

ESP-001 - 2A Rev.00		<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b> Technical specification for Pre-bid Tie-up		Std. / Doc. Number	
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	<b>Revisions:</b> Refer to record of revisions	<b>Prepared by :</b>	<b>Checked by :</b>	<b>Approved by :</b>	<b>Date :</b> 12.06.2021



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### 1.0.0 INTRODUCTION

Indian Oil Corporation Limited (IOCL) is a flagship national oil company meeting India's energy needs for over half a century. IOCL's business interests straddle the entire hydrocarbon value-chain – from refining, pipeline transportation and marketing of petroleum products to exploration & production of crude oil & gas, marketing of natural gas and petrochemicals, besides forays into alternative energy and globalization of downstream operations. IOCL operates 15 million metric tons per annum (MMTPA) refinery at Panipat in state of Haryana. To meet IOCL's commitment sustainable development to maximize the reuse of treated effluent and reduce its fresh water consumption, Panipat refinery is intended to recover the maximum water recovery from existing RO reject by installation of MEE plant including filtration system, RO plant and multi effect evaporator. This specification is issued for placement of order for supply, erection, construction, testing, commissioning, demonstration of performance guarantee test for the "Evaporator section and salt handling" plant complete with necessary electrics, instrumentation, automation and communication, etc. to complete the work in all respect.

BHEL intends to participate as a "Turnkey Contractor" in the above tender.

As per Tender requirement by M/s IOCL, turnkey contractor (here BHEL) shall submit a "Technology Tie-up Agreement" in prescribed format with qualified MEES along with BHEL's Techno-commercial bid for evaluation by IOCL.

### 1.1.0 INTENT OF SPECIFICATION:

BHEL is in the process of identifying "Qualified MEE System Supplier (MEES)" to enter in to a Tie-up Agreement, which shall be part of BHEL's bid to IOCL. BHEL will place an order on selected "MEE System Supplier (MEES)", in case BHEL adjudged as successful EPC Bidder and awarded the "Project" by IOCL. This "AGREEMENT" should be valid up to the completion period of BHEL for the plant as per contractual agreement with M/s IOCL.

The intent of this specification is to elaborate the scope of "MEES" for the proposed 30 m<sup>3</sup>/hr ZLD system for the ETP. The Prospective MEES will undertake that the ZLD technology shall conform to all technical specification requirements set forth in the tender attached and further agrees to abide by with the execution schedule.

In the event, BHEL is declared as successful EPC Bidder and awarded the "Project", the MEES shall be responsible for design, engineering, supply, erection, testing, pre-commissioning, commissioning, trial runs, sustained load test after commissioning and performance guarantee test run for 72 hrs. continuous operation, guaranteeing and handing over, all on turnkey basis as required & complete in all respect and demonstration of guarantees, calibration, spares & maintenance tools etc. for ZLD system of the said project.

BHEL is looking for a prospective ZLD System Supplier (MEES) qualified as per the requirements specified in this Technical Specification.

This specification specifies the requirement of Design, Engineering, Manufacturing, Assembling, Inspection, Testing at manufacturer's works and Delivery of properly packed and painted Zero Liquid Discharge (ZLD) system with all accessories as specified in the scope of work and as required for the safe and trouble-free operation of equipment to be installed at site.



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**2.0.0 SPECIAL NOTES TO BIDDERS:****LEGEND**

IOCL	Indian Oil Corporation Ltd.
BHEL	Bharat Heavy Electricals Limited
PE&SD	Project Engineering & Systems Division, Hyderabad, unit of BHEL
BQC	Bidder Qualification Criteria
PO	Purchase Order
LOI	Letter of Intent
Contractor	EPC Contractor
<b>MEES</b>	Qualified MEE (ZLD) System Supplier

**2.0.1** This specification shall read in conjunction with its enclosures. In case of any discrepancy arising between this specification & its enclosures, the most stringent of all shall be followed and shall over-ride others. Further, if a requirement in this specification or its enclosures, calls for decision of BHEL, it shall be bidder's sole responsibility to clearly bring out the same distinctively in his technical tender offer, to enable BHEL to furnish their decision. If such a requirement is not duly addressed by bidder during tender stage and same comes out during order execution stage, it shall be binding on the bidder to comply with the decision furnished by BHEL then, without any cost, delivery, or any other commercial implications.

- a) Bidders shall comply with various requirements of this specification. Bidders can bring out only those deviations, which are impractical to meet, for BHEL review.
- b) Bidders may please note that unless the deviations are specifically brought out under deviations clause, it will be considered that no deviations are taken, even if they are mentioned elsewhere directly/indirectly in the offer.

**2.0.2** Any additional equipment, material, etc., which are not specifically mentioned here, but are required to make the supplied equipment complete in all respect, in accordance with the intent of this technical specification, contractual agreement, statutory requirements, relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be covered under the scope of this specification.

**2.0.3** The Bidder shall accept full responsibility for the completeness and for the faultless working of all the equipment. These shall be executed on the basis of proven design principle and in accordance with the latest state of the art in such a manner that the purpose to be served by the equipment is fulfilled in every respect and a maximum of operational dependability and efficiency are assured. Standardization of equipment, materials etc. shall be employed in the design. Care shall be taken to ensure safe operation as well as simplicity of assembling and dismantling of all parts of the plant.

**2.0.4** Bidder shall quote strictly as per the scope of supply and requirements of this specification. Unsolicited or Alternate offers from the bidders will not be entertained.

**2.0.5** In case bidder feels that it is necessary to exclude some components of scope of supply or some of the features of specification requirements due to any technical constraints, bidder shall bring the same to the notice of purchaser during pre-bid stage and take their prior approval before submission of their bid.

**2.0.6** In case Bidder is unable to offer due to any specific requirement of specification, Bidder shall bring out the same in their regret letter. Otherwise, it will be considered that non-participation by the bidder is attributable to reasons other than any specification requirements.



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### 3.0 BIDDER QUALIFICATION CRITERIA

- 3.1 The Bidder shall have experience in design/engineering, supply, installation/supervision of installation and commissioning of at least one Multiple Effect Evaporator (MEE) Plant having capacity not less than **9 Cum/hr (180 Cum/day)** in any industry and having RO Reject as feed, during any of the last ten years ending on the last date of month immediately previous to the month in which the last date of submission of bids (in case of extended bid submission date, original bid submission date shall be considered) falls. The above Multiple Effect Evaporator (MEE) Plant shall have been in satisfactory operation for at least one year as on date of bid submission. The Unit(s) as referred at 3.1 above must have been commissioned within the last 10 years ending on last day of the month immediately previous to the month in which last date of bid submission falls (in case of extended bid submission date, original bid submission date shall be considered).

