Annexure – A- Terms and Conditions

ACCEPTANCE OF TECHNO - COMMERCIAL TERMS AND CONDITIONS BY THE BIDDERS

Description of the Equipment:	**Start-up system control valves along with Commissioning and Mandatory Spares.**
Projects	**Udangudi 1x660MW project** **Yadadri 5x800MW project** **Patratu 3x800MW project**
BHEL Tender No. & Date	**1802100217 dated 03.12.2021**
Name of the firm (Bidder)	**:**
Address	**:**
Contact details	**Contact person 1** **Name:** **Designation:** **Office Phone:** **Mobile:** **e-mail:** **Contact person 2** **Name:** **Designation:** **Office Phone:** **Mobile:** **e-mail:**

To be filled by bidder

Sl. No.	Terms and conditions	Vendor's confirmation
1.	**Technical:** Supply of Start-up system control valve along with commissioning and mandatory spares for boiler application shall be as per the Specification attached with the enquiry. 1. BM/SCV:001 Rev:07 (Common for all Projects.) 2. Datasheet for Udangudi Project 3. Datasheet for Yadadri Project 4. Datasheet for Patratu Project Quality Plan shall be submitted by bidder meeting the SQP attached with the enquiry and additional requirements applicable for the offered system. Supply shall be as per the quality plan approved by end customer.	
2.	**Pre-qualification requirement (PQR)**: Offer shall be considered only if bidder is meeting Tender Prequalification requirement (Annexure-B, C & D). Vendor to comply with Pre-Qualification requirement of the tender and submit along with their technical bid - the credentials and other documents as	

	indicated in the PQR in the format prescribed. Otherwise their offer will get rejected.	
3.	**Evaluation method** The tender will be evaluated on package basis as indicated below. **Package-I:**- Startup system control valves, along with commissioning and Mandatory Spares for two units of Udangudi 2x660MW Project. (RFQ Sl. No. 10 to 230) **Package-II:**- Startup system control valves, along with commissioning and Mandatory spares for five units of Yadadri 5x800MW Project. (RFQ Sl. No. 240 to 590) **Package-III:**- Startup system control valves, along with commissioning and Mandatory spares for three units of Patratu 3x800MW Project. (RFQ Sl. No. 600 to 780) Items against each package are indicated in the Annexure-E, Schedule of Items enclosed. Evaluation shall be on total landed cost to BHEL on FOR destination basis. Currency of evaluation shall be **INR.** Rate quoted in Foreign currencies will be converted to INR by multiplying with the Exchange rate (SBI TT Selling rate) as on the technical bid opening date. If the date of opening happens to be a bank holiday, then the forex rate as on previous bank (SBI) working day shall be taken.	
4.	Vendor shall quote as per the enclosed price Schedule format only.	
5.	**Vendor offers will be considered for price bid opening subject to fulfilment of techno commercial suitability and sub vendor approval by end customer against each Package. Requirements for taking up for sub vendor approval by end customer are as below:** 1. Patratu project: Filled up Annexure-M along with supporting documents 2. Yadadri & Udangudi Project: Previous supply credentials for similar item	
6.	Inspection by BHEL/ BHEL approved TPIA/Customer CV test report to be submitted for BHEL review and approval before final inspection.	
7.	**Firm Price:** The quoted / finalised rates shall be Firm till execution of the supplies. Offer with PVC clause will not be considered.	
8.	The Tender will be operated in two part bid system. One-part consisting of PQR, Technical bid with Commercial terms & conditions and other part is Price Bid. Based on the PQR compliance, technical suitability and sub vendor approval by end customer, vendors will be short-listed. The price Bid of short listed vendors will be opened on a suitable date with due intimation to vendors. Reverse Auction is not applicable for this tender.	
9.	**Delivery term:** **Indigenous Suppliers**	

	The quote shall be on FOR destination basis as indicated below inclusive of Packing, forwarding, Freight also to yours account. **Package-I, Udangudi Project:** • For Main supply and commissioning spares (RFQ Sl. No. 10 to 70):- FOR Udangudi Project site. • For Mandatory spares (RFQ Sl. no. 80 to 230):- FOR BHEL Trichy stores. **Package-II, Yadadri Project:** • For Main supply and commissioning spares (RFQ Sl. No. 240 to 300):- FOR Yadadri Project site. • For Mandatory spares (RFQ Sl. no. 310 to 590):- FOR BHEL Trichy stores. **Package-III, Patratu Project:** • For Main supply and commissioning spares (RFQ Sl. No. 600 to 660):- FOR Patratu Project site. • For Mandatory spares (RFQ Sl. no. 670 to 780):- FOR BHEL Trichy stores. Transit Insurance is under BHEL scope @0.12%. **Import Supplier:** • Import vendors to submit offers on CFR (Cost & Freight), Chennai port (LILO – Liner in Liner Out) basis for all the packages. Port of loading should be indicated without fail. Port of discharge should be Chennai.	
10.	**a.** Acceptance of materials supplied: i. The supply shall be strictly as per the specifications in the tender /purchase order. ii. Delivery of the ordered items as per the delivery terms in the Purchase Order does not automatically constitute acceptance of the delivered items. iii. The acceptance or otherwise of the delivered items at BHEL /Stores/Trichy will be separately communicated to the supplier by BHEL either through B2B portal or through e-mail within 120 days from the delivery of items or delivery of the required test certificates /other documents whichever is later. **iv.** In case of rejection of the delivered items at BHEL/Stores/ Trichy, either part or full, the vendor shall replace the rejected items as per the specification in the Purchase order/tender at their cost within specified days/months of communication of rejection to the supplier. **v.** In case of rejection of the delivered items, either part or full, if the supplier fails to replace the rejected items within the specified days/months of communication of the	

	rejection, the same shall be treated as failure to execute the contract and actions as per the Guidelines for Suspension of Business Dealings with Suppliers /Contractors available in the webpage: http://www.bhel.com/vender_registration/vender.php. would be taken against such supplier	
11.	**Payment terms:** **Indigenous Supplier (Non MSE)** **For Main supply and commissioning spares:** Payment term is 100% direct payment after 60 days from the date of dispatch against site acknowledgement and against 10% PBG valid for the warranty period. **For Mandatory spares:** Payment term is 100% direct EFT payment after 60 days from the date of receipt and acceptance of materials and against 10% PBG valid for the warranty period. **Indigenous Supplier (MSE)** **Payment will be as per MSMED Act, 2006 against 10% PBG valid for the warranty period.** Supplier quoting for MSME payment term should submit Udyam Registration Certificate along with Part-I bid.	
12.	**Import Supplier** BHEL Payment term is 100% payment on CAD basis after 60 days from the date of receipt of documents, specified in PO, at BHEL bank against 10% PBG valid for the warranty period. Respective bank charges to respective account. If supplier insists for LC, only Usance LC with 60 days credit will be opened one month prior to material readiness, further loading @ 1.5% on the offered value will be considered. If Hence supplier shall intimate the material readiness accordingly for opening of L.C. LC validity period will be 90 days and for any extension, applicable charges will be to supplier's account.	
13.	No deviation is permitted in payment term. Any deviation on the above term is liable for rejection.	
14.	**Performance Bank Guarantee:** BHEL require a performance Bank Guarantee to a value of 10% of supply valve covering the Guarantee/Warranty period. The PBG shall be in BHEL format (Format attached) which is to be opened in any one of the banks mentioned under List of Consortium Banks attachment. All banks charges shall be to vendor account only. Any deviation on PBG leads to rejection of offer.	
15.	**Liquidated damages (LD):** a) Time is the essence of the contract. b) The ordered items shall be delivered as per the delivery period mentioned in the Purchase Order. c) In case the supplier supplies the ordered items beyond the delivery period specified, Liquidated Damages -LD - as detailed below shall be will be levied from the supplier without prejudice	

	to any other relief /compensation available to BHEL, Tiruchirapalli under any other condition of the contract/applicable legal provisions. d) Failure to dispatch the materials in the time as per the delivery quoted in our Purchase Order(PO) would make the supplier liable to an un-conditional LD at the rate of 0.5% of the undelivered portion per week of the delay or part thereof subject to a maximum of 10% of Purchase order value. e) Any deviation from the above LD clause, loading will be applied to the extent to which it is not agreed by the bidder (at offered value). f) Indigenous: For "FOR Delivery terms", Lorry way bill date will be taken for LD calculation. g) Import: For CFR terms, BL date will be considered for LD calculation. h) Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers. Hence applicable GST shall also be recoverable from suppliers on LD amount. Debit note will be issued by BHEL for this amount, indicating the respective supply invoice number.	
16.	PO will be released separately for below mentioned items of each package: • Main supply & commissioning spares • Mandatory spares (I.e. 6 POs in total) In case of PO placements, required documents have to be submitted for approval within 25 days from the date of PO & reply for any further clarification has to be within 7 days. Any delay beyond the above specified period will be considered during LD calculation.	
17.	**Guarantee / Warranty Period:** **Mandatory Guarantee clause:** 24 months from the date of supply or 18 months from the date of actual put in use, whichever is earlier. **Additional Guarantee/Warranty:** If the vendor is qualified for this tender based on confirmation for clause 3 (d) of PQR Annexure-B, C & D, additional guarantee/warrantee as per clause 3(d) PQR Annexure-B, C & D is also applicable.	
18.	**Repair & replacements:** Within the guarantee period vendor has to replace / rectify the defective/ damaged items on free of cost within a reasonable time of reporting from our end.	
19.	**Guarantee / Warranty Period:** No Deviation is permitted. If still vendor offered any deviation on the Guarantee / warranty period, it may lead to rejection of offer.	
20.	**Erection and Commissioning support:** Price to be quoted by the seller in terms of price per man-day for erection and commissioning support.	

	If commissioning engineer is deputed from Indian office, then the payment will be released in INR only. Conversion of foreign currency to INR shall be as per clause 3. This service will be utilized by BHEL-site through power sector regions. Separate PO will be released by BHEL-Site through power sector regions to avail the vendor's supervision service. During this period, vendor should also ensure that the blanking plate is installed during initial supply and subsequent hydro test and acid cleaning operation at site. Vendor to ensure proper purging of the lines to eliminate the presence of foreign particles before installing the trim parts and commissioning activity. All the expenses like to & fro charges, incidentals, boarding & lodging at site are to be borne by the vendor. **The price calculated for 14 days of erection and commissioning per unit (Two HWL valves and One MEFCV) or 2 % of the total contract value of Main supply items of each unit(boiler) whichever is lower will be considered for price comparison per unit.** **Depending upon the actual duration of erection and commissioning support availed, the payment will be paid by BHEL- power sector regions based on the vendor quoted amount (price per man-day) with total Erection and Commissioning support charges limited to cap of 2% of the total contract value of Main supply items of each unit(boiler).**	
21.	**Risk purchase clause:** a. In the event of any successful Tenderer's failure to fulfil any of the tender / Contract obligations including supply of whole or any part of the ordered items as per Contract / Agreement, BHEL has the right to terminate the contract and purchase from elsewhere, at the risk and cost of the defaulted supplier, either the whole of the goods or any part which the supplier has failed to deliver or dispatch within the time stipulated in the contract or if the same were not available, the best and nearest available substitute thereof. The supplier shall be liable for the additional expenditure/difference in Cost, if any, including consequential losses which BHEL may sustain by reason of risk purchase in addition to the applicable LD as per the Purchase order/contract. b) The decision of BHEL with regard to the additional expenditure / difference in cost and consequential losses incurred by BHEL shall be final and binding on the supplier. b) The amount recoverable under risk purchase shall be recovered from the defaulted supplier in all or any of the following manners: • from dues available in the form of Bills payable to defaulted supplier, SD, BGs against the same contract. • from the dues payable to defaulted supplier against other contracts in the same Region/Unit /any other region/unit In-case recoveries are not possible with any of the above available	

	options, Legal action shall be initiated for recovery against defaulted supplier.	
22.	**Suspension of Business Dealings:** Withdrawal of offer after price bid opening or varying the same in any manner within the validity period, but before the placement of order will be liable for suitable action for suspension of further business with the vendor as per BHEL corporate procedures. e) Abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/vender.php (Guidelines for suspension of business dealings with suppliers/ contractors).	
23.	**Delivery Period:** • Delivery Period shall be 24 weeks from the Manufacturing clearance. • Manufacturing clearance for Main supply and commissioning spares for each Package will be provided **unit wise** based on Documents approval from Customer /BHEL and **site erection schedule**. CV test report to be submitted for BHEL review and approval before final inspection. • Manufacturing clearance for Mandatory Spares covered in all three packages will be issued tentatively by fourth quarter of FY 2022-23 only. • Unit wise item against each package shall be as per Annexure-E schedule of items. • Material shall be dispatched after obtaining dispatch clearance from BHEL.	
24.	**Documents are to be submitted along with technical bid (Part-1)** 01. Covering letter 02. Unpriced offer. 03. Filled technical specification and BHEL datasheets. 04. Filled BHEL Terms and condition sheet (Annexure-A) 05. Filled Annexure-B, C & D: PQR along with supporting documents. 06. Cv calculations and Cv curve 07. GA Drawing 08. Actuator sizing calculation 09. Catalogue's 10. Detailed BOQ of the package indicating the following: a. Set details of commissioning and mandatory spares. b. Breakup of special tools.	

	11. Third party non-disclosure agreement 12. Certification as per Make In India clause 13. MSE Certificates (if applicable) Documents are to be submitted along with Price bid (Part-2) 01. Priced offer **Note:** All the pages of documents are to be signed and sealed by authorized signatory of the company. Any query during enquiry stage shall be replied within three days failing which offer may be rejected as non-responsive.	
25.	**Offer Validity:** 120 days minimum from techno commercial bid opening (Part-1)	
26.	**Inspection and testing requirements:** Inspection and testing requirements are to be carried out as per the specification and BHEL/Customer approved Drawing, Technical spec &QP and all test certificates are to be submitted in complete set. Inspection notice period: For TPI inspector visit to vendor works, a minimum of 3 working days' notice period.	
27.	**O & M manuals:** BHEL require 1 sets of printed O & M manuals with 3 soft copies in CD-ROM at no cost to be sent to BHEL/ Trichy.	
28.	**Kindly indicate the GST No of your Firm**	
29.	**Kindly Indicate the HSN Code for all items**	
30.	**Please indicate the applicable GST % (IGST)**	
31.	Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GST registration number which should clearly have mentioned in the offer. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.	
32.	Supplier shall mention their GSTN registration number in all their invoices and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No which is linked/uploaded in GSTN network shall be clearly indicated), item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, etc.	
33.	All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).	
34.	Invoices will be processed only upon completion of statutory requirement and further subject to following: • Vendor declaring such invoice in Form GST ANX-1 • Receipt of Goods or Services and Tax invoice by BHEL	
35.	As the continuous uploading of tax invoices in GSTN portal (in GST ANX-1) is available for all (i.e. both Small & Large) tax payers under proposed new GST Return System, all invoices raised on BHEL may be uploaded immediately in GST portal on despatch of material	

	/rendering of services. The supplier shall ensure availability of Invoice in GST portal before submission of invoice to BHEL. Invoices will be admitted by BHEL only if the invoices are available in GSTN portal (in BHEL's GST ANX-2).	
36.	In case of discrepancy in the data uploaded by the supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note or debit note (details also to be uploaded in GSTN portal) for the shortages or rejections in the supplies or additional claims, within the calendar month informed by BHEL.	
37.	In cases where invoice details have been uploaded by the vendor but failed to remit the GST amount to GST Department (Form PMT-08 or Form GST RET-01 to be submitted) within stipulated time, then GST paid on the invoices pertaining to the month for which GST return not filed by the vendor will be recovered from the vendor along with the applicable interest (currently 24% p.a) and all subsequent bills of the vendor will not be processed till filing of the GST return by the vendor	
38.	In case GST credit is denied to BHEL due to non-receipt or delayed receipt of goods and/ or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount claimed in the invoice shall be disallowed to the vendor.	
39.	Where any GST liability arising on BHEL under Reverse Charge (RCM), the vendor has to submit the invoices to BHEL well within the timeline prescribed in GST Law, to enable BHEL to discharge the GST liability. If there is a delay in submission of invoice by the vendor resulting in delayed payment of GST by BHEL along with Interest, then such Interest payable or paid shall be recovered from the vendor.	
40.	Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contracts. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Tax Invoice will be issued by BHEL indicating the respective supply invoice number.	
41.	GST TDS will be deducted as per Section 51 of CGST Act 2017 and in line with Notification 50/2018 – Central Tax dated 13.09.2018. GST TDS certificate which will be generated in GST portal subsequent to vendor accepting the TDS deduction in the GST portal, will be issued to the vendor.	
42.	A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL	
43.	Recovery / deduction as applicable as per Direct and Indirect taxes as notified by Govt. Of India from time to time will be made and information/certificate for such deduction/recoveries shall be provided by BHEL to the vendor	
44.	**Duty benefits for import vendors**	

	a) Whether PTA/ CEPA or any other agreement/treaty between respective Governments/Countries exists and the same is applicable for your supplies w.r.t this Enquired Items/tender. b) If yes, mention the Concessional Customs Duty (Such Duty Benefits) % c) Documentary proof for the applicable Concessional Customs Duty (eg. PTA/ CEPA or other agreement) shall be submitted along with the Part-1 bid. d) Relevant documents and details to avail the above concessional duty benefits by BHEL shall be submitted by the supplier along with dispatch documents. e) In the event of seller failing to provide appropriate documents along with dispatch documents for purchasers to avail disclosed concessional duty benefits in India, financial loss, so incurred, will be to the seller's account. **Note:** Evaluation of the Price bids will be based on the above details only and unless mentioned/furnished by the vendor, Customs Duty benefit will not be applied for evaluation purposes.	YES / NO SUBMITTED/NOT SUBMITTED CONFIRMED/NOT CONFIRMED CONFIRMED/NOT CONFIRMED
45.	**MSE VENDOR:** ***i. If L1 vendor is an MSE vendor entire project package will be ordered on L1 vendor.*** ***ii. If a Non MSE vendor is coming as L1, then L1 prices will be counteroffered on MSE vendor who is quoting price within the price band L1+15% and if they are agreeing, purchase order will be awarded for full/complete supply of total tendered value to MSE.*** ***iii. If more than one MSE vendors are available in the L1+15% price band then lowest of the MSE vendor will be selected for counteroffering. If lowest MSE vendor is not accepting it will be counteroffered to the next MSE vendor in the price band and so on.*** ***iv. Finally if none of the MSE vendor in the price band is not accepting it will be ordered on L1 non MSE vendor.*** Payment for MSE Indigenous vendors will be as per MSMED Act, 2006 MSE suppliers can avail the intended benefits only if they submit along with the offer, attested/notarized copy of ***Udyam Registration certificate.*** **Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry, in case of any deficiency in the above required documents or in case the documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal even if submitted earlier.**	

46.	**Make in India:** For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/ Non- Local supplier and purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-Il bids against this NIT. **The 'Class-I local supplier'/ 'Class-II local supplier' shall submit along with Part-I bid a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.**	
47.	**Packing Requirements (for indigenous vendors):** • Packing should ensure the healthiness of the Equipment including all electrical Accessories which may be stored for longer period (up to 2 years) at Site conditions (open to atmosphere). • All openings (Fluid, Pneumatic & Electric) shall be firmly capped. • Items shall be packed in suitable enclosure (to prevent damage/rusting due to Seashore atmospheric conditions) from all four sides and also it should be covered with polythene to make it water proof. • Packing and struts shall be used to arrest rolling of items and to avoid transit damage. • Limit switches and such components shall be encapsulated properly with suitable material like Thermocol. • Suitable arrangement (lugs/hooks) for loading and unloading of the equipment in packed condition at site. **Packing Requirements (for import vendors):** • Packing shall be sea worthy.	
48.	**Conditions for Import Suppliers** The preferred shipment mode "**Containerized Cargo** or **Break Bulk**" shall be specified clearly in the offer. **FOR CFR INCO TERMS – CONTAINERIZED CARGO** o For CFR terms, moved through CONTAINERS (Suppliers should clearly specify this in their offer) it would be presumed by BHEL that the freight charges quoted is on LILO (LINER IN LINER OUT) basis including extra charges, if any, like Container Imbalance Charges, Trade Imbalance charges or any other charges payable to the Liner. No other charges other than the quoted Freight rate will be paid by BHEL excepting applicable Terminal Handling Charges, Container cleaning Charges, DO charges to Shipping Liner at Discharge Port. 14 FREE DAYS FOR Container detention shall be provided.	

