
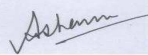




TD-201 Rev No. 00	Form No.  HYDERABAD	<p align="center">PRODUCT STANDARD</p> <p align="center">PROJECT ENGINEERING & SYSTEMS DIVISION</p> <p align="center">HYDERABAD-32</p>		<p align="center">PY51217</p> <hr/> <p align="center">Rev No. 00</p> <hr/> <p align="center">Page 1 of 27</p>				
<p align="center">TECHNICAL SPECIFICATION FOR FIRE WATER STORAGE TANKS</p> <table border="1" data-bbox="295 888 1448 1041"> <tr> <td data-bbox="295 888 524 963">PROJECT :</td> <td data-bbox="524 888 1448 963">3 X 660 MW SUPER-CRITICAL THERMAL POWER PROJECT, NORTH KARANPURA</td> </tr> <tr> <td data-bbox="295 963 524 1041">CUSTOMER :</td> <td data-bbox="524 963 1448 1041">M/S NATIONAL THERMAL POWER CORPORATION LIMITED</td> </tr> </table>					PROJECT :	3 X 660 MW SUPER-CRITICAL THERMAL POWER PROJECT, NORTH KARANPURA	CUSTOMER :	M/S NATIONAL THERMAL POWER CORPORATION LIMITED
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CUSTOMER :	M/S NATIONAL THERMAL POWER CORPORATION LIMITED							
Ref. Doc	Prepared By:  ANUPAM SHARMA	Reviewed By:  R. MURALIDHAR	Approved By:  M. SIVA PRASAD BABU	Date: 16.11.15				

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p><u>DOCUMENTS TO BE SUBMITTED ALONG WITH BID:</u></p> <p>The bidder must submit the following documents along with their bid so as to enable BHEL to evaluate their offer.</p> <p><u>Bidder to note that in case following documents are not submitted along with offer, the offer may be liable for Technical Rejection.</u></p> <ul style="list-style-type: none"> - Signed and Stamped copy of Annexure-I(Datasheet for Fire Water Storage Tanks) - Checklist for the offer (Annexure-VII) – Completely filled and stamped copy along with all the necessary documents and drawings. - Unpriced “Price-Bid Format” (Annexure-VIII) - Completely filled and stamped copy - Any deviations/clarifications required on the technical specification/annexures, bidder has to raise the pre-bid queries vide Annexure-V and bidder has to submit zero deviation offer. 		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>1.0 INTENT OF SPECIFICATION</p> <p>1.1 The specification is intended to cover design, engineering, supply of material (including commissioning spares), inspection and testing at vendor's / sub-vendor's works, proper packing and forwarding, shipment & delivery at site and also supervision of the following activities</p> <ul style="list-style-type: none"> (i) Tank Fabrication, Erection and Commissioning, (ii) Inspection and Testing and (iii) Handing over <p>of 2 nos. of 2300 m3 Fire water Tanks as per the specifications and requirements indicated in different sections of this specification.</p> <p>1.2 Storage of Material, fabrication, Erection and Commissioning of Tank is not in the scope of bidder. However, bidder to furnish recommended erection and commissioning procedures along with all the drawing / documents required to facilitate Fabrication, Erection and Commissioning of the tanks by others.</p> <p>1.3 The contractor shall be responsible for providing all material, equipment & services required to ensure operability, maintainability, reliability and safety of the tanks as covered under this specification, irrespective of whether they have been specifically indicated in this specification or not.</p> <p>1.4 It is not the intent to specify herein all the details of design and manufacture. However, the equipment / system shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material which in his judgement is not in full accordance herewith.</p> <p>1.5 The general terms and conditions, instructions to tenderer and other attachment referred to elsewhere are hereby made part of the tender specifications. The equipment / material and works covered by their specification are subject to all the attachments referred in the specification. The tenderer shall be responsible for adherence to all requirements stipulated herein.</p> <p>1.6 All text/ numeric in the document / drawings to be generated by the successful bidder will be in English language only.</p> <p>1.7 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder/vendor and customer /purchaser/ employer will mean BHEL and /or NTPC/Consultant as interpreted by BHEL in the relevant context.</p>		
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PROJECT INFORMATION


1.	Owner	M/S NATIONAL THERMAL POWER CORPORATION
2.	Project	3X660 MW NORTH KARANPURA STPP
3.	Owner's Consultant	--
4.	Location	Tandwa town in Chatra districts in the state of Jharkhand on Hazaribagh-Chatra State highway at a distance of about 50 kms from Hazaribagh city
5.	Nearest Airport	RANCHI
6.	Nearest Railway Station	KHALARI RAILWAY STATION
7.	Access to site	AS INDICATED ABOVE
8.	Maximum Average DBT	45 Deg.C for outside
9.	Minimum Average DBT	--
10.	Relative Humidity	--
	Design AMB Humidity	--
11.	Wind data	
	Max. wind speed (as per IS:875)	39 m/s(Design Wind Speed)
	Prevailing Wind Direction	LATER
	Seismic coefficient	III (IS 1893)


2.0 SPECIAL INSTRUCTIONS TO BIDDERS


2.1 This specification shall be read in conjunction with all its enclosures. In case of any discrepancy arising between this job specification & its enclosures, the most stringent of all (as determined by purchaser) shall be followed. Further, if a requirement in this specification or any of the enclosures, calls for a decision from the Purchaser, it shall be bidder's sole responsibility to clearly bring out/highlight the same distinctively in his pre-bid queries, so as to enable purchaser to furnish their decision/clarification. If such issues/requirements are not duly addressed by bidder during the pre-bid stage and if such issues/requirements are observed later during order execution stage, it shall be binding on the bidder to comply with the final decision made by the purchaser subsequently, without any cost, delivery, or any other commercial implications.


2.2 Any additional equipment, material, services etc., which are not specifically mentioned in this specification, but required to make the Tanks complete in all respects, in accordance with the intent of this technical specification, contractual agreement,


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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>statutory requirements, relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be covered under the scope of this specification.</p> <p>2.3 Any specific hardware/software/item/ etc. required as indicated in 2.2. above but not listed elsewhere in this specification or its enclosures, shall be deemed to be included in the basic price quoted by the bidder. Also, all mounting hardware/accessories/fittings/conduits/etc. required for the Erection & Commissioning of the Tanks shall be deemed to be included in the basic price quoted by the bidder. Bidder, at no point of time, shall be eligible to raise any extra claim in this regard.</p> <p>2.4 The Bidder shall accept full responsibility for the completeness and for the reliable operation of Tanks as a whole. These shall be executed on the basis of proven design principle. Standardization of equipment, materials etc. shall be employed in the design. Care shall be taken to ensure safe operation as well as simplicity of Erection & Commissioning of the Tanks. Even though, the requirements are specified in detail to the extent possible, bidder to apply good engineering practices in the design, selection of equipment, manufacturing, procurement, transportation, fabrication, painting, inspection & testing, supervision of erection & commissioning of system etc., wherever same is not clearly spelt out.</p> <p>2.5 By accepting the contract, the bidder shall be deemed to have accepted the obligation of supplying everything that is necessary for the purpose mentioned above, regardless of any omission in the specification or on the drawings for the fulfillment of complete main plant package.</p> <p>2.6 Bidder to note that the Purchase Order for Supply of Material for Fire Water Storage Tanks for the 3 x 660 MW North Karanpura STPP shall be placed on lump sum fixed prices based as per tender specification requirements. Bidder to further note that they shall not be permitted for any claim for additional commercial implication on any account during the detail engineering stage</p> <p>2.7 Bidder shall quote strictly as per the scope of supply and requirements of this specification. Bidder offer shall be strictly as per these specification requirements. Unsolicited or Alternate offers from the bidders will not be entertained.</p> <p>2.8 In case bidder feels that it is necessary to exclude some components of scope of supply or some of the features of specification requirements due to any technical constraints, bidder shall bring the same to the notice of purchaser during pre-bid stage and take their prior approval before submission of their bid. All such clarifications required by the bidder shall be intimated to BHEL together as a single notice within a week of receipt of enquiry by bidder and clarifications on the same shall be obtained by the bidder from the purchaser. In case no such clarifications are sought during pre-bid stage, it will be assumed that bidder has no comments or observations on BHEL's specification and no deviations to the specifications will be taken by the bidder.</p>		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		<p>2.9 Bidder to quote strictly as per BHEL's Price Bid format(Annexure-VIII). Failure to do shall make their offer liable for rejection. Any tampering/modification/change of the BHEL's price format is not allowed and is liable for rejection of bidders offer.</p> <p>2.10 In case Bidder is unable to offer due to any specific requirement of specification, Bidder shall bring out the same in their regret letter. Otherwise it will be considered that non participation by the bidder is attributable to reasons other than any specification requirements.</p> <p>2.11 Compliance with this specification shall not relieve the bidder of the responsibility of furnishing equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified start up and operating conditions.</p> <p>2.12 The design information, specifications and drawings indicate the "Minimum" requirements and are intended to enable Bidders to ascertain the extent of the work involved. Bidders are expected to supplement the information included in this specification as required and submit a comprehensive bid.</p> <p>2.13 The intending tenderers shall be deemed to have visited the site and have studied the conditions before submitting the Bids. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the work in strict conformity with the drawings and specifications.</p> <p>2.14 Civil works will be done by BHEL based on civil inputs furnished by the bidder during detail engineering. In case of any changes in the civil input drawing after civil work is completed, necessary prices on account of modification of the civil work shall be deducted from bidder's account.</p> <p>3.0 SCOPE OF SUPPLY, SCOPE OF SERVICES, EXCLUSIONS AND TERMINAL POINT DETAILS:</p> <p>The Fire water tanks to be engineered and the materials shall be supplied at site under this specification shall be generally as per enclosed DATA SHEET for Fire Water Storage Tank(Annexure-I) and also the Sketch for Fire Water Storage Tank (Annexure-X).</p> <p>Technical Details of above tanks are indicated in Datasheet for Fire Water Storage Tank(Annexure-I).</p> <p>3.1 SCOPE OF SUPPLY: (Two Nos of Fire Water Storage Tanks, each of capacity 2300 cu.m)</p> <p>3.1.1 The Scope of Supply shall include the following major items:</p> <p>a) All the plate materials required for Tank Bottom, Shell, and Roof etc. for the Water Tanks.</p>	
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<ul style="list-style-type: none"> b) All the required connections, nozzles and accessories required for each tank as per enclosed Data Sheet for Fire Water Storage Tanks(Annexure-I) and as per Annexure-IX Reference P&ID. c) All the required piping material inside the tank. d) All the required pad plates on the tanks for supporting outside piping. e) All flanges and counter flanges/blind flanges for all nozzles of tank connections including the fasteners (bolts, studs, nuts) and gaskets for these connections. f) All the required manhole covers/flanges including the fasteners (bolts, studs, nuts) and gaskets. Manholes shall be provided with davit arrangement for ease of maintenance. g) All the structural material required for roofs, ladders, wind girders, rails, platforms, stairs, supports, stiffeners, curb angles etc. h) 2 Nos of Suitable Goose Neck Vents with bird wire mesh shall be provided for each tank as per Annexure-IX Reference P&ID i) The following instrumentation along with their fittings, accessories, mountings etc. (As per the enclosed Data Sheets provided elsewhere in this specification) : <ul style="list-style-type: none"> 1) 2 Nos of Level Transmitter(Level High, level Low, Level Low Low) Top Mounted Ultrasonic Type Level Transmitter for each tank as per Datasheet for Fire Water Storage Tank(Annexure-I) & Annexure-IX Reference P&ID 2) 1no Level Indicator(Mechanical Level Indicator of Float and Board Type) for each tank as per Datasheet for Fire Water Storage Tank(Annexure-I) & Annexure-IX Reference P&ID j) Seal Pot and Breather tanks shall be provided for DM & Intermittent DM Water Storage tanks as per Annexure IX & Annexure XIII. k) Piping from Vent and Overflow of DM & Intermittent DM Water Storage tanks upto Breather tank and Seal pot are in bidder's scope of supply. l) All inlet lines shall be provided with diffusers to limit the velocity. m) All anchor bolts, nuts, washers including pad plates (as required for anchoring of tank as per approved design calculations). 		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>4.0 DETAILED DESIGN & TECHNICAL REQUIREMENTS</p> <p>4.1 The successful bidder shall furnish design calculations(in native/original format) to BHEL during detailed engineering stage for approval along with the relevant pages of authentic supporting literature e.g. Code, Hand book, National / international Standards etc. All steps including formulas and abbreviations shall be clearly shown in the calculation. All inputs / assumptions shall be indicated in the first sheet of the calculation. Calculation shall be necessarily done in SI UNITS only for the followings: -</p> <ol style="list-style-type: none"> a) The tanks shall be designed as per IS: 803/API-650 latest edition. b) Material of construction of Water Storage tanks shall be mild steel conforms to IS – 2062 Grade – B. c) Plate thickness calculation (different courses of shell plate, bottom plate and roof plate thickness), roof curb angle, top wind girder, intermediate wind girder, tank internal pressure vis-a-vis. allowable value. <ol style="list-style-type: none"> (i) Shell, Bottom and Roof plate thicknesses shall be provided as specified in datasheet for water storage tanks enclosed as Annexure-I. Plate thickness calculation shall be approved from BHEL / Customer during detailed engineering stage. However, if the addition / summation of calculated value of plate thickness (excluding tolerance on plate as per relevant IS) / nominal minimum thickness specified in the relevant design code / standard and corrosion allowance comes out more than the specified value then the nearest available (higher side) plate thickness in the market shall be provided for bottom, shell and roof plates without any commercial implication. (ii) Negative tolerance on plate thickness shall not be considered in the plate thickness calculation and also shall not be provided in the tank. Only positive tolerance shall be considered. d) All inlet piping shall be taken from bottom of the tank(Shell Side). The clearance between the bottom of the tank and the edge of the inlet piping shall be kept as per code and good engineering practices. e) All the manhole covers/flanges shall be of hinged & bolted type with nuts, bolts and gaskets in bidder’s scope of supply. The size of the manhole shall be minimum 600 mm. f) Wind and seismic load calculations required for foundation bolt design. If required, wind girders shall be provided based on the code design calculations. g) Weight calculation of plates, appurtenances & structures separately shall be included in the Design calculation. 		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>4.14 Code conformance for flanges / counter flanges shall be as per IS2062 Gr B (Dimensional standard- ANSI B16.5 clause 150/IS 1538).</p> <p>4.15 The number & size of nozzles (including flanges, counter flanges and inside piping) indicated in the sketches attached with the data sheets are tentative and bidder guidance purpose only and the same may undergo minor change during detail engineering stage for which no commercial implication shall be entertained by BHEL.</p> <p>4.16 Bidder shall furnish the Standard calculation along with the roof structure calculation during detail engineering for checking the stability of roof.</p> <p>4.17 The tank shall be designed for filled water head / atmospheric pressure and design temperature for the tank shall be as specified in the DATA SHEET for Water Storage Tanks(Annexure-I).</p> <p>4.18 Type of roof for vertical cylindrical storage tanks shall be either supported cone roof or self supporting cone roof as per latest edition of relevant design code.</p> <p>5.0 TESTING & INSPECTION</p> <p>5.1 Bidder shall maintain an effective Quality Assurance System, to ensure that all equipment and material supplied as a part of the Fire water tanks meet required Quality standards and specifications.</p> <p>5.2 After award of contract, bidder shall submit Quality Plan for approval. The quality plan shall be submitted in BHEL quality plan format, Bidder to note that all the cost involved in any of the inspection & testing requirements as per the approved quality plan shall be deemed to be included in the price quoted by the bidder. Bidder shall not be eligible to raise any extra claim on account of any inspection & testing as per the approved quality plan.</p> <p>5.3 The particulars of the proposed tests and the procedure for the tests shall be submitted to the Owner / Engineer for approval before conducting the tests. The successful bidder shall submit recommended FQP (field quality plan) and suggestive PG test procedure for BHEL review during detail engineering stage.</p> <p>5.4 Quality plans are approved By NTPC/Consultant and final acceptance will be after physical inspection by NTPC.</p>		
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6.0 PAINTING(is Excluded from Bidders Scope)

