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| **A. Hydraulic** | | | | | | | |
| 1 | PTS-Electrical,<br>Volume II, Section II,<br>E1 – Generator and excitation system | 1.2 | 1.2 TYPE AND RATING OF GENERATOR | 3 of 67 | Inertia constant (H) Minimum 3.0 MW-Sec/MVA | There are discripency in the minimum inertia requirement in different clauses. We understand that the inertia requirement of the generating unit shall be suitably defined based on hydraulic transient analysis considering the speed rise and pressure limit at any operating condition including maximum continous overload condition. Kindly confirm. | Technical Data Sheet in WORD file attached |
| 2 | PTS-Mechanical,<br>Volume II, Section II,<br>M1 – Turbine and MIV | 1.6 | 1.6 Generator characteristics | 10 of 83 | The inertia constant of the generating unit at the maximum output shall not be less than 4.0 kW–sec per kVA. The fly wheel effect (GD2) of the generating unit shall be worked out accordingly by the Bidder in coordination with generator manufacturer. | | |
| 3 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.8 | 1.8 Silt considerations and Turbine Performance | 10 of 83 | The turbine will be able to operate safely and cavitation free at any head between the maximum and minimum net head and between 50% and 100% load…..... | Cavitation free is not quantifiable, henec we understand that the cavitation pitting/ metal loass shall be inline with IEC60609-1. Kindly accept. | As per IEC. |
| 4 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.9 | 1.9 Smooth, Stable and Quiet Operation and Noise Limit | 11 of 83 | 3. The peak-to-peak pressure pulsation at any of the 4 taps located below the runner shall not exceed 3% (6% peak to peak) of the rated net head…..... | Considering the project paramters and project specific speed range, the pressure pulsation requirement is stringent.<br>We propose to modify the pressure pulsation requirement as follows:<br>"**The peak pressure pulsations** at any of the 4 taps located below the runner shall not exceed 3 % (6% peak to peak) of the rated net head **at rated Power**."<br>Kindly accept. | As per technical specification. |
| 5 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.9 | 1.9 Smooth, Stable and Quiet Operation and Noise Limit | 11 of 83 | 4. The peak-to-peak power pulsations shall not exceed 1% of the rated power. (Ignoring however any isolated sharp peaks)…..... | Considering the project paramters and project specific speed range, the power pulsation requirement is stringent.<br>We propose to modify the power pulsation requirement as follows:<br>"**The peak power pulsations shall not exceed 2% of the rated power. (Ignoring however any isolated sharp peaks)**."<br>Kindly accept. | As per technical specification. |
| 6 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.9 | 1.3 Hydraulic conditions | 11 of 83 | Operating Conditions<br>The turbines shall be capable of delivering 81.20 MW plus 10% continuous overload at the rated net head of 201.80 m. In addition, the tenderer shall guarantee the maximum output which will be available at the minimum net head of 199.80 m without exceeding normal stresses.....<br>.....The operational net head range will be 201.80 m to 199.80 m and the turbine shall be designed to operate safely continuously at 110% of rated power under the range of net heads specified. | There are descripency for maximum output requirement at 199.80m net head in given both paragraphs. Kindly modify the clause as proposed below:<br><br>"The turbines shall be capable of delivering 81.20 MW plus 10% continuous overload at the rated net head of 201.80 m. In addition, the tenderer shall guarantee the maximum output which will be available at the minimum net head of 199.80 m without exceeding normal stresses.....<br>.....The operational net head range will be 201.80 m to 199.80 m and the turbine shall be designed to operate safely continuously ~~**at 110% of rated power**~~ under the range of net heads specified. | Accepted. The clause stand modified as:<br>"The turbines shall be capable of delivering 81.20 MW plus 10% continuous overload at the rated net head of 201.80 m. In addition, the tenderer shall guarantee the maximum output which will be available at the minimum net head of 199.80 m without exceeding normal stresses. Maximum unit stresses in rotating parts of the turbine shall not exceed provisions as per relevant Clause.<br>The operational net head range will be 201.80 m to 199.80 m and the turbine shall be designed to operate safely continuously under the range of net heads specified. The rated head of the plant shall be 201.80 m." |
| 7 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.9 | 1.3 Hydraulic conditions | 11 of 83 | Operating Conditions<br>The operational net head range will be 201.80 m to 199.80 m ….... | We understand that the given net head range (201.8m to 199.8m) is based on FRL & MDDL condition while all 3 units are in operation, however maximum net head will occur while 1 unit shall be in operation at FRL condition. So in view of this kindly confirm the below deatils:<br>Maximum net head while 1 unit in operation and corrseponding TWL. | Maximum net head is 201.80 m and corresponding TWL is EL 1189..00 |
