arranged to turn and swivel in order to maintain rope alignment under all circumstances. Equalizer sheaves/ bar shall be mounted on roller bearings and not on ball bearings.

All sheaves shall have guards for rope. The guards shall fit close to the flange having clearance not more than 1/3 of rope diameter between the sheave and inside of the guard.

4.13.0 LOAD HOOK

Drop forged steel hooks of standard shank design shall be provided and it shall be duly load tested for 100% over load and shall be as per IS: 3815.

The hook shall be arranged to swivel on an anti-friction thrust bearing mounted on a trunnion.

4.13.1 Make of Hook:

Hook shall be any one of the followings: HERMAN MOHTTA, HERCULES, SILPA UDYOG, SMRITI FORGINGS or KARACHIWALA.

4.13.2 Load Cell:

A Load Weighing System with Load Cell to be fixed/provided at the Equalizer Pulley. The display shall be of 100MM size(JUMBO), Load Cell IPA or reputed make acceptable to OIL.

4.14.0 GEARING

Spur and helical gearing shall normally be used for all motions. High speed reduction shall be through helical gears. All gears shall be hardened and tempered by alloy or carbon steel with machine cut teeth. Gear teeth shall be preferably cut in metric module system. Surface hardening of teeth is not permissible and shall be as per IS: 4460.

All gear shall be completely covered and guarded by covers firmly attached to brackets. All the gears shall be enclosed in oil tight casing except where not possible. All gear shafts shall be supported on bearings mounted in gear box

unless specifically agreed upon otherwise. In case of totally enclosed gear boxes splash or automatic lubrication system shall be used.

The gear boxes shall be stress relieved. The gear boxes shall be provided with breather vents, oil level indicator dip stick and easily accessible drain plugs. Radial clearance between gear box inner surface and the outside diameter of the gear shall be at least 1.1/4 times the depth of the largest gear tooth inside the gear box or 20 mm whichever is higher. The facial clearance between the inner surface of the gear box and the face of the gear or pinion shall be at least 20 mm.

4.15.0 BEARINGS

Ball and roller antifriction bearing of SKF/NBC/ZKL shall be used throughout. Rated life of ball and roller bearings shall not be less than total life in working hours given under the class of crane. Life of bearing shall be calculated in accordance with manufacturer's recommendation. All bearing housings shall be made of cast or wrought steel.

Grouped grease lubrication system shall be provided for bearings wherever possible. Minimum internal diameter of grease pipes shall be 8 mm. All pipes work shall be securely fixed, protected from damage and accessible throughout.

4.16.0 BRAKES

The electro-hydraulic thruster operated brakes shall be designed to arrest the motion and hold safely the full load capacity of the hoist. The brakes for LT & CT motion shall be designed from the following consideration.

Braking against travelling shall be capable of arresting the motion within a distance in meters equal to 10% of the speed in M/min when travelling at rated speed with rated load.

Make of Thruster Brake shall be any one of the following: ELECTROMAG, SPEED-O-CONTROL, OMEGA or TECHNICAL SYSTEMS

4.17.0 DRIVE

(VVVF Drives of either ABB, SIEMENS, INDRAMET or MITSUBISHI. The drive rating selection shall take into consideration the crane duty and the possible overloading of cranes.)

A dual drive mechanism shall be provided for LT motion.

LT motion shall be imparted to the running wheels on both the end carriage preferably by centrally driven motor through reduction gear.

The CT mechanism shall consist of two pairs of wheels - one pair of which shall be driven by a motor through reduction gear or by geared motor.

Hoisting motion shall be driven by a motor through reduction gear.

4.18.0 WHEELS

Rail wheels for overhead travelling crane shall be double flanged with straight tread, unless guide rollers on sides to take up horizontal thrust are provided.

4.19.0 BUFFER

Spring loaded case or rubber buffers shall be fitted at 4 corners of the crane and also at the four ends of the bridge girders for soft dashing of crane and trolley respectively.

Buffers/stops shall be rigidly bolted in place such that the bolts are not in direct shear.

4.20.0 PLATFORM AND LADDER

Safe means of access shall be provided to every place where examination and maintenance works are required to be done by a person. Platforms shall be of chequered plates. It shall also give adequate facility for changing of rope for hoist.

4.21.0 GENERAL

Defects in materials, like fractures, cracks, blow holes, lamination pitting etc. are not allowed.

All bolts except those with nyloc shall be provided with grip locks nuts or spring washers.

Bolts in tension shall not be avoided as far as possible. Black bolts shall not be used for transmitting loads. High tensile bolts shall not be used unless approved by purchaser.

All welding shall be in accordance with the relevant Indian Standard codes. Transverse fillet welding on load carrying members shall be avoided.

Parts requiring replacement or inspection or lubrication shall be easily accessible. Inspection window with bolted covers, grease nipple etc. may be provided.

The crane shall be equipped with safety devices and clearances to comply with the recognized standards and purchaser's requirement.

Crane shall have a permanent inscription in English on each side, readily legible from the floor level, stating the safe working load in tones.

All the equipment under this specification shall be suitable for the typical dusty, moisturized and hot environment. The deflection test is to be conducted conforming to IS: 807.