~~All the necessary surface preparation required for painting and painting of tanks to be carried out by bidder at site/sub vendor works for the material and equipment supplied by the bidder. Painting specification shall be in line with the painting details indicated in Annexure I(Datasheet for Fire Water Storage Tanks)~~

7.0 DRAWINGS AND DOCUMENTS TO BE SUBMITTED WITH THE BID

The bidder must submit the following drawings and documents along with their bid in **2 Sets** so as to enable BHEL to evaluate their offer. In absence of any of these documents, BHEL reserves right not to evaluate the offer of the concerned bidder.

- a) Checklist for Tanks as per Annexure-VII
- b) List of recommended spares for 3 years normal operation indicating quantities in terms of numbers as per(Annexure-VI).
- c) Un-priced copy of price format(Annexure-VIII) indicating quoted/ not quoted against each row & column.
- d) Start up & Commissioning Spares(List and quantity as per bidders recommendation)
- e) Tentative GA for BHEL' reference only. Bidder to furnish the weight of each tank (in empty condition and water filled condition). Bidder to note that the weight in water filled condition shall be considered from bottom of tank up to top of curb angle.

In the absence of any documents mentioned above, bidder's offer is liable to be rejected. Further any documents submitted by bidder other than above shall not be taken cognizance of and these shall not form part of contract.

8.0 DRAWINGS/ DOCUMENTS REQUIRED DURING DETAIL ENGINEERING

- 8.1 The successful bidder shall submit the following drawings / documents during detail engineering stage(after award of contract) for approval / information / reference (as the case may be):-

S.no.	Document no.	Category	Title	
A.	DESIGN CALCULATION			Time Period for Submission from PO Date.
1		Approval	Design Calculation for Fire Water Storage Tank,	1 Week

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			seismic design calculation along with roof structure	
2			Vent sizing calculation.	1 Week
B.	DRAWINGS			
1		Approval	GA - Storage Tank including nozzle details, bill of material, weld details etc.	2 Weeks
2		Information	GA of stairway indicating platforms, landings and handrails with bill of materials	2 Weeks
3		Information	Roof structural detail of Storage Tank including nozzle details, bill of material, weld details etc.	2 Weeks
4		Information	Plate cutting layout of storage tank (shell, roof and bottom plate)	2 Weeks
5		Information	Fabrication Drawing for Storage Tank	2 Weeks
6		Approval	Nozzle orientation drawing of Storage Tank	3 Weeks
7		Approval	Load Data of Tank Foundations and Details of Anchor Chair for Tank Foundations	2 Weeks
8		Approval	GA / cross-sectional drawing of CS valve.	
9		Approval	GAD of Level Indicator	3 Weeks
10		Approval	GAD of Level Switch	
B.	DATA SHEETS			
1		Approval	Data sheet for Plates & Structure	3 Weeks
2		Approval	Data sheet for Pipe, Fittings, and Flanges & Accessories.	3 Weeks
3		Approval	Datasheet for Paint for Water Storage Tanks.	3 Weeks
4		Approval	Datasheet for Valves.	
C.	QUALITY PLANS			
1		Approval	Recommended Field Quality Plan	3 Weeks
2		Approval	Inspection Check List of MS	3 Weeks

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			Plates & Structural Steel	
3		Approval	QAP of Valves.	3 Weeks
4		Approval	QAP for MS Plates & Structural Steel	3 Weeks
5		Approval	QAP for Pipe, Fittings, Flanges & Accessories.	3 Weeks
6		Approval	QAP for Level indicator and level transmitter	3 Weeks
7		Approval	QAP for Level Switch	
D			GENERAL / OTHER DOCUMENTS	
1		Information	Bar Chart	1 Week
2		Approval	Billing Break-Up for Supply	8 Weeks
3		Approval	Makes of Bought-out Items	2 Weeks
4		Approval	As Built	After Approval of all drawings(Before PO Delivery Date)
		Approval	O&M Manual	After Approval of all drawings(Before PO Delivery Date)
5		Approval	Packing procedure before FOB delivery	12 Weeks
6		Approval	Packing list	12 Weeks
7		Approval	Suggestive PG test procedure	12 Weeks
8		Approval	Erection procedure	12 Weeks
9		Approval	Commissioning procedure	12 Weeks
10		Approval	Painting Procedure	12 Weeks
11		Approval	Valve schedule	

8.2 All drawings shall be prepared as per BHEL's title block and bear BHEL's drawing No. and customer /consultant's drawing no; which will be forwarded to the successful bidder during detail engineering stage.

8.3 Data sheets of various items shall be prepared by the bidder for storage tanks and shall be submitted to BHEL / customer / consultant for approval after placement of order and any changes required by BHEL / customer / consultant for the same shall be incorporated and adhered by the bidder without any commercial implications.

8.4 GA drawing, nozzle schedule, design data, material of construction etc. shall be prepared by the bidder during detail engineering stage based on specification / contractual requirement and there should be no commercial implication on account of finalization of the drawings and documents.

8.5 O & M manual shall be furnished to BHEL for approval during detailed engineering stage.

8.6 All possible efforts shall be made by the bidder to get the approval of drawings and documents from BHEL / customer / consultant at the earliest and the documents prepared / generated by them or their sub-vendors shall be checked by their competent authority before submission to BHEL.

8.7 Revision made by the bidder in any drawings and documents shall be highlighted by indicating the no. of revisions in a triangle without fail so that the minimum time is required by BHEL to review the drawings and documents.

8.8 Any other drawings and documents in addition to the list of drawings and documents indicated in the NIT specification as required by BHEL for the execution of the project shall be furnished by them during detailed engineering stage and no commercial implication shall be entertained by BHEL for the same.

8.9 Bidder to confirm that all the drawings shall be prepared in Auto Cad - 2010 version and required number of hardcopies and soft copies shall be furnished to BHEL during detailed engineering stage.

Following may be noted wrt the drawing submission schedule.

SL NO.	DESCRIPTION	NUMBER OF COPIES TO BE SUBMITTED	WHEN TO SUBMIT
1.	Initial drawings/documents under approval and information category.	4	As per approved Master document list
2.	Revised drawings/documents incorporating BHEL's comments.	4	Within 1 week of receipt of commented Drawings from BHEL
3.	Final Drawings/documents	10	Within 2 months of placement of order.
4.	Erection Documentation	8	1 Month before dispatch of equipment, The list of documents identified under master document list for erection to be furnished in 5 nos. of folders.

SL NO.	DESCRIPTION	NUMBER OF COPIES TO BE SUBMITTED	WHEN TO SUBMIT
5.	Draft O & M Manuals with out test certificates	2	2 months before the delivery date of equipment
6.	Revised O & M Manuals with Test Certificates to be submitted to BHEL (Hyderabad)	10	Within one month after dispatch of equipment
7.	Final O&M Manuals and Approved Documents/Drawings in a CD	3	Within one month after dispatch of equipment


8.10 15 days time is required by BHEL to offer their comments on the drawings and documents being submitted by the bidder (during detailed engineering stage in the event of L.O.I being placed) from the date of receipt.


8.11 The engineering drawings submitted by successful bidder for approval during detailed engineering stage showing / indicating the followings:-


- Scope of work by BHEL and bidder shall be indicated with different legend or in the form of note.
- Recommended locations of earthing bosses.
- Civil loads and the detailed calculation showing weights of roof, bottom, and shell plates, all accessories and nozzles etc.
- Details of pockets as required for anchor bolts.


8.12 Bidder to depute competent designer (s) at BHEL's office during detailed engineering stage to discuss drawings and other technical documents as and when required by BHEL. However, minimum 7 days notice shall be served for the same.


8.13 All the drawings which are required to be furnished to BHEL during detailed engineering stage shall include technical parameters, details of paints, BOQ / BOM etc in tabular form indicating all components including bought out items and their quantity, material of construction indicating its applicable code / standard, weight, make etc.