	○ In case of shipment through Containers on CFR basis, the BL should bear the endorsement that "14 free days for Container Detention is applicable". **FOR BREAKBULK CARGO:** ○ For CFR terms, moved through BREAK BULK BASIS (Suppliers should clearly specify this in their offer) it would be presumed by BHEL that the freight charges quoted is on LILO (LINER IN LINER OUT) basis. ○ The materials will be Custom cleared from Port itself. **Important Information for Import Suppliers:** • Indian Customs has imposed a penalty on late filing of Bill of Entries (Air/Sea Shipments) by the importer. Bill of Entry is Required to be Filed Latest by the End of Day Preceding the Day (including Holidays) of Arrival of the Vessel for sea shipments and by the end of same day on arrival of air shipment. Penalty for not filing Bill of Entry within the specified time period is Rs.5000/- per day (for Initial 03 days) & Rs.10000/- per day (thereafter). • The vendor should submit the Non-Negotiable Documents (Air Way Bill/Bill of Lading, Commercial Invoice, Packing List, Certificate of Origin, etc.) either by email or post/courier to BHEL well before the landing of cargo at final port of discharge, giving sufficient lead time for BHEL to process the procedures that are to be done before arrival of vessel at discharge port. • Vendor will be held responsible for the penalty arises against the late filing of Bill Of entry due to: a. Non availability of Non-Negotiable Documents (NNDs) before the cargo arrival b. Discrepancy in documents c.Short landing of Consignments (For shipments on CFR/CPT/CIF/CIP – Chennai Port) • For all the shipments of the contracts (POs) finalized on CFR - Chennai Port basis: (i) Delivery Orders involving multiple agencies like liners/freight forwarders are not allowed. There must be a single agency office at the final discharge Port (Chennai) for issuing the Delivery Order to BHEL. (ii) The detention/demurrage charges arising due to the nomination of containers under single BL to different/ multiple CFS by the liner will be deducted from Vendor's bills only. (iii) The detention/demurrage charges arise due to the delay in collection of Delivery Orders from multiple agencies of liner/freight forwarder also whose offices are not at available	

Chennai, the same amount will be deducted from Vendor's bills only.

(iv) Apart from the normal charges like Terminal Handling Charges, Container cleaning Charges, Delivery Order Charges at final port of discharge no other charges will be borne by BHEL.

(v) The liner/freight forwarders should be properly communicated by the Vendor for not to claim such charges for issuing Delivery Order. If the liner/freight forwarder claims such charges in their invoices, the same amount will be deducted from the Vendor bills without any prior intimation in order to avoid the delay in Customs clearance. The likely additional/hidden costs or charges are:

- CIC - Container Imbalance Charges/Surcharges
- EIC - Equipment Imbalance Charge/Surcharges
- CAF - Container/Currency Adjustment Factor
- BAF - Bunker adjustment Factor
- RDS - Rupee Depreciation Surcharge
- CDS - Currency Depreciation Surcharge
- PCS - Port Congestion Surcharge
- LSS - Low Sulphur Surcharge
- Devanning Charges

Transport Conditions for Import:

The Original Documents (Bill of Lading, Invoice, Packing List, Certificate of Origin & Test Certificate) shall reach BHEL well in advance before the vessel arrival. The soft copies of the above shall be forwarded to BHEL immediately after shipment.

- 14 FREE DAYS for Container detention at final port of destination shall be provided and the same to be endorsed in the Bill of Lading. If there is no free day or less than 14 free days provided by the supplier, the actual cost incurred towards detention charges due to non-availability of above said free days will be recovered from the supplier Invoice.

- In the event of delayed submission of documents/ non-submission of documents by the supplier as per the mutually agreed terms, an amount up to 5% of the invoice value will be retained towards detention/ demurrage & other charges and the difference if any between actual charges and recovery will be settled separately through supplementary invoice.

- In such cases, the Supplier shall authorize the Steamer / Shipping agent / transporter to freely release the consignment to BHEL by providing a "Surrender Bill of Lading".

	○ Otherwise, No-objection Certificate shall be issued to the Liner, authorizing BHEL to get the Delivery Order without producing the Original Bill of Lading. ○ This is required to ensure avoidance of detention/ demurrage at Chennai Sea-port that may arise in case of delayed presentation of documents by the Seller.	
49.	**Fraud Prevention Policy** Bidder along with its associate /collaborators /sub-contractors /sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.	
50.	**Cartel Formation** All the firms should desist from forming cartel as the practice is prohibited under Section 3(3) (a) & (d) of the competition Act 2002. If any such instance is observed during this tender will attract disciplinary action as per BHEL policies.	
51.	**Resolution of Disputes** The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the contract/tender which the Parties are unable to settle mutually), arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof. Notes: 1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators. 2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Annexure X to this Terms and conditions. The Annexure X together with its appendices will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this terms and conditions.	

	Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the parties, in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, then, either Party may, by a notice in writing to other Party refer such dispute or difference to sole arbitration of an arbitrator appointed as per the Arbitration and Conciliation Act, 1996 (India) or statutory modification or re-enactment thereof and the rules made thereunder and for the time being in force. The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the parties. Subject as aforesaid, the provision of Arbitration & Conciliation Act 1996 (India) or statutory modification or re-enactment thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceeding under this clause. The seat of arbitration shall be Trichy, Tamil Nadu, India . The cost of arbitration shall be borne as per the award of the Arbitrator. Subject to arbitration in terms of clause above, the Courts at Trichy, Tamil Nadu, India shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract. Notwithstanding the existence or any dispute or difference and/or reference for the arbitration, the vendor shall proceed with and continue without hindrance the performance of its obligation under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract. <u>In Case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:</u> In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/Port Trusts inter se and also between CPSEs and Government Departments/Organizations (Excluding disputes concerning Railways, Income Tax, Customs & Excise Departments, such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in DPE OM No. 4(1)/2013 –DPE (GM)/FTS-1835 dated 22-05-2018.	
52.	**<u>Force Majeure clause</u>**	

	a. Notwithstanding the provisions contained in other clauses, the supplier shall not be liable for imposition of any such sanction so long the delay and/or failure of the supplier in fulfilling its obligations under the contract is the result of an event of Force Majeure. For purposes of this clause, Force Majeure means an event beyond the control of the supplier and not involving the supplier's fault or negligence and which is not foreseeable and not brought about at the instance of the party claiming to be affected by such event and which has caused the non – performance or delay in performance. Such events may include, but are not restricted to, wars or revolutions, hostility, acts of public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes excluding by its employees, lockouts excluding by its management, freight embargoes and Acts of GOD. b. If a Force Majeure situation arises, the supplier shall promptly notify the Purchaser/Consignee in writing of such conditions and the cause thereof within twenty-one days of occurrence of such event. Unless otherwise directed by the Purchaser/Consignee in writing, the supplier shall continue to perform its obligations under the contract as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event. c. If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of Force Majeure for a period exceeding sixty days, either party may at its option terminate the contract without any financial repercussion on either side. d. In case due to a Force Majeure event the Purchaser/Consignee is unable to fulfil its contractual commitment and responsibility, the Purchaser/Consignee will notify the supplier accordingly and subsequent actions taken on similar lines described in above sub-paragraphs.	
Note	1. In the event of our customer order covering this tender being cancelled /placed on hold / otherwise modified, BHEL would be constrained to accordingly cancel / hold / modify the tender at any stage of execution. 2. BHEL may negotiate the L1 rate, if not meeting our budget / estimated cost. BHEL may re-float the tender opened, if L1 price is not acceptable to BHEL. Any deviation in specified commercial terms- Annexure-A, will lead to rejection of offer. 3. BHEL reserves its right to reject an offer due to unsatisfactory past performance by the respective Vendor in the execution of any contract to any BHEL project / Unit. 4. **Any other Techno –Commercial Terms indicated by the vendor in their offer elsewhere will be ignored. BHEL will proceed with tender evaluation as per Annexure-A only.**	

Annexure-B

Project: UDANGUDI 2x660MW Cust No: 1729 & 1730

Qualification and proveness criteria requirement for Startup control valves.

Sl no	BHEL Requirements	Vendor Confirmation / Comments
1.	The bidder should have supplied control valves of Z type and of minimum 16 inch valve size with the required valve material (F11 or superior material) and rating as per this specification requirement and the same valves should have been commissioned in at least one plant of sub / super critical steam generating units with an operating pressure more than 255 kg/cm2 in similar applications mentioned in our specification and are in successful operation for a period of not less than 1 year as on the date of techno-commercial bid opening. Note: The bidder can also offer such Valve manufactured under collaboration or with a valid licensing agreement for design, engineering, manufacture and supply of such Valve in India along with necessary document mentioned below from the collaborator.	Confirmed / Not confirmed
2.	The supplier has to submit anyone of the following supporting documents meeting the above requirement in Sl. No.1. a) Copy of minimum one (1) performance certificate in English from end user along with copy of related PO/LOI/LOA/WO specifying that the product / equipment is running successfully for one (1) year from date of commissioning meeting the requirement. b) Minimum two PO/LOI/LOA/WO placed with a minimum gap of one (1) year from same purchaser meeting the requirement. c) Minimum three customer's/ third party's inspection reports/ test certificates/ commissioning certificates meeting the requirement.	Submitted / Not Submitted Submitted / Not Submitted Submitted / Not Submitted

3.	Boiler start-up valves often experience debris, because the water separator is likely to collect the debris of the boiler. On the other hand, the valve has to be in a completely tight closed position for long operating periods during dry mode of boiler operation. If the trim parts slightly damaged by debris, then continuous leakage of flashing water will quickly erode the trim parts and further increase the leakage. This will lead to severe damage of the valve. Therefore, the trim design should prevent particle being trapped in the trim parts and subsequent damage to the trim parts and seals.	Confirmed / Not confirmed
	a) Vendor to provide confirmation that the offered trim design will not get damaged due to particle entrapment.	**Confirmed** / **Not confirmed**
	b) Vendor to confirm that the valve trim design offered meeting the requirement against Sl.No.3, was in successful operation for a period of not less than 1 year as on the date of techno-commercial bid opening.	**Confirmed** / **Not confirmed**
	c) The supplier has to submit **anyone** of the following supporting documents meeting the requirement under 3.b.	
	i. Copy of minimum one (1) performance certificate in English from end user along with copy of related PO/LOI/LOA/WO specifying that the product / equipment is running successfully for one (1) year from date of commissioning.	Submitted / Not Submitted
	ii. Minimum two PO/LOI/LOA/WO placed with a minimum gap of one (1) year from same purchaser.	Submitted / Not Submitted
	iii. Minimum three customer's/ third party's inspection reports/ test certificates/ commissioning certificates.	Submitted / Not Submitted
	(d) If the vendor is unable to confirm Sl.No.3.b, for the offered trim design which could have been an improved version as a part of their continuous improvement process, the vendor must agree to provide warranty with respect to trouble free operation of the valve and accessories even with **the presence of debris for a period up to 5 years after the successful completion of COD of the** respective boiler.	Confirmed / Not Applicable

Abbreviation:
(PO) - Purchase order, (LOI) –Letter of Intent, (LOA) - Letter of award, (WO) - Work order

Annexure-C

Project: YADADRI 5X800MW Cust. No: 1823 TO 1827

Qualification and proveness criteria requirement for Startup control valves.

Sl no	BHEL Requirements	Vendor Confirmation / Comments
1.	The bidder should have supplied control valves of Z type and of minimum 18 inch valve size with the required valve material (F11 or superior material) and rating as per this specification requirement and the same valves should have been commissioned in at least one plant of sub / super critical steam generating units with an operating pressure more than 255 kg/cm2 in similar applications mentioned in our specification and are in successful operation for a period of not less than 1 year as on the date of techno-commercial bid opening. Note: The bidder can also offer such Valve manufactured under collaboration or with a valid licensing agreement for design, engineering, manufacture and supply of such Valve in India along with necessary document mentioned below from the collaborator.	Confirmed / Not confirmed
2.	The supplier has to submit anyone of the following supporting documents meeting the above requirement in Sl. No.1. a) Copy of minimum one (1) performance certificate in English from end user along with copy of related PO/LOI/LOA/WO specifying that the product / equipment is running successfully for one (1) year from date of commissioning meeting the requirement. b) Minimum two PO/LOI/LOA/WO placed with a minimum gap of one (1) year from same purchaser meeting the requirement. c) Minimum three customer's/ third party's inspection reports/ test certificates/ commissioning certificates meeting the requirement.	Submitted / Not Submitted Submitted / Not Submitted Submitted / Not Submitted

3.	Boiler start-up valves often experience debris, because the water separator is likely to collect the debris of the boiler. On the other hand, the valve has to be in a completely tight closed position for long operating periods during dry mode of boiler operation. If the trim parts slightly damaged by debris, then continuous leakage of flashing water will quickly erode the trim parts and further increase the leakage. This will lead to severe damage of the valve. Therefore, the trim design should prevent particle being trapped in the trim parts and subsequent damage to the trim parts and seals.	Confirmed / Not confirmed
	a) Vendor to provide confirmation that the offered trim design will not get damaged due to particle entrapment.	**Confirmed** / **Not confirmed**
	b) Vendor to confirm that the valve trim design offered meeting the requirement against Sl.No.3, was in successful operation for a period of not less than 1 year as on the date of techno-commercial bid opening.	**Confirmed** / **Not confirmed**
	c) The supplier has to submit **anyone** of the following supporting documents meeting the requirement under 3.b.	
	i. Copy of minimum one (1) performance certificate in English from end user along with copy of related PO/LOI/LOA/WO specifying that the product / equipment is running successfully for one (1) year from date of commissioning.	Submitted / Not Submitted
	ii. Minimum two PO/LOI/LOA/WO placed with a minimum gap of one (1) year from same purchaser.	Submitted / Not Submitted
	iii. Minimum three customer's/ third party's inspection reports/ test certificates/ commissioning certificates.	Submitted / Not Submitted
	(d) If the vendor is unable to confirm Sl.No.3.b, for the offered trim design which could have been an improved version as a part of their continuous improvement process, the vendor must agree to provide warranty with respect to trouble free operation of the valve and accessories even with **the presence of debris for a period up to 5 years after the successful completion of COD of the** respective boiler.	Confirmed / Not Applicable

Abbreviation:
(PO) - Purchase order, (LOI) –Letter of Intent, (LOA) - Letter of award, (WO) - Work order

Annexure-D

Project: PATRATU 3x800MW Cust No: 1828, 1829 & 1830

Qualification and proveness criteria requirement for Startup control valves.