The units referred at 3.1 should also have been in operation for at least 1 (one) year after commissioning.

Copy of Detailed Letter of Acceptance (DLOA) / Work Order /relevant extract of work Order/ Contract Agreement along with Detailed scope of work and Completion / Acceptance Certificate reckoned from date of Acceptance / Commissioning of Plant. Further, a certificate in respect of minimum one year successful operation of the Plant issued by the Owner/End user shall also be submitted.

#### Financial Criteria

- 3.3.1 The average annual turnover of the MEES, in the preceding three (3) financial years as on the date of techno-commercial bid opening, should not be less than the **INR 15 Crores** (Rupees Fifteen Crores Only) or in equivalent foreign currency.
- 3.3.2 Audited financial statement have to be submitted for all the five years as indicated against clause above. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by chartered accountant. Published Annual Report available in the public domain shall also be acceptable.
- 3.3.3 In case audited Financial statements have not been submitted any of five years as indicated above, then the applicable audited statements submitted by bidders against the requisite three years, will be averaged for five years i.e. total divided by five.
- 3.3.4 MEES shall not be under Holiday List/ Negative List/ Suspension List/ Banning List of IOCL, BHEL.

### 4.0 DOCUMENTATION

- 4.1 Multiple Effect Evaporator (MEE) system supplier to furnish the following documentary proof for meeting the above technical qualification criteria mentioned in Sl. no. 3.1:
- Copy of relevant pages of work orders(s)/contract agreements(s)/contract documents(s) mentioning the scope of work for the reference item submitted for qualification.
  - Completion Certificates by Owner/ Owner's Consultant/Main Contractor for the reference item submitted for qualification.
  - Commissioning certificate of the plant issued by the Owner/Owner's Consultant/Main Contractor certifying that the supplied plant has been successfully commissioned.



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d) Certificate(s)/communication from Owner(s)/Owner's Consultant/Main Contractor, for having completed 1 year of operation after commissioning of the reference Plant submitted for qualification. If the bidder is not able to submit the certificate(s)/communication from the Owner(s)/Owner's Consultant/Main Contractor, then following additional documents shall also be considered for proof of satisfactory operation for at least 1 (one) year after commissioning, along with the Bid.

- Certificate of Release of full & final Security Deposit (Bank Guarantee) by Client against the defect liability period.

OR


- Certificate of Completion of Performance Guarantee and Test run (PGTR) with completion date at least 1 year prior to bid submission.

OR

- For reference job of IOCL in support of successful operation of one year, if the bidder does not have certificate for successful operation of one year, then the qualification of the reference job order submitted by the bidder for the tender will be checked internally by IOCL based on the information submitted with the bid. If certified internally by IOCL that the submitted work order qualifies successfully for one year satisfactory operation, then same shall be acceptable.

For establishing the Technical PQC credentials of Mechanical Completion, Commissioning, PGTR and one year successful Plant/unit operation post commissioning, a single certificate from the client mentioning all the details of Mechanical Completion, Commissioning, PGTR and one year successful operation since commissioning as well as executed work value will also be considered.

- 4.2 A job executed by a MEES for its own plant/ projects cannot be considered as experience for the purpose of meeting requirement of BQC of the Bidding Document. However, jobs executed for Subsidiary/ Fellow subsidiary /Holding company will be considered as experience for the purpose of meeting BQC subject to submission of tax paid invoice(s) duly certified by Statutory Auditor of the bidder towards payments of statutory tax in support of the job executed. Such bidders shall submit these documents over and above the other required documents under the various Clauses of BQC

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## 5.0 TERMS OF CONTRACT

- 5.1 MEES shall extensively use latest design software including 3D Modeling with PDS/PDMS software.
- 5.2 BHEL may depute its Engineers to office/factory of MEES to expedite design, supplies of the MEES
- 5.3 After start of construction, MEES shall position at work site a field engineering team essentially consisting of General Civil, Piping & Structures initially and followed by Electrical and Instrumentation, who have been involved in carrying out the design at the design office in order to closely coordinate with site construction group to resolve any issues related to design/ construction and provide additional drawings/ documents as required.
- 5.4 MEES shall note and comply to the applicable clauses in GCC/SCC of BHEL' s NIT and IOCL's Tender Specification.

## 6.0 BID EVALUATION CRITERIA

- 6.1 The bidders are expected to meet the Bidder Qualification Criteria as detailed earlier in this specification (ref cl 3.0). The same shall be evaluated during technical bid scrutiny. The offers made by the bidders not meeting the BQC are liable for rejection.
- 6.2 The bid evaluation shall be on lowest value arrived among all the quoted bidders as per the data filled by bidders in Price Bid Format. Quotations submitted in partial will be summarily rejected. BHEL will not entertain any other expenses/ assumptions written separately elsewhere other than those specified in the price bid format.
- 6.3 The Price Factors shall be binding on the Bidders. No deviation shall be permitted.
- 6.4 Successful Bidder shall be awarded the LOI for Pre-Bid Tie-up. Subsequently PO for Gas Engines will be awarded to Successful bidder if BHEL bags the order as EPC contractor.
- 6.5 MEES shall note and comply to the applicable clauses in GCC/SCC of BHEL' s NIT and IOCL's Tender Specification.

## 7.0 DELIVERABLES TO BE SUBMITTED DURING PRE-BID AND POST BID STAGE

- 7.1 Deleted
- 7.2 For deliverables in the scope of MEES in Post-Order Stage, refer IOCL's Tender Specification.
- 7.3 In general, it is expected that the MEES shall maintain high standards of engineering, quality in deliverables submitted and accuracy in documentation submitted meeting the intended contractual requirements.

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7.4 If the Bidder is in JV/corporation with the principal firm, all the drawings submitted by the bidder/MEES shall be vetted by the competent person in principal firm before submitting the deliverables to BHEL.

7.5 The detailed list of deliverables during the Pre-bid stage and during detailed engineering to be submitted along with offer

7.6 The deliverables of MEES shall be submitted to BHEL only, unless instructed otherwise.

7.7 BHEL will review the deliverables and furnish its observations, comments, if any to MEES for their incorporation and resubmission to BHEL.

MEES shall clarify, with all supporting details on any queries raised by BHEL on their deliverables

#### 8.0 Delivery Schedule:

8.1 MEES shall note and comply to the applicable clauses in GCC/SCC of BHEL's NIT and IOCL's Tender Specification.

#### 8.2 Penalty Clause

8.3 MEES shall note and comply to the applicable clauses in GCC/SCC of BHEL's NIT and IOCL's Tender Specification.

### 9.0 PERFORMANCE GUARANTEE

9.1 MEES shall provide a list of laboratory test procedures and frequencies thereof required for validating Performance Guarantees.