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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		<p>8.14 All drawings and documents including general arrangement drawing, data sheet, calculation etc. shall be furnished to BHEL during detailed engineering stage and shall include / indicate the following details for clarity w.r.t. inspection, construction, erection and maintenance etc.:-</p> <ol style="list-style-type: none"> a) All drawings and documents shall bear BHEL's title block and drawing / document number. However, BHEL's drawing / document numbering scheme shall be furnished to the successful bidder after the placement of L.O.I. b) All drawings and documents shall indicate the list of all reference drawings including general arrangement. c) All drawings shall include / show plan, elevation, side view, cross - section, skin section, blow - up view, all major self-manufactured and bought out items shall be labelled and included in BOQ / BOM in tabular form. <p>8.15 ENGINEERING COMPLETION:</p> <p>The Engineering shall be considered as completed after the following activities are finished:</p> <ul style="list-style-type: none"> • Final approval of all the Drawings / Documents which are in 'Approval' Category as per Document List in clause 8.1 above. • After successful review of drawings/documents which are in 'Information' Category as per Document List in clause 8.1 above. • Final approval of detailed Bill of Quantity (BOQ). <p>8.16 ERECTION & COMMISSIONING DOCUMENTATION:</p> <p>8.16.1 ERECTION DOCUMENTATION:</p> <p>8.16.1.1 Erection document List shall be prepared during Engineering review meeting (after award of contract) identifying all the DOCUMENTS / DRAWINGS required for completion of Erection activities of the complete system, to be submitted by the bidder as part of documentation.</p> <p>8.16.1.2 The Bidder shall submit for Purchaser's approval draft manual for Equipment Delivery and Erection (EDE Manual) covering detailed instructions, write up, technical data, drawings, check-lists, documentation formats for all activities after equipment manufacture upto installation of equipment. This manual shall cover general instructions for all equipment and specific instructions for individual equipment wherever required and shall include at least the following :</p> <ul style="list-style-type: none"> • Instructions for packing, shipping, receiving, handling, ware-housing and storage. 	
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		<ul style="list-style-type: none"> • Part number/Dispatch link-up of all the equipments/items supplied and also their co-relation with system/drawing/approved BOQ. • Instructions for location and installation of equipment furnished by this specification. • Installation drawings for field mounted equipment and other equipment covered under this specification. • Instruction relating installation of piping, support and routing drawings of drain and overflow nozzles. • Check lists and quality assurance hold points. • Formats for all related documentation. • The EDE Manual shall conform to the requirements of this specification, all applicable codes and standards, recommendations of equipment manufacturers and accepted good engineering practices and shall be subject to Employer approval during detailed engineering. • The Bidder shall ensure that all work under this part shall be performed as per the requirements of this specification, Employer approved EDE Manual and drawing/documents approved by the Employer during detailed engg. <p>NOTE: Material will be delivered directly from manufacturer plant/Stock Yard/Godown to NTPC project site. Correlation of material with MTC will be done by BHEL before delivery and correlated MTC along with delivery challan will be submitted to NTPC-RIO for issuance of MDCC.</p> <p>8.16.1.3 Erection Manuals</p> <p>The erection manuals shall be submitted at least three (3) months prior to the commencement of erection activities of particular equipment/system. The erection manual should contain the following as a minimum.</p> <ul style="list-style-type: none"> • Erection strategy. • Sequence of erection. • Erection instructions. • Critical checks and permissible deviation/tolerances. • List of tool, tackles, heavy equipments like cranes, dozers, etc. • Bill of Materials • Procedure for erection. • General safety procedures to be followed during erection/installation. • Procedure for initial checking after erection. • Procedure for testing and acceptance norms. • Procedure / Check list for pre-commissioning activities. • Safety precautions to be followed in erection all equipments and electrical supply distribution during erection 	
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>8.16.2 COMMISSIONING DOCUMENTATION:</p> <p>8.16.2.1 The contractor shall submit the commissioning documentation, comprising of Standard checklists, pre-commissioning procedures, testing schedules, commissioning schedules and commissioning networks for various Equipment / systems covered under the contract, for the approval of employer.</p> <p>8.16.2.2 Standard checklist, as the name suggests, shall be a fairly general documents, containing the list of all checks required to be carried out for similar and repetitive type of equipment to ensure consistent and thorough checking.</p> <p>8.16.2.3 The testing schedule is a document, designed for safe and systematic commissioning of individual equipment/sub-system. Commissioning schedule is a document envisaged for commissioning of a system. The testing/Commissioning schedule shall have a standard format in order to maintain consistency of presentation, content and reporting. A brief write up on the contents of the Testing Schedule/Commissioning Schedule is as per the following:</p> <p>Testing Schedules should be designed to ensure that the plant area, equipment or apparatus are tested and commissioned and will operate as per the employer’s specifications and good engineering practices.</p> <p>Testing Schedule/Commissioning Schedule is required to be of a standard format in order to maintain consistency of presentation, content and reporting.</p> <p>Testing Schedule/Commissioning Schedule should contain the following sections to make the document a self contained one:</p> <ul style="list-style-type: none"> a) Plant Details/Design data b) Testing Objective/Proposals c) State of the Plant required prior to commissioning <ul style="list-style-type: none"> ○ Erection Status with respect to Mech. Elect and C&I ○ Services required ○ Safety requirements d) Test method including completion/acceptance criteria e) Results f) Testing Programme g) Mech/Elect/C&I –Plant item completing list h) List of Drawing/documents required for carrying out the testing. <p>8.16.2.4 The contractor shall submit the list of commissioning documentation to be submitted by him, alongwith their submission schedule for various</p>		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		<p>equipment/systems covered under the contract, with in 6(six) month from the date of award of contract, for the acceptance of employer.</p> <p>8.16.2.5 The Contractor shall submit the commissioning documentation, for various equipment/covered under the contract, for the approval of employer, at least 12 months before the scheduled date of commissioning of the equipment/systems.</p> <p>9.0 PRE-BID CLARIFICATIONS AND DEVIATIONS</p> <p>9.1 Bidders are advised to quote strictly as per BHEL’s specification requirements. In case bidder excludes some components of scope of supply or some features of specification requirements, the bidder will be required to include the same in the scope during offer evaluation stage /contract execution stage without any additional commercial and price implications on account of the same. Bidder to note that they won’t be entitled for any price impact on account of withdrawal of deviation taken from BHEL spec during technical scrutiny/evaluation of the bidder’s offer . Price impact will be allowed by BHEL only to the extent of change of specification during tender evaluation stage, if any, from BHEL end.</p> <p>9.2 In case bidder feels that it is necessary to exclude some components of scope of supply & some features of specification requirements, due to genuine constraints if any, bidder has to clearly bring out the same to the notice of BHEL and take their prior approval <u>before submission of bid</u>. Bidders are requested to bring out only those issues and deviations which are impractical to meet (or) not technically advisable as per the experience of bidder, for BHEL’s review <u>before the submission of bid</u>. All such clarifications required by the bidder shall be intimated to BHEL together as a single notice within a week of receipt of the Enquiry/NIT/RFQ in the enclosed format (Annexure -V). All such applicable deviations /clarification shall have cross reference to page number /section / clause /para etc. of this specification or its annexure with proper reasons for the deviations for purchaser’s consideration. Any such applicable deviations /clarification not listed under the above section, even if reflected in any other portion of the bidder’s proposal shall not be considered applicable. Purchaser shall review the above pre-bid queries & deviations submitted by the bidder and furnish the necessary clarifications /instructions to the bidder immediately. Bidder shall submit their offer taking cognizance of these clarifications/instructions provided by Purchaser.</p> <p>9.3 In absence of any such pre-bid clarifications sought by the bidder and in case of contradictory requirements of the specification (if any), the more stringent requirement as interpreted of Purchaser/Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Purchaser/ Customer as and when brought to their notice either by the bidder or by purchaser/ customer themselves.</p>	
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		<p>However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.</p> <p>9.4 The bidder’s offer shall not carry any sections like clarification, interpretations and /or assumptions.</p> <p>9.5 Bidders are advised to quote strictly as per BHEL’s specification requirements. In case bidder excludes some components of scope of supply or some features of specification requirements, the bidder will be required to include the same in the scope during offer evaluation stage /contract execution stage without any additional commercial and price implications on account of the same. Bidder to note that they won’t be entitled for any price impact on account of withdrawal of deviation taken from BHEL spec during technical scrutiny stage. Price impact will be allowed by BHEL only to the extent of change of specification during tender evaluation stage, if any, from BHEL end.</p> <p>9.6 Information like Bill of materials (BOM), Instrument list, datasheets, and typical specifications enclosed by the bidder as a part of their bid, shall be retained for information only and shall not be referred by contractor in future as contractual agreement during contract execution stage. No implication shall be admissible on the basis of these documents during any stage of contract execution and the requirements of as specified/indicated this specification will be binding and final. System wise BOQ shall be finalized based on approved drawings during detail engineering stage.</p> <p>10.0 BID EVALUATION CRITERIA</p> <p>REFER PRICE BID FORMAT (ANNEXURE-VIII)</p> <p>The bid shall be evaluated based on the price quoted for the tank and its accessories & commissioning spares, Supervision charges for E&C and any technical loading due to non-adherence to the technical specification.</p> <p>However, the price for recommended spares shall not be considered for evaluation purpose.</p> <p>11.0 OTHER REQUIREMENTS</p> <p>11.1 Bidder to assess the capability of their sub-vendors in terms of preparation of drawings, calculations, documents, quality assurance, supply of material etc. as per project schedule before placing the order on them. No deviations shall be entertained.</p> <p>11.2 Items shall be procured strictly from the subvendor list as per Annexure-III</p> <p>11.3 Dealers are not acceptable for any item of the package. Bidder shall procure all items including plates, structurals, flanges, counter flanges etc. from BHEL approved sub vendor only. No argument on this account shall be entertained.</p>	
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>11.4 While supplying the material bidder shall consider suitable margin (at least 5%) for the materials i.e. pipes, plates, flanges and fittings, traps, insulation and cladding etc. over and above the requirement as per approved drawing / documents so as to take care of material shortage at site during erection.</p> <p>11.5 Commissioning spares are deemed to be included in bidder’s scope and same shall be supplied during erection and commissioning stage. In case of any shortfall of these spares, same shall be procured by BHEL and the prices of the same shall be deducted from bidder’s account.</p> <p>12.0 Billing Breakup Methodology</p> <p>12.1. Billing break-up (BBU) shall be submitted to BHEL in following methodology:</p> <p>12.2. The BBU shall be prepared only for the pro-rata billing purpose.</p> <p>12.3. BBU will contain complete list of items required for the completion of the project as per specification and shall be dispatched by bidder irrespective of the items/quantities are indicated in the document or not.</p> <p>12.4. Any additional requirement of the item already indicated in the document will be updated in the subsequent revision of this document. All such item will be dispatched as “free item” term to BHEL.</p> <p>12.5. Inspection & Testing of all items shall be as per approved quality plan. The entire item shall be dispatched to site only after the completion of Inspection and testing requirement as per approved quality plan. Non-inclusion of any item does not absolve the vendor from meeting the requirement.</p> <p>12.6. Vendor shall obtain prior permission from BHEL after submitting all the documents before ensuring dispatch of all main items applicable for project.</p> <p>12.7. Inspection & quality: All the items applicable for this project shall be inspected as per approved quality plan. It may be noted that any item shall be dispatched to site only after complying with the Inspection requirements as per approved quality plan.</p> <p>12.8. As separate document indicating the details of all the items having SHELF LIFE shall be furnished. Prior permission from BHEL shall be taken before dispatch of any of the item having shelf life.</p> <p>12.9. Applicable taxes & duties shall be extra.</p> <p>12.10. BBU shall be a comprehensive document having details of all the items applicable for this project .There should not be any Non-Billable item to be supplied at site.</p> <p>12.11. BBU shall be submitted as per “Payment Terms of Annexure-BB”</p>		
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12.12. Wherever Lot items are indicated, same shall be quantified in details in a separate annexure. Similarly all Accessories/ Instruments/ items are to be defined with comprehensive details

It is to be ensured that all fittings, accessories (including Bolts, fittings etc.), Instrument and other items, if any, shall be listed in separate line items or in a separate annexure.

12.13. In case requirement of any such item / additional item is detected at any stage of the contract execution, BBU will be revised to reflect the same. However all the additional items will be supplied as a 'Zero Value Item', without any commercial implication to BHEL. All the contractual requirements shall be valid for these additional items also.

13.0 LIST OF ANNEXURES

The following are the List of Annexures

1. Annexure I – Datasheet for Water Storage Tanks
2. Annexure II –Piping Material Specification
3. Annexure III – Sub-Vendor List
4. Annexure IVA- Datasheet for Level Indicator
5. Annexure IVB- Datasheet for Plates & Structural Steel
6. Annexure V-Pre-Bid Clarifications
7. Annexure VI- Recommended Spares for 3 Years of Normal Operation
8. Annexure VII- Checklist(To be submitted by the bidder along with offer)
9. Annexure VIII- Price Bid Format
10. Annexure IX-Reference P&IDs
11. Annexure X- Sketch for Water Levels of Storage Tanks
12. Annexure-XI- Inspection, Testing, Erection And Commissioning Requirements
- ~~13. Annexure XII – Site Facilities in Bidder and BHEL's Scope~~
- ~~14. Annexure XIII – Typical Seal Pot and Breather Tanks for DM & Intermittent DM water Storage Tanks~~

14.0 Variant Table

Var No:	Description	Material code
01	Design, engineering, supply of material (including commissioning spares), inspection and testing at vendor's / sub-vendor's works, proper packing and forwarding, shipment & delivery at site	PY9751217016
02	Supervision of Tank fabrication, Erection & Commissioning, Inspection & Testing and Handing over	PY975121702X

Annexure-I

Datasheet for Fire Water Storage Tanks

Sl.No.	Description	Unit	Value/Specification
1	General		
1.1	Type of Tank		Vertical cylindrical fixed cone roof type
1.2	Quantity of Tanks	Nos	2
1.3	Fluid stored		Water
2	Design Features		
2.1	Tank Design Code		IS803 / API 650
2.2	Wind Load		Calculation for wind effect shall be in accordance with IS: 875-1987(part-3). Note: As per design calculation, if required, vendor shall provide required no. of wind girders
2.3	Earthquake Consideration		Seismic Load Design Criteria (1) Design Code/Zone IS: 1893, Parts 1 & 4 / Zone III (2) Soil Type Type III (3) Importance Factor 1.75 (4) Zone Factor, Z=0.16
2.4	Design Liquid		Water
2.5	Capacity of Tank	cu.m.	2300(Net), 2500(Gross)
2.6	Maximum Capacity	cu.m.	2596(Approx.)
2.7	Minimum Capacity	cu.m.	233(Approx.)
2.6	Dimension of tank (Dia x Height)	m x m	16.5 x 13.0
2.7	Design Metal Temperature	°C	80
2.8	Design Pressure		Full of Water + Atmospheric Pressure
2.9	Density of Design liquid	kg/cu.m	1000
2.10	Thickness provided for		
a	Shell mm	mm	10.0 (1st course), 8.0 (2 nd , 3 rd & 4 th courses) & 6.0 (remaining courses). All these thicknesses are including corrosion allowance Note: In addition to the final quantities of shell plates, Following Shell plates shall be supplied as extra plates common for both the tanks 1) 2 Nos of 10 mm thick plates, 2) 2 Nos of 8mm thick plates, 3) 2 Nos of 6mm thick plates.
b	Roof Plate	mm	6.0 (Including Corrosion allowance) Note: In addition to the final quantities of roof plates, 2 Nos of 6 mm thick roof plates

			shall be supplied as extra plates common for both the tanks.
c	Bottom Plate	mm	8.0 (Including Corrosion allowance) Note: In addition to the final quantities of bottom plates, 2 Nos of 8 mm thick bottom plates shall be supplied as extra plates common for both the tanks.
2.11	Corrosion Allowances	mm	1.5 mm
2.12	Joint Efficiency of weld joints		0.7
2.13	Design wind speed	m/s	39 m/s
3	Material of Construction		
3.1	Shell, Roof & Bottom plate		IS2062 Gr.E250 B
3.2	Shell & Roof appurtenances		
a	For Manholes		
	Size and location		600NB & One each on shell and roof
	Necks, flanges and coverplates		IS2062 Gr.E250 B, conform to IS803
	Bolts & Nuts		IS1367 Cl 4.6/4, Galvanized.
b	For Nozzles		
	No. and size of Shell, Roof, Vent and Drain Nozzles		As per P&ID for Fire Water Pumping System, Drg No.138316-00081 enclosed as Annexure-IX.
	No. and size of spare nozzles		One spare inlet and one spare outlet nozzle shall be provided. Sizes of these nozzles shall be same as inlet and outlet nozzle sizes.
	Location of Inlet Nozzles		All inlet nozzles shall be routed from bottom shell side of tank
	Nozzle necks		Up to 150NB IS1239 PART-I HEAVY GRADE, ERW. 200NB & Above IS3589 Gr.Fe330, ERW with 6.35thk
	Flanges and counter-flanges		IS2062 Gr.E250 B, conform to ASME B16.5, #150.
	Bolts & Nuts		IS1367 Cl 4.6/4, Galvanized.
c	Fittings		
	Dimensional standard		Up to 150NB-IS1239 PART-II, 200NB & Above-fabricated from parent pipe.
	End connection		Up to 50NB SW, Above 50NB BW.