Sl no	BHEL Requirements	Vendor Confirmation / Comments
1.	The bidder should have supplied control valves of Z type and of minimum 18 inch valve size with the required valve material (F11 or superior material) and rating as per this specification requirement and the same valves should have been commissioned in at least one plant of sub / super critical steam generating units with an operating pressure more than 255 kg/cm2 in similar applications mentioned in our specification and are in successful operation for a period of not less than 1 year as on the date of techno-commercial bid opening. Note: The bidder can also offer such Valve manufactured under collaboration or with a valid licensing agreement for design, engineering, manufacture and supply of such Valve in India along with necessary document mentioned below from the collaborator.	Confirmed / Not confirmed
2.	The supplier has to submit anyone of the following supporting documents meeting the above requirement in Sl. No.1. a) Copy of minimum one (1) performance certificate in English from end user along with copy of related PO/LOI/LOA/WO specifying that the product / equipment is running successfully for one (1) year from date of commissioning meeting the requirement. b) Minimum two PO/LOI/LOA/WO placed with a minimum gap of one (1) year from same purchaser meeting the requirement. c) Minimum three customer's/ third party's inspection reports/ test certificates/ commissioning certificates meeting the requirement.	Submitted / Not Submitted Submitted / Not Submitted Submitted / Not Submitted

3.	Boiler start-up valves often experience debris, because the water separator is likely to collect the debris of the boiler. On the other hand, the valve has to be in a completely tight closed position for long operating periods during dry mode of boiler operation. If the trim parts slightly damaged by debris, then continuous leakage of flashing water will quickly erode the trim parts and further increase the leakage. This will lead to severe damage of the valve. Therefore, the trim design should prevent particle being trapped in the trim parts and subsequent damage to the trim parts and seals.	Confirmed / Not confirmed
	a) Vendor to provide confirmation that the offered trim design will not get damaged due to particle entrapment.	**Confirmed** / **Not confirmed**
	b) Vendor to confirm that the valve trim design offered meeting the requirement against Sl.No.3, was in successful operation for a period of not less than 1 year as on the date of techno-commercial bid opening.	**Confirmed** / **Not confirmed**
	c) The supplier has to submit **anyone** of the following supporting documents meeting the requirement under 3.b.	
	i. Copy of minimum one (1) performance certificate in English from end user along with copy of related PO/LOI/LOA/WO specifying that the product / equipment is running successfully for one (1) year from date of commissioning.	Submitted / Not Submitted
	ii. Minimum two PO/LOI/LOA/WO placed with a minimum gap of one (1) year from same purchaser.	Submitted / Not Submitted
	iii. Minimum three customer's/ third party's inspection reports/ test certificates/ commissioning certificates.	Submitted / Not Submitted
	(d) If the vendor is unable to confirm Sl.No.3.b, for the offered trim design which could have been an improved version as a part of their continuous improvement process, the vendor must agree to provide warranty with respect to trouble free operation of the valve and accessories even with **the presence of debris for a period up to 5 years after the successful completion of COD of the** respective boiler.	Confirmed / Not Applicable

Abbreviation:
(PO) - Purchase order, (LOI) –Letter of Intent, (LOA) - Letter of award, (WO) - Work order

Annexure-E: Schedule of Items				
RFQ SL. NO.	**MATERIAL CODE**	**ITEM DESCRIPTION**	**QTY**	**UNIT**
PACKAGE-I UDANGUDI 2X660MW PROJECT				
MAIN SUPPLY AND COMMISSIONING SPARES FOR TWO UNITS Refer Annexure-E1 for unit-wise split up				
10	L172912486701001	SEPERATOR LEVEL CONTROL VALVE ASSEMBLY (SLCV)	4	SET
20	L172912486701002	MINIMUM ECONOMISER FLOWCONTROL VALVE ASSY (MEFCV)	2	SET
30	L172912486701003	COMMON ELECTRO HYDRAULIC CONTROL UNIT.	2	SET
40	L172912486701004	SPECIAL TOOLS	2	SET
50	L172912486701005	TUBINGS AND FITTINGS	2	SET
60	L172912486701006	FILLS OF HYDRAULIC FLUID	4	SET
70	L172982498802001	COMMISSIONING SPARES FOR EACH VALVE(START-UP CVS)	2	SET
MANDATORY SPARES (Common for Two units)				
80	L1729S2486701017	ELECTRO-HYDRAULIC ACTUATOR FOR MEFCV	1	LOT
90	L1729S2486701018	ELECTRO-HYDRAULIC ACTUATOR FOR SLCV	1	LOT
100	L1729S2486701019	VALVE TRIM (INCL.CAGE, PLUG, STEM) FOR MEFCV	1	SET
110	L1729S2486701020	VALVE TRIM (INCL.CAGE, PLUG, STEM) FOR SCV	1	LOT
120	L1729S2486701021	DIAPHRAGMS, O' RINGS, SEAL FOR MEFCV	2	LOT
130	L1729S2486701022	DIAPHRAGMS, O' RINGS, SEAL FOR SLCV	4	LOT
140	L1729S2486701023	PRESSURE GAUGES FOR MEFCV	2	LOT
150	L1729S2486701024	PRESSURE GAUGES FOR SLCV	2	LOT
160	L1729S2486701025	SOLENOID VALVES FOR MEFCV	2	LOT
170	L1729S2486701026	SOLENOID VALVES FOR SLCV	2	LOT
180	L1729S2486701027	POSITIONER UNITS(COMPLETE UNIT)FOR MEFCV	1	LOT
190	L1729S2486701028	POSITIONER UNITS(COMPLETE UNIT)FOR SLCV	1	LOT
200	L1729S2486701029	POSITION FEEDBACK TRANSMITTERS FOR MEFCV	2	LOT
210	L1729S2486701030	POSITION FEEDBACK TRANSMITTERS FOR SLCV	2	LOT
220	L1729S2486701031	TORQUE& LIMIT SWITCH ASSEMBLY FOR MEFCV	2	LOT
230	L1729S2486701032	TORQUE& LIMIT SWITCH ASSEMBLY FOR SLCV	2	LOT

Annexure-E: Schedule of Items				
RFQ SL. NO.	**MATERIAL CODE**	**ITEM DESCRIPTION**	**QTY**	**UNIT**
PACKAGE-II YADADRI 5X800MW PROJECT				
MAIN SUPPLY AND COMMISSIONING SPARES FOR FIVE UNITS Refer Annexure-E2 for unit-wise split up				
240	L182312486701001	SEPERATOR LEVEL CONTROL VALVE ASSEMBLY (SLCV).	10	SET
250	L182312486701002	MINIMUMECONOMISER FLOWCONTROL VALVE ASSY (MEFCV)	5	SET
260	L182312486701003	COMMON ELECTRO HYDRAULIC CONTROL UNIT.	5	SET
270	L182312486701004	SPECIAL TOOLS	5	SET
280	L182312486701005	TUBINGS AND FITTINGS	5	SET
290	L182312486701006	FILLS OF HYDRAULIC FLUID	10	SET
300	L182382498804001	COMM SPARES FOR EACH VALVE	5	SET
MANDATORY SPARES (Common for Five units)				
310	L1823S2486701001	SMART POSITIONERS/ POSITIONER FOR SLCV	2	NO
320	L1823S2486701033	SMART POSITIONERS/ POSITIONER FOR MEFCV	2	NO
330	L1823S2486701034	COMPLETE CONSUMABLES FOR SLCV	4	SET
340	L1823S2486701035	COMPLETE CONSUMABLES FOR MEFCV	4	SET
350	L1823S2486701036	VALVE DISC FOR SLCV	4	SET
360	L1823S2486701037	VALVE DISC FOR MEFCV	4	SET
370	L1823S2486701038	VALVE SPINDLE FOR SLCV	4	SET
380	L1823S2486701039	VALVE SPINDLE FOR MEFCV	4	SET
390	L1823S2486701040	VALVE SEAT FOR SLCV	4	SET
400	L1823S2486701041	VALVE SEAT FOR MEFCV	4	SET
410	L1823S2486701042	BUSH FOR SLCV	4	SET
420	L1823S2486701043	BUSH FOR MEFCV	4	SET
430	L1823S2486701044	GUIDE FOR SLCV	4	SET
440	L1823S2486701045	GUIDE FOR MEFCV	4	SET
450	L1823S2486701046	COUPLING NUT FOR SLCV	4	SET
460	L1823S2486701047	COUPLING NUT FOR MEFCV	4	SET
470	L1823S2486701048	ACTUATOR PISTON WITH ROD & SEAL FOR SLCV	4	SET
480	L1823S2486701049	ACTUATOR PISTON WITH ROD & SEAL FOR MEFCV	4	SET
490	L1823S2486701050	STEM PACKING AND RUBBER DIAPHRAGMS FOR SLCV	2	SET
500	L1823S2486701051	STEM PACKING AND RUBBER DIAPHRAGMS FOR MEFCV	2	SET
510	L1823S2486701052	VALVE TRIM FOR SLCV	2	SET
520	L1823S2486701053	VALVE TRIM FOR MEFCV	2	SET
530	L1823S2486701054	SOLENOID VALVES FOR SLCV	2	NO
540	L1823S2486701055	SOLENOID VALVES FOR MEFCV	2	NO
550	L1823S2486701056	POSITION TRANSMITTERS FOR SLCV	2	NO
560	L1823S2486701057	POSITION TRANSMITTERS FOR MEFCV	2	NO
570	L1823S2486701058	LIMIT SWITCHES FOR SLCV	2	NO
580	L1823S2486701059	LIMIT SWITCHES FOR MEFCV	2	NO
590	L1823S2486701060	GUIDE BUSH FOR SLCV	4	NO

Annexure-E: Schedule of Items				
RFQ SL. NO.	**MATERIAL CODE**	**ITEM DESCRIPTION**	**QTY**	**UNIT**
PACKAGE-III PATRATU 3X800MW PROJECT				
MAIN SUPPLY AND COMMISSIONING SPARES FOR THREE UNITS Refer Annexure-E3 for unit-wise split up				
600	L182812486701001	SEPERATOR LEVEL CONTROL VALVE ASSEMBLY. (SCV)	6	SET
610	L182812486701002	MINIMUMECONOMISER FLOWCONTROL VALVE ASSY	3	SET
620	L182812486701003	COMMON ELECTRO HYDRAULIC CONTROL UNIT.	3	SET
630	L182812486701004	SPECIAL TOOLS	3	SET
640	L182812486701005	TUBINGS AND FITTINGS	3	SET
650	L182812486701006	FILLS OF HYDRAULIC FLUID	6	SET
660	L182882498802001	COMM SPARES FOR START UP CONTROL VALVES	3	SET
MANDATORY SPARES (Common for Five units)				
670	L1828S2486701001	E/H ACTUATOR FOR SEPARATOR LVL CTRL VAL	1	NO
680	L1828S2486701002	E/H ACTUATOR FOR MEFCV	1	NO
690	L1828S2486701003	DIAPHRAGMS,ORINGS FOR SEP LVL CTRL VAL	2	SET
700	L1828S2486701004	DIAPHRAGMS,ORINGS FOR MEFCV	2	SET
710	L1828S2486701005	PRESSURE GAUGE FOR SEP LVL CTRL VAL	2	NO
720	L1828S2486701006	PRESSURE GAUGE FOR MEFCV	2	NO
730	L1828S2486701007	SOLENOID VALVE FOR SEP LVL CONTROL VALVE	2	NO
740	L1828S2486701008	SOLENOID VALVE FOR MEFCV	2	NO
750	L1828S2486701009	POSITIONER/SMART POSITIONER- SEP LVL CTR	1	NO
760	L1828S2486701010	POSITIONER/SMART POSITIONER- MEFCV	1	NO
770	L1828S2486701011	PNEUMATIC AIR FITER/REGULATOR(IF APPLIC)	2	NO
780	L1828S2486701012	AIR LOCK RELAY (IF APPLICABLE)	2	NO

Annexure-E1 Unit wise split up for Udangudi Project						
RFQ SL. NO.	**MATERIAL CODE**	**ITEM DESCRIPTION**	**QTY FOR UNIT-1**	**QTY FOR UNIT-2**	**TOTAL QTY**	**UNIT**
10	L172912486701001	SEPERATOR LEVEL CONTROL VALVE ASSEMBLY (SLCV)	2	2	4	SET
20	L172912486701002	MINIMUM ECONOMISER FLOWCONTROL VALVE ASSY (MEFCV)	1	1	2	SET
30	L172912486701003	COMMON ELECTRO HYDRAULIC CONTROL UNIT.	1	1	2	SET
40	L172912486701004	SPECIAL TOOLS	1	1	2	SET
50	L172912486701005	TUBINGS AND FITTINGS	1	1	2	SET
60	L172912486701006	FILLS OF HYDRAULIC FLUID	2	2	4	SET
70	L172982498802001	COMMISSIONING SPARES FOR EACH VALVE(START-UP CVS)	1	1	2	SET

Annexure-E2 Unit wise split up for Yadadri Project									
RFQ SL. NO.	**MATERIAL CODE**	**ITEM DESCRIPTION**	**QTY FOR UNIT-1**	**QTY FOR UNIT-2**	**QTY FOR UNIT-3**	**QTY FOR UNIT-4**	**QTY FOR UNIT-5**	**TOTAL QTY**	**UNIT**
240	L182312486701001	SEPERATOR LEVEL CONTROL VALVE ASSEMBLY (SLCV).	2	2	2	2	2	10	SET
250	L182312486701002	MINIMUM ECONOMISER FLOW CONTROL VALVE ASSY (MEFCV)	1	1	1	1	1	5	SET
260	L182312486701003	COMMON ELECTRO HYDRAULIC CONTROL UNIT.	1	1	1	1	1	5	SET
270	L182312486701004	SPECIAL TOOLS	1	1	1	1	1	5	SET
280	L182312486701005	TUBINGS AND FITTINGS	1	1	1	1	1	5	SET
290	L182312486701006	FILLS OF HYDRAULIC FLUID	2	2	2	2	2	10	SET
300	L182382498804001	COMM SPARES FOR EACH VALVE	1	1	1	1	1	5	SET

Annexure-E3 Unit wise split up for Patratu Project							
RFQ SL. NO.	**MATERIAL CODE**	**ITEM DESCRIPTION**	**QTY FOR UNIT-1**	**QTY FOR UNIT-2**	**QTY FOR UNIT-3**	**TOTAL QTY**	**UNIT**
600	L182812486701001	SEPERATOR LEVEL CONTROL VALVE ASSEMBLY. (SCV)	2	2	2	6	SET
610	L182812486701002	MINIMUMECONOMISER FLOWCONTROL VALVE ASSY	1	1	1	3	SET
620	L182812486701003	COMMON ELECTRO HYDRAULIC CONTROL UNIT.	1	1	1	3	SET
630	L182812486701004	SPECIAL TOOLS	1	1	1	3	SET
640	L182812486701005	TUBINGS AND FITTINGS	1	1	1	3	SET
650	L182812486701006	FILLS OF HYDRAULIC FLUID	2	2	2	6	SET
660	L182882498802001	COMM SPARES FOR START UP CONTROL VALVES	1	1	1	3	SET

ENGINEERING SPECIFICATION

FOR

STARTUP CONTROL VALVES

SPECIFICATION NO: BM/SCV: 001

Prepared by:	Reviewed by:	Approved by:
A.JAIGANESH Sr.Engineer PE / FB (BM)	I.GOPALAN Manager PE / FB (BM)	K.PERIASAMY Dy.General Manager PE / FB (BM)

Revision Log — Template Form Revision No.: 00

Revision No.	Date	Reason	Prepared		Reviewed		Approved	
			Name	Sign	Name	Sign	Name	Sign.
01	19.01.13	C&I comments	A.Jai Ganesh		Gopalan.I		K.Perisamy	
02	07.03.14	Standardization	A.Jai Ganesh		K.Sridharan		K.Perisamy	
03	30.01.17	Site Feedbacks	A.Jai Ganesh		V.Gunasekaran		K.Sridharan	
04	30.03.17	Update	Saji. P.J		A.JaiGanesh		K.Sridharan	
05	11.07.19	Site Feedback	Pinisetty Raviraja		A.Jai Ganesh		V.Gunasekaran	
06	12.05.20	Site Feedback	Prateek Kumar Jain		A.Jai Ganesh		V.Gunasekaran	
07	05.06.20	Site Feedback	Prateek Kumar Jain		A.Jai Ganesh		V.Gunasekaran	

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1.0 PURPOSE

1.1 This Specification defines the minimum, acceptable requirements for the design and performance of one pair of BOILER SEPARATOR LEVEL CONTROL VALVES (HWL-1, HWL-2 VALVES) and one BOILER MINIMUM ECONOMIZER FLOW CONTROL VALVE (MEFCV VALVE) for a coal fired, supercritical, steam generating unit.

2.0 SCOPE OF WORK

2.1 Supplier shall provide equipment and components in accordance with the approved suppliers listed in this specification, unless otherwise approved by BHEL. Equipment or components not listed shall be Supplier's standard.

2.2 For skid mounted assemblies, all instrumentation and control wiring connections by BHEL to Supplier's equipment shall be external to the equipment on numbered terminal strips in junction boxes or electrical panels.

2.3 All piping furnished by the Supplier shall be provided in ISO standard sizes in nominal Metric units (DN sizes). All weld end preparations, socket weld couplings, threaded connections, flange sizes and ratings, at BHEL/Supplier terminal points shall comply with ISO standards in Metric units and also as per the data sheet.

2.4 Nozzles shall be prepared for connection with BHEL piping as follows:

- Welded connections 50 NB and smaller shall be socket weld connections in accordance with the requirements of ASME B16.11.
- Welded connections 65NB and above shall be butt weld connections. Butt weld ends shall be beveled for welding in accordance with the requirements of BHEL.

2.5 All flanged connections shall be supplied in accordance with the requirements of ASME B16.5.

2.6 All materials shall be new and in accordance with applicable ASTM specifications or with other recognized standards such as SAE. No peening, caulking or filling shall be permitted in repairing cracks, pin-holes or blow-holes. Defects in fabricated steel shall be repaired by chipping out welds to bottom of vee and re-welding.

2.7 The use of asbestos or material containing asbestos shall not be permitted. The use of mercury or material containing mercury shall not be permitted. All nonmetallic materials shall be noted to BHEL for approval.

2.8 The equipment and materials specified are intended to be the minimum suitable for the intended service. They are not intended to limit the Supplier's responsibility for proper design and selection of equipment. It is the Supplier's responsibility to bid a complete system for the intended service and the specification is only for general guidelines. Any changes in proposed equipment or materials during design shall be approved by BHEL.

2.9 All quotations and attachments submitted to BHEL shall be in the English language.

2.10 All quotations and inquiries to BHEL shall be routed through Purchase department- Materials Management/BOI.

2.11 Parts subject to wear, corrosion, deterioration or requiring adjustment, inspection or repair shall be accessible and capable of reasonably convenient removal, replacement and repair.

2.12 The Supplier shall complete and submit the Supplier Data Sheets and guarantees located in Section 10.0 of this specification with the equipment offered in full conformance with the specification. The Supplier shall provide a complete written description of all omissions or exceptions to the requirements of this specification. This written description must be included in Section 11.0 EXCEPTIONS TO THE SPECIFICATION of this specification. Without the complete data sheets and the EXCEPTIONS TO THE SPECIFICATION sheets, the proposal will not be evaluated.

2.13 Optional equipment shall be priced separately.

2.14 The Supplier shall be governed by the following regulations, codes, and standards, including their latest respective addenda, amendments, and errata.

AFBMA	Antifriction Bearing Manufacturers' Association
AGMA	American Gear Manufacturers' Association
AHI	American Hydraulic Institute
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society Mechanical Engineers

ASTM	American Society Testing and Materials
AWS	American Welding Society
EIA	Electronics Industries Association
FCI	Fluid Controls Institute, Inc.
IEC	International Electro technical Commission
IEEE	Institute of Electrical and Electronics Engineers
IPCEA	International Power Cable Engineers Association
ISA	Instrumentation Society of America
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry
NEMA	National Electrical Manufacturers' Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
OSHA	Occupational Safety Health Act
PFI	Pipe Fitting Institute
SAMA	Scientific Apparatus Makers Association
SSPC	Steel Structures Painting Council
UL	Underwriter's Laboratories

In addition to the codes and standards specifically mentioned above for the equipment / plant / system, all equipment parts, systems and works covered under this specification shall comply with all currently applicable statutory regulations and safety codes of the Republic of India as well as of the locality where they will be installed, including the following:

a) Bureau of Indian Standards (BIS)
b) Indian Electricity Act
c) Indian Electricity Rules
d) Indian Explosives Act
e) Indian Factories Act and State Factories Act
f) Indian Boiler Regulations (IBR)
g) Rules for Electrical installation by Tariff Advisory Committee (TAC).
h) Any other statutory codes / standards / regulations, as may be applicable.

Unless covered otherwise by Indian codes & standards and in case nothing to the contrary is specifically mentioned elsewhere in the specifications, the latest editions of the following codes and standards shall also apply:

a) American Petroleum Institute (API)
b) International Organization for Standardization (ISO)
c) Tubular Exchanger Manufacturer's Association (TEMA)
d) American Welding Society (AWS)
e) Expansion Joint Manufacturers Association (EJMA)
f) Heat Exchange Institute (HEI)
g) Standards of the Hydraulic Institute, U.S.A.