| 8 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.10 | 1.10 Basic Design and Rating | 12 of 83 | Turbine rating<br>It shall also be capable of delivering this output i.e. 81.20 MW at full guide vane opening when operating at minimum net head of 199.8 m.<br>It shall be capable of delivering continuous overload guaranteed output 89.34 MW with full guide vane opening, when operating at rated net head of 201.08 m. Percentage opening of guide vane to this effect shall be guaranteed in the GTP. | Guide vane opening shall be decided by bidder based on selected solution, hence in view of this, kindly request you to modify the clause as proposed below:<br>It shall also be capable of delivering this output i.e. 81.20 MW **within full guide vane opening** when operating at minimum net head of 199.8 m.<br>It shall be capable of delivering continuous overload guaranteed output 89.34 MW **within full guide vane opening**, when operating at rated net head of 201.08 m. Percentage opening of guide vane to this effect shall be **informed** in the GTP. | Accepted.<br>This clause shall stand amended as:<br>"It shall also be capable of delivering this output i.e. 81.20 MW within full guide vane opening when operating at minimum net head of 199.8 m.<br>It shall be capable of delivering continuous overload guaranteed output 89.34 MW within full guide vane opening, when operating at rated net head of 201.08 m. Percentage opening of guide vane to this effect shall be informed in the GTP." |

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| 9 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.10 | 1.10 Basic Design and Rating | 12 of 83 | Turbine rating<br>The design head of the turbine at which the best efficiency point occurs shall be within the head of 201.8 m……. | We understand that the best efficiency of offered operating range should be within the head of 201.8m. Kindly confirm. | confirmed |
| 10 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.15 | 1.15 Guaranteed output | 14 of 83 | The Contractor shall guarantee the following turbine outputs at shaft coupling at rated speed of 300 rpm:<br>i. It shall also be capable of delivering output of not less than 81.20 MW at shaft coupling with 85% of guide vane opening, when operating at rated net head of 201.8m.<br><br>ii. It shall be capable of delivering a continuous overload output of 89.34 MW with full guide vane opening, when operating at rated net head of 201.80m.<br><br>iii. It shall also be capable of delivering output of 81.20 MW at full guide vane opening, when operating at net head of 199.80 m. | The Guide vane opening shall be selected in order to meet the required output, hence kindly request you to modify the clause as proposed below.<br><br>i. It shall also be capable of delivering output of not less than 81.20 MW at shaft coupling **within 85% of guide vane opening**, when operating at rated net head of 201.8m.<br>ii. It shall be capable of delivering a continuous overload output of 89.34 MW **within full guide vane opening**, when operating at rated net head of 201.80 m.<br>iii. It shall also be capable of delivering output of 81.20 MW **within full guide vane opening**, when operating at net head of 199.80 m. | Accepted. This clause shall stand amended as:<br><br>i. It shall also be capable of delivering output of not less than 81.20 MW at shaft coupling within 85% of guide vane opening, when operating at rated net head of 201.8m.<br>ii. It shall be capable of delivering a continuous overload output of 89.34 MW within full guide vane opening, when operating at rated net head of 201.80 m.<br>iii. It shall also be capable of delivering output of 81.20 MW within full guide vane opening, when operating at net head of 199.80 m. |
| 11 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.15 | 1.15 Guaranteed Efficiencies | 14 of 83 | As the turbine has to operate under varying heads as per rule curve, the weighted average efficiency shall be calculated from the following formula:<br>Weighted average efficiency,<br>ηt av<br>= 0.2*η110 + 0.4*η100 + 0.15*η75 + 0.25*η50<br>Where,<br>ηt av = weighted average efficiency of turbine η110,η100,η75 and η50 are the efficiency of turbine at 110%,100%, 75% and 50% of rated output respectively at rated net head of 201.8m. | We understand that the only Weighted average efficiency shall be subjected to guarantee/ LD/ penality purpose. The efficiency/ discharge/ guide vane opening values at single operating points shall not be subject to guarantee and shall be only for information purpose. Kindly accept. | The test shall be as per IEC 60041.<br><br>The Guaranteed Weighted Average Efficiency of the Turbine and Generator as per formula given in the Bid Specifications shall not be less than 93.5% and 98% respectively.<br>Guaranteed efficiency of the Turbine operating at the rated head and rated output shall not be less than 94.5 percent.<br>However, the bidder may note that the efficiency of the turbine at other individual points i.e. 110%, 75% and 50% contribute to the calculation of WAE (which is a guaranteed rechnical particular).<br><br>The discharge/ guide vane opening values at single operating points shall not be subject to guarantee and shall be only for information purpose. |