3.4	Gaskets		CNAF, 3Thk
3.5	Structurals, stairways and platforms		IS2062 Gr.E250 A
3.6	Foundation bolts & Nuts		IS1367 Cl 4.6/4, Galvanized.
3.7	Hand rail		32NB, IS:1239 MEDIUM CLASS (GI)
3.8	Earthing lugs & Nameplate		Austenitic Stainless Steel (SS304)
4	Accessories		
4.1	Spiral stair case		Yes Required(Bidder's Scope)
4.2	Hand railing		Yes Required(Bidder's Scope)
4.3	Anchor chairs & foundation bolts		Yes Required(Bidder's Scope)
4.4	Mechanical Level Gauge		Yes, 1 No. Float and Board Type Mechanical Level gauge for each tank is in bidders scope of supply
4.5	Level Transmitter		Yes, 2 No's, Top Mounted Ultrasonic Type Level Transmitter for each tank are in bidders scope of supply
4.6	Gauge Hatch Nozzle with hinged cover		Yes Required(Bidder's Scope)
4.7	Earthing lugs		Yes, 2 No.s for each Tank
4.8	Cathodic Protection		Not Required.
5	Painting		
i.	Internal Painting of the Tank		
	Surface Preparation		Surface preparation shall be carried out by shot blasting as per SA 2-1/2
	Primer		One Coat of epoxy zinc phosphate primer of min DFT of 30-35 micron.
	Paint		Three (3) coats of epoxy resin based finish paint with 25 micron as thickness of each coat.
	Total Thickness		Total Thickness of primer and paint shall not be less than 400 micron.
ii.	External Painting of the Tank		
	Surface Preparation		Surface preparation shall be carried out by shot blasting as per SA 2-1/2
	Primer		One Coat of epoxy zinc phosphate primer of min DFT of 30-35 micron.
	Paint		Three (3) coats of epoxy resin based finish paint with 25 micron as thickness of each coat.
	Total Thickness		Total Thickness of primer and paint shall not be less than 300 micron.

iii.	Bottom Plate Underside Painting		
	Primer Coat		One Coat of Epoxy zinc Phosphate Primer of min. DFT: 30-35 Micron per Coat
	Finish Coat		Three(3) Coats of Coal tar Epoxy paint with 25 micron thickness of each coat


All Steel Surfaces (external) exposed to atmosphere (outdoor installation)


(i) **Surface Preparation:** The steel surfaces to be applied with painting shall be thoroughly cleaned before painting by wire brushing, air blowing, etc.

(ii) **Painting:** One (1) Coat of red oxide primer of thickness 30 to 35 microns followed up with three (3) coats synthetic enamel paint, with 25 microns as thickness of each coat. ~~For plant at coastal area, epoxy paint shall be used in place of enamel paints.~~

Annexure-II

Piping Material Specification

CLAUSE NO.	TECHNICAL SPECIFICATION	
	<p>vii) The diesel engine drive of the pump shall conform to the requirements of TAC. Each of the diesel engine shall be provided with batteries (2x100%) and battery chargers (2x100%).</p> <p>viii) Battery of the diesel engine shall be lead acid type as per IS and shall be large enough to crank the engine twelve times successively, each for a duration of 10 sec. without any charging in between.</p> <p>ix) Each engine shall be provided with fuel oil tank having adequate capacity to hold sufficient fuel oil for a minimum of twelve (12) hours of full load run. The fuel oil tank shall preferably be mounted on the engine. No fuel oil tank will be provided by the Employer.</p> <p>x) Continuous drive motor rating (at 50⁰C ambient) shall be at least 10% (ten percent) above the maximum load demand of the pump in the entire operating range of the pump.</p> <p>xi) The feeding line of the spray system from the header shall be provided with 2x100% capacity basket type filters to avoid any particles in the spray system.</p> <p>xii) The system shall be complete with required instrumentation, control recirculation pipe line with valves for each of the pumps, NRV in discharge outlet etc.</p> <p>xiii) Pumps shall be designed for continuous operation at its best efficiency point to meet the specific requirements of the system for which it is to be employed. Pumps of each category shall be suitable for parallel operation.</p> <p>xiv) Fire Water Storage Tanks: Two numbers each of 50% capacity fire water storage tanks shall be provided by the bidder. The fire water storage tanks shall be vertical cylindrical steel tanks. The total capacity of the fire water storage shall be as per the recommendations of TAC.</p> <p>xv) Fire water booster pump house: Two sets of Hydrant & Spray booster pumps (one motor driven & one diesel driven pump) alongwith associated equipment shall be installed in fire water booster pump house. Tapping shall be taken from nearest hydrant and spray header.</p> <p>xvi) Fire water pump house shall be provided with a monorail electric hoist of capacity capable of lifting heaviest component but not less than 5 metric tonnes capacity and booster pump house shall be provided with a chain pulley block of adequate capacity. The electric hoist and chain pulley block shall conform to the requirements of technical specification enclosed.</p> <p>8.00.00 PIPING AND VALVES</p> <p>8.01.00 General Data for Pipes etc.</p> <p>i) Mild steel as per IS:1239 (Part-I) medium grade (upto 150 NB) & as per IS:3589 Gr 410 (above 200 NB) or Equivalent for pipes normally filled with water.</p> <p>ii) Mild steel as per IS:1239 (Part-I) medium grade (upto 150 NB) & as per IS:3589 Gr.410 (above 200 NB) or Equivalent and galvanised as per IS:4736 for pipes normally empty and periodically charged with water and foam system application.</p> <p>iii) Pipe protection shall be as follows :</p>	
<p>NORTH KARANPURA STPP (3X660MW) EPC PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO. CS-4410-001-2</p>	<p>Sub Section-A-16 Fire Detection & Protection System</p> <p>Page 17 of 21</p>

CLAUSE NO.	TECHNICAL SPECIFICATION			
	<p>To prevent soil corrosion buried pipes / pipes in trench shall be properly lagged with corrosion protective tapes of minimum thickness of 4 mm (one layer)/2mm (two layers) of coal tar type as per IS:15337 or AWWA C 203.</p> <p>iv) Pipe thickness:</p> <p>a) For Pipe sizes upto 150 NB and above: As per IS:1239 Part-I medium grade.</p> <p>b) For Pipe sizes 200 NB and above refer Annexure-I.</p> <p>v) All valves shall be as per applicable IS/BS codes & approved by TAC for specific fire protection system and shall be provided with locking arrangement (with locks) in open or close condition. Further, all gate/butterfly valves of size 200 mm & above shall be provided with spur gear reduction unit.</p> <p>vi) All the flanges and counter flanges shall conform to ANSI B 16.5 CI 150.</p> <p>vii) Strainer Body as per IS:2062 (tested).</p> <p>viii) Pipe Fittings</p> <p>1) The material shall conform to ASTM A 234 Gr WPB or ASTM A 105 or equivalent and dimensional standard conforming to ANSI B 16.11 (socket & threaded type), ANSI B 16.9 (for butt welded fittings) and ANSI B 16.5 (for flanges and flanged fittings) as the case may be. Further, galvanised malleable cast iron fittings as per IS:1879 in Cast iron fitting as per BS-1641 are also acceptable.</p> <p>2) Grooved couplings : Vendor may also use mechanical grooved couplings type fittings in GI pipe lines for HVW / MVW spray system. All materials and products shall be either Underwriters Laboratories (UL) Listed or Factory Mutual (FM) Approved and installed in accordance with NFPA Standard 13 / equivalent Standard.</p> <p>3) The fittings shall be galvanised as per IS : 4736 for galvanised pipe application. In case of branching connections from GI mains for spray piping network, socket may be welded for more than two pipe reduction instead of standard tees.</p> <p>4) Fabricated fittings shall not acceptable up to pipe size to 300 NB. For sizes 350 NB and above, fittings may be fabricated as per BS:2633/BS:534.</p> <p>ix) Welding of galvanised iron pipes/fittings would be permitted provided the same is carried out by means of special electrodes suitable for the above application and the same shall be approved by Employer. After, welding, welded portions shall be applied with three coats of zinc silicate treatment/rich paint over one coat of suitable primer. Further, the Contractor shall provide proper zinc paint at the point of welding.</p>			
9.00.00	PAINTING			
9.01.00	All the Equipments shall be protected against external corrosion by providing suitable painting.			
9.02.00	The surfaces of stainless steel, Gunmetal, brass, bronze and non-metallic components shall not be applied with any painting.			
NORTH KARANPURA STPP (3X660MW) EPC PACKAGE	TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO. CS-4410-001-2	Sub Section-A-16 Fire Detection & Protection System	Page 18 of 21	



ANNEXURE-I

PIPING THICKNESS:

Pipes for sizes 200 NB & above shall confirm to IS: 3589 Grade 410. The thickness as mentioned below are the minimum specified nominal thickness as per IS: 3589. Tolerance as per code shall be applicable.

Nominal pipe Size (mm)	Outside Diameter (mm)	Wall Thickness (mm)
200 NB	219.1	6.3
250 NB	273	6.3
300 NB	323.9	7.1
350 NB	355.6	8.0
400 NB	406.4	8.0
450 NB	457	8.0
500 NB	508	8.0
600 NB	610	8.0

Annexure-III

Sub-Vendor List

S.No	Item	Sub vendor
1	MS PLATE(SHELL, BOTTOM & ROOF)	STEEL AUTHORITY OF INDIA LTD
		TISCO
		RINL
		JINDAL STEEL & POWER LIMITED
		ESSAR STEELS LIMITED
		ISPAT INDUSTRIES LTD
		LLYOD's STEEL INDUSTRIES LTD
		JSW STEEL LIMITED
2	M.S PIPE(IS: 1239/IS:3589 UPTO 150NB/900NB)	REFER VENDOR LIST ATTACHED BELOW
3(a)	CARBON STEEL & ALLOYSTEEL - HEAVY STRUCTURAL STEEL (WF BEAMS, ANGLES & CHANNELS)	STEEL AUTHORITY OF INDIA LTD
		BEEKAY STRUCTURAL STEELS
		UNION STAHL GMBH
		SALZGITTER MANNESMANN INTL GMBH
		IGAWARA INDL SERVICE & TRADING
		JINDAL STEEL & POWER LIMITED
		CORUS UK LTD.,
4(b)	STRUCTURAL STEEL (BEAMS, ANGLES & CHANNELS)	SUJANA METAL PRODUCTS LTD.
		STEEL AUTHORITY OF INDIA LTD
		RASHTRIYA ISPAT NIGAM LIMITED,
		BEEKAY STRUCTURAL STEELS
		NANDAN STEELS & POWER LTD.
		MAHAMAYA STEEL INDUSTRIES LIMITED
		TOPWORTH STEELS & POWER
		AGRAWAL STRUCTURE MILLS PVT. LTD.
		PRIME ISPAT LIMITED
		SKS ISPAT POWER LTD.
		MONNET ISPAT & ENERGY LTD.
		RELIABLE SPONGE PVT. LTD.
		JINDAL STEEL & POWER LIMITED
		KANISHK STEEL INDUSTRIEL LTD.
NOBLE TECH INDUSTRIES PVT. LTD.		
4(c)	MS FLATS, NON CRITICAL & SMALL QUANTITY	SUJANA METAL PRODUCTS LTD.
		STEEL AUTHORITY OF INDIA LTD

	STRUCTURALS	PUSHPA ISPAT PVT. LTD.
		RASHTRIYA ISPAT NIGAM LTD,
		STEEL AUTHORITY OF INDIA LTD
		THE STAR WIRE (I) LTD.,
		PADMINI STEELS
		SARADA STEELS&BEARING COMPANY
		FERROMET STEELS PRIVATE LIMITED
5	PIPE FITTINGS	U I PIPE FITTINGS PVT. LTD.
		TUBE PRODUCTS INCORPORATE
		GUJARAT INFRAPIPES PVT.LTD.,
		SAWAN ENGINEERS PVT. LTD.
		TRUE FORGE PVT.LTD.,
		DEE DEVELOPMENT ENGINEERS LTD.,
		TRUE FAB ENGINEER (P) LTD.
		P.K. TUBES & FITTINGS PVT. LTD.
		K. S. PIPE FITTINGS PVT. LTD.
		TUBE TURN (INDIA) P. LTD.
6	FLANGES	PRESHZINGER ENGINEERING
		THE PUNJAB STEEL WORKS,
		METAL FORGINGS P. LTD.
		TUBE PRODUCTS INCORPORATE
		C.D. INDUSTRIES,
		CHW FORGE PRIVATE LIMITED
		KISAAN STEELS (PVT) LTD.,
7	GASKETS	JYOTHI INDUSTRIES,
		STARFLEX SEALING INDIA
		JAMES WALKER INMARCO INDS PVT LTD
		UNIQUE INDUSTRIAL PACKINGS PVT. LTD
		UNI KLINGER LTD.
		I G P ENGINEERS LIMITED,
		MADRAS INDUSTRIAL PRODUCTS,
		PACKINGS & JOINTINGS GASKETS
8	LEVEL INDICATOR	LEVCON
		SIGMA INSTRUMENTS
		D.K. INSTRUMENTS
		FLOW STAR
		V-AUTOMAT