After the satisfactory deflection test the crane is to be tested to an over load of 125% of the rated capacity conforming to IS: 807 & IS: 3177. OIL shall depute engineers at your worksite during the deflection/load/overload test.

5.00.0 ELECTRICALS

5.01.0 CONTROL(VVVF Drive for all motions)

For general guidance the selection of motors control shall be done on the following basis unless mentioned otherwise:

- a) All motors shall be provided with magnetic springs operated contactor control, with inherent under voltage protection. All motors shall have IP54 protection.
- b) Contactors used shall be of heavy duty mill-type design of SIEMENS or L & T make. Continuous ratings of contactors selected shall be a least 50% higher than the respective full load currents of motors at equivalent continuous ratings. The contactors & relay operating coils shall be rated for 110 volts A.C.
- c) All contactors control gear shall be metal-clad and so disposed that the contracts and terminals arrangements are readily accessible for inspection and maintenance purposes.
- d) Each Contactor shall be suitable for utilization AC 4 category.
- e) Each contactor shall be provided with required number of NO and NC contacts for inter locking.
- f) Each panel shall of protection IP54 and have SIEMENS or L&T contactors and shall be suitable for AC4 Duty class.(All electrical panels shall be provided with suitable illumination for visibility and trouble shooting.)

g)Electrical Design: All electrical elements shall be so selected that they withstand 25% overloading of the crane at any time of operation.

h)Master Controller Steps: A 5-Step Controller of suitable amperage and spring return type shall be provided for each of the Hoist, LT & CT motion.

i) Frequency Converter: The VVVF DRIVE shall be supplied with suitable DBR for all motions.

j) Suitable horn/hooter for LT motion of the crane

Install suitable hooter/horn for alerting personnel engaged in work under the workshop. The hooter should be continuous for the entire LT motion.

5.01.05 PENDENT PUSH BUTTON CONTROLS

The control shall be designed so that remote control may be effected by means of push button pendent switches. The release of push button shall immediately and automatically cause the brakes to function and stop the crane. For emergency stop, one no. power contactor of suitable rating shall be used. When this emergency stop switch is activated, all power of the crane should be cut-off.

Necessary trailing arrangement for using the pendant push button station from either side shall be provided.

Magnetic reversing type contactors shall be provided for the different motions and operated by momentary contact type push button shall return to off position as soon as fingers pressure is released by the operator. A separate button shall be provided for each speed of multi-speeds. Push buttons shall be shrouded except for emergency stop push-button which shall preferably have mushroom head. The reversing contactors shall be electrically & mechanically interlocked with each other. The control scheme adopted shall ensure smooth lowering/hoisting and travel.

The pendant push button control switches shall be adequately protected to prevent accidental contact with live parts of cross-wise or down shop leads & shall be capable of withstanding rough handling without being damaged. The covers shall be effectively secured.

An arrangement shall be made so that the crane can be operated by pendant push-button system from various positions across the width of operating floor.

The length and supporting arrangement of the electric cable of the pendant shall be such that the crane can be operated from any position across the width of the crane bay.

The weight of the pendant shall be supported independent of the electric cable by means of chain or wire rope. The pendant shall be effectively earthed. A chain or hook does not provide an effective earth connection and should not be relied upon for that purpose. Pendant control shall have locking facility to prevent unauthorized operation.

5.01.05 LIMIT SWITCHES

Limit switches shall be provided to prevent the crane hook from over hoisting and lowering. Similarly limit switch shall be provided to prevent over travel during cross and long travels.

The limit switches shall be totally enclosed type with properly designed actuators and shall be readily accessible for adjustment and repair. Limit switches shall conform to the requirement specified in IS- 3177.

All limit switches shall have IP54 protection.

Make of Limit Switch shall be any one of the following: Gravity type SIEMENS, INDUSTRIAL SYNDICATE, BCH, SKC or SOC

5.01.05 SQUIRREL CAGE INDUCTION MOTORS

The crane shall be equipped with motors of ample capacity for performing S-4 duties and speeds specified. All the motors shall be HIGH TORQUE CRANE squirrel cage induction motors of 40% CDF rating, 150 starts/hour, TEFC enclosure, class F insulation as per IS 325. Motor control by VVFD and shall be designed for operation at 415 volts($\pm 10\%$), 3 phase , 50($\pm 5\%$)Hz, AC supply and shall conform to latest version of IS: 325 & IS: 3177.

The breakdown torque of the motors shall not be less than 225 percent of full load torque at rated voltage and frequency.

The motor shall be strong and sturdy to withstand shock and vibration transmitted to them. The bearings shall have ample strength and shall be of the sleeve, roller or ball type sealed to prevent oil leakage and dust entry.

Motors shall be of suitable make conforming to the relevant standard. All motors shall conform to IEC frame size and preferred output ratings as per IS-325 and IS 1231, suitable for 300 starts per hour and should have IP-54 protection.

Each motor shall be designed to facilitate inspection, cleaning, replacement and repairs and shall operate through out its load and speed range without undue vibrations or noise. The motors shall be so located that their terminals are easily accessible for inspection and maintenance and normal ventilation is not restricted.