| 12 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section IV<br>TDS01 – Turbine and MIV | A.04, A.05 & A.06 | A.04 Turbine efficiency<br>A.05 Weighted Average Efficiency of Turbine Generator Unit<br>A.06 Turbine Discharge for the following outputs | 3 of 16 | A.04 Turbine efficiency:<br>Guaranteed efficiency of Turbine at rated head for the following outputs:<br>A.4.1 110% %<br>A.4.2 100% %<br>A.4.3 75% %<br>A.4.4 50% %<br>A.4.5 Weighted Average Efficiency of Turbine %<br>A.05 Weighted Average Efficiency of Turbine Generator Unit: %<br>A.06 Turbine Discharge for the following outputs:<br>A.6.1 Guaranteed max. Output at rated head (153.3 m) m3/sec<br>A.6.2 Guaranteed rated Output at rated head (153.3m) m3/sec<br>A.6.3 Guaranteed max. Output at max. head m3/sec<br>A.6.4 Guaranteed max. Output at min. head m3/sec<br>A.6.5 Guaranteed max. Output at 75% of rated head m3/sec<br>A.6.6 Guaranteed max. Output at 50%of rated head m3/sec | | |
| 13 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.15 | 1.15 Guaranteed Efficiencies | 14 of 83 | The guaranteed weighted average efficiency of **turbine generator** unit shall not be less than 93.5% and Guaranteed efficiency of the Turbine operating at the rated head and rated output shall not be less than 94.5 percent. | Considering the project parameters, weighted average efficiency formula and weighing of 0.25 at part load (50%) condition, the minimum requirement of turbine generator weighted average efficiency (93.5%) is on very higher side and techincally not feasible. In view of this, we propose to keep the requirement as follows:<br><br>**"The guaranteed weighted average efficiency of turbine unit shall not be less than 93.5% and Guaranteed efficiency of the Turbine operating at the rated head and rated output shall not be less than 94.5 percent."**<br><br>Kindly accept. | The Guaranteed Weighted Average Efficiency of the Turbine and Generator as per formula given in the Bid Specifications shall not be less than 93.5% and 98% respectively.<br>Guaranteed efficiency of the Turbine operating at the rated head and rated output shall not be less than 94.5 percent. |
| 14 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>E1 – Generator and excitation system | 1.2 | 1.2.8 Guarantees on Efficiency & Output; Rejection Limit | 5 of 67 | 1.2.8.3 The weighted average efficiency of the generator shall be determined from the individual guaranteed efficiencies and test figures at four loads as specified below:…….....…….....The guaranteed weighted average efficiency of turbine generator unit shall not be less than 93.5% and Guaranteed efficiency of the Generator operating at the rated head and rated output shall not be less than 98.5 percent. | | |
| 15 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.16 | 1.16 Prediction of Guarantees from Model Test | 15 of 83 | The minimum acceptance weighted average efficiency of the turbine shall be 93.5 % and no benefit shall be given to the contractors for the efficiency offered beyond 93.5 %. | | |

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| 16 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.15 | 1.15 Guaranteed Efficiencies | 15 of 83 | Complete details of test method, agency which will conduct the test, provisions to be made for field testing, calibration of instruments for tests and all other relevant details to be given in the offer. Contractor shall be under obligation to accept these tests for liquidated damages. Corporation reserves the right to appoint the Contractor or any independent agency or agency recommended by the Contractor for conducting these tests. | Field testing by E&M supplier shall also be acceptable. Please review and confirm. | Bid stipulation shall prevail. |
| 17 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.38 | 1.38 Field acceptance tests | 62 of 83 | Capacity and efficiency tests shall be conducted on one turbine, chosen by Engineer In-Charge at a later date, to verify that the power output and efficiency guarantees have been fulfilled…..... | | |
| 18 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.16 | 1.16 Prediction of Guarantees from Model Test | 15 of 83 | The Contractor shall predict the performance and demonstrate the capability of design offered to meet the guarantees and provide trouble free and smooth operation of the turbine on the basis of Computational Fluid Dynamics (CFD) and model test analysis. The Contractor shall conduct CFD analysis to prove that the design offered is optimized for minimum relative velocities and minimum silt damage and also to indicate peak turbine efficiency, if possible. The Contractor shall prove the experience in conducting such analysis. Price of CFD and model..... | Considering Model test as mandatory requirement, the offered guarantees/ performance shall be demonstrated during model acceptance test. Hence in view of the this, CFD analysis requirement is not foressen. Kindly request you to delete the CFD analysis requirement. | Bid stipulation shall prevail. |