		PUNE TECTROL
		SBEM
		SCIENTIFIC DEVICES
		GAUGES BOURDEN
9	ULTRASONC TYPE LEVEL TRANSMITTER	E&H, GERMANY/AURANGABAD
		SIEMENS MILTRONICS, CANADA
		EMERSON, PAWANE(MAIN KIT FROM MOBREY-UK)
		NIVELCO, HUNGERY



PROJECT :NORTH KARANPURA STPP
STPP (3X660MW)
Main Supplier : BHEL
PACKAGE: FDPS PACKAGE
SUPPLIER: BHEL-HYDERABAD
CONT. NO.:CS- 4410 -001-2

INDICATIVE LIST OF ITEMS REQUIRING
QUALITY PLAN AND SUB- SUPPLIER
APPROVAL

DOC. No. : CS- 4410-001-FDPS

Revision No. : 00

DATE: 22.01.2015

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SUB SYSTEM: MECHANICAL

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS
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		II		MAHARASHTRA SEAMLESS	RAIGAD	A	
11.	MS PIPE (IS:1239 / IS:3589 UPTO 150 NB/ 900 NB)	I		MUKAT TANKS AND VESSELS	TARAPUR	A	LONGITUDINAL SAW (SINGLE SIDE WELD) AS PER IS 3589
		II		SAIL	ROURKELA	A	
		I		PSL	CHENNAI/ VIZAG/ KUTCH/DAMAN	A	SPIRAL WELD SAW AS PER IS 3589
		I		MAHARASHTRA SEAMLESS	RAIGAD	A	200 NB TO 500 NB ERW PIPES AS PER IS 3589
		I		RATNAMANI	KUTCH	A	ERW PIPES AS PER IS 3589 UPTO 400 NB
		I		JINDAL	GHAZIABAD	A	UPTO 350 NB ERW PIPES AS PER IS 1239/3589
		I		SURYA ROSHNI	BAHADURGARH	A	UPTO 400 NB ERW PIPES AS PER IS 1239/3589
		I		RATNAMANI	KUTCH	A	SPIRAL WELD SAW AS PER IS 3589
		I		RATNAMANI	CHHATRAL	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 600 NB
		I		JCO GAS PIPES	CHINDWARA	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 400 NB
		I		PRATIBHA PIPES & STRUCTURE PVT. LTD.	THANE	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 400 NB
		I		LALIT PROFILE	THANE	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 355 MM
		I		SURENDRA ENGG.	RAJPURA	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 500 NB
		I		SAMSHI PIPES INDUSTRIES	VADODARA	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 450 NB

Antulds

Kumarapur



PROJECT :NORTH KARANPURA STPP
STPP (3X660MW)
Main Supplier : BHEL
PACKAGE: FDPS PACKAGE
SUPPLIER: BHEL-HYDERABAD
CONT. NO.:CS- 4410 -001-2

INDICATIVE LIST OF ITEMS REQUIRING
QUALITY PLAN AND SUB- SUPPLIER
APPROVAL

DOC. No. : CS- 4410-001-FDPS

Revision No. : 00

DATE: 22.01.2015

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SUB SYSTEM: MECHANICAL

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS
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		I		MUKUT PIPES	RAJPURA	A	LONGITUDINAL SAW (SINGLE SIDE WELD) AS PER IS 3589 UPTO 500 NB
		I		INDUS TUBES	G B NAGAR	A	UPTO 300 NB ERW PIPES AS PER IS 1239/3589
		I		MANN IND	INDORE	A	SPIRAL WELD SAW AS PER IS 3589
		II		TATA	JAMSHEDPUR	A	UPTO 150 NB ERW PIPES AS PER IS 1239
		I		WELSPUN	BHARUCH	A	SPIRAL WELD SAW AS PER IS 3589
		I		DADU PIPES	SIKRANDRABAD	A	UP TO 300 NB ERW PIPE AS PER IS 3589
		I		JINDAL INDUSTRIES LTD.	HISSAR	A	UP TO 300 NB ERW BLACK PIPE AS PER IS 1239/3589
		I		APL APOLLO TUBES LTD.	SIKANDRABAD	A	MS pipes (Black & GI) as per IS 1239 & MS pipes (Black & GI) as per IS 3589 up to 250 NB size, 8 mm thickness and Grade up to Fe 410.
		I		LLYODS LINE PIPES LTD.	THANE	A	MS pipes (Black & GI) as per IS 1239 & MS pipes (Black) as per IS 3589 up to 350 NB size, 8 mm thickness and Grade up to Fe 410.
		I		WELPSUN	ANJAR	A	UPTO 400 NB ERW PIPES AS PER IS 1239/3589
12.	FIRE HOSE	II		BIS APPROVED SOURCES WITH VALID LICENCE		A	

Ardu

Ramangir

Annexure-IV(A)
Datasheet for Plates and Structural Steel

Annexure-IV(B)
Datasheet for Level Indicator

Annexure-IV(C)
Datasheet for Level Transmitter
(Ultrasonic Type)

ANNEXURE-IV(A): DATA SHEET FOR PLATES & STRUCTURAL STEEL

1.0	Make	:	As per sub-vendor list enclosed as Annexure-III
2.0	Quantity of Structural Steel	:	As per approved BOQ
A.0	MS Plate		
1.0	Material(Shell, Bottom and Roof Plate)	:	IS:2062, Gr. B
2.0	Width	:	To be informed to successful bidder during detail engineering stage
3.0	Length	:	To be informed to successful bidder during detail engineering stage
4.0	Thickness (minimum)	:	As specified in Datasheet for Fire Water Storage Tanks(Refer Annexure-I)
5.0	Chemical Composition	:	As per IS:2062
6.0	Mechanical Composition	:	As per IS:2062
7.0	Inspection & Testing	:	As per approved ICP/QAP
B.0	Angle, Channel, Beam, Bar and Flat		
1.0	Material	:	As per IS:2062, Grade-A
2.0	Size	:	As per IS Structural Hand Book

ANNEXURE-IV(B): DATA SHEET FOR LEVEL INDICATOR

S.NO.	COMPONENT	DESCRIPTION
1	Type	Float and Dial Type Level Gauge
2	Float Material	SS 316
3	Guide Cable	SS 316
4	Float Cable	SS 316
5	Spring	As per manufacturer standard
6	Cover	CS
7	Roller / Pulley and Pulley Housing	CS
8	Scale Board	Aluminium, P.U. Painted
9	Pointer and Graduations	Aluminium and S.S.
10	Accuracy	(+/-)1% of full scale range
11	Range	To suit tank size
12	Quantity	One (1) number each for the fire water storage tanks
13	Make	As per sub-vendor list enclosed as Annexure-III

NOTE: For other components, the material shall be intimated to successful bidder by BHEL during detail engineering for which no commercial implication shall be entertained by BHEL. Suitable mechanism shall be provided by the bidder to minimize air ingress into the tank.

Annexure-IV(C)

Datasheet for Level Transmitter (Ultrasonic Type)

2.02.0

for pressure measurement.

LVDT type is not acceptable.

Where the process fluids are corrosive, viscous, solid bearing or slurry type, diaphragm seals shall be provided. Parts below the diaphragm shall be removable for cleaning. The entire volume above the diaphragm shall be completely filled with an inert liquid suitable for the application.

GUIDED WAVE RADAR TYPE LEVEL TRANSMITTER

Guided wave radar type level transmitters shall be provided for level measurements of the vessel under vacuum or low pressure applications as specified in Part-A.

Type	Guided wave Radar
Principle	TDR (Time domain reflectometry)
Probe Type & Material	Coaxial, SS316/316L. If required, probe shall be suitable for overfill prevention.
Signal o/p	4-20mA with HART signal suitable for overfill prevention.
Display	Integral
Power supply	24 VDC
Accuracy	5mm
Electromagnetic compatibility	Shall meet EN 61326-1 (1997) and AmdtA1, class A equipment/EN 50081-2 & EN 5008 1-2 & EN 50082-2
Mounting	External cage mounting

The transmitters shall be provided with IP-55 protection class with durable corrosion resistant coating.

The transmitters shall be able to provide digital signals super imposed on 4-20 mA signal as per HART protocol.

2.03.00

Ultrasonic Type level Transmitter

Sl.No.	Features	Essential/Minimum requirement
1.	Type of Transmitter	Non contact Microprocessor based 2 wire type, HART protocol compatible Ultrasonic transmitter. Also refer note-3.
2.	Output signal	4-20mA DC (Analog) along with superimposed digital signal (based on HART protocol)
3.	Sensor Accuracy	+/- 0.5% of calibrated span.

CLAUSE NO.	TECHNICAL REQUIREMENTS	
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Sl.No.	Features	Essential/Minimum requirement
4.	Sensor Repeatability	3mm or better
5.	Power supply	24 V DC +/-10%
6.	Temperature compensation	To be provided within transducer
7.	Configuration	
8.	Housing	Weather proof as per IP-55 with durable corrosion resistant coating.
9.	Adjustment/Calibration/maintenance	From hand held calibrators/ centralized PC based system (as applicable)
10.	Zero and Span adjustment	Continuous, tamper proof, remote as well as manual adjustability from instrument. It shall be possible to calibrate the instrument without any level in the tank/sump etc.
11.	Sensor Material	Corrosion resistant material to suit individual application requirement.
12.	False signal tolerance	Transmitter shall be capable of ignoring false echoes from internal tank/sumps obstructions such as pipes, heating coils or agitator blades. Also transmitter shall have adjustable damping circuitry
13.	Range	Range of transmitter shall be capable of covering the complete level span of tank taking care of blocking distance, frequency attenuation due to surface, obstructions, vapors etc.
14.	Display	LCD display with integral keypad to be provided.
15.	Diagnostics	Loss of echo alarm etc.
16.	Load Impedance	500 ohms minimum
17.	Electrical Connection	Plug and socket
18.	Accessories	<ul style="list-style-type: none"> • All weather canopy for protection from direct sunlight and direct rain. • All mounting hardware and accessories required for erection and commissioning mounting fittings materials shall be SS 316. <p>For hazardous area, explosion proof enclosure as described in NEC article 500</p>

Annexure-V

Pre-Bid Clarification Format

Annexure-VI

Recommended Spares for 3 Years of Normal Operation

ANNEXURE-VI: RECOMMENDED SPARES FOR 3 YEARS OF NORMAL OPERATION

S.No.	Item Description	Quantity
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

SIGNATURE : _____
NAME : _____
DESIGNATION : _____
COMPANY : _____
DATE : _____

COMPANY SEAL

Annexure-VII
CHECK LIST
(TO BE SUMITTED ALONG WITH OFFER)

ANNEXURE-VII: CHECK LIST TO BE SUBMITTED BY THE BIDDER ALONG WITH THE OFFER

Note: Bidder to note that Check List shall be completely filled and the data required in-line with Check List shall be submitted along with their Offer will all the necessary data/drawings/documents to enable Purchaser to evaluate the offer submitted.

<u>S.No.</u>	<u>Description</u>	Bidder's Confirmation [Yes/No]	Remarks/Comments By Bidder
1	Bidder to confirm compliance with PY-51217 and its annexures without any deviations and price implications.		
2	As per Clause 1.1 of PY 51217, Tank fabrication, erection and commissioning are not in bidders scope. However, bidder to furnish recommended erection and commissioning procedure along with drawing / documents to facilitate Erection and Commissioning of Tank. Bidder to confirm.		
3	Bidder to Confirm Compliance with Annexure-XI: Site facilities in Bidder's and BHEL's Scope.		
4	Bidder has already raised pre-bid queries (if any) on Technical specification for Storage tanks through Annexure-V(Pre-Bid Clarifications). Pre-Bid Clarifications Received from purchaser and the same are Agreed/Accepted without any price implication (If any). The offer is submitted without any deviations and price implication. Bidder to confirm.		
5	Bidder to Confirm Compliance with Datasheet for Fire Water Storage Tanks (Annexure-I). Signed and stamped copy of Annexure-I is enclosed with Bidder's offer.		
6	As per S.No. 2.10(a, b & c) of Annexure-I: Datasheet of Fire Water Storage Tanks. Following are included in bidder's cope of supply.		