Motor insulation shall be of class - F. Motor shall be one hour rated with temperature rise in accordance with the stipulations of applicable standards for the class of insulation and enclosure used.

The motor shall be subjected to type and routine tests and the test reports shall be furnished.

MOTOR RATINGS(for Hoist, LT & CT drive): The motor shall be 6 pole, 40% CDF, S4 Duty squirrel Cage motor and suitable power rating

Make of Electric Motors shall be :BHARAT BIJLEE,SIEMENS,KEC or CROMPTON GREAVES.

5.01.04 The makes of the following items shall be as given here under:

- i) All Contactors: SIEMENS or L & T
- ii) Over-load Relays: SIEMENS or L&T(Thermal Type).
- iii) HRC Fuses: GEC, L&T or SIEMENS.
- iv) Rotary Limit Switch: SIEMENS, OMEGA, SOC or INDUSTRIA SYNDICATE
- v) Switch fuse unit: SIEMENS, L&T or GEC
- vi) Molded case C.B: SIEMENS, Schneider, L&T or LEGRAND
- vii) ON Delay Timer: Electronic type relay
- viii) Push - Buttons SIEMENS or L&T
- ix) Connectors: Only ELMAX make
- x) Couplings: WMI, FENNER or ALFEX
- xi) Cables: Reputed Makes & ISI Approved
- xii) Bridge Light Fittings: Philips, GE or CROMPTON
- xiii) Master controller: OMEGA, ELECTROMAG, SPEED-O-CONTROL, TECHNICAL SYSTEMS or SKC
- xiv) Other Elements Vendor to specify items & makes

5.01.05 CONTROL PANEL

Main isolating switch should be located at ground level. Additionally one isolating MCCB shall be mounted on the crane itself with the protective panel. An isolating MCB/MPCB(MPCB for Motor feeder) unit of suitable capacity shall be provided for each outgoing feeder. Electromagnetically operated contactor of adequate rating with inherent under voltage protection together with thermal overload element shall be provided for each motor circuit. The thermal overload shall be a hand reset element. A hand reset push button shall be provided on the panel for resetting. Earth leakage circuit breakers shall be used in every motor feeder in order to cut off power supply to the motor in case of earth leakage of the particular motor/feeder.

Control Power shall be of 110V AC. A 440V/110V suitable rating transformer shall be used for the purpose. Adequate protection against short circuit shall be provided. Power for the control circuit shall be taken through a suitably rated DP MCB at primary side and RCCB for secondary side for earth leakage protection. All the component of the control circuit shall be enclosed in a metal clad panel with hinged front and back cover for case of inspection and maintenance. The side cover shall have louvers and the panel shall be so located that the normal ventilation is not restricted.

All indication lamp shall be LED type.

5.01.06 TRAILING CABLE:

All the collector gears shall be easily accessible for maintenance purpose. For bridge (Cross Travel), only trailing cable not flexible copper conductor should be used.

The trailing cables shall have ample length and shall be supported by means of properly designed movable clamps. These clamps shall be fitted with rollers and shall run freely on a guide rail allowing relative movement of bridge and hoist unit without undue stress or wear on the suspended cables. Consideration shall be given to the inclusion of a minimum of two spare conductors or provision for the later additional conductors.

5.01.07 EARTHING:

The ground connection of individual equipment installed on the crane as well as the structure shall be bonded to maintain electrical continuity all -through as on the terminal boxes.

Earthing should be done as per relevant IS-3043 & IS-1966 specification (at least two separate earthing located at two different places shall be used for the equipment of voltage above 250V)

5.01.08 WIRING

All power and control cables shall be installed with adequate protection against mechanical damage and damage from weather. Where conduits or flexible tubes are used, their ends shall be screwed in adequately to prevent ingress of moisture. Alternatively, multicolor armoured power and control cables, suitably clamped, may be used. Suitable clamping gland should be provided at both ends of each multicore cable.

All power and control cables shall be tagged at both ends for quick identification.

The cable and wiring system for each motion shall be independent and common returns shall be avoided. Power cable and control wiring shall be effectively separated and connections shall be terminated to terminal box suitable for

outside connection with proper ferrule numbers. Wiring on Trolley and Bridge End shall be carried out without Junction Box.

Cables shall avoid locations where high temperature and mechanical damage are likely to be experienced under service conditions. Adequate precautions shall be taken to prevent ingress or collection of water or oil in any part of the conduit of trunking system.

The successful bidder shall furnish wiring diagram with proper terminal nos.

The successful bidder shall furnish and install all external and internal power, control and auxiliary circuits wiring of the electrical drives, accessories and panels.

All wires for Power, Control and Lighting shall be rated for 1100V grade. Control cables should be minimum 2.5 sq.mm copper and power cable should be minimum 6 sq.mm and above (as per load) Aluminum armoured PVC insulated and PVC sheathed cable. The cables shall conform to IS- 1554 (latest edition).

Structural members connected mechanically shall required bonding for providing necessary continuity as mentioned. From crane bridge structure or end carriage to the long travel wheels the continuity is formed through the wheels which is harmful to the bearings when fault current flows.