Other International/ National standards such as DIN, VDI, BS, GOST etc. shall also be accepted for only material codes and manufacturing standards, subject to the Employer's approval, for which the Supplier shall furnish, adequate information to justify that these standards are equivalent or superior to the standards mentioned above. In all such cases the Supplier shall furnish specifically the variations and deviations from the standards mentioned elsewhere in the specification together with the complete word for word translation of the standard that is normally not published in English.

3.0 APPLICABLE CODES & STANDARDS

3.1 The valves shall comply with the applicable requirements of the latest edition of ASME B31.1, Power Piping Code.

3.2 Valve design in accordance with ASME B16.34.

3.3 The valve sizing shall be in compliance with latest edition of ISA 75.01 Hand book on Control Valves considering measures to avoid choked flow.

3.4 All pressure retaining parts of the valve shall be made of materials, including specific limitations on various materials that are in full compliance with PG.-5 of ASME Code Section 1.

3.5 Materials- Only materials listed and rated in B16.34 are acceptable and materials offered shall be appropriate to the design conditions listed.

3.6 For valves manufactured other than standards listed above, the Supplier shall specify (at the time of quotation) the Codes and Standards which will be used through the manufacturing and design processes. The Codes and Standards as specified will be subject to approval by **BHEL.**

3.7 Reference to the above Codes and Standards shall mean the latest revision, edition and addenda effective at the date of order unless specifically stated otherwise in this specification.

3.8 All welders and all welding procedures welders utilized shall be qualified in accordance with ASME Section IX. When welders and welding procedures are qualified in accordance with codes other than those specified, the Supplier must take exception at the time of quotation.

3.9 All materials shall be readily identifiable. Mill test reports shall be obtained for all pressure boundary parts. These test reports shall be available for

review at the Vendor's shops. Copies of these are to be supplied to the Company, if requested, prior to ordering.

3.10 Valve Revisions at supplier end

Supplier shall fabricate the valves based on the drawings approved by BHEL. If the valve design requires modification due to Supplier error during the Supplier tests or QA inspection, the Supplier will correct the design and reflect these changes in the AS-BUILT revision of the drawings.

4.0 EQUIPMENT FURNISHED BY SUPPLIER

4.1 Two (2) BOILER SEPARATOR LEVEL CONTROL VALVES (HWL-1, HWL-2 VALVES) complete with hydraulic actuator and associated positioning controls as per this specification.

4.2 One (1) BOILER MINIMUM ECONOMIZER FLOW CONTROL VALVE (MEFCV) complete with hydraulic actuator and associated positioning controls as per this specification.

4.3 One (1) Common Hydraulic Unit and Electronic Control Unit for the positioning control of the two BOILER SEPARATOR LEVEL CONTROL VALVES (HWL-1, HWL-2 VALVES) and Minimum Economizer Flow Control Valve (MEFCV) as per this specification.

4.4 Optional Equipment

4.4.1 The following equipment shall be proposed as an option.

☒ One *(1)* stainless steel tubing, fittings and necessary supports to connect all necessary hydraulic lines between the SUPPLIER supplied Common Hydraulic Unit and the SUPPLIER supplied two BOILER SEPARATOR LEVEL CONTROL VALVES (HWL-1, HWL-2 VALVES) and one Minimum Economizer Flow Control Valve (MEFCV) hydraulic actuators. Each Valve location from the common hydraulic unit shall be referred from the project specific data sheet (Annexure I).

i. Hydraulic Unit to HWL1 - refer Annexure II
ii. Hydraulic Unit to HWL2 - refer Annexure II
iii. Hydraulic Unit to MEFCV - refer Annexure II

☒ *Two (2)* fills of hydraulic fluid, first for start up and second for hydraulic fluid change prior to operation.

☒ Following special tools are must.

a) Flushing kit for valves.

b) Flushing kit for Hydraulic system including the flushing device. Flushing filter, Flushing Filter elements, hose pipes & valves to be supplied as spares along with the flushing kit.

c) N2 filling kit – Used for charging of accumulators with N2 as well as pressure checking and adjustment

d) *One (1)* lot of all tools that are required for assembly, disassembly and maintenance of system components. Bidder shall not assume that certain tools will be available locally at site. In case of problems arising during hydro test /assembly / maintenance at later stage, it will be supplier responsibility to resolve at no extra cost to BHEL. (The list of tools not specified as required items varies from supplier to supplier). The supply shall furnish the following but not limited to the mentioned, all tools and torque wrenches, suitable sockets and extension bars, double wrenches, screwdrivers, tapes etc., required for erection, calibration, servicing including instructions for their use. Tools shall be new. Tools shall be shipped to the project site in a suitable, separate container, clearly marked with the name of the equipment for which they are intended.

☒ *One (1)* lot of commissioning spares for each valve per SUPPLIER'S specific recommendation.

☒ ~~*One (1)* lot of recommended spares for each valve per SUPPLIER'S specific recommendation for One (1) year warranty period of operation~~ (Dealt By Spares Group)

☒ ~~*One (1) lot of recommended spares per SUPPLIER's specific recommendation for Three (3) years of operation after final acceptance*~~ (Dealt By Spares Group)

5.0 TERMINAL POINTS

5.1 At all valve inlets and outlets.

5.2 At the terminal junction boxes on each supplied valve, the terminals in the hydraulic power unit, and the terminals in the control cabinet.

6.0 FACILITY SITE SPECIFIC DATA

Please refer to attached specifications Annexure-II for Facility Site Specific Data (if applicable) and Annexure-III for Surface Preparations and Coatings requirements (if applicable).

7.0 DRAWINGS AND DATA BY SUPPLIER

7.1 Detailed Calculations to demonstrate the suitability of the selected valve for the application.

7.1.1 Cavitation in case the valve is for liquid application.
7.1.2 Noise and Vibration.
7.1.3 Flashing in case the valve is for saturated liquid application.
7.1.4 Valve sizing calculations.(Cv, valve outlet velocity)
7.1.5 Actuator sizing calculations

7.2 All drawings, calculations, specifications, bills of materials and other data submitted shall be in Metric units. Dual Dimensions are acceptable with Metric (primary) and English (in parenthesis). Metric units shall comply with the International SI System.

7.2.1 The following units are to be used for main parameters:

- Temperature °C
- Pressure kg /ocm^2 (g)
- Dimensions mm
- Flow kg/sec

7.3 Documents to be submitted with Quotation

- Valve Performance Data and curves.
- The Supplier shall provide dimensional outline drawings of the assembled unit(s). The drawings shall show overall dimensions, terminal box dimensions, mounting connections, clearances required for proper installation and maintenance shall state lifting requirements, and the weights of all major components. In addition to the sectional drawing, supplier has to provide isometric drawing of HWL valve body for heat tracing requirement.
- GA drawing of actuator.

- Actuator sizing calculations.
- GA drawing and circuit diagram of Common Hydraulic control Unit.
- Hydraulic Power Unit diagram (P&ID) with Set points.
- Hydraulic connection diagram from HPU to individual actuator with BOM.
- Flushing and commissioning procedure documents with drawings.
- Electrical Circuit diagram.
- Control panel arrangement.
- List of commissioning spares.
- List of special tools and equipment as required for assembling, complete dismantling, and maintenance of all equipment supplied,
- Performance data and curves.
- Completed Supplier Data Sheets per Section 10.0
- Any special requirements or operational limits shall be explicitly stated in each quotation.
- Field testing requirements.
- Terminal box wiring diagram
- Integrated Manufacturing and Quality Plan for BHEL's review
- Certificates as per QR and PTR requirements (applicable to Non-PMD vendor).

7.4 Descriptions of Equipment

- A written description of the equipment being offered shall be provided with the Bid. This information shall explain details of the design, construction, control, operation and performance.
- Consumable list including, compressed air, instrument air and electrical requirements indicating frequency of usage; intermittent or continuous.
- Experience List for valves in similar service including size, service, flow rate, pressure, temperature, and date placed in operation.

7.5 Documents to be submitted during Contract

- Detailed arrangement drawings of the assembled units including support details, flange connections, etc. All materials shall be readily identifiable on Supplier's drawings.
- Electrical wiring diagrams and connection details
- Instrument list
- Instrument data sheet(s) (ISA format or equal)
- Valve flow characteristic curve
- List of shop tests that will be conducted on the furnished equipment
- Complete set(s) of instruction, operation, maintenance, and erection manuals, quantities will be identified in the purchase order

- List of shop applied paints and protective finishes identifying compatible site applied coatings
- List of all lubricants required for the equipment operation identifying preferred acceptable substitutes
- Detailed shipping list with quantity units in meters and numbers (not in Lot(s)).
- Link between BOM and shipping list shall be provided
- O&M manual for HPU and actuator.
- O&M manuals – 1 set of Hard copy to be sent to site along with equipment.
- Data sheets & drawings for approval.
- O&M manual in soft copy – One copy of O&M manuals in soft copy is to be submitted in CD-ROM (Compact disc). The O&M manuals should be furnished within three months from the date of placement of order.
- Certification sheet for each valve containing the following information:
  - ✓ Manufacturer's Name
  - ✓ Manufacturer's serial number on the valve body
  - ✓ Flow direction arrow on the valve body
  - ✓ ASME material specification used for pressure parts including valve body and other pressure retaining parts
  - ✓ Maximum allowable pressure (design pressure), kg/cm^2 (g) and design temperature, °C
  - ✓ Hydrostatic shell test pressure, kg/cm^2 (g). Additional certification for valves manufactured to B16.34 Special Class.
  - ✓ Welding Certification: All welding on the valve has been performed using procedures and welders qualified in accordance with ASME Code Section IX.
  - ✓ Radiographs: Radiographic examination has been performed as required by ASME B16.34. One set of the completed radiographs, properly identified with the respective parts, will be retained and available for inspection for a period of five (5) years.
  - ✓ IBR from III C.
  - ✓ Surface examination of all castings performed by magnetic particle or liquid penetrant methods to the technique and acceptance standards of ASME B16.34.
  - ✓ One (1) copy of each material manufacturer's certification.
  - ✓ Authorized and dated signature certifying the above information to be complete and correct.
  - ✓ Operation and Maintenance Manual describing the operation of the entire system shall be supplied (both hard copies and soft copies).

8.0 PERFORMANCE DATA & TECHNICAL REQUIREMENTS

8.1 Component Design Criteria-Function

8.1.1 Separator Level Control (HWL-1 & HWL-2) Valves:

The separator level control valves (HWL-1 & HWL-2) are used to control the water level in the water separator during “wet” mode operation of a supercritical boiler. As the level exceeds the set point first one, then the second valve will open. The valves will throttle saturated water from boiler at high pressure to a flash tank at atmospheric pressure. The water will be flashing to steam as it exits the valves.

8.1.2 Minimum Economizer Flow Control (MEFCV) Valve:

The Minimum Economizer Flow control valve (MEFCV) is used to control the economizer inlet flow during start-up and low load operation. Demand for this valve is established based on measured economizer inlet flow compared to a minimum boiler flow requirement.

9.0 DESIGN AND CONSTRUCTION

9.1 In general, all valves and associated accessories shall meet the applicable requirements of accepted standards and attached customer specifications.

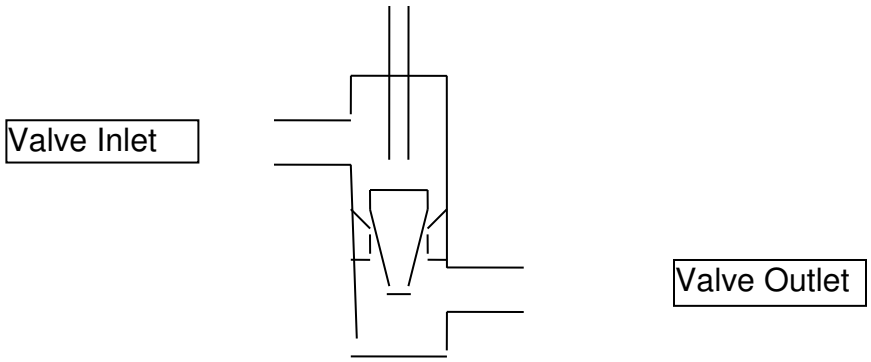
9.2 Design of the valves shall meet the latest edition of ASME B16.34.

9.3 The valve sizing shall be in compliance with latest edition of ISA S75.01 Hand book on Control Valves considering measures to avoid choked flow.

9.4 **The valve sizing shall be suitable for obtaining maximum flow conditions with valve opening at approximately 80% of total valve stem travel and minimum flow conditions with valve stem travel not less than 10% of total valve stem travel.** All the Control Valves shall be capable of handling at least 120% of the required maximum flow. Further the valve stem travel range from minimum flow condition to maximum flow condition shall not be less than 50% of the total valve stem travel.

9.5 The control valve size should not be smaller than connecting line size by more than 1 step.

9.6 Valves shall be straight through in "Z" valve configuration. "Z" configuration has parallel inlet and outlet nozzles in two different horizontal planes.



"Z" Valve

9.7 Valve shall be forged design.

9.8 Plug shall be one-piece construction either cast, forged, or machined from solid bar stock. Plugs shall be screwed and pinned to valve stems or shall be integral with the valve stems.

9.9 All control valves shall have stems, guide bushings, plugs, seat rings, stem lock pins, stuffing box parts and other trim parts made of stainless steel alloys and suitably hardened. Valve guide posts and bushings shall be stellite faced. Stellite faced guide posts and bushings shall be differential hardened for applications involving high pressure drop as well as for flashing and cavitation applications. **Trim material shall be 17-4 PH SS / 440C depending upon the service conditions to ensure required degree of hard facing so as to avoid erosion**. However , Bidder may offer valves with body and trim materials better than specified and in such cases , Bidder shall furnish the comparison of properties including cavitation resistance , hardness , tensile strength , strain energy , corrosion resistance and erosion resistance etc. of the offered material vis-a-vis the specified material for Owner's consideration and approval..

9.10 The valve model proposed should be designed to prevent cavitation, wire drawing and flashing on the downstream side of the valve and piping for operation throughout the full range under the specified conditions. For cavitation service, the trim design shall be of multistage pressure drop type to prevent cavitation occurring downstream of trim / valve.

9.11 **Bidder shall furnish in his proposal detailed calculations to establish whether flashing or cavitation will occur or not under any operating condition for a particular application. These calculations shall be subject to Owner's review and approval and in case it is established at any stage of the contract that cavitation will occur, the Bidder shall provide specially designed anti-cavitation trim (such as cage guiding valves or multi stack/multi path disc valves) for the same at no extra price. Further the Bidder shall furnish in his proposal the detailed write up, technical literature, etc. clearly indicating as to how the occurrence of cavitation shall be prevented by the design of his offered anti-cavitation trim**.

9.12 Valve sizing shall be in accordance with the latest edition of ISA Handbook on Control Valves with due consideration for the measures to avoid chocked flow. Bidder shall ensure that valve outlet velocity does not exceed 8 m / sec. for liquid services, 150 m / sec. for steam services and 50% of sonic velocity for flashing services.

9.13 Valve outlet shall have a 5 degree downward slope to ensure proper drainage of valve outlet.

9.14 Valve inlet and outlet cages shall be provided if required by the indicated process conditions.

9.15 For valves with butt weld ends, the supplier is required to prepare weld profiles to BHEL supplied information.

9.16 Both the valves and their accessories shall be designed for the process and local installation environment.

9.17 All valves and accessories shall be suitable for outdoor service. Electrical components (actuators, limit switches, solenoid valves, positioners, controllers, etc.) shall meet the requirements of IP 65.

9.18 The Supplier shall provide all necessary converters, positioners, position transmitters, etc. mounted on the control valve.

9.19 The direction of flow shall be clearly marked on each valve.

9.20 Control valves, their actuators and associated ancillary equipment must be selected to suit the application, design and working conditions specified and also the environmental conditions in which they are installed. The pressure and temperature rating of valve body shall be

equal or exceed the process design conditions on control valve data sheet.

9.21 Valves and their actuators shall be adequately rated to suit the maximum differential pressure against which they will have to work, i.e. when the valve is fully closed.

9.22 Valve guiding and seating systems shall be so designed that smooth control is maintained over the full operational stroke. Design should be such that it eliminates vibration.

9.23 Valve's gland packing material shall be grafoil or graphite for all the valves.

9.24 The end for all the Control Valves shall be matched to the corresponding details for the piping on which the valve is installed.

9.25 The boiler water system will be acid cleaned at site using a 1 to 1.5% (by weight) inhibited hydrofluoric acid. The valve internals must be capable of withstanding hydrofluoric acid without getting damaged.

9.26 The Leakage Class of separator level control valves (HWL-1 & HWL-2) and for Minimum economizer flow control valve (MEFCV) is to be **Class-V** as per FCI 70.2.

9.27 Hydraulic Valve Actuators

9.27.1 The separator level control valves (HWL-1 & HWL-2) shall be supplied with a Hydraulic actuator capable of a quick full stroke closing time of 3 sec against closing loads. Normal full stroke opening/closing time shall be 12 sec. The Hydraulic actuator for the minimum economizer flow control valve (MEFCV) full stroke opening/closing time shall be 12 sec.

9.27.2 The Hydraulic actuator shall be sized to operate against the process maximum differential pressure.

9.27.3 A mechanical position indicator shall be provided on the actuator.

9.27.4 The actuator shall be equipped with a hydraulic positioning valve to convert a 4 –20 mA DC signal from the DCS to a hydraulic signal.

9.27.5 The actuator shall be furnished with a 4 –20 mA DC valve position feedback signal.

9.27.6 The actuators for the HWL valves only shall be equipped with a safety quick closing system. The safety control system shall be activated by a signal (dry contact) from the DCS supplied by others. The safety control system shall be independent of other control device. The safety control system shall be capable of closing the valve with normal control system devices unavailable.

9.28 Hydraulic Unit and Electronic Control Unit (HWL-1, HWL-2 & MEFCV)

9.28.1 All control valves (HWL-1, HWL-2 & MEFCV) shall be supplied with a Hydraulic Unit and Electronic Control Unit. The hydraulic power unit serves to supply the necessary pressurized hydraulic fluid to the Hydraulic actuators. A common hydraulic power unit may be used for multiple Hydraulic Valve Actuators. The hydraulic power unit shall be equipped with an accumulator to maintain adequate pressure during peak operating requirements. The hydraulic pumps shall be designed for the required pressure and mean oil consumption.

9.28.2 The hydraulic power unit shall be equipped with redundant motor-pump units with motor starters mounted in the Electronic Control Units. Each pump set shall be equipped with the necessary charging valve, check valves, filters, pressure reducing valves, pressure relief valves, and instrumentation required for operation of the hydraulic power unit.

9.28.3 The hydraulic power unit shall be equipped with an oil tank sized for the entire volume of oil. A tank air breather filter shall be furnished.