	<p>Extra Shell Plates: In addition to the final quantities of shell plates, Following Shell plates shall be supplied as extra plates common for both the tanks</p> <ol style="list-style-type: none"> 1) 2 Nos of 10 mm thick plates, 2) 2 Nos of 8mm thick plates, 3) 2 Nos of 6mm thick plates. <p>Extra Roof Plates: In addition to the final quantities of roof plates, 2 Nos of 6 mm thick roof plates shall be supplied as extra plates common for both the tanks.</p> <p>Extra Bottom Plates: In addition to the final quantities of bottom plates, 2 Nos of 8 mm thick bottom plates shall be supplied as extra plates common for both the tanks.</p> <p>Bidder to Confirm.</p>		
7	<p>As per Datasheet for Fire Water Storage Tanks (Annexure-I) following instrumentation in Bidder's Scope of Supply.</p> <ol style="list-style-type: none"> 1. 1 No. Float and Board Type Mechanical Level gauge for each tank. 2. 2 No. Top Mounted Ultrasonic Type Level Transmitter for each tank <p>Bidder to Confirm.</p>		
8	<p>Bidder to Confirm Compliance with Scope of supply, Scope of Services, Exclusions(Civil Engg & Civil Works ar ein Purchaser's Scope), Instrumentation(in Bidder's Scope) and other Sub-Sections of Purchase Specification PY-51217 along with enclosed Annexures.</p>		
9	<p>Bidder to note that loading data & anchor bolt details shall be provided by bidder within two weeks' time from the LOI.</p> <p>Bidder to confirm.</p>		
10	<p>Refer Note of Pg. 4 of 8 of Annexure I, wherein SS Wire Mesh shall be provided fro all nozzles except shell/roof manhole to prevent blocking of PP Balls.</p> <p>Bidder to Confirm.</p>		
11	<p>Refer S. no. 1.1 of Pg. 1 of 8 of Annexure I,</p>		

	wherein 3 layers of Polypropylene Balls of diameter 50mm each to be provided for DM Water & Intermittent DM Water Storage tanks in addition to CO2 Absorbers. Bidder to Confirm.		
12	Refer S. no. 1.1 of Pg. 1 of 8 of Annexure-I, wherein seal pot and breather tank for each DM & Intermittent DM Water Storage Tank are in Bidder's Scope of Supply. Bidder to Confirm.		
13	Refer 3.1.1(j) of PY 51217, wherein Piping from Vent and Overflow of DM & Intermittent DM Water Storage tanks upto Breather tank and Seal pot are in bidder's scope of supply. Bidder to Confirm.		
14	Refer 3.1.1(k) of PY 51217, wherein all inlet lines shall be provided with diffusers. Bidder to Confirm.		
15	Refer 4.1(d) of PY 51217, wherein all inlet Piping to CW, DM & Intermittent DM Water Storage tanks shall be routed from bottom of tank(Shell Side). Bidder to Confirm.		
16	All the documents indicated in Cl. No. 8.1 of PY 51217 shall be submitted within the time period indicated. Bidder to confirm.		
17	Painting of Tank is excluded from bidder scope and the same is not considered in bidders offer. Bidder to confirm.		
18	As per Cl. No. 3.1.1(p) of PY 51217, All the required material for routing the drain and over-flow of the tanks to the nearest storm water drain system located at 20 mtrs away from the edge of tank foundation is in bidders scope of supply. Bidder to confirm.		
19	Fire Water Storage Tanks are designed, manufactured, testing & inspection at manufacturer's works/Site in accordance with IS 803/API 650. Bidder to Confirm.		

20	<p>Bidders to note that minimum inspection check requirement are indicated in the Technical Specification for the following items.</p> <ol style="list-style-type: none"> 1) Plates 2) Valves 3) Pre-fabricated plates, Pipes and Fittings and Structural Steel 4) Level Transmitter and Level Gauges / Indicators. <p>Any changes made by customer on the same during detail engineering will not have any commercial implication. Further, QAP/CL required for balance items (if any) shall be submitted by bidder during detail engineering for customer approval.</p> <p>Bidder to confirm.</p>		
21	<p>Bidder to note that the offer is submitted without any Deviation and price implications.</p>		
22	<p>Filled and stamped copy of Recommended Spares for 3 Years of Normal Operation is enclosed with bidder's offer. Bidder to confirm.</p>		
23	<p>Bidder to indicate the deviations which are impractical. These deviations shall be raised(By Bidder) in pre-bid clarification format(Refer Annexure-V) only.</p>		
24	<p>Bidder to Confirm Compliance with Annexure-XI(including guidelines for preparation of QAP, QAP format, Inspection, Testing and E&C requirements) with purchase specification PEMC-51217</p>		
25	<p>100 % Additional Gaskets(Quantity Equivalent to Installed Gaskets) for each Condensate Forwarding Tank shall be supplied in loose. Bidder to Confirm.</p>		
26	<p>Bidder to Confirm the following</p> <p>i) Provision of Float cum Dial Type Mechanical Level Gauge.</p> <p>ii) Provision of Manholes: One. No(600 mm) on Shell Plate and One No(600 mm)</p>		

	on Roof Plate. iii) Provision of Ladder: One No. of Spiral Staircase for each Tank(1000 cu.m) and suitable access platform.		
27	Size and No. of Foundation Bolts for all the three tanks are indicated in Bidder's offer. Bidder to Confirm.		
28	Filled and stamped copy of un-priced bid format(Annexure-IX) is enclosed with the offer.		

SIGNATURE: _____

NAME: _____

DESIGNATION: _____

COMPANY: _____

DATE: _____

COMPANY SEAL

Annexure-VIII
PRICE BID FORMAT
FOR
FIRE WATER STORAGE TANKS

Annexure-VIII; Rev 00**ANNEXURE-VIII: PRICE BID FORMAT FOR FIRE WATER STORAGE TANKS****PROJECT - 3 X 660 MW SUPER-CRITICAL THERMAL POWER PROJECT, NORTH KARANPURA**

Sl. No.	Description	Qty.	Unit	PRICE (Refer Notes)	
				Unit Price (Rs.)	Total Price (Rs.)
A	MAIN BID Supply of Materials for Fire Water Storage Tanks				
1	Price for Design, Supply of Material to Site, for 2 Nos of Fire Water Storage Tanks, each of Capacity 2300 Cu.m as per Cl. No. 3.0 of PY 51217	1	SET		
2	Per diem rate for the supervision of Fabrication, Erection & Commissioning, Inspection & Testing, Painting and Handing over of 2 Nos of 2300 cu.m Capacity Fire Water Storage Tanks.	80	Days		
3	Travel expenses (inclusive of all other charges like visa fee (if applicable), insurance etc) from / to vendor works to site for Engineer per visit for supervision of Fabrication, Erection & Commissioning, Inspection & Testing, Painting and Handing over of 2 Nos of 2300 cu.m Capacity Fire Water Storage Tanks.	5	Visits		
B	OPTIONAL BID				
1.	3 Years operational spares(Detailed list with individual prices to be furnished as per Annexure-VI-Recommended Spares for 3 Years of Normal Operation)	1	SET		
2.	Price for Fabrication, Erection, Inspection, Testing, Painting, Commissioning and Handing over of 2 Nos of fire water tanks(See Note-6)	1	SET		

Notes:

1. Bidder to quote strictly as per BHEL's NIT requirements.
2. Bidder to note that any additional claim after placement of order will not be entertained under any circumstances.
3. Offer will be evaluated based on total price for Supply of Materials for Fire water Storage Tanks including supervision of E&C (i.e. Sl. Nos. **A.1 + A.2 + A.3** of price format). Prices of Optional Item shall not be considered for Price bid evaluation.
4. Separate Purchase Orders will be issued for Supply portion and for Erection & Commissioning works of this project. The Purchase Order for Supply portion will be issued by BHEL-PE&SD

Annexure-VIII; Rev 00

whereas the Purchase Order for E&C portion will be issued by BHEL-PSER (BHEL's Construction Management Division) as per the site requirements.

5. Bidder to quote the base rates only. Applicable taxes and duties to be indicated separately. Indian bidders to quote in Indian Rupees & Foreign bidders to quote in US \$.
6. For the purpose of tender, total no of 80man days to be covered in 5 visits have been considered. However, either or both of the number of man days or number of visits may change on either side based on the actual site requirement. Bidder to note that payment against Sl. No.A.2 & A.3 above shall be made as per the actual number of visits and man days required for the supervision of the complete E&C activities as per these diem rates.
7. Site Storage, Fabrication, Erection & Commissioning, Inspection and Testing, Painting of Fire Water Storage Tanks are excluded from Bidder Scope. However bidder to **quote** optional price for fabrication, erection, inspection, testing, commissioning & handing over of 2 Nos fire water tanks. Bidder to consider material handling equipment, electrical power, water, paint etc. while quoting the price for fabrication. BHEL site may use these rates for the purpose of ordering of fabrication of the tanks with the supplied material.
8. Bidder to quote all the items against above S.Nos(A.1, A.2, A.3 & B.1 , B.2). Any column cannot be left blank. Further bidder to quote individual prices for each item against above S.Nos(A.1, A.2, A.3 & B.1 , B.2). Common/lump sum prices are not acceptable.

BIDDER'S SIGNATURE

NAME:

DATE

COMPANY SEAL

Annexure-IX

REFERENCE P&IDs

As per P&ID for Fire Water Pumping System,	Drg No. 138316-00081	2 Nos of Fire Water Storage Tank(Capacity 2300 cu.m)
--	----------------------	--

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

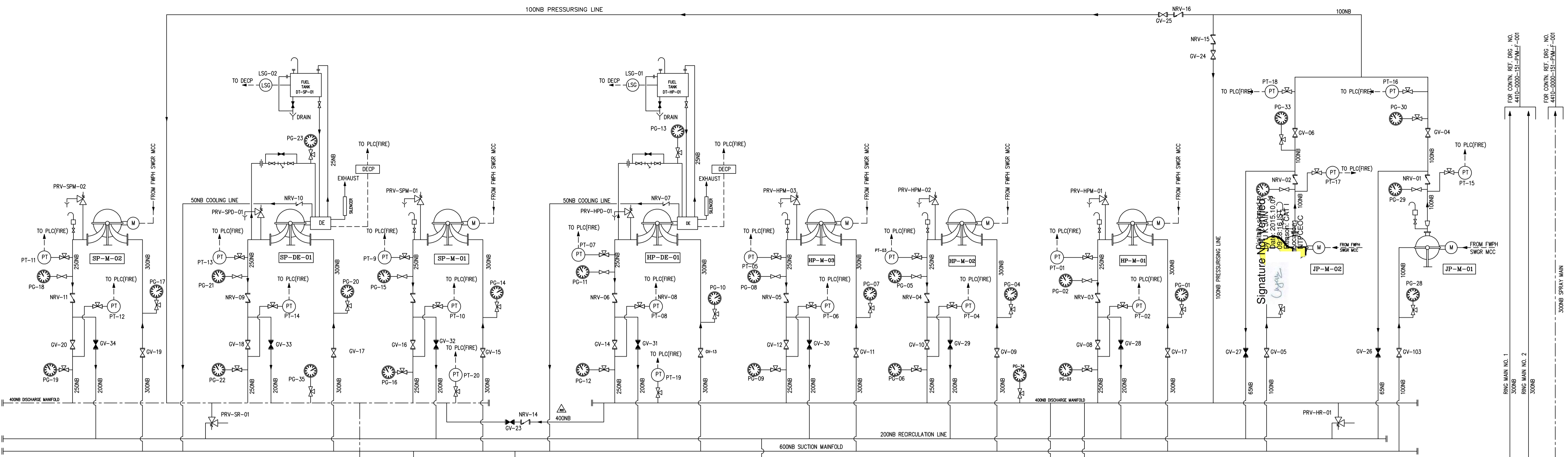
GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

INVENTORY NO

SIGN. AND DATE

REF. DRG. NO.