Equipment supplied with power by flexible cable shall be earthed by means of spare cores provided in the flexible cables.

LIGHTING

2 nos 500 w energy efficient lighting shall be provided on the bridge. Bulk head light fitting with dust proof covers shall be used.

Under slung light of suitable wattage on shock -absorbing anti-swing suspension shall be provided for uniform floor illumination.

CURRENT COLLECTION

Gun metal shoe type current collector shall be provided. The width of the collector shoe shall be sufficient to permit the permissible lateral movement of the crane.

5.01.09 NAME PLATE & IDENTIFICATION

Name plate shall be fixed on the crane showing the safe working load etc. as per the requirement of the factory act.

5.01.10 SPARE PARTS.

Bidder shall include spare parts required for the two (2) years trouble free operation of the crane in their offer. A complete list of such spare parts shall be furnished along with the offer.

6.00.0 INSPECTION AND TESTING

6.01.0 Materials used shall be of tested quality. Certificate shall be furnished for material of construction of all critical parts. Non-destructive testing shall be employed wherever applicable as per relevant Indian Codes and Standards.

6.02.00 The testing and inspection(pre-dispatch) shall be carried at suppliers work as per IS: 3177 , IS: 807 and IS: 325 with latest amendments and these should also meet the requirement of the Factories Act, of the state of Assam.

The following Schedule of Stage Inspections is to be strictly adhered to, prior to dispatch from the Supplier's works.

STAGE-I

- a. Verification of Test Certificate for Raw Materials used for Girders, End- Carriages, Trolleys, Gear box Casings, etc.
- b. Verification of X-Ray Report of Butt Joints coming in the Girders and Random Testing on the Welds, by physical examination.
- c. Box Girder setting before closing of the Bottom Flanges for inspecting the quality of welding and presence of waviness
- d. Trolley Frame Fabrication before setting the Mechanisms

STAGE-II

- a. Inspection of Bridges and End -Carriages with Wheel Assembly and Alignment checking.
- b. Verification of Span & Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment.
- c. Free running of all the Mechanisms

STAGE-III(Final Inspection)

- a. Measurement of CAMBER in the Bridges.
- b. Full / rated Load Test and Deflection Test.
- c. Deflection & Permanent Set Measurement.

d. 25% OVER-LOAD Lifting Ability Check.

6.02.01 OIL shall depute engineers for the stage-inspection at supplier/manufacturer's worksite which you have to intimate OIL at least 15 days in advance.

Every facility is to be obtained for OIL's inspection to witness the testing.

6.02.02 Load testing shall be carried out again at General Workshop at Duliajan during installation & commissioning by the supplier.

6.02.03 During the load testing, it shall be responsibility of the supplier to obtain fitness certificate of the crane for operation from Govt. authorised representative from the locality. The certificate of load testing/fitness of the crane has to be submitted to OIL along with the commissioning report.

7.00.0 SPECIAL CLEANING, PAINTING & PROTECTION

The crane shall be thoroughly cleaned, before application of paint. Two (2) coats of red oxide , zinc chromate primer 1.0 mil D.F.T. per coat followed by two(2) coat of semi gloss synthetic enamel of canary yellow shade 1.0 mil D.F.T. per coat. Black stripe shall be provided on the parts of the equipment that may cause hazard/obstruction on the parts of the equipment that may cause hazard/obstruction to working personnel / traffic of any kind.

8.00.0 PERFORMANCE GUARANTEE

The successful bidder shall be responsible for defective goods supplied by him including shortcomings of the guaranteed quality and performance as follows:

The successful bidder shall guarantee that the materials of construction and workmanship of all machinery and equipment supplied by him are as specified in the Technical requirement and wherever there are as nothing specifically mentioned in the Technical requirement shall correspond to the best available grade & quality.

The successful bidder also guarantee that the machinery and equipment under his scope of supply shall conform to the design parameters and standards wherever mentioned.

ANNEXURE III :

CIVIL & STRUCTURAL WORK:

The Scope of Work includes broadly land filling, grading, levelling, construction of buildings, foundations, sheds, boundary walls, oil water separator pits, cement matressing, hard standing, security hut along with watch towers, water supply system, internal and peripheral roads, concrete internal cum external drainage , walkways (1.5 meter wide), landscaping etc as per guidelines given below as well as parameters of Engineering design set by the successful bidder. All the drawing including design shall have to be approved by OIL.

1. Land filling, land development including grading & levelling, micro grading and land consolidation of the entire area of the proposed project site as marked in the attached drawing. The Finished Grade Level (FGL) of the proposed project site should be 186.309 meters above from mean sea level.
2. Design & construction of foundations for all facilities & equipments.
3. Design & construction of industrial sheds for all facilities & equipments. All sheds shall be RCC/Steel framed structure.

The size of the generating shed should be designed to place all the generating sets inside the shed. The Gap between the generating sets should be sufficient (minimum 3 meters) to manoeuvre for working around the individual Generating Sets. The length of the shed should also be sufficient to prevent rain water from entering the shed. The generating shed will be equipped with an overhead crane facility as described in the tender document. In case the generating sheds are placed inside a building than the building should be equipped with an overhead crane facility as described in the tender document. The building should be designed accordingly. In this case the building should be acoustically enclosed.