9.28.4 The hydraulic power unit shall be equipped with an accumulator sized to deliver the oil flow at required pressure for all conditions. The accumulator shall be equipped with a pressure gauge.

9.28.5 The Electronic Control Unit cabinet shall be a free standing IP 65 rated with front and rear access doors to be installed outdoors. The control cabinet shall contain processors or

controllers and I/O necessary for valve positioning, hydraulic unit control and interface between the Hydraulic Unit / Electronic Control Unit and customer supplied DCS.

9.28.6 In addition to the following signal exchanges, if additional signals are envisaged as per vendor's design, then the same have to be terminated in the respective terminal boxes/junction boxes.

HWL-1 Position Demand (from DCS)	4-20 mA DC
HWL-1 Valve Position feedback (to DCS)	4-20 mA DC
HWL-1 Position Failure (to DCS)	Dry Contact
HWL-1 Quick Closing (from DCS)	Dry Contact
HWL-1 Valve Opened (to DCS)	Dry Contact
HWL-1 Valve Closed (to DCS)	Dry Contact
HWL-2 Position Demand (from DCS)	4-20 mA DC
HWL-2 Valve Position feedback (to DCS)	4-20 mA DC
HWL-2 Position Failure (to DCS)	Dry Contact
HWL-2 Quick Closing (from DCS)	Dry Contact
HWL-2 Valve Opened (to DCS)	Dry Contact
HWL-2 Valve Closed (to DCS)	Dry Contact
MEFCV Position Demand (from DCS)	4-20 mA DC
MEFCV Valve Position feedback (to DCS)	4-20 mA DC
MEFCV Position Failure (to DCS)	Dry Contact
MEFCV Opened (to DCS)	Dry Contact
MEFCV Closed (to DCS)	Dry Contact
Hydraulic Power Unit On (from DCS)	Dry Contact
Hydraulic Power Unit Off (from DCS)	Dry Contact
Hydraulic Power Unit Pressure too low (to DCS)	Dry Contact
Hydraulic Power Unit Auto (to DCS)	Dry Contact
Hydraulic Power Unit Alarm (to DCS)	Dry Contact
Hydraulic Power Unit Fault (to DCS)	Dry Contact

9.28.7 415 V, 3 Ø, AC Power supply feeder will be provided for the hydraulic power pack. 240 V, AC Power supply feeder will be provided. It is vendor's responsibility to further distribute the same to different points and further derivation of various control supplies/power supplies.

9.28.8 Vendor to offer the latest version of control system/positioners with additional features.

9.28.9 The offered Hydraulic Power Unit and the Control system/panels shall be suitable for outdoor applications.

9.28.10 All Cables (Power cables/Control Cables/Instrumentation cables) run between various equipment supplied vendor, shall be in vendor's scope. These cables shall be laid in conduits/cable trays.

9.28.11 All Cables (Power cables/Control Cables/Instrumentation cables) interfaced with various equipment supplied by the vendor, have to be terminated by using suitable Double compression, flame proof/weather proof, Brass with Nickel plated cable glands.

9.28.12 Vendor to provide suitable cable glands for all interfacing cables from/to DCS. Cable sizes will be indicated during engineering stage.

9.28.13 Test Certificates and Calibration Certifications shall be provided for all Instruments and Motors as applicable.

9.29 Valve Selection Criteria

9.29.1 The control valves, actuators and actuator hydraulic systems shall be sized based on the valve data sheets. These data sheets shall be filled in and submitted with the bid and with the first submittal of valve drawings.

9.29.2 The Supplier shall meet all process conditions shown on the data sheet or shall notify BHEL of any deviations. All deviations must be approved by BHEL before manufacture of the valve.

9.29.3 The Supplier shall guarantee total sound levels on Supplier furnished equipment shall not exceed 85 dB(A). Sound pressure level at all conditions shall not be greater than 85 dBA when measured at 1.0 meter downstream of the valve and 1.0 meter away from the pipe. The noise abatement shall be obtained by valve body, trim design and piping arrangement and not by the use of silencers.

9.29.4 The bidder has to submit calculated noise levels (dBA) for the operating conditions specified in the datasheet.

9.30 Test and Examinations

All valves shall be tested in accordance with the quality assurance program agreed between the Owner and the Contractor, which shall meet the requirements of IBR and other applicable codes. The BHEL Approved Quality Plan is to be followed. The tests shall include but not limited to the following bidder shall submit a manufacturing quality plan along with the offer for BHEL / QA review and approval.

9.30.1 Material, mechanical and chemical test shall be performed in a manner as specified in the relevant codes.

9.30.2 Non-destructive examination shall be performed as per ASME-B-16.34 (Steel Valves).

9.30.3 100% radio graphic test on casings of all valves having rating of 600 lbs or above; magnetic particles / dye penetrant examination on all internal and external machined surfaces and 100% ultra-sonic testing of forgings and bars (of size 40 mm and above) of all valves with rating of 600 lbs or above shall be performed as per ASME B16.34.

9.30.4 The material test certificates (correlated to melt number) shall be furnished by the vendor for identification and correlation.

9.30.5 The butt-welding end of all valves, dye-penetrate test as per ASTM E165 shall be carried out on 100% of the valves and the result shall show no defects.

9.30.6 100% MPI shall be done on base/body casing with pressure rating 1500 class and above in line with ASME B16.34.

9.30.7 Hydrostatic Test

Valves shall be subjected to hydrostatic shell test in accordance with ASME-B16.34 prior to seat leakage test. If the valves are reworked on the pressure parts for any reason after hydrostatic test, they must be retested. Valves shall be hydrostatically tested in Manufacturer's Works in accordance with code requirements. All hydrostatic testing and inspection shall be completed before any paint is applied to valve body. Certificates of inspection shall be executed in accordance with the latest codes and required codes shall be forwarded to the Engineer. All gaskets used for test shall be of the same

material and design as specified for the finished product. Where mechanical gasket joints are broken following tests, new gaskets shall be furnished with the equipment, and the joints shall be retested.

9.30.8 Leakage Test

Valve closure test and seat leakage tests shall be performed in accordance with ASME -B16.34 and as per applicable Leakage Class. The leakage from packing shall be zero or bubble tight.

9.30.9 Functional Tests

The fully assembled or completed valves including the actuators control devices and accessories shall be functionally tested to demonstrate the operability and response time of the valve and the actuator. This may be done by cycling the valves 3 or 4 times form open to close position. The same controller can be used to test each valve. These tests shall also include the verification of control valve operation features such as stay put operation, fail to open, fail to close on signal failure etc. in line with the specification requirements. Performance tests such as Linearity, Hysteresis, Sensitivity and Accuracy are to be checked as per specification.

9.30.10 Cv Test (If applicable)

Cv test shall be carried out as type test on each size type and design of the valves as per ISA-75.02 standard and the test reports, shall be furnished for Owner's approval.

9.31 Additional requirements

9.31.1. Machined surfaces shall be suitably protected.

9.31.2. Valve ends shall be protected by means of metallic covers/polythene caps/rubber and protectors to prevent damage to ends & also to avoid foreign material entering the valve while shipment & storage.

9.31.3. All valves shall be packed suitably in wooden cases in order to avoid damage during transit and also during storage at site.

9.31.4. Valve tag nos. shall also be incorporated in all the dispatch documents.

9.31.5. All unpainted surfaces shall be protected with a rust preventive, which can be removed by solvent washing. The use of grease or oil other than light grade mineral oil for corrosion protection is prohibited.

9.31.6. Paint specifications are to be submitted for purchaser's review with bid.

9.31.7. All exposed machined surfaces shall be coated with suitable rust preventative coating prior to shipment.

9.31.8. The seller shall adequately crate, block, anchor and protect equipment as required to prevent damage during overseas shipment and outdoor storage for a period of one (1) year at the site.

9.31.9. All threaded connections shall be plugged or capped with standard pipe plugs or caps.

9.31.10. List of commissioning spares shall be quoted if applicable.

9.31.11. List of recommended spares for 5 years trouble free operation of valves shall be quoted.

9.31.12. Recommended list of special tools and equipment (required for assembling, complete dismantling and maintenance of all equipment supplied) to be provided and also to be supplied along with valve.

9.31.13. One spare filter element each to be supplied for the SS filter provided in the Hydraulic Control Unit.

9.31.14. Drain valve for the oil tank, vent air breather, and isolation lines in the oil supply lines are to be necessarily provided.

9.31.15. Mechanical oil level indicator has to be extended through full height of the tank. (0 % to 100 %)

9.31.16. Man hole to be provided in the Oil tank in order to provide means to access the internals of the oil tank and for maintenance.

9.31.17. Stainless steel Oil tank to be supplied and internal surface should not be painted.

9.31.18. Vendor to provide isolation valves in the pressure and return lines (oil lines) to carry out maintenance activities in the oil line and also in the fail safe manifold & control manifold.

9.31.19. Vendor to supply welding type socket fittings in the entire hydraulic pipes joint.

9.31.20. Vendor to provide a provision to indicate the accumulator pressure in local as well as in remote.

9.31.21. Hydraulic fluid /oil cooler is to be provided

9.31.22. Flushing procedure for oil pipe lines with required drawings, BOM list to be submitted by vendor which shall meet the ISO 44061999/ NAS standard.

9.31.23. Vendor to mention the equivalent Servo grade or other Indian grades for HPU oil.

9.31.24. Recommended spares list shall be submitted by the vendor.

9.31.25. Hook up drawing to be submitted with all required details.

9.31.26. Pressure transmitter in the oil supply line of HPU to check leak in oil lines

9.31.27. P&ID for hydraulic circuit between HPU and individual actuators with BOM.

9.31.28. P&ID should include all the setting points for various control elements.

9.31.29. Detailed shipping list to be sent to site and that shall be easily correlated with P&ID and BOM.

9.31.30. Hydraulic torque wrenches and other special tools if any are to be supplied.

9.31.31. Dos and Don'ts / Precautionary measures to be adopted at site during various stages of commissioning of boiler shall be prepared by the vendor and to be submitted for BHEL.

9.32 Support and Services

9.32.1

Optional price to be quoted by the seller in terms of price per man-day for erection and commissioning support.
If commissioning engineer is deputed from Indian office, then the payment will be released in INR only.
This service will be utilized by BHEL-site through power sector regions. Separate PO will be released by BHEL-Site through power sector regions to avail the vendor's supervision service.

During this period, vendor should also ensure that the blanking plate is installed during initial supply and subsequent hydro test and acid cleaning operation at site. Vendor to ensure proper purging of

the lines to eliminate the presence of foreign particles before installing the trim parts and commissioning activity.

All the expenses like to & fro charges, incidentals, boarding & lodging at site are to be borne by the vendor.

The price calculated for 14 days of erection and commissioning per unit (Two HWL valves and One MEFCV) will be considered for price comparison per unit.

Depending upon the actual duration of erection and commissioning support availed, the payment will be paid by BHEL- power sector regions based on the vendor quoted amount (price per man-day).

The Vendors to submit an Optional price for providing training to our personnel at the works of Valve manufacturer for 2 man month period .

Our personnel will make their own Travel / Lodging / Boarding arrangements. Depending upon the actual duration of training man months availed, the payment will be proportionately reduced on the vendor quoted amount (if period is lesser than 2 man months).

9.33 Evaluations

9.33.1 Bids will be analyzed, not only to determine conformity to the requirements of this Specification, but also to evaluate any features of design, construction, and guaranteed performance of the equipment offered which would result in a higher or lower capital, operating, or maintenance cost to BHEL.

9.33.2 Nothing in this specification shall be construed to relieve the vendor from his responsibility. This specification covers briefly the requirements of the system. It is the responsibility of the vendor to take care of other basic and essential requirements. In case of any discrepancy in the contents expressed in the specification, vendor shall include all items required for completeness of the system even if it is not specified explicitly in this specification.

10.0 SUPPLIER'S DATA SHEETS (TO BE SUBMITTED WITH THE BID)

10.1 Valve Data Sheets

10.2 All data to be in Metric units. The Supplier shall fill in the valve data sheets for each valve. The operating conditions furnished for MEFCV is preliminary only. Final operating conditions can be informed only after the boiler recirculation pump operating conditions are finalized, which can happen even after the placement of this PO. This may/may not affect the selected Cv for MEFCV. The vendor to accommodate these changes in the operating conditions and offer the valve which meets all the specification requirements without any price implication to BHEL.

10.3 Guarantees

CUSTOMER NAME	
PROPOSAL NUMBER	
SUPPLIER NAME	

The Supplier shall clearly state at the time of quotation all performance guarantees specific to the equipment offered.

11.0 EXCEPTIONS TO THE SPECIFICATION

CUSTOMER NAME	
PROPOSAL NUMBER	
SUPPLIER NAME	

I have confirmed to Sections 1.0 through 10.0 and Appendix A except as specifically noted as follows:

12.0 APPENDIX A, CONTRACT SPECIFIC REQUIREMENTS

Please refer the attached, Annexure I - Valve Datasheets and project specific data sheets, Annexure II - for Facility Site Specific Data

ANNEXURE-I

Customer No: **1729 & 1730** Tag Nos.: **10HAG15AA301, 10HAG15AA302** Qty.: **2 Nos. / BOILER**

SEPARATOR LEVEL CONTROL (HWL-1 & HWL-2) VALVE DATA SHEET

	PART – A (TO BE FILLED UP BY PURCHASER)		PART – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT	**2x660 MW UDANGUDI STPP**	
	SERVICE	**HWL-1 & HWL-2**	
	LOCATION	OUTDOOR	
	DUTY	MODULATING	
	PIPE SIZE (inlet / outlet)	**D457 x 65 / D457 x 65**	
	PIPE MATERIAL (inlet / outlet)	**SA106 Gr.C/ SA106 Gr.C**	
	MEDIUM	FEED WATER	
BODY	MODEL No.		
	TYPE OF BODY: GUIDING: No. OF PORTS	Z type	
	BODY SIZE: PORT SIZE: DESIGN CV		
	BODY RATING (ASME)		
	END CONNECTION	**Inlet: Butt Welded; Style-P, d1 =343.25 mm** **Outlet: Butt Welded; Style-P, d1=343.25 mm**	
	BODY MATERIAL	**F11**	
	PACKING MATERIAL	GRAFOIL/GRAPHITE	
	BONNET TYPE		
	TRIM FORM		
	TRIM MATERIAL: SEAT / PLUG : CAGE / STEM		
	BALANCED / UNBALANCED		
	FLOW	FLOW TO CLOSE	
	VALVE OUTLET VELOCITY	< 50% Sonic Velocity	
	REQUIRED LEAKAGE CLASS	**V**	
	NOISE LEVEL (dBA)	LESS THAN 85 dBA	
	VALVE LIFT mm		
	ANTI FLASHING TRIM		
ELECTRO HYDRAULIC ACTUATOR	MODEL No. & SIZE		
	CLOSE AT: OPEN AT (kg/cm^2 (g))		
	SHUT OFF DIFFERENTIAL		
	STEM ORIENTATION		
	MANUAL OVERRIDE	YES	
	TRAVEL TIME FOR		
	OPEN TO CLOSE, CLOSE TO OPEN, TRIP	<12 Secs / <12 Secs / < 3 secs	
	VALVE POSN. ON SIGNAL (4-20mA) FAILURE	FAIL TO CLOSE	
	VALVE POSN. ON FLUID SUPPLY FAILURE	FAIL TO CLOSE	
PERFORMANCE OF VALVE	LINEARITY	± 2%	
	HYSTERESIS	± 1%	
	SENSITIVITY	± 0.5%	
	ACCURACY (OVERALL)	± 2%	

SERVICE CONDITIONS

Sl. No.	LOAD	No of valves Operating	FLOW/ Valve kg/s	INLET PR. $kg/cm^2(g)$	OUTLET PR. $kg/cm^2(g)$	INLET TEMP (°C)	Sp. Gravity	Calc. Cv	Valve Lift %	Valve outlet velocity	Noise Level dBA
01.	Cold Start Min Water flow*	1	28.5	4.6	0.0	100					
02.	Cold Start Min OT flow*	1	199.8	4.2	0.0	100					
03.	Cold Start Swell flow*	2	157	3.7	0.0	100					
04.	Hot Start 140 bar Min OT flow*	1	199.8	144.1	0.0	337					
05.	Hot Start 140 bar Swell flow*	2	157	143.3	0.0	337					
06.	Hot Start 160 bar Min Water flow*	1	28.5	164.9	0.0	348					

*- 2 Phase flow at valve outlet

ACTUATOR SIZING PRESSURE	:	303.1 kg/cm² (g)
BODY DESIGN: PRESSURE / TEMPERATURE	:	325.5 kg/cm² (g) / 374°C
TEST PRESSURE	:	2 x Design Pressure
IBR FORM – III C	:	REQUIRED
TOTAL WEIGHT (VALVE+ ACTUATOR+ ACCESSORIES)	:	kg

Valves should be directly weldable to connecting pipe without the use of reducers. ONLY GLOBE "Z" VALVES ACCEPTABLE.