9.2 Performance tests shall be started when the operation of the UNIT is stabilized under design conditions. The UNIT shall be operated and controlled in accordance with procedures set up beforehand. One or more performance test shall be carried out for a maximum of 120 hours under the technical direction of OWNER/LICENSOR and/or their designated representatives after successfully commissioning the UNIT in accordance with the procedures and conditions detailed in the Bid documents. At the end of the performance test, an uninterrupted period of 72 hours shall be selected by OWNER and average results obtained during that period shall form the basis of comparison between the actual performance and the guaranteed performance.

9.3 MEES's liabilities on account of not meeting the above said Engineering Guarantees and Performance Guarantees (because of Engineering related issues), **shall be limited to 10% (Ten percent) of the MEE Supply** value between BHEL and MEES, payment of which is reserved against issue of Commissioning and Performance Test Certificate by OWNER.

9.4 MEES shall note and comply to the applicable clauses in GCC/SCC of BHEL's NIT and IOCL's Tender Specification.





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### 10.0 OTHER INSTRUCTIONS

- 10.1 Since speedy completion of project is essential for a tight project schedule, it shall be responsibility of MEES to ensure timely delivery of all milestones.
- 10.2 MEES shall familiarize fully with the standard/ procedures/ practice of BHEL/OWNER, to avoid any dispute at later date and after order placement.
- 10.3 BHEL shall not pay any amount, other than the fee specifically agreed, towards any cost incurred by MEES by way of salaries to their employees (income and taxes), insurance of any nature, benefits/ bonus to the employees, etc. BHEL's liability is limited to the amount contracted for the services to be rendered under the scope of work defined.
- 10.4 MEES shall not commit any expenditure on behalf of BHEL without BHEL's consent in writing, during the execution of the work defined in the scope.
- 10.5 MEES shall bear all expenses/ fee penalties if it infringes on patents/ licenses of any persons/ organizations or in case of suits, court proceedings, damage claims etc., due to any reason whatsoever.
- 10.6 MEES shall ensure that it possesses the latest revisions of various national and international standards, codes of practices, statutory & environmental regulations etc. as applicable, for execution of the work. BHEL shall not provide any such documents to MEES. Engineers of MEES assigned for this project shall have familiarity on relevant documents as mentioned above for their use and applications.
- 10.7 MEES shall maintain at their own cost the personal accidents policy, life insurance and / or any such insurance required in respect of their personnel deputed to outstation visits for the given contract.
- 10.8 BHEL reserves the right to terminate or suspend the contract or withdraw part of the scope of the work at any stage of its execution, if it is found that MEES has not met its obligation for the performance / progress is not up to the expected standards and overall work is likely to suffer. In such an event, BHEL shall give 15 days' notice in writing. In such case all costs incurred accordingly by BHEL to complete any work forming part of the contract shall be recovered from MEES. In case of such premature termination of contract, BHEL reserves the right to claim damages from MEES including the initiation of judicial proceedings.
- 10.9 MEES shall keep all information/data/drawings etc. related to the work as confidential information and shall not divulge or use the information indirectly or directly in any way detrimental to the interest of BHEL. All drawings, documents, manuals, design calculations including all originals prepared or obtained during the work shall remain the property of BHEL and shall be handed over to BHEL on demand.
- 10.10 MEES shall comply with the laws and regulations of the country, the state and territories concerned, during the progress of the work.
- 10.11 MEES shall submit progress report on the status of the work entrusted to them periodically and as mutually agreed upon.
- 10.12 MEES shall ensure optimal & economic design while executing the work, but without sacrificing the customer specification requirements/ Statutory regulations/ code provisions/ safety aspects.





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## TECHNICAL REQUIREMENTS

### I. GENERAL DESCRIPTION:

Waste water shall be generated from Refinery and adjacent Naptha cracker from their respective treatment Plants having existing UF & RO units. They will be transferred to the upcoming MEE plant at take over point (TOP). The waste waters are designated as follows:

- a) TTP RO reject wastewater.
- b) PNC RO reject waste water.
  - a) TTP RO plant is located within IOCL Panipat refinery from where it will be pumped to MEE plant at take over point (TOP). The waste water consists of reject of RO plant.
  - b) PNC RO plant is located in Naptha Cracker plant, which is away from refinery, from where waste water will be pumped to MEE plant at take over point (TOP).
  - c) Condensate water generated from evaporation and crystallization plant will be pumped and transferred to a location to be decided later. The condensate water pipeline will be terminated at the takeover point (TOP)

The ETP system consists of clarification, media filtration, ultra-filters and RO membranes for treating the above indicated effluents. The RO reject from the final RO stream of ETP shall be treated in MEE (Multi effect evaporator) system. The 2nd stage RO Reject shall be collected in final reject storage tank/MEE feed tank. The tank with storage capacity equivalent to ~ 16 hrs of design feed flow shall homogenize the feed and then the same shall be pumped for further processing. The final reject storage tank shall also act as a buffer storage tank to provide for the storage of the feed during the Cleaning Cycle of the Evaporator and Dryer units of the MEE Plant. Condensate from evaporator and crystallizer shall be collected in condensate tank.

### II. SCOPE OF WORK (SUPPLY & SERVICES) OF MEES:

The capacity of MEE system: **30 m<sup>3</sup>/hr**. The scope of work of MEES, indicating supply and services, is listed below:

- a. Technology tie-up agreement during bid submission to M/s IOCL, by BHEL  
Enter into tie-up agreement with BHEL in the prescribed sample format attached with the specification.
- b. Pre-Bid engineering services by MEES (during bid submission by BHEL, to IOCL):
  - 1. Support BHEL for Pre-bid engineering of the MEE system by providing required inputs, data sheets, drawings etc. for "Tender Purpose" to submit along with BHEL bid.  
*Detailed BOQ estimation and cost estimation for Civil is in the scope of BHEL.*
  - 2. Support BHEL for Technical closure of bid with customer pertaining to MEE system.
- c. Scope of MEES during project execution:
  - 1. Design, engineering, manufacture, testing, supply, erection, commissioning of complete MEE system consisting of following major equipment:



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Sl. no.	Name of the unit/item	Quantity nos.	Minimum capacity of each unit, stream (Refer Note-2) cu m/hr
A.	Evaporation and crystallisation plant	1 (W)	30
1.	Evaporation system for one (1) Lot evaporator and crystallisation units consisting of:		
a)	Forced circulation tubular evaporator (1 <sup>st</sup> effect) with pre-heater, if any	1 (W)	As per design
b)	Forced circulation tubular evaporator (2 <sup>nd</sup> effect) with pre-heater, if any	1 (W)	As per design
c)	Forced circulation tubular evaporator (3 <sup>rd</sup> effect) with pre-heater	1 (W)	As per design
d)	Forced circulation tubular evaporator (4 <sup>th</sup> effect) with pre-heater	1 (W)	As per design
e)	Flash vessel or vapour separator (for each effect)	One (1) (W) lot; one for each effect	As per design
f)	Recirculation pumps and product transfer pumps (for last effect) complete with motor, base frame, mechanical seal etc. (for each effect)	One (1) (W) lot; one for each effect	As per design
g)	Thermo Vapour Recompressor (TVR) system	1 (W)	As per design
h)	Steam and process condensate pot (for each effect); (At the choice of Bidder)	One (1) (W) lot; one for each effect	As per design
i)	Rotary Vacuum pump (water ring type) with Seal pot	2 nos. (1W+1S)	As per design
j)	Steam Jet Ejector	1 (W)	As per design
k)	Concentrate outlet pump	1 (W)	As per design
2.	Condensation system for one (1) no. evaporator and crystallisation plant consisting of:		
a)	Primary surface condenser (Plate type or tubular type)	1 (W)	As per design
b)	Secondary surface condenser (Plate type or tubular type), if required	1 (W)	As per design
c)	Condensate removal pump	1 (W)	As per design
d)	Condensate tank (RCC)	1 (W)	2 hrs detention time
e)	Condensate transfer pump	2 Nos (1W+1S)	As per design
f)	Plate type heat exchanger for condensate water	1 (W)	As per design
3.	Crystallisation system of concentrated liquor from evaporators consisting of:		
a)	Balance Tank	1 (W)	As per requirement
b)	Feed pump for ATFD	2 (W)	As per design
c)	Crystalliser (ATFD)	2 Nos (2W)	As per requirement
d)	Balance Tank (ATFD)	1 (W)	As per requirement
e)	Surface condenser (ATFD) (Tubular type)	1 (W)	As per design
f)	Condensate removal pump (ATFD)	2 Nos (2W)	As per design



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4.	Condenser cooling system complete with all accessories, electrics, instrumentation, automation etc. consisting of:	One (1) lot;	As per requirement
	a) Cooling tower	Not required	Cooling water supply available
	b) Closed loop recirculation pumps (1W+1S), if required	2 nos. (1W+1S)	As per design
	c) Instruments	One (1) lot;	As per requirement
	d) Any other items/ equipments	One (1) lot;	As per requirement
5.	Pump sealing and cooling as well as cooled water for vacuum pump seal ring arrangement with all accessories, electrics, instrumentation and automation etc. both for evaporator and crystalizer consisting of:		As per requirement
	a) Sealing water supply pump (1W+1S)	2 nos. (1W+1S)	As per design
	b) Plate type heat exchanger for sealing water	1 (W)	As per design
	c) Sealing water storage tank	1 (W)	As per design
	d) Instruments	One (1) lot;	As per requirement
	e) Any other items/equipment	One (1) lot;	As per requirement
6.	Feed system consisting of:		
	a) Final reject storage tank (RCC)	1(W)	16 hrs detention time
	b) Feed pump for evaporator system	2 (1W+ 1S)	As per requirement
7.	Misc. items consisting of:		
	a) Control panel with mimic diagram	1(W)	As per requirement
	b) Vapour ducts	One (1) lot;	As per requirement
	c) Product/Condensate/Non-condensable Pipes and fittings, seal water piping	One (1) lot;	As per requirement
	d) Local Mountings	One (1) lot;	As per requirement
	e) CIP tank	1 (W)	As per requirement
	f) CIP circulation pumps	2 nos. (1W+1S)	As per design
	g) Defoamer dosing tank	1 (W)	As per requirement
	h) Defoamer dosing pumps	2 nos. (1W+1S)	As per design
	i) Antiscalant dosing tank	1 (W)	As per requirement
	j) Antiscalant dosing pumps	2 nos. (1W+1S)	As per design
	k) Caustic soda dosing tank	1 (W)	As per requirement
	l) Caustic soda dosing pumps	2 nos. (1W+1S)	As per design



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8.	a)	Neutralisation Tank – 2 (RCC-underground)	1(W)	Minimum 70 cu m
	b)	Agitator for Neutralisation Tank – 2	1 (W)	As per requirement
	c)	Neutralisation Tank - 2 effluent pumps	2 nos. (1W+1S)	As per design
	d)	Acid dosing tank	1 (W)	As per requirement
	e)	Acid dosing pumps	2 nos. (1W+1S)	As per design
	f)	Caustic soda dosing tank	1 (W)	As per requirement
	g)	Caustic soda dosing pumps	2 nos. (1W+1S)	As per design
9.		Salt handling facility consisting of :		
	a)	Fork lift (diesel operated)	1 (W)	Minimum 3 Ton capacity
	b)	Manual travelling trolley	1 (W)	
	c)	HDPE/Wooden palate for handling by fork lift	20	
	d)	HDPE bags for storage of salts	2000	

**Notes:**

- (1) Only major units/equipment required for the system are indicated herewith.
- (2) Minimum capacity or minimum equivalent capacity is indicated for guidance. Contractor can provide higher capacity of system. Contractor can increase number of stages of evaporator. Contractor can increase number of ATFD system due to capacity restriction or from operation point of view at no extra cost to Owner.
- (3) Contractor to provide one unit/ one number complete rotating equipment with motor as stores spare/warehouse spare/mandatory spare, where there are no installed spare unit. Contractor to provide foundation with pipe connection and valve beside operating unit for quick installation of warehouse spare unit.
- (4) The term 'as per design' indicates that, capacity/size in design confirming to the specification and design basis stated in the document.
- (5) The system (or each stream) shall be capable of independent operation to facilitate isolation during maintenance/low effluent demand/low capacity situation.
- (6) Symmetrical nature of systems/units/equipments/streams shall be provided for easier process control, changeability, spares etc.

*Bidder shall indicate storage of dry salt bags upto 48 hrs. (two days) with sufficient free space for movement of fork lift. (BHEL Scope).*

2. Assist in obtaining the approvals of various engineering documents from customer during contract stage.
3. Furnish required input details for the civil design of the ETP and MEE system (detail BOQ, design and execution by BHEL)
4. Establishing plant performance guarantees as per the tender specification.
5. Visit of experts to meetings at intimated location and also at project site for support, if required.
6. Supply E&C spares for MEE equipment. It shall form part of the main equipment supply.



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Supply of special tools and tackles of MEE system. The scope of such tools shall form part of the main equipment supply and a separate list for the same shall be furnished along with bid.