The capacity of the Plant shall be upgraded to atleast 10 MW in near future; therefore the Generating Shed should also have a provision for expansion.

4. Design & construction of a suitable RCC building.
5. Surface preparation including cement matressing, hard standing in and around all the industrial sheds, fire pump station, security control room, approach to watch towers, around the over ground Fire fighting tanks, approach to high mast lights and around fire hydrant points etc.
6. Detailed planning & construction of 4.5 meters wide approach, internal and peripheral road networks above the proposed FGL within the plant boundary.
7. Design & construction of Security watch towers (4 nos) with spiral staircase as per the tentative OIL drawings (OIL drg. 9641 & 9642 supplied herewith) including design & construction of one no. security control room. Additionally aluminium framed, sliding type glass windows along with one no. of door to be provided in the open space of the watch towers.
8. Design & construction of Boundary wall surrounding the proposed land as marked in the plot plan attached herewith as per the tentative OIL drawing(OIL drg. 8658 supplied herewith) along with 2 nos. of iron gates of minimum 5 meter width along with wicket gates, considering wind pr. 200 kg/sq. cm and category of industries as A type. Additionally, Concertina coil to be provided on the top of the wall in the middle of Y steel structure. The space or gap between the two consecutive wire of the Concertina coil should not be more than 5cm after installation.
9. Detailed design and implementation of Potable & industrial water supply system along with sanitary plumbing system.
10. Planning, design and construction of an integrated concrete drainage system (for storm & process water) within plant boundary. The proposed concrete drain will be of proper slope along the peripheral road will be connected to the natural drain outside the proposed plant battery limit. Oil water separators (2 nos.) of sufficient size to be designed and constructed within the proposed project site on the outlet of the drains just before leaving the boundary wall.
11. Construction of RCC culverts of suitable size as per sound industry norms, wherever required.
12. Design & construction of fittings & fixtures as per requirement of electrical items of works.

13. Economical planning of layout of all the facilities of the power plant considering serviceability, utility and safety are within the scope of this tender (to be submitted within 15 days from LOA).

14. Creation of a 10 feet wide green belt around the perimeter of the power plant.

15. Miscellaneous civil works like pitching with turfing to protect the slopes of all earthen embankments including roads, providing walk ways wherever required, writing name / sign boards for all the structures and tanks, signs/ markings, safety slogans(sizes and colour code will be provided by OIL), dismantling / demolishing of unwanted structures, diversion of channels/ drains as suggested by OIL.

16. Any other civil/ structural works that may emerge during detailed engineering/ construction phase of work are within the scope of this tender.

BROAD GUIDELINES FOR CIVIL & STRUCTURAL WORK:

A. Detailed Planning & design of all civil works shall be done as per relevant IS codes applicable for the site & area of the plant. Architectural, detailed structural and working drawings for the purpose of construction; detailed drawings for internal/external electrification & plumbing; detailed planning of internal roads, drains & landscaping shall be submitted by the contractor for OILs approval prior to execution (to be submitted within 15 days from LOA).

B. Structures, facility supports, painting etc.:

1. Wind Load:

Design of structures & buildings for wind load shall be as per relevant IS & other codes.

2. Seismic Load:

Design of structures for seismic load shall be as per IS: 1893 part I 2004.

3. Soil Data:

Bearing capacity of soil shall be considered as per Geo-technical report of Soil Investigation already furnished.

4. Design and construction of pile foundations if required shall be carried out as per relevant IS & other codes.

5. Minimum depth of foundation for all structures shall be from the Finished Grade Level (FGL) where cutting has been done and shall be from the Natural Grade Level (NGL) where filling has been done at respective location, for achieving the required FGL.
6. The effect of ground water table shall be duly considered while designing the structures.
7. Minimum grade of concrete used for various types of structures, shall be M20.
8. Finished floor level should be 450mm above the Finish Grade Level (FGL) which is 186.309 meters above from mean sea level.
9. The cement to be used shall be Ordinary Portland Cement (OPC) conforming to IS:269 or Portland slag cement conforming to IS:455.
10. Usage of in-house developed software packages shall not be permitted. Only STAAD-III/ STAAD PRO or any other standard software shall be used for analysis and design of the structures.
11. All bricks shall be kiln burnt of class designation 75.
12. All steel structures etc. will be constructed & fabricated in accordance with relevant IS codes.
13. All structures shall be thoroughly cleaned of all dirt, grease, rust and mill scale as per IS: 1477 (Part-I) - 1971. Removal of rust and scale shall be preferably by power driven wire brushes. Areas, which become inaccessible after assembly, shall be painted before assembly after cleaning the surfaces as described above. The surfaces shall be perfectly dry before painting. Wherever shop primer painting is damaged, the surfaces shall be thoroughly cleaned and touched up with the corresponding primer. Site painting shall not be done in frosty or foggy weather or when humidity is such as to cause condensation on the surface to be painted. Unless otherwise specified, all structures shall be painted with one coat of red oxide zinc chromate conforming to IS: 2074-1979 as primer to be applied at shop. For all structure second coat of primer shall be applied at site after erection. All structures shall be given two coats of finishing paints of approved quality and colour over primer. The under coat shall have different tint to distinguish from the finishing coats.
14. A note shall be mentioned in all the relevant drawings, clearly specifying that the foundations and supporting structures have been designed considering the Hydro-test weight of the Vessels/Facilities / Equipment.