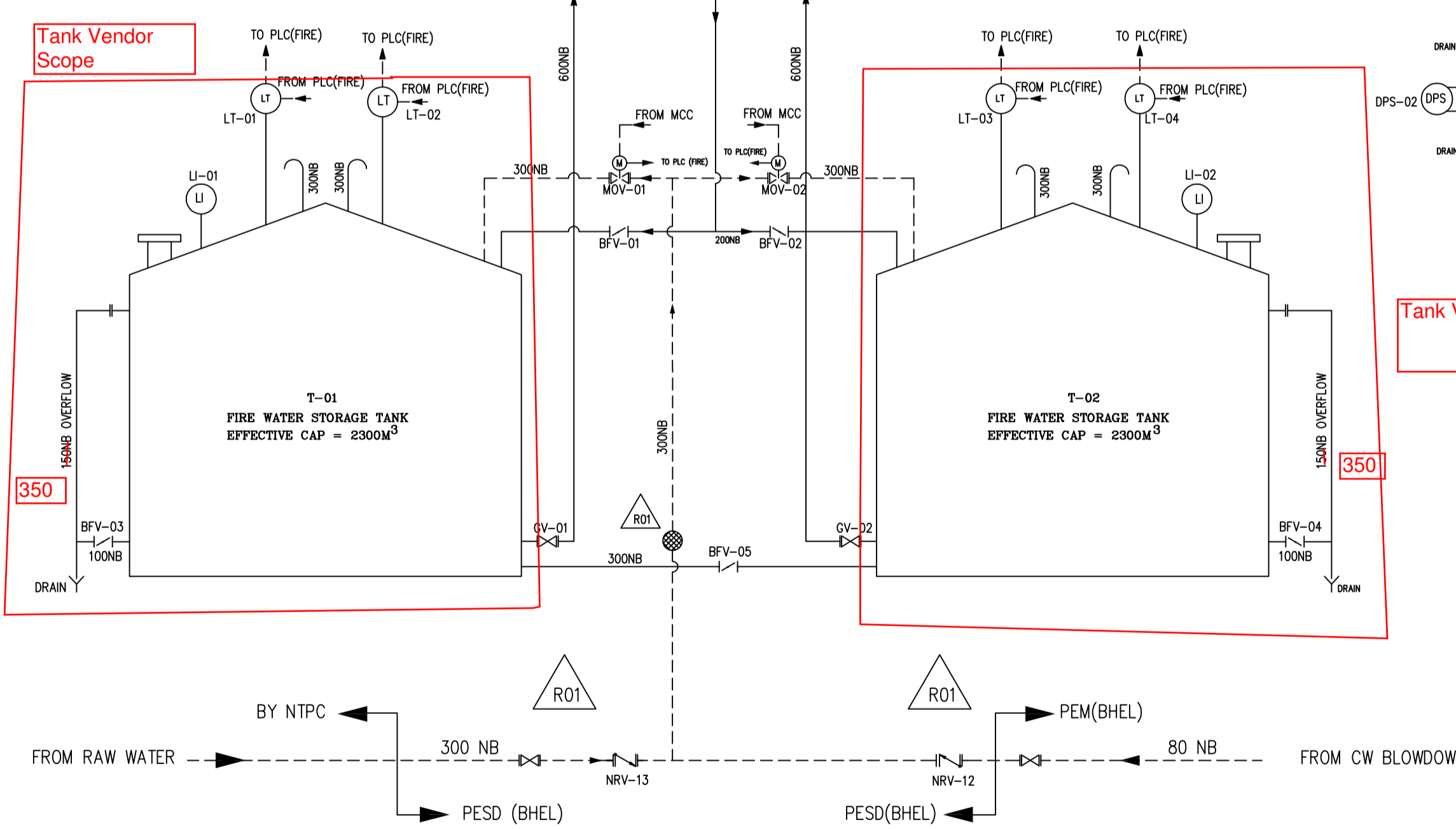
COMPUTER FILE NAME



Nozzle Details on each Fire Water Storage Tank

- 2.4" - 1 No. (Suction Line)
- 8" - 1 No. (recirculation line)
- 12" - 1 No. (Tank Make-Up Line)
- 14" - 1 No. (Tank Overflow)
- 4" - 1 No. (Tank Drain)
- 3" - 2 No. (For Top Mounted Ultrasonic Type Level transmitter)
- 12" - 1 Number (inter connecting line)
- 2" - 1 No. (Mechanical Level Indicator)
- 12" - 2 No. Vent Line
- 1 No. Shell manhole as per API-650
- 1 No. Roof manhole as per API-650

All the above nozzles are of 150# except Level Transmitter which is 300#. One No. Spare Inlet(12") and One NO. Spare Outlet(24") shall be provided with blind flanges.



NOTES:

- A tap off from pressurized raw water header shall be provided by customer for filling up the fire water tanks. The tap off from raw water header is considered within 100 m from the fire water tanks.

SETTING OF INSTRUMENTS

TAG NO.	SETTING	FUNCTION	ANNUNCIATION
PT-01	4.0	HYDRANT MAIN PUMP HP-M-01 START	HYDRANT MAIN PUMP HP-M-01 RUNNING
PT-02	9.0	HYDRANT MAIN PUMP HP-M-01 FAILS TO START	HYDRANT MAIN PUMP HP-M-01 FAILS TO START
PT-03	4.0	HYDRANT MAIN PUMP HP-M-02 START	HYDRANT MAIN PUMP HP-M-02 RUNNING
PT-04	8.5	HYDRANT MAIN PUMP HP-M-02 FAILS TO START	HYDRANT MAIN PUMP HP-M-02 FAILS TO START
PT-05	4.0	HYDRANT MAIN PUMP HP-M-03 START	HYDRANT MAIN PUMP HP-M-03 RUNNING
PT-06	8.0	HYDRANT MAIN PUMP HP-M-03 FAILS TO START	HYDRANT MAIN PUMP HP-M-03 FAILS TO START
PT-07	4.0	HYDRANT MAIN PUMP HP-DE-01 START	HYDRANT MAIN PUMP HP-DE-01 RUNNING
PT-08	7.5	HYDRANT MAIN PUMP HP-DE-01 FAILS TO START	HYDRANT MAIN PUMP HP-DE-01 FAILS TO START
PT-09	4.0	SPRAY MAIN PUMP SP-M-01 START	SPRAY MAIN PUMP SP-M-01 RUNNING
PT-10	9.0	SPRAY MAIN PUMP SP-M-01 FAILS TO START	SPRAY MAIN PUMP SP-M-01 FAILS TO START
PT-11	4.0	SPRAY MAIN PUMP SP-M-02 START	SPRAY MAIN PUMP SP-M-02 RUNNING
PT-12	8.5	SPRAY MAIN PUMP SP-M-02 FAILS TO START	SPRAY MAIN PUMP SP-M-02 FAILS TO START
PT-13	4.0	SPRAY MAIN PUMP SP-M-02 RUNNING	SPRAY MAIN PUMP SP-M-02 RUNNING
PT-14	8.0	SPRAY MAIN PUMP SP-M-02 FAILS TO START	SPRAY MAIN PUMP SP-M-02 FAILS TO START
PT-15	4.0	JOCKEY MAIN PUMP JP-M-01 START	JOCKEY MAIN PUMP JP-M-01 RUNNING
PT-16	10.0	JOCKEY MAIN PUMP JP-M-01 FAILS TO START	JOCKEY MAIN PUMP JP-M-01 FAILS TO START
PT-17	4.0	JOCKEY MAIN PUMP JP-M-02 START	JOCKEY MAIN PUMP JP-M-02 RUNNING
PT-18	9.5	JOCKEY MAIN PUMP JP-M-02 FAILS TO START	JOCKEY MAIN PUMP JP-M-02 FAILS TO START
PT-19	10.5	JOCKEY MAIN PUMP JP-M-02 STOP	JOCKEY MAIN PUMP JP-M-02 STOP
PT-20	5.0	HYDRANT MAIN PUMP HP-M-02 STOP	HYDRANT MAIN PUMP HP-M-02 STOP
PT-21	5.0	HYDRANT MAIN PUMP HP-M-03 STOP	HYDRANT MAIN PUMP HP-M-03 STOP

NOTES:

- THE FAILS TO START ANNUNCIATION FOR FIRE & JOCKEY PUMP IS DERIVED FROM PRESSURE TRANSMITTER ON DOWN STREAM OF NRV WITH A TIME DELAY

DETAIL OF PUMPS

	JOCKEY PUMP JP-M-01 (MAIN)	JOCKEY PUMP JP-M-02 (STAND BY)	HYD PUMP HP-M-01	HYD PUMP HP-M-02	HYD PUMP HP-M-03	HYD PUMP HP-DE-01	SPRAY PUMP SP-M-01	SPRAY PUMP SP-M-02	SPRAY PUMP SP-DE-01
TYPE	HORIZONTAL CENTRIFUGAL	HORIZONTAL CENTRIFUGAL	HORIZONTAL CENTRIFUGAL	HORIZONTAL CENTRIFUGAL	HORIZONTAL CENTRIFUGAL	HORIZONTAL CENTRIFUGAL	HORIZONTAL CENTRIFUGAL	HORIZONTAL CENTRIFUGAL	HORIZONTAL CENTRIFUGAL
CAPACITY (M³/Hr)	75	75	410	410	410	410	410	410	410
TOTAL BOWL HEAD(MLC)	120	120	105	105	105	105	120	120	120
RPM	2920	2920	1485	1485	1485	1500	1485	1485	1500

LEGEND

—	HYDRANT MAIN	⊗	DIFFERENTIAL PRESSURE GAUGE
- - -	SPRAY MAIN	⊗	BASKET STRAINER
⊗	GATE VALVE (NORMALLY OPEN)	⊗	Y-TYPE STRAINER
⊗	GATE VALVE (NORMALLY CLOSED)	DECP	DIESEL ENGINE CONTROL PANEL
⊗	GLOBE VALVE	PLC(FIRE)	PLC PANEL LOCATED IN FIRE WATER PUMP HOUSE
⊗	NON RETURN VALVE	REMOTE I/O'S	REMOTE I/O PANEL LOCATED IN BOOSTER PUMP HOUSE
⊗	MOTORISED VALVE	JP-M-01	MOTOR DRIVEN JOCKEY PUMP(MAIN)
⊗	BUTTERFLY VALVE	JP-M-02	MOTOR DRIVEN JOCKEY PUMP(STANDBY)
⊗	BUTTERFLY VALVE NORMALLY CLOSED	HP-M-01	MOTOR DRIVEN JOCKEY PUMP NO.1
⊗	PRESSURE RELIEF VALVE	HP-M-02	MOTOR DRIVEN JOCKEY PUMP NO.2
⊗	PRESSURE GAUGE	HP-M-03	MOTOR DRIVEN JOCKEY PUMP NO.3
⊗	PRESSURE TRANSMITTER	HP-DE-01	DIESEL ENGINE DRIVEN HYDRANT PUMP NO.1
⊗	ELECTRIC MOTOR	SP-M-01	MOTOR DRIVEN SPRAY PUMP NO.1
⊗	DIESEL ENGINE	SP-M-02	MOTOR DRIVEN SPRAY PUMP NO.2
⊗	ULTRASONIC LEVEL TRANSMITTER	SP-DE-01	DIESEL ENGINE DRIVEN SPRAY PUMP NO.1
⊗	LEVEL INDICATOR	SP-DE-02	DIESEL ENGINE DRIVEN SPRAY PUMP NO.2
⊗	LEVEL GAUGE CUM SWITCH	(DPS)	DIFFERENTIAL PRESSURE SWITCH
⊗	3-WAY VALVE MANFOLD		

CUSTOMER: **NTPC Limited** (A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT: **NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)**

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

DEPT. 415 UNTO. L.T.D. CODE. 415

SCALE: REF. TO ASSY. DRG. -N.A.-

WEIGHT (KG) -N.A.-

ITEM NO. -N.A.-

NO. OF ITEMS -N.A.-

TITLE: **P&ID DIAGRAM FOR FIRE WATER PUMPING SYSTEM**

DRG. NO. **1-38316-00081**

CUST. DRG. NO. **4410-001-151-PVM-L-004**

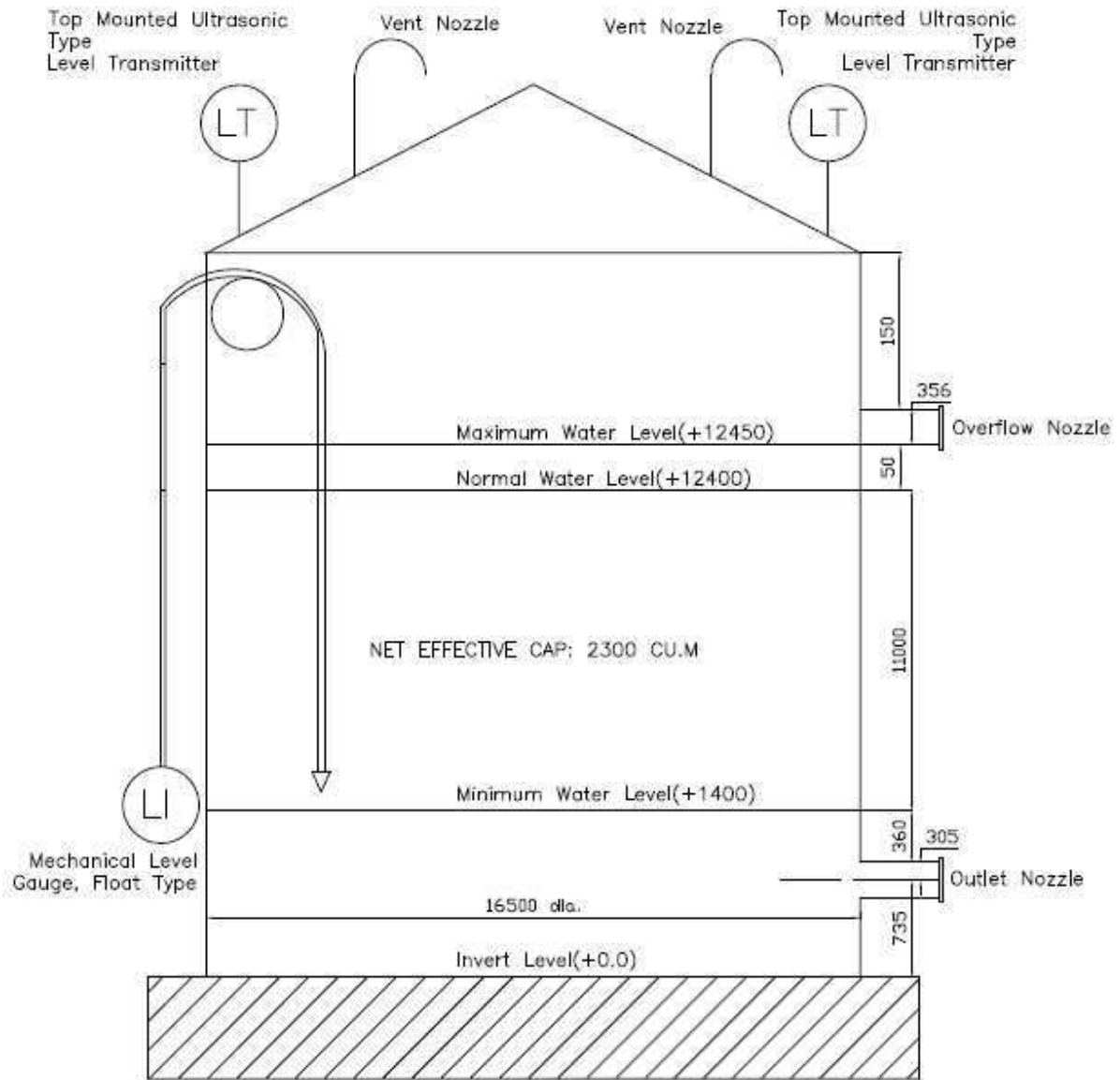
SHT. No. **02**

REV.	DATE	CHD/APPD	REV.	DATE	CHD/APPD	REV.	DATE	CHD/APPD	REV.	DATE	CHD/APPD	REV.	DATE	CHD/APPD	REV.	DATE	CHD/APPD	REV.	DATE	CHD/APPD															
1			2			3			4			5			6			7			8			9			10			11			12		