### III. Design basis

The evaporation and crystallization plant shall be designed based on the following:

- i. Inlet Flow: 30 cu m/hr
- ii. Number of stream: One (1)
- iii. Plant Operating hours: 24 hrs./day inclusive of CIP, cleaning and maintenance time
- iv. Inlet quality – Final reject water quality as per Bidder's design of RO system
- v. Design efficiency for salt recovery - 99 %

Note:

1. The description and technical specification of Evaporation and Crystallization Plant provided in this tender specification is for forced circulation multiple effect type evaporator. Other type of evaporator such as falling film type, thin film type evaporator or vapor compression type evaporator will not be accepted.
2. Capacity of evaporator & crystallizer indicated above is minimum capacity. However, contractor can provide higher capacity of the system, if required, at no extra cost to Owner. Bidder/ Contractor can increase number of stages of evaporation system, if required, at no extra cost to Owner.

The detailed process description and design basis shall be as per M/s IOCL tender document attached with the specification as Annexure.

### IV. SCOPE MATRIX BETWEEN MEES AND BHEL

Sl. No.	Description	Basic Engineering	Detail Engineering	Supply	Execution
1	MEE system	MEES	MEES	MEES	MEES

- 1) **Basic Engineering:** means conceptual design, sizing criteria.
- 2) **Detail Engineering:** Procurement,
- 3) **Execution:** means erection, commissioning and establishing performance guarantee.

*Note: The civil design and civil works are in the scope of BHEL. However, MEES shall provide all the necessary civil inputs.*

*The process scheme and detailed technical specification of the MEE system is available for download Search on ROMEE-PR-WTS-001 in Tender Search on web site <https://iocletenders.nic.in>*



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**V. INFLUENT WASTE WATER CHARECTERISTICS**

The influent waste water characteristics to MEE, are indicated as Annexure-1:

**VI. TREATED WATER REQUIREMENTS AND GUARANTEES**

Description	Condensate water quality (From evaporator & Crystallizer)
pH at 25°C	7.5 to 8.0
Temperature, °C	<45
Turbidity, NTU	<2
Total suspended solids, mg/l	<2.0
Oil & grease, mg/l	BDL
Total dissolved solids, mg/l	<500
Total hardness (as CaCO <sub>3</sub> ), mg/l	<15
Calcium hardness (as CaCO <sub>3</sub> ), mg/l	-
Magnesium hardness (as CaCO <sub>3</sub> ), mg/l	-
Sodium (as Na), mg/l	-
Potassium (as K), mg/l	-
Total Iron (as Fe), mg/l	-
Manganese as Mn, mg/l	-
Copper (as Cu), mg/l	-
Zinc (as Zn), mg/l	-
Lead (as Pb), mg/l	-
Aluminium (as Al), mg/l	-
Chlorides (as Cl), mg/l	-
Sulphate (as SO <sub>4</sub> <sup>2-</sup> ), mg/l	<50
Fluoride (as F), mg/l	-
Carbonate (as CaCO <sub>3</sub> ), mg/l (as CO <sub>3</sub> )	-
Bi-carbonate (as CaCO <sub>3</sub> ), mg/l	-
Methyl orange alkalinity (as CaCO <sub>3</sub> ), mg/l	<100

Phenolphthaleim alkalinity (as CaCO <sub>3</sub> ), mg/l Detection Limit: 1.0 mg/l	-
Colloidal silica (as SiO <sub>2</sub> ), mg/l	-
Dissolved (reactive) silica (as SiO <sub>2</sub> ), mg/l	<8
Free carbon di-oxide, mg/l	-
Ammonical Nitrogen (as NH <sub>3</sub> -N), mg/l	-





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Nitrate nitrogen (as NO <sub>3</sub> ), mg/l	-
Total Kjeldahl Nitrogen (as N), mg/l	-
Biological oxygen demand (BOD), (5 days at 20°C), mg/l	-
Chemical oxygen demand (COD), mg/l	<50
Cyanide (as CN), mg/l Detection Limit: 0.001 mg/l	-
Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l Detection Limit: 0.001 mg/l	-
Sulphide (as S), mg/l	NIL
Total Phosphate (as PO <sub>4</sub> ), mg/l	NIL
Conductivity, S/cm at 25°C	-
Free Residual Chlorine (FRC), mg/l	-

Note: Moisture content of salt (solid waste) generated from evaporator and crystallizer of plant, shall be 6 %. All other guarantees such as utilities, power consumption etc. shall be as indicated in the M/s IOCL tender document, attached as Annexure.

## **VII. TECHNICAL SPECIFICATION**

1. Mechanical: The complete design, supply, erection, commissioning and establishing the performance parameters of all the equipment (as per the enclosed MEE tender scheme) needed to treat the incoming effluent to MEE to meet the guarantee parameters. If any equipment is required over and above the scheme, for meeting the outlet parameters, is to be considered by the Bidder. The scheme indicated is minimum.
2. Electricals: Complete electrical system consisting of motors, MCC panel, cables, cable trays, earthing, etc. for the MEE are in the scope of Bidder. The detailed specification of these electrical are indicated in the attached IOCL tender document.
3. C&I: All the instruments, as detailed in the attached IOCL specification, PLC panel, instrument cables etc. are in the scope of Bidder only. The detailed specification is indicated in the attached IOCL tender document.

## **VIII. OPERATION AND CONTROL PHILOSOPHY:**

The evaporator and crystallizer plant shall be operated, monitored and controlled through one central programmable logic controller (PLC) with complete automation to perform normal operation, sludge removal, valve operation etc. However, the total plant shall have provision of manual Intervention and operation of the same, locally or from remote. PLC based control system shall be provided to start, stop, monitor and control the plant from one central place. All the local push buttons required for the plant shall be housed near the plant. Temperature measurement for various as mentioned above shall be sensed by individual temperature indicating transmitter and displayed in the panel/monitor. Operator can read those temperatures automatically in sequence or manually at any of the above points randomly to operate the plant effectively.

- 2) An interlock sequence shall be provided for starting and stopping of the plant in predetermined correct sequence only and not otherwise due to any mistake in operation.
- 3) An alarm annunciator indicates tripping of any drive and also abnormal parameters if any in the plant. This will provide extra facility to monitor the plant from panel and operate the plant correctly in manual mode.
- 4) An automatic PID based level control loop shall be provided for evaporator to regulate product





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flowing out from the evaporator. This ensures constant level in the system and avoids Fluctuations in performance of total plant. The loop consists of level sensor (indicating transmitter), PID controller (electronic type), I/P converter to convert electronic signal to pneumatic signal and pneumatic control valve.