15. All CGI sheet should be Dyna roofing. However, materials have to be approved by OIL. Documentary evidence of procurement must be furnished before erection of sheet.

16. Overhead tanks shall rest on independent staging with proper design and to be approved by OIL.

C. Equipment foundations:

RCC foundations for vibrating equipment e.g. Gensets, engines, pumps shall satisfy the following requirements:

1. The minimum grade of concrete to be used shall be M20.
2. Minimum reinforcement as per requirements of IS: 2974 shall be provided unless required otherwise by design.
3. The soil stress below foundations under dead loads shall not exceed 80% of the allowable soil bearing capacity for static loading.
4. Foundations shall be so designed that natural frequency of the foundation system shall not resonate with the following:
 - Operating speed of the motor / engine
 - 2 x operating speed of the motor / engine
 - Critical speed of the motor (for centrifugal pumps).
5. Natural frequency of the foundations shall preferably be +/- 20% away from the above mentioned frequencies. However, amplitudes of vibration of the foundation block shall always be checked to be within permissible limits.
6. Amplitudes of vibration shall be less than values specified by the equipment manufacturer. If not specified, provisions of IS: 2974 shall be followed.
7. The foundation and its superstructure shall be separated from adjacent foundations and platforms. Clear air gap shall be provided in superstructure to avoid transmission of vibrations to adjacent structures. Special note shall be given on the drawing in this respect and suitable details shall be shown as required.
8. Foundations shall not rest on previously back-filled or sensitive soils.

9. When several foundations for similar equipment need to be seated on a common raft, the computation for vibration shall proceed assuming that each machine foundation is independent of others by breaking up the raft into sections corresponding to separate foundations. The design value for the permissible amplitude of vibrations may be increased by 30 percent.

D. Building and Structures:

A suitable building capable of housing the Control Room (Insulated Glass panel facing the Gen-Sets), aesthetically designed Engineer's office including separate room for OIL representative, Conference room for at least 20 persons, Staff room, Store room, HT & LT switchgear room and UPS room, Canteen, Work-shop, lavatory with modern amenities (separate for gents & ladies) etc. should be provided. The Control room, Engineers office and Conference room must be air-conditioned.

The Building shall be designed as per the provision of relevant IS Codes. Earth quake and wind load to be considered as per the provisions of IS codes including IS: 1893, IS: 875, IS: 13920, IS: 4326.

In addition to this design & construction of industrial sheds for all facilities & equipments are to be done by the contractor. Floor shall be normal CC floor with plastering in case of all industrial sheds.

E. Boundary wall:

Design, supply of all materials, construction of Boundary wall surrounding the plot along the periphery as per the tentative OIL drawing(OIL drg. 8658 supplied herewith) considering wind pr. 200 kg/sq. cm and category of industries as A type. Additionally, Concertina coil to be provided on the top of the wall in the middle of Y steel structure. The space or gap between the two consecutive wires of the Concertina coil should not be more than 3cm after installation. The boundary walls must be plastered on both the sides with 15 mm thick 1:5 cement mortar. Both sides of the boundary wall also shall be painted with two coats of weather shield exterior acrylic emulsion paint over one coat primer. The height of the wall as shown in the tentative drawing supplied herewith must be considered from the proposed FGL of the plant (i.e. 186.309 meters above from mean sea level .The FGL outside of the proposed boundary wall also should be 186.309 meters upto the ladder drain to neutralize the earth pressure from inside to the boundary wall.

F. Civil Finishing Work:

1. All the exposed surface of the RCC work viz. column, beam, slab, terrace (chhajja) etc. shall be plastered with 6 mm thick 1:4 cement mortar.

2. All the internal brick work shall be plastered with 15 mm thick 1:5 cement mortar.
3. All the external brick work shall be plastered with 20 mm thick 1:5 cement mortar.
4. Rolling shutters, wherever required, shall be used 18 SWG rolling shutter with adequate locking arrangement.
5. Steel/Aluminium window shall be provided as per IS specification.
6. Standard steel/ decorative flush doors shall be provided to meet the specific requirement.
7. All internal plastered surfaces shall be distempered with oil-bound distempers (two coats) on top of priming coat with cement primer. Before distempering, surfaces shall be smoothed with plaster of Paris.
8. All external plastered surfaces shall be painted with two coats weather coating applying weather shield exterior acrylic emulsion paint over one coat primer.
9. All steel & wooden surfaces shall be painted with two coats of synthetic enamel paint over a coat of primer.
10. Floors of buildings for OIL representative, Plant Management Control Room, Administrative building and conference room shall be of marble tiles.
11. All toilet block shall be fitted with modern good quality fittings. Floor shall be covered with good quality ceramic tiles and wall shall be fitted with good quality glazed tiles.
12. Certificates for quality assurance for all building materials utilized shall be furnished from appropriate authorities.