PART – A (TO BE FILLED UP BY PURCHASER)			PART – B (TO BE FILLED UP BY BIDDER)
ACCESSORIES	ELECTRO HYDRAULIC POSITIONER POSITION LIMIT SWITCH POSITION TRANSMITTER SOLENOID VALVE E/H CONVERTER JUNCTION BOX HAND PUMP LOCAL POSITION INDICATOR HYDRAULIC POWER UNIT(COMMON FOR HWL AND MEFCV) ELECTRONIC CONTROL UNIT (COMMON FOR HWL AND MEFCV)	REQUIRED REQUIRED REQUIRED NOT REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED	
ELECTRO HYDRAULIC POSITIONER	MANUFACTURER & MODEL No. ENCLOSURE CLASS INPUT SIGNAL OUTPUT SIGNAL INCREASE IN SIGNAL	 IP-65 4 - 20 mA TO SUIT ACTUATOR TO OPEN / TO CLOSE	
LIMIT SWITCH	MANUFACTURER & MODEL No. OPEN: INT: CLOSE CONTACT TYPE RATING (AC/DC) ENCLOSURE CLASS	 1 No. FOR OPEN &1 No. FOR CLOSE DPDT 2 NO + 2 NC 5A 240V, AC and 0.2A, 220V, DC IP65 / NEMA 4	
POSITION TRANSMITTER	MANUFACTURER & MODEL No. TYPE SUPPLY OUTPUT RATING ACCURACY ENCLOSURE CLASS	 LVDT 2 WIRE TYPE 24V DC 4 – 20 mA / 0-100 Ohms +/- 1% FS IP65 / NEMA 4	
HAND WHEEL	ORIENTATION	SIDE MOUNTED	
JUNCTION BOX	No. OF WAYS SIZE CABLE GLANDS: (SIZE / QTY) ENCLOSURE CLASS	THIRTY SIX REQUIRED REQUIRED IP65 / NEMA 4	
E/H CONVERTER	INPUT SIGNAL : POWER SUPPLY SPLIT RANGE ENCLOSURE CLASS	4 – 20mA, DC / 24V, DC YES / NO // YES / NO IP65 / NEMA 4	
SIGN. : NAME : DATE :	PREPARED BY PINISETTY RAVIRAJA	CHECKED BY A.JAIGANESH	APPROVED BY V. GUNASEKARAN V. GUNASEKARAN Senior Manager Boiler Mountings / PE (FB) BHEL, TRICHY - 620 014	VENDOR SEAL SIGN.: NAME: DATE:

Customer No: **1729 & 1730** Tag Nos.: 10**HAG31AA301** **Qty.: 1 No. / BOILER**

MINIMUM ECONOMISER FLOW CONTROL VALVE DATA SHEET

	PART – A (TO BE FILLED UP BY PURCHASER)		PART – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT	**2x660 MW UDANGUDI STPP**	
	SERVICE	**MEFCV**	
	LOCATION	OUTDOOR	
	DUTY	MODULATING	
	PIPE SIZE (inlet / outlet)	**D323.9 x 45 / D323.9 x 45**	
	PIPE MATERIAL (inlet / outlet)	**SA106 Gr.C/ SA106 Gr.C**	
	MEDIUM	FEED WATER	
BODY	MODEL No.		
	TYPE OF BODY: GUIDING: No. OF PORTS	"Z"	
	BODY SIZE: PORT SIZE: DESIGN CV		
	BODY RATING (ASME)		
	END CONNECTION & RATING (ASME)	**BUTT WELDED; STYLE-P, d1 = 245.15mm**	
	BODY MATERIAL	**SA105**	
	PACKING MATERIAL	GRAFOIL	
	BONNET TYPE		
	TRIM FORM		
	TRIM MATERIAL: SEAT / PLUG		
	: CAGE / STEM		
	BALANCED / UNBALANCED		
	FLOW	FLOW TO CLOSE	
	VALVE OUTLET VELOCITY	< 8 m/s	
	REQUIRED LEAKAGE CLASS	**V**	
	NOISE LEVEL (dBA)	LESS THAN 85 dBA	
	VALVE LIFT mm		
	ANTI-CAVITATION TRIM		
ELECTRO HYDRAULIC ACTUATOR	MODEL No. & SIZE		
	CLOSE AT: OPEN AT (Kg/cm^2 (g))		
	SHUT OFF DIFFERENTIAL		
	STEM ORIENTATION		
	MANUAL OVERRIDE	YES	
	TRAVEL TIME FOR		
	OPEN TO CLOSE, CLOSE TO OPEN	<12 Secs / <12 Secs	
	VALVE POSN. ON SIGNAL (4-20mA) FAILURE	STAY PUT	
	VALVE POSN. ON SUPPLY FAILURE	STAY PUT	
PERFORMANCE OF VALVE	LINEARITY	± 2%	
	HYSTERESIS	± 1%	
	SENSITIVITY	± 0.5%	
	ACCURACY (OVERALL)	± 2%	

SERVICE CONDITIONS

Sl. No.	LOAD	FLOW kg/s	INLET PR. $kg/cm^2(g)$	OUTLET PR. $kg/cm^2(g)$	Pr. Drop kg/cm^2	INLET TEMP (°C)	Spec. gravity	Calc. Cv	Valve Lift %	Valve outlet velocity	Noise Level dBA
01.	Ambient	199.8	17.1	8.8	8.3	100					
02.	Warm Start -80 bar	199.8	92.6	88.1	4.5	295					
03.	Hot Start -140 bar	199.8	151.6	148.9	2.7	337					
04.	Hot Start -160 bar	199.8	171.0	169.2	1.8	348					

ACTUATOR SIZING PRESSURE	:	350.1 kg/cm² (g)
BODY DESIGN: PRESSURE / TEMPERATURE	:	350.1 kg/cm² (g) / 348°C
TEST PRESSURE	:	2 x Design Pressure
IBR FORM – III C	:	REQUIRED
TOTAL WEIGHT (VALVE+ ACTUATOR+ ACCESSORIES)	:	kg.

Valves should be directly weldable to connecting pipe without the use of reducers. ONLY GLOBE "Z" VALVES ACCEPTABLE.

PART – A (TO BE FILLED UP BY PURCHASER)			PART – B (TO BE FILLED UP BY BIDDER)
ACCESSORIES	ELECTRO HYDRAULIC POSITIONER	REQUIRED	
	POSITION LIMIT SWITCH	REQUIRED	
	POSITION TRANSMITTER	REQUIRED	
	SOLENOID VALVE	NOT REQUIRED	
	E/H CONVERTER	REQUIRED	
	JUNCTION BOX	REQUIRED	
	HAND WHEEL (SIDE MOUNTED)	REQUIRED	
	LOCAL POSITION INDICATOR	REQUIRED	
	HYDRAULIC POWER UNIT(COMMON FOR HWL AND MEFCV)	REQUIRED	
	ELECTRONIC CONTROL UNIT (COMMON FOR HWL AND MEFCV)	REQUIRED	
ELECTRO HYDRAULIC POSITIONER	MANUFACTURER & MODEL No.		
	ENCLOSURE CLASS	IP-65	
	INPUT SIGNAL	4 - 20 mA	
	OUTPUT SIGNAL	TO SUIT ACTUATOR	
	INCREASE IN SIGNAL	TO OPEN / TO CLOSE	
LIMIT SWITCH	MANUFACTURER & MODEL No.		
	OPEN: INT: CLOSE	1 No. FOR OPEN &1 No. FOR CLOSE	
	CONTACT TYPE	DPDT 2 NO + 2 NC	
	RATING (AC/DC)	5A 240V, AC and 0.2A, 220V, DC	
	ENCLOSURE CLASS	IP65 / NEMA 4	
POSITION TRANSMITTER	MANUFACTURER & MODEL No.		
	TYPE	LVDT 2 WIRE TYPE	
	SUPPLY	24V DC	
	OUTPUT RATING	4 – 20 mA / 0-100 Ohms	
	ACCURACY	+/- 1% FS	
	ENCLOSURE CLASS	IP65 / NEMA 4	
HAND WHEEL	ORIENTATION	SIDE MOUNTED	
JUNCTION BOX	No. OF WAYS	THIRTY SIX	
	SIZE	REQUIRED	
	CABLE GLANDS: (SIZE / QTY)	REQUIRED	
	ENCLOSURE CLASS	IP65 / NEMA 4	
E/H CONVERTER	INPUT SIGNAL : POWER SUPPLY	4 – 20mA, DC / 24V, DC	
	SPLIT RANGE	YES / NO // YES / NO	
	ENCLOSURE CLASS	IP65 / NEMA 4	

	PREPARED BY	CHECKED BY	APPROVED BY	VENDOR SEAL
SIGN. :				SIGN.:
NAME :	PINISETTY RAVIRAJA	A.JAIGANESH	V. GUNASEKARAN	NAME:
DATE :				DATE:

V. GUNASEKARAN
Senior Manager
Boiler Mountings / PE (FB)
BHEL, TRICHY - 620 014

Annexure-II

1. Project Specific Data:

One *(1)* stainless steel tubing, fittings and necessary supports to connect all necessary hydraulic line between the common SUPPLIER supplied Common Hydraulic Unit and the three SUPPLIER supplied BOILER SEPARATOR LEVEL CONTROL VALVES (HWL-1, HWL-2 VALVES) and Minimum Economizer Flow Control Valve (MEFCV) hydraulic actuators. Each Valve location from the common hydraulic unit is as follows.

i. Hydraulic Unit to HWL1 - 50m.
ii. Hydraulic Unit to HWL2 - 50m.
ii. Hydraulic Unit to MEFCV - 60m.

ANNEXURE-I

Customer No: **1823-1827** Tag Nos.: **HAG15AA301, HAG15AA302** **Qty.: 2 Nos. / BOILER**

SEPARATOR LEVEL CONTROL (HWL-1 & HWL-2) VALVE DATA SHEET

		PART – A (TO BE FILLED UP BY PURCHASER)	PART – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT	**5X800MW YADADRI TPS**	
	SERVICE	**HWL-1 & HWL-2**	
	LOCATION	OUTDOOR	
	DUTY	MODULATING	
	PIPE SIZE (inlet / outlet)	**D508 X7 0 / D508 X 70**	
	PIPE MATERIAL (inlet / outlet)	**SA106 Gr.C/ SA106 Gr.C**	
	MEDIUM	FEED WATER	
BODY	MODEL No.		
	TYPE OF BODY: GUIDING: No. OF PORTS	Z type	
	BODY SIZE: PORT SIZE: DESIGN CV		
	BODY RATING (ASME)		
	END CONNECTION	**Inlet: Butt Welded; Style-P, d1 =385.5 mm** **Outlet: Butt Welded; Style-P, d1=384.5 mm**	
	BODY MATERIAL	**F11**	
	PACKING MATERIAL	GRAFOIL/GRAPHITE	
	BONNET TYPE		
	TRIM FORM		
	TRIM MATERIAL: SEAT / PLUG : CAGE / STEM		
	BALANCED / UNBALANCED		
	FLOW	FLOW TO CLOSE	
	VALVE OUTLET VELOCITY	< 50% Sonic Velocity	
	REQUIRED LEAKAGE CLASS	**V**	
	NOISE LEVEL (dBA)	LESS THAN 85 dBA	
	VALVE LIFT mm		
	ANTI FLASHING TRIM		
ELECTRO HYDRAULIC ACTUATOR	MODEL No. & SIZE		
	CLOSE AT: OPEN AT (kg/cm^2 (g))		
	SHUT OFF DIFFERENTIAL		
	STEM ORIENTATION		
	MANUAL OVERRIDE	YES	
	TRAVEL TIME FOR		
	OPEN TO CLOSE, CLOSE TO OPEN, TRIP	<12 Secs / <12 Secs / < 3 secs	
	VALVE POSN. ON SIGNAL (4-20mA) FAILURE	FAIL TO CLOSE	
	VALVE POSN. ON FLUID SUPPLY FAILURE	FAIL TO CLOSE	
PERFORMANCE OF VALVE	LINEARITY	± 2%	
	HYSTERESIS	± 1%	
	SENSITIVITY	± 0.5%	
	ACCURACY (OVERALL)	± 2%	

SERVICE CONDITIONS

Sl. No.	LOAD	No of valves Operating	FLOW/ Valve kg/s	INLET PR. $kg/cm^2(g)$	OUTLET PR. $kg/cm^2(g)$	INLET TEMP (°C)	Sp. Gravity	Calc. Cv	Valve Lift %	Valve outlet velocity	Noise Level dBA
01.	Cold Start Min Water flow	1	34.5	5.3	0.0	37.8					
02.	Cold Start Min OT flow	1	255.1	4.9	0.0	37.8					
03.	Cold Start Swell flow*	2	196.5	4.2	0.0	100					
04.	Hot Start 140 bar Min OT flow*	1	255.1	144.5	0.0	336.6					
05.	Hot Start 140 bar Swell flow*	2	196.5	143.6	0.0	336.6					
06.	Hot Start 160 bar Min Water flow*	1	34.5	165.3	0.0	347.3					

*- 2 Phase flow at valve outlet

ACTUATOR SIZING PRESSURE	:	**274.6 kg/cm² (g)**
BODY DESIGN: PRESSURE / TEMPERATURE	:	**298.1 kg/cm² (g) / 374°C**
TEST PRESSURE	:	**2 x Design Pressure**
IBR FORM – III C	:	**REQUIRED**
TOTAL WEIGHT (VALVE+ ACTUATOR+ ACCESSORIES)	:	**kg**

Valves should be directly weldable to connecting pipe without the use of reducers. ONLY GLOBE "Z" VALVES ACCEPTABLE.

PART – A (TO BE FILLED UP BY PURCHASER)			PART – B (TO BE FILLED UP BY BIDDER)
ACCESSORIES	ELECTRO HYDRAULIC POSITIONER POSITION LIMIT SWITCH POSITION TRANSMITTER SOLENOID VALVE E/H CONVERTER JUNCTION BOX HAND PUMP LOCAL POSITION INDICATOR HYDRAULIC POWER UNIT(COMMON FOR HWL AND MEFCV) ELECTRONIC CONTROL UNIT (COMMON FOR HWL AND MEFCV)	REQUIRED REQUIRED REQUIRED NOT REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED	
ELECTRO HYDRAULIC POSITIONER	MANUFACTURER & MODEL No. ENCLOSURE CLASS INPUT SIGNAL OUTPUT SIGNAL INCREASE IN SIGNAL	 IP-65 4 - 20 mA TO SUIT ACTUATOR TO OPEN / TO CLOSE	
LIMIT SWITCH	MANUFACTURER & MODEL No. OPEN: INT: CLOSE CONTACT TYPE RATING (AC/DC) ENCLOSURE CLASS	 1 No. FOR OPEN &1 No. FOR CLOSE DPDT 2 NO + 2 NC 5A 240V, AC and 0.2A, 220V, DC IP65 / NEMA 4	
POSITION TRANSMITTER	MANUFACTURER & MODEL No. TYPE SUPPLY OUTPUT RATING ACCURACY ENCLOSURE CLASS	 LVDT 2 WIRE TYPE 24V DC 4 – 20 mA / 0-100 Ohms +/- 1% FS IP65 / NEMA 4	
HAND WHEEL	ORIENTATION	SIDE MOUNTED	
JUNCTION BOX	No. OF WAYS SIZE CABLE GLANDS: (SIZE / QTY) ENCLOSURE CLASS	THIRTY SIX REQUIRED REQUIRED IP65 / NEMA 4	
E/H CONVERTER	INPUT SIGNAL : POWER SUPPLY SPLIT RANGE ENCLOSURE CLASS	4 – 20mA, DC / 24V, DC YES / NO // YES / NO IP65 / NEMA 4	
SIGN. : **NAME :** **DATE :**	**PREPARED BY** **PINISETTY RAVIRAJA**	**CHECKED BY** **A.JAIGANESH**	**APPROVED BY** **V. GUNASEKARAN**	**VENDOR SEAL** **SIGN.:** **NAME:** **DATE:**

Customer No: **1823-1827** Tag Nos.: 10**HAG31AA301** **Qty.: 1 No. / BOILER**

MINIMUM ECONOMISER FLOW CONTROL VALVE DATA SHEET

	PART – A (TO BE FILLED UP BY PURCHASER)		PART – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT	**5 X 800MW YADADRI TPS**	
	SERVICE	**MEFCV**	
	LOCATION	OUTDOOR	
	DUTY	MODULATING	
	PIPE SIZE (inlet / outlet)	**D323.9 x 45 / D323.9 x 45**	
	PIPE MATERIAL (inlet / outlet)	**SA106 Gr.C/ SA106 Gr.C**	
	MEDIUM	FEED WATER	
BODY	MODEL No.		
	TYPE OF BODY: GUIDING: No. OF PORTS	"Z"	
	BODY SIZE: PORT SIZE: DESIGN CV		
	BODY RATING (ASME)		
	END CONNECTION & RATING (ASME)	**BUTT WELDED; STYLE-P, d1 = 245.15mm**	
	BODY MATERIAL	**SA105**	
	PACKING MATERIAL	GRAFOIL	
	BONNET TYPE		
	TRIM FORM		
	TRIM MATERIAL: SEAT / PLUG		
	: CAGE / STEM		
	BALANCED / UNBALANCED		
	FLOW	FLOW TO CLOSE	
	VALVE OUTLET VELOCITY	< 8 m/s	
	REQUIRED LEAKAGE CLASS	**V**	
	NOISE LEVEL (dBA)	LESS THAN 85 dBA	
	VALVE LIFT mm		
	ANTI-CAVITATION TRIM		
ELECTRO HYDRAULIC ACTUATOR	MODEL No. & SIZE		
	CLOSE AT: OPEN AT (Kg/cm^2 (g))		
	SHUT OFF DIFFERENTIAL		
	STEM ORIENTATION		
	MANUAL OVERRIDE	YES	
	TRAVEL TIME FOR		
	OPEN TO CLOSE, CLOSE TO OPEN	<12 Secs / <12 Secs	
	VALVE POSN. ON SIGNAL (4-20mA) FAILURE	STAY PUT	
	VALVE POSN. ON SUPPLY FAILURE	STAY PUT	
PERFORMANCE OF VALVE	LINEARITY	± 2%	
	HYSTERESIS	± 1%	
	SENSITIVITY	± 0.5%	
	ACCURACY (OVERALL)	± 2%	

SERVICE CONDITIONS

Sl. No.	LOAD	FLOW kg/s	INLET PR. $kg/cm^2(g)$	OUTLET PR. $kg/cm^2(g)$	Pr. Drop kg/cm^2	INLET TEMP (°C)	Spec. gravity	Calc. Cv	Valve Lift %	Valve outlet velocity	Noise Level dBA
01.	Ambient	255.1	23.8	10.4	13.4	37.8					
02.	Cold Start -80 bar	255.1	95.9	89.4	6.5	295					
03.	Hot Start -140 bar	255.1	153.3	150.3	3	366.6					
04.	Hot Start -160 bar	255.1	172.4	170.7	1.7	347.3					

ACTUATOR SIZING PRESSURE : 323.5 kg/cm² (g)
BODY DESIGN: PRESSURE / TEMPERATURE : 323.5 kg/cm² (g) / 348°C
TEST PRESSURE : 2 x Design Pressure
IBR FORM – III C : REQUIRED
TOTAL WEIGHT (VALVE+ ACTUATOR+ ACCESSORIES) : kg.
Valves should be directly weldable to connecting pipe without the use of reducers. ONLY GLOBE "Z" VALVES ACCEPTABLE.