5) An automatic PID pressure control loop at inlet of live steam line to ensure uniform steam supply at desired condition to the plant. This also ensures exact required temperature of 1<sup>st</sup> effect.

6) A control valve (or double solenoid valve) shall be provided which will control the flow to ensure the safe boiling temperature in calendria. These safe temperatures ensures no overheating of product at any stage, which otherwise may cause undesired fouling in the tubes.

An automatic PID feed flow control loop shall be provided in the feed line of the plant so that operator is able to control the feed rate to the plant. (Flow control valve shall be provided in HRSCC feed pump discharge).

8) With the PID control loop arrangement constant feed rate to the plant and constant supply of steam to the plant can be ensured.

9) All equipment and valve status (On/off/trip status or open/close) should be indicated.

Necessary failure in operation/trip shall have visual and sound alarms.

10) The local push buttons with control boxes of individual pumps, equipment shall have selector switches with position of manual and automatic.

11) The remote selection facility at the HMI shall have the override over the local selector switch position in the local control boxes.

12) Preparation and dosing of chemical (Operation of pump from local control panel) shall be controlled manually.

13) All pumps shall work on level sensing.

14) In general operating pumps selected shall be rotated on a daily basis or after fixed time interval.

15) PLC shall have indications of all instrument/transmitter readings in HMI.

**NOTE:**

For detail Instrumentation and control system, refer Instrument design philosophy (section:5.4)

- Specification of equipment and design data are general in nature and may require changes based on specific selection and application. Tenderer is required to make their own judgment for proper selection of equipment in their offer or during detail engineering if LOA is placed on them. Tenderer is required to submit proper design calculation.
- Responsibility of selection of equipment rests entirely on the tenderer considering that tenderer is required to provide guarantee on the equipment selected, which will undergo performance testing at site during PG test.
- Where specification of all equipment required for completeness of the system is not specified herewith, tenderer is required to make selection of proper equipment based on their judgment.

**IX. Quality & Inspection**

**Quality Assurance Program**

To ensure that the equipment and services under the scope of contract whether manufactured or assembled within the MEES's works or at his Sub-Vendor's premises or at the Owner's site or at any other place or work are in accordance with the specifications, MEES shall adopt suitable quality assurance program to control such activities at all points, as



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necessary. Such program shall be outlined by the MEES and shall be finally accepted by the Owner / Authorized representative after discussions before the award of Contract. The QA program shall be generally in line with ISO-9002/IS-14001. A quality assurance program of the MEES shall generally cover the following:

System for shop manufacturing and site erection control including process controls, fabrication and assembly controls.

### **Quality Assurance Documents**

The MEES shall submit required no. of copies of the following Quality Assurance documents

- Material test reports on components as specified by the specification and approved Quality Plans.
- The inspection plan with verification, inspection plan check points, verification sketches, if used and method used to verify that the inspection and testing points in the inspection plan were performed satisfactorily.
- Sketches and drawings used for indicating the method of traceability of the radiographs to the location on the equipment.
- Non-destructive examination results, reports including radiography interpretation reports.
- Factory tests results for testing required as per applicable codes and standards referred in the specification and approved Quality Plans.
- Inspection reports duly signed by QA personnel of the customer and MEES for the agreed customer hold points.

The equipment shall be guaranteed to meet performance requirements required by this specification and rectification shall be carried out until satisfactory results are obtained. The Owner reserves the right to reject the equipment should the performance values fall short of those indicated in the schedule of Technical data sheets.

### **Quality Plan:**

MEES to furnish Quality Plan [Supply Quality plan] to BHEL along with offer in their standard format for general review by BHEL. During Detailed engineering, in addition to various tests indicated in this specification, Quality plan will be reviewed with respect to standard Inspection, standard Engineering practices, applicable standards, code etc. Accordingly, various tests required, stages of inspection and appropriate agencies for Inspection will be intimated. MEES to abide by the same.

#### **1. Tests & Inspection:**

The manufacturer shall conduct all tests required to ensure that the equipment furnished shall conform to the requirements of this specification and in compliance with requirements of applicable codes and standards.

The particulars of the proposed tests and the procedures for the tests shall be submitted to the Purchaser/Consultant for approval before conducting the tests.

#### **2. Test at Manufacturer's work (as applicable):**

Material Tests

Other Tests

Site Performance Test:



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3. Inspection agency:

BHEL/Third Party appointed by BHEL/Customer. The various inspection stages will be witnessed by individual agencies (or) Group of Agencies as per above, in line with approved quality plan.

**X. PROTECTION FOR SHOP FABRICATED ITEMS:**

- a) All coated surfaces shall be protected against abrasion, impact, discoloration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or non-metallic protecting device. The parts which are likely to get rusted due to exposure to weather, should also be properly treated and protected in a suitable manner. All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. All surfaces which will not be easily accessible after the shop assembly, shall beforehand be treated and protected for the life of the equipment. All surfaces shall be thoroughly cleaned of all mill scale, oxide and other coatings and prepared in the shop.
- b) The surfaces that are to be finish-painted after installation or require corrosion protection until installation, shall be shop painted with at least two coats of primer. The finished colors shall be as per manufacturer's standards.
- c) Shop primer for all steel surfaces which will be exposed to operating temperature below 95°C shall be selected by the MEES after obtaining specific approval of the Purchaser regarding the quality of primer proposed to be applied.
- d) All other steel surfaces which are not to be painted shall be coated with suitable rust preventive compound subject to the approval of the Purchaser.
- e) All material shall be delivered in a clean and usable condition. Openings shall be securely covered against entry of foreign material where appropriate.

**XI. PACKING AND TRANSPORTATION:**

All equipment shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. MEES shall follow necessary road safety rules and shall obtain permission from highway authorities for goods movement. However, these aspects shall be taken into consideration in the design of the packing for the system.

**XII. NAME PLATES & TAG PLATES:**

- A. Components whose identity is important for operation and maintenance of the plant shall be provided with permanently attached tag bearing the Purchaser's coding together with relevant text clearly inscribed.
  - a) A corrosion-resistant nameplate shall be attached to each unit in a clearly visible, easily accessible location. The nameplate shall be stamped with the following information: **Manufacturer's name**



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- b) Manufacturer's model number
- c) Manufacturer's serial number
- d) Purchaser's equipment tag number (item No.)
- e) Service name
- f) Weight (kg)
- g) Hydrostatic test pressure, Bar. (g)
- h) Other design information of the flow media like flow rate, temperature, pressure etc.
- B. Nameplates shall be 3 mm (0.12") thick engraved plate of sufficient rigidity with lettering of a minimum height of 4 mm (0.16"). The method of implementation and labelling will be informed for all components after award of contract.
- C. Identification tags shall be provided and placed on all MEES furnished items. Tags shall be corrosion resistance, having a larger than diameter of 3 cm, and shall have black identification figures stamped thereon. Figure height shall be larger than 0.5 cm. Tags shall bear the component system designation symbol shown on the MEES's drawings.