G. Site Grading:

1. Actual site grading layout shall be developed by the contractor based on the levelling philosophy. Site grading shall also include micro grading after erection/construction of equipments and structures. All the trees, tree roots and vegetation etc. shall be grubbed up and removed from the site. However, all benchmarks established by OIL, if any, shall be protected. All statutory requirements shall be complied before clearing the vegetation/trees. All the unwanted existing structures, if any, shall also be dismantled / demolished.

2. The borrow earth for filling up of the proposed site shall be arranged by the contractor anywhere outside the terminal limits at his own cost. The right of way, cost of royalties etc. for the borrow areas shall be taken care of by the contractor himself. The contractor shall furnish the characteristics of the good earth to be utilized for filling and the location of the borrow areas for OILs review and approval. Quality and characteristic of soil shall be as per standard specification.

3. All unpaved open areas shall be suitably graded and sloped towards the drains. Grading the area shall be done by cutting and filling based on the relevant survey details, indicative layout and the levelling philosophy.

4. Cutting area:

Thoroughly rolled and compacted as per standard practice.

5. Filling area:

Compacted in layers not exceeding 30 cm doosey to achieve minimum 90% of max. laboratory dry density as per IS: 2720.

6. Grading shall be done with the following slopes:

General site grading:

I) 1 in 500 - In the areas where facilities are located

II) 1 in 1600 - Open area.

III) 1 in 200 - During micro-grading

7. The slope of earth beyond the grading plant shall be 1.5 (H): 1 (V). The Finish Grade Level (FGL) which is 186.309 meters above from mean sea level.

H. Roads, shoulders & site finish and Pavements:

1. Roads shall be provided as per the approved general arrangement and at other places wherever required for movement of vehicles, access of trucks/tenders, approach to storage, plant and loading gantry areas and various units/facilities, unloading area, product movement etc. The road layout shall be developed indicating the road top levels, road width etc. keeping in view heavy vehicle forward/backward movement and placement. The carriageway width of all the roads shall be 4.5 M. The roadway width shall be 6.5 M which includes side berm of 1M width on either side.

2. Specifications of roads shall be

- 150 mm thick granular materials (compacted)
- 150 mm thick W.B.M. with 65 mm graded broken stone (compacted)
- 40 mm thick bituminous surface with 25 mm down graded broken stone.

3. Roads shall be designed considering the following required:

- Camber 1 in 50
- Radius of Curve 12 meters wherever possible.
- Ruling gradient 1:30

4. Road cross-sections shall be designed based on the maximum load envisaged and based on the filled up soil. Characteristics and the design calculations shall be furnished for review and approval by OIL. The sides of the road embankments shall have either brick pitching with cement mortar or turfing as per directive of OIL representatives.

5. RCC/CC/Bituminous pavements shall be provided wherever required within the proposed plant area to make the proposed plant operational friendly to the satisfaction of OIL. RCC pavements shall be in panels of 150 mm thick of grade M20 concrete. If demanded ramp on both sides for entry and exit should be provided.

I. Storm Water Drainage:

Storm water drainage system in the proposed plant shall consist of a well designed open surface drain network so that all the storm water from the plant is efficiently drained off without any water logging. The storm water drainage shall be designed for uncontaminated surface water runoff. The pavement in the unit/ equipment area shall be suitably sloped towards drain for collection of rainwater in the drains around the equipment area. The entire storm water network shall be so designed to discharge the entire storm water of the plant to the nearby drain/nallah running outside the plant area. The bed level of the drain at the disposal point from the terminal shall be fixed such so that there is no back flow from main drain.

J. Ditches & drains:

Contractor shall select various types of ditches in the plant so as to have an economical ditch layout, based on the guidelines given below. Drains shall be provided along the roadside. In any block normally three sides should have rectangular drain and one side trapezoidal main drain. Secondary drains if required shall also be provided and connected to the main drain along the roadside. The drains shall be covered with suitable cover/grating wherever required for safety/statutory or operational requirement.

Construction:

- Rectangular Ditches: Brick masonry with cement plaster/ RCC M15
- Trapezoidal: PCC M15/RCC M15 in Cement mortar

Design of drain shall be done as per Manning's formula

- Minimum velocity in ditch: 0.6 m/Sec.
- Maximum velocity in ditch: 2.5 m/Sec.
- Minimum depth : 300 mm
- Minimum rectangular drain width: 300 mm
- Main rectangular drain width : 500 mm
- Main Trapezoidal drains Top width(min) : 750 mm
- Bottom width(min.): 500 mm

Slopes

- Trapezoidal drains : 1:1000 min
- Rectangular drain : 1:500 min

K. Culverts:

Storm water drains, pipes, cables etc. shall cross the road by suitable RCC pipe culverts or RCC box culverts. Selection of the type of culverts shall be carried out by the Contractor. Material of construction of culverts shall be as below:

Pipe culverts: RCC pipe class NP3 as per IS: 458 enclosed in PCC/ RCC as per strength requirement (Min. size - 350 MM)

Box Culverts: RCC construction (Min. M20)

Contractor shall furnish the design calculations for the storm water drainage. While furnishing the layout of storm water drainage, contractor shall also furnish the flow diagram for indicating the flow in drains, culverts etc. Excess serviceable/unserviceable material after utilizing the above stated work shall be disposed off by the contractor to locations outside the terminal battery limits after obtaining all necessary approvals from Govt. /Local authorities.