PART – A (TO BE FILLED UP BY PURCHASER)			PART – B (TO BE FILLED UP BY BIDDER)
ACCESSORIES	ELECTRO HYDRAULIC POSITIONER POSITION LIMIT SWITCH POSITION TRANSMITTER SOLENOID VALVE E/H CONVERTER JUNCTION BOX HAND WHEEL (SIDE MOUNTED) LOCAL POSITION INDICATOR HYDRAULIC POWER UNIT(COMMON FOR HWL AND MEFCV) ELECTRONIC CONTROL UNIT (COMMON FOR HWL AND MEFCV)	REQUIRED REQUIRED REQUIRED NOT REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED	
ELECTRO HYDRAULIC POSITIONER	MANUFACTURER & MODEL No. ENCLOSURE CLASS INPUT SIGNAL OUTPUT SIGNAL INCREASE IN SIGNAL	 IP-65 4 - 20 mA TO SUIT ACTUATOR TO OPEN / TO CLOSE	
LIMIT SWITCH	MANUFACTURER & MODEL No. OPEN: INT: CLOSE CONTACT TYPE RATING (AC/DC) ENCLOSURE CLASS	 1 No. FOR OPEN &1 No. FOR CLOSE DPDT 2 NO + 2 NC 5A 240V, AC and 0.2A, 220V, DC IP65 / NEMA 4	
POSITION TRANSMITTER	MANUFACTURER & MODEL No. TYPE SUPPLY OUTPUT RATING ACCURACY ENCLOSURE CLASS	 LVDT 2 WIRE TYPE 24V DC 4 – 20 mA / 0-100 Ohms +/- 1% FS IP65 / NEMA 4	
HAND WHEEL	ORIENTATION	SIDE MOUNTED	
JUNCTION BOX	No. OF WAYS SIZE CABLE GLANDS: (SIZE / QTY) ENCLOSURE CLASS	THIRTY SIX REQUIRED REQUIRED IP65 / NEMA 4	
E/H CONVERTER	INPUT SIGNAL : POWER SUPPLY SPLIT RANGE ENCLOSURE CLASS	4 – 20mA, DC / 24V, DC YES / NO // YES / NO IP65 / NEMA 4	

	PREPARED BY	CHECKED BY	APPROVED BY	VENDOR SEAL
SIGN. :				SIGN.:
NAME :	PINISETTY RAVIRAJA	A.JAIGANESH	V. GUNASEKARAN	NAME:
DATE :				DATE:

Annexure-II

1. Project Specific Data:

One *(1)* stainless steel tubing, fittings and necessary supports to connect all necessary hydraulic line between the common SUPPLIER supplied Common Hydraulic Unit and the three SUPPLIER supplied BOILER SEPARATOR LEVEL CONTROL VALVES (HWL-1, HWL-2 VALVES) and Minimum Economizer Flow Control Valve (MEFCV) hydraulic actuators. Each Valve location from the common hydraulic unit is as follows.

i. Hydraulic Unit to HWL1 - 50m.
ii. Hydraulic Unit to HWL2 - 50m.
ii. Hydraulic Unit to MEFCV - 60m.

BHEL	**SPECIFICATION FOR STARTUP CONTROL VALVES**	SPECIFICATION NO.: SCV_MAIN SPEC	
		SECTION: Boiler Mountings/PE (FB)	
		REV. NO.: 00	DATE: 12.05.2020
		PAGE NO : 1 OF 4	

Customer No: 1828, 1829 and 1830 Tag Nos.: HAG15AA301. HAG15AA302 Qty.: 2 Nos. /BOILER

SEPERATOR LEVEL CONTROL VALVE DATA SHEET

	PART – A (TO BE FILLED UP BY PURCHASER)		PART – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT	**PATRATU – 3 x800 MW**	
	SERVICE	**HWL 1 & HWL 2**	
	LOCATION	OUTDOOR	
	DUTY	MODULATING	
	PIPE SIZE (inlet / outlet)	D 508x 80/ D508X80	
	PIPE MATERIAL (inlet / outlet)	**SA106 Gr.C/ SA106 Gr.C**	
	MEDIUM	FEED WATER	
BODY	MODEL No.		
	TYPE OF BODY : GUIDING : No. OF PORTS	Z Type	
	BODY SIZE: PORT SIZE: DESIGN CV		
	END CONNECTION & RATING (ASME)	**Inlet : BUTT WELDED; STYLE-P, d1 = 368 mm** **Outlet : BUTT WELDED; STYLE-P, d1 = 384.5 mm**	
	BODY MATERIAL	**F11**	
	PACKING MATERIAL	GRAFOIL/GRAPHITE	
	BONNET TYPE		
	TRIM FORM		
	TRIM MATERIAL: SEAT / PLUG : CAGE / STEM		
	BALANCED / UNBALANCED	BALANCED	
	FLOW	FLOW TO CLOSE	
	VALVE OUTLET VELOCITY	< 50% Sonic Velocity	
	REQUIRED LEAKAGE CLASS	**V**	
	NOISE LEVEL (dBA)	LESS THAN 85 dBA	
	VALVE LIFT mm		
	ANTICAVITATION TRIM		
ELECTRO HYDRAULIC ACTUATOR	MODEL No. & SIZE		
	CLOSE AT: OPEN AT (Kg/cm^2 (g))		
	SHUT OFF DIFFERENTIAL		
	STEM OREINTATION		
	MANUAL OVERRIDE	YES	
	TRAVEL TIME FOR		
	OPEN TO CLOSE, CLOSE TO OPEN, TRIP	<12 Secs / <12 Secs / < 3 secs	
	VALVE POSN. ON SIGNAL (4-20mA) FAILURE	FAIL TO CLOSE	
	VALVE POSN. ON FLUID SUPPLY FAILURE	FAIL TO CLOSE	
PERFORMANCE OF VALVE	LINEARITY	± 2%	
	HYSTERISIS	± 1%	
	SENSITIVITY	± 0.5%	
	ACCURACY (OVERALL)	± 2%	

SERVICE CONDITIONS

Sl. No.	LOAD	No of valve Operating	FLOW Kg/sec per valve	INLET PR. $kg/cm^2(g)$	OUTLET PR. $kg/cm^2(g)$	INLET TEMP (°C)	Sp. Gravity	Calc. Cv	Valve Lift %	Valve outlet velocity	Noise Level dBA
01.	Cold Start Min Water flow *	1	34.1	6.0	0.0	100					
02.	Cold start Min OT Flow*	1	269.3	5.5	0.0	100					
03.	Cold Start Swell Flow*	2	202.9	4.8	0.0	100					
04.	Hot Start 140 bar (a) Min OT Flow *	1	269.3	144.8	0.0	337					
05.	Hot start 140 bar(a) Swell Flow*	2	202.9	143.8	0.0	337					
06.	Hot Start 160 bar (a) Min Water Flow*	1	34.1	165.8	0.0	348					

*Two phase flow at valve outlet

ACTUATOR SIZING PRESSURE : 307.5 kg/cm² (g)
BODY DESIGN: PRESSURE / TEMPERATURE : 331.2 kg/cm² (g) / 393°C
TEST PRESSURE= 2 X DESIGN PRESSURE
IBR FORM – III C : REQUIRED
TOTAL WEIGHT (VALVE+ACTUATOR+ACCESSORIES) : Kgs.
Valves should be directly weldable to connecting pipe without the use of Reducers. ONLY GLOBE "Z" VALVES ACCEPTABLE.

PART – A (TO BE FILLED UP BY PURCHASER)			PART – B (TO BE FILLED UP BY BIDDER)
ACCESSORIES	ELECTRO HYDRAULIC POSITIONER POSITION LIMIT SWITCH POSITION TRANSMITTER SOLENOID VALVE E/H CONVERTER JUNCTION BOX HAND PUMP LOCAL POSITION INDICATOR HYDRAULIC POWER UNIT(COMMON FOR HWL AND MEFCV) ELECTRONIC CONTROL UNIT (COMMON FOR HWL AND MEFCV) VOLUME BOOSTER & DUMP VALVE	REQUIRED REQUIRED REQUIRED NOT REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED REQUIRED IF REQUIRED	
ELECTRO HYDRAULIC POSITIONER	MANUFACTURER & MODEL No. BYPASS : GAUGES : ENCLOSURE CLASS INPUT SIGNAL OUTPUT SIGNAL INCREASE IN SIGNAL	 IP-65 4 - 20 mA TO SUIT ACTUATOR TO OPEN/TO CLOSE	
LIMIT SWITCH	MANUFACTURER & MODEL No. OPEN: INT: CLOSE CONTACT TYPE RATING (AC/DC) ENCLOSURE CLASS	 1 No. FOR OPEN &1 No. FOR CLOSE DPDT 2 NO + 2 NC 5A 240V, AC and 0.2A, 220V, DC IP65 / NEMA 4	
POSITION TRANSMITTER	MANUFACTURER & MODEL No. TYPE SUPPLY OUTPUT RATING ACCURACY ENCLOSURE CLASS	 LVDT 2 WIRE TYPE 24V DC 4 – 20 mA / 0-100 Ohms +/- 1% FS IP65 / NEMA 4	
HANDWHEEL	ORIENTATION	SIDE MOUNTED	
JUNCTION BOX	No. OF WAYS SIZE CABLE GLANDS: (SIZE / QNTY) ENCLOSURE CLASS	THIRTY SIX REQUIRED REQUIRED IP65 / NEMA 4	
E/H CONVERTER	INPUT SIGNAL : POWER SUPPLY SPLIT RANGE ENCLOSURE CLASS	4 – 20mA, DC / 24V, DC YES / NO // YES / NO IP65 / NEMA 4	

	PREPARED BY	CHECKED BY	APPROVED BY	VENDOR SEAL
SIGN. : NAME : DATE :	PRATEEK KUMAR JAIN	A JAI GANESH	V GUNASEKARAN 26/5/20	SIGN.: NAME: DATE:

V. GUNASEKARAN
Senior Manager
Boiler Mountings / PE (FB)
BHEL, TRICHY - 620 014

Customer No: 1828,1829 & 1830 Tag Nos.: HAG 31AA301 **Qty.: 1 Nos. / BOILER**

MINIMUM ECONOMISER FLOW CONTROL VALVE DATA SHEET

	PART – A (TO BE FILLED UP BY PURCHASER)		PART – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT	**PATRATU– 3 x 800 MW**	
	SERVICE	**MEFCV**	
	LOCATION	OUTDOOR	
	DUTY	MODULATING	
	PIPE SIZE (inlet / outlet)	D 406.4X 55/ D406.4X55	
	PIPE MATERIAL (inlet / outlet)	**SA106 Gr.C/ SA106 Gr.C**	
	MEDIUM	FEED WATER	
BODY	MODEL No.		
	TYPE OF BODY : GUIDING : No. OF PORTS	"Z"	
	BODY SIZE: PORT SIZE: DESIGN CV		
	END CONNECTION & RATING (ASME)	**BUTT WELDED; STYLE-P, d1 = 310.15 mm**	
	BODY MATERIAL	**SA105**	
	PACKING MATERIAL	GRAFOIL	
	BONNET TYPE		
	TRIM FORM		
	TRIM MATERIAL: SEAT / PLUG		
	: CAGE / STEM		
	BALANCED / UNBALANCED	FLOW TO CLOSE	
	FLOW	< 8 m/s	
	VALVE OUTLET VELOCITY	**V**	
	REQUIRED LEAKAGE CLASS	LESS THAN 85 dBA	
	NOISE LEVEL (dBA)		
	VALVE LIFT mm		
	ANTICAVITATION TRIM		
ELECTRO HYDRAULIC ACTUATOR	MODEL No. & SIZE		
	CLOSE AT: OPEN AT (Kg/cm^2 (g))		
	SHUT OFF DIFFERENTIAL		
	STEM OREINTATION		
	MANUAL OVERRIDE	YES	
	TRAVEL TIME FOR		
	OPEN TO CLOSE, CLOSE TO OPEN	<12 Secs / <12 Secs	
	VALVE POSN. ON SIGNAL (4-20mA) FAILURE	STAYPUT	
	VALVE POSN. ON SUPPLY FAILURE	STAYPUT	
PERFORMANCE OF VALVE	LINEARITY	± 2%	
	HYSTERISIS	± 1%	
	SENSITIVITY	± 0.5%	
	ACCURACY (OVERALL)	± 2%	

SERVICE CONDITIONS

Sl. No.	LOAD	FLOW Kg/sec	INLET PR. $kg/cm^2(g)$	OUTLET PR. $kg/cm^2(g)$	INLET TEMP (°C)	Pr. Drop $kg/cm^2(g)$	Sp. Gravity	Calc. Cv	Valve Lift %	Valve outlet velocity	Noise Level dBA
01.	Ambient	269.3	23.1	10.8	100	12.3					
02.	Warm Start 80 bar(a)	269.3	96.2	89.9	295.0	6.3					
03.	Hot start 140 bar (a)	269.3	153.6	150.6	337	3.0					
04.	Hot start 160 bar (a)	269.3	172.7	170.9	348	1.8					

ACTUATOR SIZING PRESSURE : **358.6 kg/cm² (g)**
BODY DESIGN: PRESSURE / TEMPERATURE : **358.6 kg/cm² (g) / 348°C**
TEST PRESSURE : 2X DESIGN PRESSURE
IBR FORM – III C : REQUIRED
TOTAL WEIGHT (VALVE+ACTUATOR+ACCESSORIES) : **Kgs.**
Valves should be directly weldable to connecting pipe without the use of Reducers. ONLY GLOBE "Z" VALVES ACCEPTABLE.

PART – A (TO BE FILLED UP BY PURCHASER)			PART – B (TO BE FILLED UP BY BIDDER)
ACCESSORIES	ELECTRO HYDRAULIC POSITIONER	REQUIRED	
	POSITION LIMIT SWITCH	REQUIRED	
	POSITION TRANSMITTER	REQUIRED	
	SOLENOID VALVE	NOT REQUIRED	
	E/H CONVERTER	REQUIRED	
	JUNCTION BOX	REQUIRED	
	HAND WHEEL (SIDE MOUNTED)	REQUIRED	
	LOCAL POSITION INDICATOR	REQUIRED	
	HYDRAULIC POWER UNIT(COMMON FOR HWL AND MEFCV)	REQUIRED	
	ELECTRONIC CONTROL UNIT (COMMON FOR HWL AND MEFCV)	REQUIRED	
	VOLUME BOOSTER & DUMP VALVE	IF REQUIRED	
ELECTRO HYDRAULIC POSITIONER	MANUFACTURER & MODEL No.		
	ENCLOSURE CLASS	IP-65	
	INPUT SIGNAL	4 - 20 mA	
	OUTPUT SIGNAL	TO SUIT ACTUATOR	
	INCRASE IN SIGNAL	TO OPEN/TO CLOSE	
LIMIT SWITCH	MANUFACTURER & MODEL No.		
	OPEN: INT: CLOSE	1 No. FOR OPEN &1 No. FOR CLOSE	
	CONTACT TYPE	DPDT 2 NO + 2 NC	
	RATING (AC/DC)	5A 240V, AC and 0.2A, 220V, DC	
	ENCLOSURE CLASS	IP65 / NEMA 4	
POSITION TRANSMITTER	MANUFACTURER & MODEL No.		
	TYPE	LVDT 2 WIRE TYPE	
	SUPPLY	24V DC	
	OUTPUT RATING	4 – 20 mA / 0-100 Ohms	
	ACCURACY	+/- 1% FS	
	ENCLOSURE CLASS	IP65 / NEMA 4	
HANDWHEEL	ORIENTATION	SIDE MOUNTED	
JUNCTION BOX	No. OF WAYS	THIRTY SIX	
	SIZE	REQUIRED	
	CABLE GLANDS: (SIZE / QNTY)	REQUIRED	
	ENCLOSURE CLASS	IP65 / NEMA 4	
E/H CONVERTER	INPUT SIGNAL : POWER SUPPLY	4 – 20mA, DC / 24V, DC	
	SPLIT RANGE	YES / NO // YES / NO	
	ENCLOSURE CLASS	IP65 / NEMA 4	

	PREPARED BY	CHECKED BY	APPROVED BY	VENDOR SEAL
SIGN. :			28/5/20.	SIGN:
NAME :	PRATEEK KUMAR JAIN	A JAI GANESH	V GUNASEKARAN	NAME:
DATE :			V. GUNASEKARAN Senior Manager Boiler Mountings / PE (FB) BHEL, TRICHY - 620 014	DATE:

Annexure-II

1. Project Specific Data:

One *(1)* stainless steel tubing, fittings and necessary supports to connect all necessary hydraulic line between the common SUPPLIER supplied Common Hydraulic Unit and the three SUPPLIER supplied BOILER SEPARATOR LEVEL CONTROL VALVES (HWL-1, HWL-2 VALVES) and Minimum Economizer Flow Control Valve (MEFCV) hydraulic actuators. Each Valve location from the common hydraulic unit is as follows.

i. Hydraulic Unit to HWL1 - 50m.
ii. Hydraulic Unit to HWL2 - 50m.
ii. Hydraulic Unit to MEFCV - 60m.

STANDARD QUALITY PLAN FOR CONTROL VALVES (STEAM & WATER APPLICATIONS)

Prepared By **Quality Assurance**	VENKANNA RUPANI	R. Venkanna 14/09/2015

Reviewed by	Signature
Quality Assurance G. PANNEER SELVAM	14/09/15
Engineering K. SRIDHARAN	16/09/15
Materials Management/BOI K. UDAYA KUMAR	16/9/15
Quality Control R. DHARMAR	15/09/15

Rev No	Date	Approved by	Signature
00	14/09/2015	AGM / QA & BE	

Record of Revisions

Rev No	Details of Revision	Remarks
00	Fresh Issue	

बी एच ई एल BHEL	MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS	**STANDARD QUALITY PLAN** **PRODUCT: CONTROL VALVES – STEAM & WATER APPLICATIONS (SH, RH SPRAY BLOCK; SB PRESSURE REDUCING; WARM KEEPING LEVEL; START-UP SYSTEM:SEPARATOR LEVEL & MINIMUM ECONOMIZER FLOW)** **SUB-SYSTEM :Steam Generator Package**	QWI NO:SQP:SD:06 REV.NO.00 DATE: 14/09/2015 PAGE: 2 OF 5

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	C	N	
1	2	3	4	5	M	C/N	7	8	9	D*	** 10			11
1.0	**RAW MATERIALS & BOUGHT OUT ITEMS**													
1.1	Body, Bonnet, inlet & outlet nozzles (if applicable)	Chemical & Mech Properties, Heat treatment, Hardness@	B	TC Verification	1/Heat	1/Heat	BHEL approved datasheet/ ASTM Std	BHEL approved datasheet / ASTM Std	MTC	√	P	V	V	@on Gr 91 materials only.
		Surface quality*	B	Visual Examination	100%	100%	MSS SP 55	MSS SP 55	MTC	√	P	V	V	*on castings.
		Internal Soundness for class rating ≥ 900 (RT/UT#)	B	TC Verification	100%	100%	ASME Sec V	RT: ASME B16.34 Appendix I/ UT: ASME B16.34 Appendix IV	MTC	√	P	V	V	#RT as per ASME B16.34; UT for forgings of dia/thick ≥50mm.
		#Sub-Surface Soundness(MPI)	B	TC Verification	100%	100%	ASME Sec V/ ASTM E709	ASME B 16.34 Appendix II	MTC	√	P	V	V	#On accessible areas.
1.2	Trim(Plug, Seat ring & Stem)	Chemical & Mechanical Properties, Hardness@	B	TC Verification	1/Heat	1/Heat	BHEL approved datasheet / ASTM Std	BHEL approved datasheet / ASTM Std	MTC	√	P	V	V	@on Gr 91 materials only.
		Stem Internal Soundness(UT#)	B	TC Verification	100%	100%	ASME Sec V/ ASTM A 388	ASME B 16.34 Appendix IV	MTC	√	P	V	V	#UT for dia/ thick ≥50mm
1.3	Pressure retaining fasteners	Chemical, Mechanical Prop & Dimensions	B	TC Verification	1/Heat	1/Heat	BHEL approved datasheet /ASTM Std	BHEL approved datasheet /ASTM Std	MTC/ COC	√	P	V	V	
1.4	Diaphragm/ Piston Cylinder, if applicable	Surface Quality, Strength & %Elg, Hardness, *, Endurance Life, Dimensions	B	Visual & Measurement	1/ Lot 100%	1/ Lot 100%	Manufacturer's Specification 10,000 Cycles	Manufacturer's Specification No damage	COC	√	P	V	V	*property change after heat aging.
1.5	Springs, if applicable	Chemistry, Strength, Hardness, Endurance*, Scragging, Linearity & Dimensions	B	Chemical Analysis, Compression & Load test, Measurement, Cyclic Test, Measurement	1/ Lot	1/ Lot	Manufacturer's Specification 10,000 Cycles	Manufacturer's Specification No damage	COC	√	P	V	V	*including stiffness ratio.