Annexure-X

Sketch for Fire Water Levels of Storage Tanks

CROSS-SECTIONAL VIEW OF FIRE WATER STORAGE TANK (of Capacity 2300 cu.m)



Notes

1. All the dimensions are in mm.
2. Dimensions of height of tank are indicative only. However Final dimensions shall be as per IS-803/API-650 Code Calculations and requirements.
3. For Details, Refer P&ID for for Fire Water Pumping System, Drg No. 138316-00081

Annexure-XI
INSPECTION, TESTING, ERECTION AND
COMMISSIONING REQUIREMENTS

PIPING, VALVE AND SPECIALITIES

A. Shop Tests

- a) All pipes and fittings shall be tested as per applicable code.
- b) DPT of pipe welds (in case of rolled and welded pipes only) shall be carried out for root and finished welds.
- c) All strainers shall be subjected to Hydraulic pressure test for leakage and Pressure drop v/s Flow for each type and size.
- d) All valves shall be hydraulically tested for body, seat and back-seat (if applicable) as per relevant standard. Check valves shall also be tested for leak tightness test at 25% of the specified seat test pressure.
- e) Valves shall be offered for hydro test in unpainted condition.
- f) Functional checks of the valves for smooth opening and closing shall also be done.
- g) Anti-corrosive protection shall be tested as per applicable code.


B. SITE TESTS


a. Piping Protection :

- i. Thickness , Holiday by spark test, Adhesion test shall be carried out as per relevant standard.
- ii. Complete piping shall be Hydro pressure tested , at 1.5 X DP or 2 X MWP whichever is higher , before protection.

b. Welding of Pipes :

- i. ERW Black / rolled welded 100% DPT on root of butt and finish weld of butt and fillet. RT on 10% randomly selected joints shall be carried out (for underground piping).
- ii. GI Pipes : Welding on GI Pipes in general shall not be done. Welding of GI Pipes, if permitted by design , (butt / socket / fillet weld) shall be done strictly as per approved drawing and procedure approved by NTPC – Engg.

		TYPICAL QUALITY PLAN				FQP. NO.:			
PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032		PRODUCT: FIRE WATER STORAGE TANK (Site Fabricated Tanks)				REV NO: 00	DATE:		
PAGE 1 OF 2									
SL NO	COMPONENTS/ CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT /ACCEPTANCE NORMS	FORMAT OF RECORD	REMARKS		
1.0	RECEIPT & STORAGE								
1.1	On Receipt of All Material at Site, Visual Check for Identification, damage etc.	B	Visual	100%	MDCC/ Challan/ No Damage	Store Ledger			
1.2	Storage of all Material at defined places	B	Visual	100%	No Damage/ Good Engineering Practice/ Supplier's instruction/ Manual	Store Log Book			
2.0	PRE-ERECTION ACTIVITIES								
2.1	Ensure all instruments that are using in Erection & Commissioning are calibrated	B	Visual/TC Review	100%	Calibration Reports/TC	Log Book			
2.2	Ensure qualified workers are put into Job	B	Visual/ Review	100%	Qualification certificates etc.	Log Book			
2.3	Welding : Welding Procedure Specification(WPS) - Parameters	B	Review	100%	ASME Sec-IX/ PQR/ WPS	Log Book			
2.3.1	Welder's Qualification (PQR)	B	Review	100%		Log Book			
3.0	ERECTION & COMISSIONING ACTIVITIES								
3.1	Ensure Completeness of Civil foundation	B	Visual	100%	Appd Dwg/Completeness of Foundation by Civil Agency	Log Book			
3.2	Dimensions of Fabrication, Cutting of Steel plates & Edge preparation	C	Visual	100%	Appd Dwg/WPS	Log Book			
3.3	Fabrication of Annular Plate/ Bottom Plate/ Shell/ Roof (Alignment, Circularity, Verticality, Nozzle orientation & Dimensions)	B	Visual	100%	Appd Drg	Log Book			
3.4	NDT								
LEGEND:- Class A(Critical) BHEL & Customer B(Major) BHEL C(Minor) VENDOR Checking Authority BHEL & Customer BHEL VENDOR Accepting Authority Customer BHEL VENDOR				PREPARED BY VENDOR SIGNATURE & STAMP		APPROVED BY BHEL QA SIGNATURE & STAMP		APPROVED BY CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE)	

		TYPICAL QUALITY PLAN				FQP. NO.:	
PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032		PRODUCT: FIRE WATER STORAGE TANK (Site Fabricated Tanks)				REV NO: 00	DATE:
						PAGE 2 OF 2	
SL NO	COMPONENTS/ CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT /ACCEPTANCE NORMS	FORMAT OF RECORD	REMARKS
3.4.1	Butt joints/ Groove Welds	B	RT(NDT)	As per Tech Spec/Appd Drg	As per Tech Spec/Appd Drg	Log Book	
3.4.2	Fillet Welds, Plug Welds etc.	B	DP(NDT)	As per Tech Spec/Appd Drg	As per Tech Spec/Appd Drg	Log Book	
3.5	Visual, Dimensions	B	Visual, Measurement	10%	Appd Drg/Tech Spec	Log Book	
3.6	Hydro Test	B	Hydro test	100%	Appd. Drg./ Tech. Spec.	Log Book	
4.0	PAINTING						
4.1	Surface preparation	B	Visual	100%	As per Tech Spec/Appd Drg	Log Book	
4.2	Painting Checks(Shade, DFT)	B	Visual, Measurement	Random	Appd. Drg./ Tech. Spec.	Log Book	


NOTE:-

1. This standard FQP should be read along with specification (latest revision), approved drawings, approved data sheet & approved procedures(if any).
2. Drawing/data sheet shall prevail over quality plan for contradiction if any between quality plan and drawing/specification.
3. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

LEGEND:- Class A(Critical) B(Major) C(Minor)	Checking Authority BHEL & Customer BHEL VENDOR	Accepting Authority Customer BHEL VENDOR	PREPARED BY	APPROVED BY	APPROVED BY
			VENDOR SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE)

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: FIRE WATER STORAGE TANK (Site Fabricated Tanks)			REV NO: 00		DATE:			
		PAGE 1 OF 2											
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
1.1	PLATES, STRUCTURES	Chemical & Mechanical Properties	Major	Chem. & Mech. Analysis	One per Lot/ Batch / Heat	Appd. Dwgs. / datasheet/ spec.	Appd. Dwgs. / datasheet/ spec.	MTC	✓	2	--	1	
1.2	PIPES	Chemical & Mechanical Properties	Major	Chem. & Mech. Analysis	One per Lot/ Batch / Heat			MTC	✓	2	--	1	
		Hydro Test, Dimension	Major	Hydro test, Measurement	100%			MTC/TC	✓	2	--	1	
1.3	PIPE FITTINGS	Chemical & Mechanical Properties	Major	Chem. & Mech. Analysis	One per Lot/ Batch / Heat			MTC	✓	2	--	1	
		NDE	Major	NDE	As per Tech Spec			NDE Reports	✓	2	--	1	
1.4	FLANGES	Chemical & Mechanical Properties	Major	CALIBRATION TEST	One per Lot/ Batch / Heat			MTC	✓	2	--	1	
		Rating, Type etc.	Major	Visual	10%	MTC/IR	✓	2	--	1			
1.5	VALVES	Chemical & Mechanical Properties	Major	Chem., Mech. Analysis	One per Lot/ Batch / Heat	Appd. Dwgs. / datasheet/ spec.	Appd. Dwgs. / datasheet/ spec.	MTC	✓	2	--	1	
		Hydro Test, NDE, Fire Safe certificate, etc *	Major	Hydro, NDE	As per BHEL Spec/ Datasheet			TC/IR	✓	2	--	1	*As applicable
1.6	INSTRUMENTS	Chemical & Mechanical Properties, Calibration	Major	Chem., Mech. Analysis	One per Lot/ Batch / Heat, 100%			MTC	✓	2	--	1	

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY	APPROVED BY	APPROVED BY
	VENDOR SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE)

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032		PRODUCT: FIRE WATER STORAGE TANK (Site Fabricated Tanks)						REV NO: 00		DATE:			
PAGE 2 OF 2													
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
									P	W	V		
		Hydro test(as applicable), Type Test(Weather, Proof & Hazardous area certification etc.)*	Major	Hydro, Type Test	100%	Appd. Dwgs. / datasheet/ spec.	Appd. Dwgs. / datasheet/ spec.	TC/IR	✓	2	--	1	*As applicable
1.7	FASTENERS	Chemical & Mechanical Properties	Major	Chem. & Mech. Analysis	One per Lot/ Batch / Heat			MTC	✓	2	--	1	
2.0	INPROCESS INSPECTION												
3.0	FINAL INSPECTION & TESTING												
3.1	All items mentioned in SI no. 1.0 & in appd. BOM including Spares if any	Visual Check, Dimensional	Major	Visual & Measurement	100%	Appd. Dwg. / datasheet/ spec/ Appd. BOM	Appd. Dwg. / datasheet/ spec/ Appd. BOM	IR	✓	2	1	--	
		BOM Check	Major	Visual	100%			IR	✓	2	1	--	
4.0	PRESERVATION & PACKING												
4.2	PACKING	Soundness of Packing	Major	Visual	Random	Appd. Dwg. / datasheet/ spec	Appd. Dwg. / datasheet/ spec	Packing List	✓	2	2	-	

NOTE:-

1. This standard MQP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Drawing/data sheet shall prevail over quality plan for contradiction if any between quality plan and drawing/specification.
3. All test certificates/reports reviewed and certified by TPI/BHEL shall be submitted to BHEL as documentation package.
4. All type test reports submitted shall not be older than 5 yrs from the date of purchase order.
5. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY	APPROVED BY	APPROVED BY
	VENDOR SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE)



QAP GUIDELINES & FORMAT

(ANNEXURE -)


The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement.


Note :

1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval.
2. No deviation to reference document is acceptable.

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Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE Rev No. 00 Page 2 of 3
	<u>GUIDELINES TO VENDORS FOR PREPARATION OF QUALITY ASSURANCE PLAN</u>		
	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<ol style="list-style-type: none"> 1. QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10. 2. Each page of QAP shall contain the following information. <ol style="list-style-type: none"> a) Vendor's name & address. b) Customer: BHEL, Hyderabad. c) Project. d) BHEL Product Standard Number/revision number as referred in P.O. e) BHEL Purchase Order Number & Date. f) Product as per P.O. description. g) QAP Number (unique and shall not repeat)/revision number/date. h) Page number and number of pages 3. QAP shall contain four parts / stages as follows. <ol style="list-style-type: none"> a) Raw materials and bought out items. b) In process Control / Inspection. c) Final assembly, Inspection & Testing. d) Painting, preservation & packing. 4. Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc). 5. Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT,DP etc.), hydrostatic test, calibration check etc.) 6. Under 'Class', indicate minor, major or critical depending on the importance of characteristic. 7. Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.) 8. Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.) 9. Under 'Reference document' and 'Acceptance norms', appropriate National & International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review & approval by our Engineering dept. 10. Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc. 	
Ref. Doc		<ol style="list-style-type: none"> 11. Please refer 'Agency' in QAP format. Under P: Perform, W: Witness, V: Verify Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR 2: (Vendor / Sub vendor) 	

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, under Witness (W) column use 1. Under 'Verify' column, use code1.</p> <p>12. Under 'D' please put (<input type="checkbox"/> Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification.</p> <p>13. Vendor's signature & stamp should be available on each page of QAP.</p> <p>14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification & Approved Drawings.</p> <p>15. The following operations/characteristics/check points may be included (AS APPROPRIATE)</p> <ul style="list-style-type: none"> a) Visual check b) Dimensional check c) Mechanical and Chemical properties. d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.) e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc. f) Check for correctness for all components mounted as per General arrangement Drawing, Bill Of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc. g) Verification of test certificate for protection class for the enclosures. h) Mechanical functioning of switches. i) Continuity of earthing and provision of earth points. j) Colour coding of wiring, size, tightness & dressing of wiring. k) Review of test certificates of assembled items, raw materials, internal test reports etc. l) Witness of functional checks, which may include mechanical run & electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc. m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc. n) Material identification (for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.) o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non Destructive Tests. p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating) q) All tests as per BHEL Product Standard & approved drawings including Type tests and Routine tests on individual items and on System as a whole. r) Packing and Preservation. <p>16. QAP Format enclosed.</p> <p>17. Typical Manufacturing QAP is attached.</p>		
	Ref. Doc		