L. Electrical / Instrumentation Trenches, Cables and Road Crossings:

The contractor shall identify the requirement of

- RCC cable trenches to be provided in the plant area.

- Buried/brick masonry, cable trenches.
- Cable crossing at roads.

RCC/brick masonry cable trenches shall be with pre-cast cover designed to sustain the maximum load envisaged. Buried cable trenches shall be constructed as per sound Industrial practice/standards. At crossings, electrical trenches shall be constructed below the instrumental trenches wherever, storm water drains crossing (if unavoidable) cabling has to be taken preferably above the drain with suitable arrangement/over cable tray. Cable crossing at roads shall be with group of RCC pipes (minimum dia 150 mm class NP-2 conforming to IS: 458 encased with PCC M15). Clear cover over top of crossing to FGL shall be 600 mm. In case of less cover RCC encasement shall be provided.

M. Electrical Cable Trenches:

These shall be made in RCC leak proof type construction, with precast covers adequately designed against loads as envisaged at respective location, suitable provisions shall be kept for insert, sleeves, slope etc. Entry and exit points shall be sealed to prevent rodent and animal entry.

N. Oil / water separators:

2 nos. of Oil / water separators with proper design as per sound industry practice at the outlet of the ladder drains within the proposed plant limit as advised by Pollution Control Board of Assam.

O. Construction Facilities:

The following construction facilities are to be arranged by the Contractor during the construction of the plant:

Construction Water: During Construction the water required for construction purposes and also for domestic consumption shall be organized by the bidder.

Construction Power: During construction activities at site, power supply at 415V and 240 V have to be organized by the bidder.

Temporary facility will be used for construction stores/offices and will be constructed by Bidder. In general all the requisite including manpower and materials required during the construction of the plant are to be arranged by the Contractor at his own cost. The security of the man and equipments including Company's material if any deployed during the construction phase of the plant shall be Contractor's responsibilities. The accommodation of the manpower deployed during the construction phase of the plant shall be arranged by the Contractor at his own cost.

P. Quality Control:

In order to ensure that the power plant is completed in time and performs at the expected level throughout its operating life, adherence to a high standard of quality will be ensured during all phases of project execution from the initial design stage till commissioning and take over. All necessary features required for trouble free operation and convenience of maintenance would be taken into account at the initial stages itself in the respective Contractor's basic engineering, detailed designs and drawings. During the engineering stage, the Contractor's design and drawings will be checked by the Owner's Engineer in order to ensure compliance with the specified quality requirements and good engineering practice. The Contractor will also be required to submit an overall quality plan covering specified quality requirements, manufacturer's standard quality assurance procedures and statutory requirements. Separate quality plans will be finalised with the respective Contractor for both shop manufacturing activities and site activities.

In order to physically ensure that the quality of equipment and systems supplied to the project are as per the approved quality plans, critical items of plant will be inspected by the Owner's Engineer both at the manufacturing stage (stage inspection) and at the time of final shop performance tests, where applicable. For other items, the suppliers will be required to submit shop test certificates, which will be reviewed by the Owner's Engineer to ensure compliance with stipulated technical requirements.

All site works will be subjected to quality surveillance in order to ensure high standard of quality of the complete power plant. The quality control measures proposed to be adopted by the Owner's Engineer would include:

- Establishing procedures for quality control including non-destructive testing requirements at site, monitoring and ensuring quality assurance of site works.
- Ensuring adherence to codes governing site work.
- Ensuring that the materials used for site works comply with the required technical specifications and that they have undergone the requisite shop tests and have been found fit for use.
- Overseeing the respective Contractor's work in ensuring that the plant is constructed/ erected design alignments and grades are in accordance with the drawings and specifications.
- Approving corrective actions taken by the respective Contractor in case any of the works are not in accordance with approved designs and specifications.
- Ensuring modifications, design, construction erection procedures required to be changed due to unforeseen conditions at site, are resolved expeditiously with the respective Contractor by sound technical solutions.

Note:

- **The following are also uploaded as a part of this addendum:**
 - i) Annexure-IV KUMCHAI SOIL REPORT**
 - ii) Annexure-V DRG NO.8658,3600 HEIGHT BRICK BOUNDARY WALL WITH 700 MM OVERHANG FOR INDUSTRIAL PURPOSE**
 - iii) Annexure-VI DRG NO.9641,SECURITY WATCH TOWER --- GENERAL ARRANGEMENT**
 - iv) Annexure-VII DRG NO.9642,SECURITY WATCH TOWER --- DETAIL OF STAIRCASE & ROOF SLAB**
 - v) Annexure-VIII Drg no.9984(Plot Plan)**
 - vi) Annexure-IX drawing no. 9984 (contour map)**