**XIII. SITE METEOROLOGICAL DATA**

<b>1</b>	<b>Atmospheric Pressure</b>	
	Average	999 mbar
<b>2</b>	<b>Ambient Temperature</b>	
	Maximum Dry Bulb Temperature	42 Deg. C
	Minimum Dry Bulb Temperature	1.0
	Wet Bulb Temperature	29
<b>3</b>	<b>Relative Humidity</b>	
	Maximum	100%

**XIV. VENDOR DOCUMENTATION:**

**1. At Pre-Bid Stage:**

Following data to be furnished by MEES for civil engineering by BHEL:

- a) Civil inputs (sizes of various process structures, foundation, building etc.)

Following documents/data to be furnished by MEES for **"Tender Purpose"** which shall be included with BHEL's bids to IOCL:



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- a) Overall Process Flow Diagram /P&IDs
- b) Process write up
- c) Control/ Operation/ Design Philosophy
- d) Functional guarantees of the plant as per IOCL "Guarantee Schedule"
- e) Data sheet for Process for Tender Purpose as per IOCL specification.
- f) st of Spares (for items supplied by MEES)
- g) Layout and area requirement.
- h) Load list and power requirement.
- i) Chemical list & consumption, unit rate and overall cost.
- j) Yearly shutdown maintenance cost.
- k) Steam requirement based on supply condition.
- l) Dry solid production quantity, analysis, specific
- m) gravity and volume, area requirement for 48 hrs
- n) storage.
- o) Operating cost estimate.
- p) Time required for CIP.
- q) Yearly down time.

## 2. During Project Execution:

Documents to be submitted by MEES after receipt of order:

Sl.No	DRG/DOC. NAME	Submission by
<b>MECHANICAL</b>		
M.01	P&ID of MEE system	1 week from PO
M.02	System write-up (Including Control Philosophy)	1 week from PO
M.03	Design Basis and Sizing Criteria including Process Calculations	1 week from PO
M.04	Equipment Layout and list	2 weeks from PO
M.05	List of Terminal Points	2 weeks from PO
M.06	Individual equipment GA drg.	3 weeks from PO
M.07	Data sheet of complete equipment	3 weeks from PO
M.08	Overall Layout of MEE system	2 weeks from PO
M.09	Painting Specification	4 weeks from PO
M.10	Piping layout	4 weeks from PO
<b>ELECTRICAL</b>		
E.01	Electrical Load List with normal and emergency power requirement	1 week from PO
E.02	GA and Datasheet of motors	2 weeks from PO
E.03	Cable datasheet	2 weeks from PO
E.04	Cable tray layout	3 weeks from PO
E.05	MCC panel GA and Wiring diagram	3 weeks from PO
E.06	Earthing details	3 weeks from PO
<b>INSTRUMENTATION</b>		
I.01	Instrument Index with BOQ, range, set points etc.,	2 weeks from PO
I.02	Instrument Hook up drawings	4 weeks from PO
I.03	Technical data sheet of Instruments	3 weeks from PO
I.04	PLC Configuration Diagram, GA & Wiring diagram	4 weeks from PO



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I.05	PLC I/O List	5 weeks from PO
I.06	PLC Logic Diagram	5 weeks from PO
I.07	PLC Control Room Layout	5 weeks from PO
I.08	PLC Power Supply AC Inputs requirement	5 weeks from PO
I.09	PLC interconnection diagrams	5 weeks from PO
<b>CIVIL</b>		
C.01	Civil input drawings for structures	4 weeks from PO
C.02	Civil input drawings for all building	4 weeks from PO
C.03	Civil input drawings for all Tanks, pits and chambers etc.	4 weeks from PO
<b>MISCELLANEOUS</b>		
MIS.01	Commissioning spares	5 weeks from PO
MIS.02	Recommended spares	5 weeks from PO
MIS.03	Consumable list (Chemicals, oil, grease etc.)	5 weeks from PO
MIS.04	O&M manual	5 weeks from PO
MIS.05	Performance Test Procedure	5 weeks from PO

**Note:** The date of first submission is indicated above. MEES shall submit all subsequent revision within 5 working days of comments. BHEL shall provide review/approval in 7 working days

3. The O&M manuals shall contain the following details as minimum in addition to those indicated in the above table: -
  - Identification details of the equipment like BHEL PO NO., Vendor's Sl. No., Vendors contact address with tel., fax details.
  - Description of the equipment.
  - Final Data sheets and Drawings of the equipment as per the list mentioned in this specification.
  - Recommended 2 years operational spares.
  - Test reports.
4. The erection documentation shall consist of
  - All drawings/documents,
  - All such drawings/documents, not submitted for review, but essential for erection/ commissioning, e.g. assembly drawings, etc.
  - Master document list
  - Site dispatchable B.O.M.

**XV. Performance Guarantees**

The guarantees shall form contract guarantees to be demonstrated through an approved performance test procedure (to be furnished by the Bidder, as per the tender) after the completion of the Plant. The schedule shall be finalized during the detail engineering stage.



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**XVI. Terminal/ Interface Points between MEES and BHEL.**

Sl. No.	Equipment	Terminal Point
<b>Mechanical</b>		
1	Influent waste water	At RO reject sump. The MEE feed pump is in the scope of the Bidder.
2	LP steam, return condensate, CW in and out	At one point near the battery limit. The pipe counter flanges along with stud nuts and gaskets at battery limit are in the scope of Bidder.
<b>Electrical</b>		
1	Power Supply 415 V	Incomer to MCC. The required cable glands and lugs are in the scope of the Bidder.
<b>Control &amp; Instrumentation</b>		
1	Power supply to PLC	At one (1) point in PLC panel incomer. Further distribution to all associated equipment including HMI, Printer etc. shall be taken care by MEES.