LEGEND: *RECORDS IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY THE SUPPLIER IN QA DOCUMENTATION;
** **M:** MANUFACTURER, **C:** BHEL QC/BHEL AIA, **N**: CUSTOMER; **P:** PERFORM. **W**: WITNESS, **V:** VERIFICATION; **CLASS** : A - CRITICAL ; B - MAJOR ; C – MINOR;
MTC- Mill /Manufacturer's Test Certificate; IR- Inspection/Test Report; (R): Routine test; (T)/(Ts): Type test, COC: Certificate of compliance

MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS	**STANDARD QUALITY PLAN** **PRODUCT: CONTROL VALVES – STEAM & WATER APPLICATIONS (SH, RH SPRAY BLOCK; SB PRESSURE REDUCING; WARM KEEPING LEVEL; START-UP SYSTEM:SEPARATOR LEVEL & MINIMUM ECONOMIZER FLOW)** **SUB-SYSTEM :Steam Generator Package**	**QWI NO:SQP:SD:06** **REV.NO.00 DATE: 14/09/2015** **PAGE: 3 OF 5**

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	C	N	
1	2	3	4	5	M	C/N	7	8	9	D*	** 10			11
1.6	Pressure Gauges, if applicable	Rating/Range, Performance	B	Visual, Calibration	100%	100%	Manufacturer's Specification	Manufacturer's Specification	IR/COC	√	P	V	V	
1.7	**Accessories:** Solenoid valve, limit switch, ALR, junction box, positioner & transmitters, etc.#	Make/rating/type; Degree of protection(as applicable)*	B	Verification	100%	100%	BHEL approved datasheet	BHEL approved datasheet	COC & Certificates *	√	P	V	V	#BHEL approved makes. *For electrical items, certificates by statutory bodies shall be furnished.
2.0	**INPROCESS INSPECTION**													
2.1	Welding Qualifications, if welding is involved	Procedure	B	Document Review	100%	100%	ASME Sec IX	ASME Sec IX	PQR & WPS	√	P	V	V	# ASME Sec IX for BHEL export boilers only
		Personnel #	B	Document Review	100%	100%	IBR/ ASME Sec IX#	IBR/ ASME Sec IX #	WPQ	√	P	V	V	
2.2	PWHT, if applicable	Time & Temp control	B	Review of HT Chart	100%	100%	WPS & IBR	WPS & IBR	HT Chart	√	P	V	V	
2.3	Hard faced Trims	Hardness	B	Measurement	On test samples only		BHEL approved datasheet / Mfg Std	BHEL approved datasheet / Mfg Std	Test Report	√	P	V	V	
2.4	Body, Bonnet, Plug, Seat Rings & Stems after machining	Surface quality, Dimensions including profile check	B	Visual & Measurement	100%	--	Manufacturer's Drawing	Manufacturer's Drawing	--	-	P	--	-	
2.5	Lapping*	M/c surface contact	B	Visual	1/Heat		---	Proper Physical contact	Test Report	-	P	-	-	*for rotating stem valves.
2.6	NDE on hard faced trims	Weld Soundness	B	LPI	100%	100%	ASME E165	ASME Sec VIII Div 1 Appd 8.4	Test Report	√	P	V	V	
2.7	NDE on butt weld joints	Weld Soundness	B	RT/UT	100%	100%	ASME Sec V	ASME Sec I	Test Report	√	P	V *	V	*Film Review
2.8	NDE on butt weld ends	Soundness of edges after m/c	B	LPI	100%	100%	ASME Sec V	ASME Sec VIII Div 1 Appd 8.4	Test Report	√	P	V	V	
2.9	Body & Bonnet	Leak tightness & pressure resistance	A	Hydro Test	100%	-	ASME 16.34/ ISA 75.19	No Leak	Register/ Log	--	P	-	-	
2.10	Hardness on Gr 91 welds	Hardness	B	Measurement	100%	10%	Manufacturer's standard	186-300 BHN	Test Report	√	P	W	V	

LEGEND: *RECORDS IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY THE SUPPLIER IN QA DOCUMENTATION;
**** M:** MANUFACTURER, **C:** BHEL QC/BHEL AIA, **N**: CUSTOMER; **P:** PERFORM. **W**: WITNESS, **V:** VERIFICATION; **CLASS** : A - CRITICAL ; B - MAJOR ; C – MINOR;
MTC- Mill /Manufacturer's Test Certificate; IR- Inspection/Test Report; (R): Routine test; (T)/(Ts): Type test, COC: Certificate of compliance

बीएचईएल BHEL	MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS	**STANDARD QUALITY PLAN** **PRODUCT: CONTROL VALVES – STEAM & WATER APPLICATIONS (SH, RH SPRAY BLOCK; SB PRESSURE REDUCING; WARM KEEPING LEVEL; START-UP SYSTEM:SEPARATOR LEVEL & MINIMUM ECONOMIZER FLOW)** **SUB-SYSTEM :Steam Generator Package**	QWI NO:SQP:SD:06 REV.NO.00 DATE: 14/09/2015 PAGE: 4 OF 5

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	C	N	
1	2	3	4	5	M	C/N	7	8	9	D*	** 10			11
3.0	**FINAL INSPECTION & TESTING**													
3.1	Performance Test on assembled valves fitted with all accessories	Leak tightness & pressure resistance of Body & Bonnet joint	A	Hydro Test	100%	10%	ASME 16.34/ ISA 75.19	No Leak	Test Report	√	P	W	V	IBR Form III C shall be submitted
3.2		Leak through seat	A	Seat Leak Test (Air/Hydro test)	100%	10%	FCI 70.2 /BHEL approved datasheet	FCI 70.2 /BHEL approved datasheet	Test Report	√	P	W	V	
3.3		Travel, linearity, hysteresis, valve opening & closing time, fail safe feature, functioning of all accessories.	A	Performance/ Calibration Test	100%	10%	IEC 60534-4/ BHEL approved datasheet	BHEL approved datasheet	Test Report	√	P	W	V	
3.4		Packing Tightness*	A	Packing Leak Test	100%	10%	ASME B16.34/ BHEL approved datasheet	ASME B16.34/ BHEL approved datasheet	Test Report	√	P	W	V	*can be done during hydro test (Cl 3.1)
3.5		Control valve flow Capacity# (Discharge Vs Opening)	A	Capacity Test (Cv test)	1/Type	1/Type	BHEL approved datasheet /ISA 75.02	ISA 75.11	Test Report#	√	P	V #	V	#Type test witnessed by BHEL or done at FCRI shall be submitted for review & clearance by BHEL Engg (certificate valid for 5 years).
3.6		Actuator chamber-Strength & leakage	B	Air Leak Test	100%	10%	Manufacturer's std	No leak when tested @ 1.5 times supply press or 60 psi max.	Test Report	√	P	W	V	
3.7	Actuator & Positioner	Model, Sl No, Qty, Rating	B	Visual & Document Review	100%	10%	BHEL approved datasheet	BHEL approved datasheet	Test Report/ COC	√	P	W	V	
3.8	Final Inspection	Overall Dimensions*	B	Measurement	100%	10%	BHEL approved GA Drawing	BHEL approved GA Drawing	Test Report	√	P	W	V	*including OD, d1, thickness, etc.

LEGEND: *RECORDS IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY THE SUPPLIER IN QA DOCUMENTATION;
** **M:** MANUFACTURER, **C:** BHEL QC/BHEL AIA, **N**: CUSTOMER; **P:** PERFORM. **W**: WITNESS, **V:** VERIFICATION; **CLASS** : A - CRITICAL ; B - MAJOR ; C – MINOR;
MTC- Mill /Manufacturer's Test Certificate; IR- Inspection/Test Report; (R): Routine test; (T)/(Ts): Type test, COC: Certificate of compliance

MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS	STANDARD QUALITY PLAN PRODUCT: CONTROL VALVES – STEAM & WATER APPLICATIONS (SH, RH SPRAY BLOCK; SB PRESSURE REDUCING; WARM KEEPING LEVEL; START-UP SYSTEM:SEPARATOR LEVEL & MINIMUM ECONOMIZER FLOW) SUB-SYSTEM :Steam Generator Package	QWI NO:SQP:SD:06 REV.NO.00 DATE: 14/09/2015 PAGE: 5 OF 5

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
										M	C	N	
1	2	3	4	5	M	C/N	7	8	9	D*	** 10		11
4.0	**PAINTING, PRESERVATION & PACKING**												
4.1	Painting	Surface Prep, Primer & finish coats &Shade, DFT	B	Visual & Measurement	100%	100%	BHEL approved painting Scheme	BHEL approved painting Scheme	Test Report	√	P	V	V	
4.2	Identification #	Marking /Name Plate & Tagging	B	Visual	100%	100%	BHEL Spec & PO	BHEL Spec & PO	Test Report	--	P	V	V	#with IBR stamp
4.3	Packing*	Cleanliness, Water-proof packing & Stability	B	Verification	100%	100%	Manufacturer's practice	Manufacturer's practice	Packing List	√	P	V	V	*with site storage & handling instructions.
4.4	Spare Parts	Parts, Type, Qty, Dimensions, etc.	B	Visual & Measurement	100%	100%	BHEL approved datasheet & PO	BHEL approved datasheet & PO	IR/COC	√	P	V	V	

Note: 1. Customer verification stages specified above shall be followed. Any witness stages shall be as specified/indicated in BHEL PO.

LEGEND: *RECORDS IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY THE SUPPLIER IN QA DOCUMENTATION;
** **M:** MANUFACTURER, **C:** BHEL QC/BHEL AIA, **N**: CUSTOMER; **P:** PERFORM. **W**: WITNESS, **V:** VERIFICATION; **CLASS** : A - CRITICAL ; B - MAJOR ; C – MINOR;
MTC- Mill /Manufacturer's Test Certificate; IR- Inspection/Test Report; (R): Routine test; (T)/(Ts): Type test, COC: Certificate of compliance

PART-I (No Deviation Certificate)

Note: The following Declaration to be submitted on the bidder's Letter Head, duly signed & stamped and to be attached along with your Technical bid of the tender.

======== Startup System Control Valve for Udangudi, Yadadri and Patratu Projects. ========

Enquiry No.: **1802100217 dated 03.12.2021**

I/We M/s. ……

have read and clearly understood all the Terms and conditions in Tender Schedule of and accordingly accept the same without any deviation what so ever.

- *I/ We unconditionally agree to all the tender conditions and no new conditions are imposed by us in the technical / price bid. I understand in the event of imposing any condition in the technical / price bid, such condition would be ignored by BHEL and only the prices will be considered for the purpose of evaluation". In case of any deviation (Technical or commercial) the same is mentioned below.*

SPECIFICATION	a) Specification for Start up control valves BM/SCV: 001 dated 05.06.2020 b) Datasheets Annexure-I and II for Udangudi, Yadadri and Patratu Projects. **c)** Annexure-A; Terms and Conditions	
DOC. REFERENCE	BHEL ENQ. CALLED FOR	FIRM'S ALTERNATE OFFER
-Nil-	**-Nil-**	**-Nil-**

- *I/ We confirm that none of our group concern or affiliates etc., appears on the list of banned firms / companies by BHEL (list available on www.bhel.com) nor any of the Director / Partner / proprietor of bidder / such group concern or affiliate etc. are involved with such company.*

- *I/ We also declare that, we have not been suspended or black listed or issued with Show Cause Notice by BHEL- Trichy or any other BHEL Unit or any PSU/ Government organization.*

- *I/ We confirm that other than us, none of our group concerns or affiliates etc. are participating in the tender either directly or indirectly through any other agency under same proprietor / common director(s) / common partner(s).*

- *I/ We confirm that if any of the above statement / information furnished by us in this tender is found to be false/ fake at any stage of tender evaluation or during execution of contract, BHEL will have the right to initiate appropriate action including legal proceeds / termination of contract, recovery of damages, penalties etc. as deemed fit.*

(Contractor Signature with Seal)

Contractor Signature

Contractor Seal

Annexure-M

CORPORATE QUALITY ASSURANCE
SUB-VENDOR QUESTIONNAIRE

i.	***Item/Scope of Sub-contracting***	
ii.	***Address of the registered office***	***Details of Contact Person (Name, Designation, Mobile, Email)***
iii.	***Name and Address of the proposed Sub-vendor's works where item is being manufactured***	***Details of Contact Person: (Name, Designation, Mobile, Email)***
iv.	***Annual Production Capacity for proposed item/scope of sub-contracting***	
v.	***Annual production for last 3 years for proposed item/scope of sub-contracting***	
vi.	***Details of proposed works***	
1.	***Year of establishment of present works***	
2.	***Year of commencement of manufacturing at above works***	
3.	***Details of change in Works address in past (if any)***	
4.	***Total Area***	
	Covered Area	
5.	***Factory Registration Certificate***	***Details attached at Annexure – F2.1***
6.	***Design/ Research & development set-up (No. of manpower, their qualification, machines & tools employed etc.)***	***Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design) Details attached at Annexure – F2.2 (if applicable)***
7.	***Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc)***	***Details attached at Annexure – F2.3***
8.	***After sales service set up in India, in case of foreign sub-vendor (Location, Contact Person, Contact details etc.)***	***Applicable / Not applicable Details attached at Annexure – F2.4***
9.	***Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any***	***Details attached at Annexure – F2.5***
10.	***Sources of Raw Material/Major Bought Out Item***	***Details attached at Annexure – F2.6***
11.	***Quality Control exercised during receipt of raw material/BOI, in-process , Final Testing, packing***	***Details attached at Annexure – F2.7***

CORPORATE QUALITY ASSURANCE
SUB-VENDOR QUESTIONNAIRE

12.	***Manufacturing facilities*** ***(List of machines, special process facilities, material handling etc.)***	***Details attached at Annexure – F2.8***
13.	***Testing facilities*** ***(List of testing equipment)***	***Details attached at Annexure – F2.9***
14.	***If manufacturing process involves fabrication then-***	***Applicable / Not applicable***
	List of qualified Welders	***Details attached at Annexure – F2.10***
	List of qualified NDT personnel with area of specialization	***(if applicable)***
15.	***List of out-sourced manufacturing processes with Sub-Vendors' names & addresses***	***Applicable / Not applicable*** ***Details attached at Annexure. –F2.11*** ***(if applicable)***
16.	***Supply reference list including recent supplies***	***Details attached at Annexure – F2.12*** ***(as per format given below)***

Project/ package	*Customer Name*	*Supplied Item (Type/Rating/Model /Capacity/Size etc)*	*PO ref no/date*	*Supplied Quantity*	*Date of Supply*

17.	***Product satisfactory performance feedback letter/certificates/End User Feedback***	***Attached at annexure - F2.13***
18.	***Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product*** ***(similar or higher rating)*** ***Note:- Reports need not to be submitted***	***Applicable / Not applicable*** ***Details attached at Annexure – F2.14*** ***(if applicable)***
19.	***Statutory / mandatory certification for the proposed product***	***Applicable / Not applicable*** ***Details attached at Annexure – F2.15*** ***(if applicable)***
20.	***Copy of ISO 9001 certificate*** ***(if available)***	***Attached at Annexure – F2.16***
21.	***Product technical catalogues for proposed item (if available)***	***Details attached at Annexure – F2.17***

Name:		***Desig:***		***Sign:***		***Date:***	

Company's Seal/Stamp:-

Integrity Pact (IP)

(a) IP is a tool to ensure that activities and transactions between the Company and its Bidders / Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

SL	IEM	Email
1.	Shri Arun Chandra Verma, IPS (Retd.)	acverma1@gmail.com
2.	Shri Virendra Bahadur Singh, IPS (Retd.)	vbsinghips@gmail.com

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

(c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) departments officials whose contact details are provided below.

Details of contact person(s): -

(1)

Name: Rajesh Kummar SB

Deptt: MM/BOI

Address: 24 Building, BHEL, Trichy

Phone: 0431-2574166

Email: sbrajesh@bhel.in

(2)

Name: Jiby MJ

Deptt: MM/BOI

Address: 24 Building, BHEL, Trichy

Phone: 0431-2574363

Email: mjjiby@bhel.in

Annexure-1

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

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

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions:

Section 2 - Commitments of the Bidder(s)/ Contractor(s)

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

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

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

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

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

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

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

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 - Compensation for Damages

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

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to

demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 - Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

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

Section 6 - Equal treatment of all Bidders/ Contractors / Sub-contractors

6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.

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

Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

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

Section 8 - Independent External Monitor(s)

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

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non- disclosure agreement.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.

8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.

8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.11 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.12 The word `Monitor' would include both singular and plural.

Section 9 - Pact Duration

9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.

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

Section 10 - Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

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

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

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

10.5 Only those bidders / contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

SBRajeshK

For & On behalf of the Principal

S.B. RAJESH KUMMAR
Senior Engineer
Materials Purchase / BOI
BHEL, TRICHY - 620 014.

(Office Seal)

For & On behalf of the Bidder/ Contractor

(Office Seal)

Place- Trichy

Date-- 03.12.2021

Witness: _____

(Name & Address) _____

JIBY. M.J.
Assistant Engineer - I
Materials Management / BOI
BHEL, TRICHY - 620 014.

Witness: _____

(Name & Address) _____

THIRD PARTY NON-DISCLOSURE AGREEMENT

I, _____, on behalf of the _____ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL, Trichy on contract is confidential and that the nature of the business of the BHEL, Trichy is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL, Trichy Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.

- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data,

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL, Trichy all documents and property of BHEL, Trichy, including: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, Trichy's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, Trichy and are reasonable given the nature of the business carried on by the BHEL, Trichy I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Place:-_____ Date:-_____

Name

Company

Signature