**XVII. Information to be submitted along with offer**

- 1.0 Filled in Annexures (Key Information, Recommended spares, special tools & tackles and Deviations)
- 2.0 Checklist
- 3.0 Unpriced price-bid format





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**ANNEXURE – I****KEY INFORMATION**

1.	Name of the Bidding Company		
2.	Registered in (mention the name of the Country)		
3.	Name, designation, telex & telephone number and postal address of responsible officer of MEES to whom all reference shall be made for expeditious co-ordination		
4.	Name, designation, telex & telephone number and postal address of responsible officer of Indian Agent.		
5.	MEES's proposal number		
6.	MEES's proposal date		
7.	Validity of offer, counted from the date of opening of bid		
8.	Guaranteed completion period, counted from date of issuance of LOI/TOI		
9.	Confirm that Scope of supply and services are exactly as per specification requirement		Yes/No
10.	Confirm Technical Compliance with Specification		Yes/No
11.	Confirm that Guarantees are as per Job Specification		Yes/No
12.	Confirm that List of Recommended Spares has been furnished as per Annexure-II		Yes/No
13.	Confirm that List of Special Tools & Tackles has been furnished as per Annexure-III		Yes/No
14.	Confirm that deviations ,if applicable, have been furnished as per Annexure-IV		Yes/No

Signature of MEES's

Authorized representative .....

Date.....



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**ANNEXURE – II**

**LIST OF RECOMMENDED SPARE PARTS**

MEES shall tabulate in the proforma below list of all spare parts as recommended by the respective manufacturer for regular, reliable operation. In case the MEES has to add any other relevant information, the same shall be indicated herein. Continuation sheets of like size and format may be used as per MEES's requirements.

Sl. No	Description	Quantity	Unit Price	Total Price	Delivery Period	Remarks
-----------	-------------	----------	---------------	----------------	--------------------	---------

Signature of MEES's  
Authorized representative .....

Date.....

**BHARAT HEAVY ELECTRICALS LIMITED**  
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MEES shall tabulate in the proforma below list of all tools and tackles as recommended by the respective manufacturer for regular, reliable operation. In case the MEES has to add any other relevant information, the same shall be indicated herein. Continuation sheets of like size and format may be used as per MEES's requirements.

Sl.No.	Description	Quantity	Remarks
<b>a</b>			
<b>b</b>			
<b>c</b>			
<b>d</b>			

Signature of MEES's  
Authorized representative .....

Date.....



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**ANNEXURE – IV****DEVIATION FROM SPECIFICATION**

If the proposal submitted has got any deviation from the technical stipulations in the bidding document, the MEES shall tabulate below the full particulars of such deviations and shall sign below. Additional sheets may be enclosed, if necessary. Deviation is to be furnished with mention of specific clause numbers. Technical and commercial deviations to scope of supply and services, shall be indicated separately. MEESs shall bring put only those deviations which are impractical to meet (or) not advisable

Sl.No .	CLAUSE NO.	DESCRIPTION AS PER SPECIFICATION	DEVIATION BY MEES

We confirm that all the deviations/exceptions to the Technical Specification PY51687, Job Specification and enclosures including reference documents attached are listed in this Annexure only. No other deviations or exceptions even if mentioned elsewhere shall be considered for any technical/ commercial evaluation or for ordering.

Signature of MEES's  
Authorized representative.....

Date .....



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**1.0 CHECK LIST**

MEES to note that Check List shall be completely filled and the data required in-line with Check List shall be submitted along with their Offer to enable Purchaser to evaluate the offer submitted.

<b>S.No.</b>	<b><u>Description</u></b>	<b>Enclosed or [Yes/No]</b>	<b>Remarks/ Comments by MEES</b>
1	<b>MEES to confirm compliance with</b> spec. and its annexure without any deviations.		
2	MEES has already raised pre-bid queries (if any) on Purchase specification.		
3	MEES Shall submit completely filled following Annexures enclosed with Technical Purchase Specification PY 51687 along with their offer <b>Annexure-I:</b> Key Information <b>Annexure-II:</b> List of Recommended Spare Parts <b>Annexure-III:</b> Special Tools and Tackles <b>Annexure-IV:</b> Deviation from specification		
4	MEES shall furnish the list of Erection and commissioning spares along with their offer.		
5	MEES to fill Deviation list (Refer Annexure-IV of PY 51687). Only those deviations indicated in this list will be considered during technical evaluation of offer. MEES to indicate the deviations which are impractical.		
6	All other requirements except the deviations brought out under deviation list, have been taken into consideration in the offer.		
7	MEES has submitted unpriced "Price bid format" with "Quoted" mentioned against price for each line item of Price Bid Format		

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**PRICE SCHEDULE**

SL. NO.	DESCRIPTION	QTY.	UNIT PRICE (Rs.)	TOTAL PRICE (Rs.)	Taxes
<b>1.0</b>	<b>DESIGN, ENGINEERING, MANUFACTURE, SUPPLY, ERECTION &amp; COMMISSIONING</b>				
1.1	Design, Engineering, Manufacture, Supply, E&C of the MEE system.	1 set			
1.2	Special Tools & Tackles for MEES's supplied items as per the specification	1 set			
1.3	<b>Commissioning and erection spares</b> [Item wise list of commissioning and erection spares with unit rate and quantity for supply items to be furnished by MEES)	1 set			
<b>2.0</b>	<b>Erection and commissioning including performance guarantee</b> of the MEE system as per the specification.	1 set			
<b>3.0</b>	<b>Operation and complete maintenance of the MEE system to meet the performance guarantees as per the specification</b>				
	<b>First year</b>				
	<b>Second year</b>				
	<b>Third year</b>				
	<b>Fourth year</b>				
	<b>Fifth year</b>				
	<b>TOTAL (1.0 + 2.0 + 3.0) for L1 Evaluation</b>				

**NOTES: -**

- MEES to quote strictly as per BHEL's NIT requirements.
- MEES to note that this is a LUMP SUM Turn-Key Order. Any additional claim after placement of order will not be entertained under any circumstances.
- MEES to quote the base rates only. All Applicable taxes and duties shall be indicated separately for the Supply Portion and Erection & Commissioning Portion.
- MEES shall also submit unpriced copy of the Price-Bid Format with "Quoted" against each line item of the format along with the technical offer.
- MEES to quote strictly in the price bid format with line wise itemized price and quantity, failing which the MEES's offer shall be liable for rejection.

Signature of MEES's  
Authorized representative .....

Date.....

ESP-001 - 2A Rev.00		<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b> <b>Technical specification for Pre-bid Tie-up</b>	Std. / Doc. Number	
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			Rev. No.	01
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**ATTACHMENTS**

Sl. No.	Description	Drg. / Doc. No.	Rev. No.
1	Influent water quality	Annexure 1	
2	Tender Scheme	Annexure 2	
4	QAP Guidelines		
5	Corporate packing standard		

**XVIII. Material Code**

Sl. No	Variant No.	Description	Material code
1.	00	Pre-bid Tie-up of MEES for Talcher Fertilizers Ltd.	PY9851687006
2.	01	Pre-bid Tie-up of MEE for IOCL Panipat	PY9751747007



[illegible]