| 19 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.19 | 1.19 Cavitation pitting guarantee | 17 of 83 | Excessive pitting shall be defined as the removal of metal from runner and other water passage components, exceeding a weight of W = 0.05 D2per 1000 hours of operation during the guarantee period, defined above where 'w' is metal weight removed due to cavitation in kilograms and D is the throat or discharge diameter of runner in metres.<br>If the guarantee expires before 8000 hours or operation the weight loss for guarantee purpose shall be on pro-rata basis.<br>In case of excessive cavitation the Contractor shall, at his cost, correct the condition by reshaping or resurfacing, grinding, polishing, building up by welding or by any other means and rectify/ replace the parts thus affected and carry out such modifications in design and such improvement in the manufacture and finish as may be required to minimize and contain cavitation pitting within permissible limit. The replacement shall be subject to the same guarantees as per the original equipment. | Any revolving cavitation guarantee shall not be offered. In case of excessive cavitation pitting and after modification/ repair/ replacment, cavitation guarantee shall be extended by 12 months from the time such replacement/repair subject to maximum time period of thirty-six (36) months from the date of putting plant and equipment into operation.<br>Kindly accept. | Bid stipulation shall prevail. |
| 20 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.21 | 1.21 Turbine Model Test | 18 of 83 | General<br>Turbine model test shall be performed in an approved test laboratory in presence of a team of Engineer of the Corporation, to demonstrate that the efficiency and other guarantees……... | We understand that the bidder is allowed to perform the model testing at bidder's facility. Kindly accept. | Bid stipulation shall prevail. |
| 21 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.21 | 1.21 Turbine Model Test | 19/20 of 83 | Tests to be conducted on model<br>The model tests shall be conducted in range of unit speeds corresponding to 65 % to 125 % of rated head and guide vane opening…….....<br>….....Runaway speed tests shall be made to determine the maximum runaway speeds under conditions corresponding to prototype net heads with range of 65% to 125% of rated net heads.....<br>.....<br>The model test shall include but not be limited to the following tests:<br>iii) Measurement of flow and hydraulic thrust at various openings and unit speeds corresponding to 65% to 125% of rated net head.<br>iv) Complete Hill chart,<br>v) Cavitation characteristic at various points corresponding to 65% to 125% of rated net head. | As project net head range is very small (199.8m to 201.80m), so in view of this model testing in range of unit speeds corresponding to prototype net head range with 65% to 125% of rated net is notinline w.r.t project requirements. Kindly request to modify the clause as:<br><br>"The model tests shall be conducted in range of unit speeds corresponding to **90 % to 110 % of rated head** and guide vane opening……."<br><br>The above specifed range shall be applicable for all clauses wherever net head range of 65% to 125% is specifed in tender specs.<br><br>Kindly accept. | Bid stipulation shall prevail. |
| 22 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section II<br>M1 – Turbine and MIV | 1.23 | 1.23 Model test report | | 14) Curves showing relationship between guide vane angle and also Guide vane opening in mm vs servomotor stroke related to maximum opening of guide vane and clear opening between two adjacent guide vanes Curves showing torques on the misaligned Guide vane and neighboring aligned vanes. | The curve showing relationship between guide vane angle/ guide vane opening in mm Vs servomotor stroke is related to prototype design/ enginnering, hence same shall be provided during deatiled enginnering of prototye. Kindly accept. | Bid stipulation shall prevail. |
| 23 | Volume II<br>Section III<br>Tender Drawings | | Power house general arrangement cross section-A & B WAP/Heo/E&M/TD/01 & 02 | | Draft Tube dimensions : Depth, length, exist width/ height | We understand that the draft tube dimensions (bottom point elevation, length, exit height & exit width) defined in the power house cross section and plan drawing are preliminary/ tentative. However, final dimensions of draft tube shall be defined by bidder based on the selected hydraulic solution and shall be informed in bid. Kindly accept. | The power house dimensions and layout has already been freezed. No Change in these dimesions shall be accepted on the acoount of change in draft tube dimensions. |

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| 24 | Volume II<br>Section III<br>Tender Drawings | | Tender drawing | | Tender drawing | In the available darwings in Vol II, Section III, only project general layout cross section/plan drawings are available, Kindly request you to share the below details/ drawings (in AutoCAD) for transient analysis purpose:<br>1. Waterways L section from intake to tail race<br>2. Waterways cross-section details at different section.<br>3. Surge Tank detailed drawing (having orifice dia, height, maximum/ minimum water level)<br>4. Head loss coefficient in HRT/ penstock<br>5. Discharge coefficienct (inflow/ outflow) of surge tank orifice. | Auto CAD drawings attached.<br><br>Head loss coefficient<br>1. for steel is 0.008 (min) and 0.012 (max).<br>2. for concrete is 0.012 (min) and 0.016 (max).<br>3. for orifice is 0.065 (inflow) and 0.07 (outflow). |
| 25 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section IV<br>TDS01 – Turbine and MIV | A.02 & A.03 | A.02 Guaranteed output at generator terminal for the following heads:<br>A.03 Guaranteed turbine output for the following heads: | 3 of 16 | <table><tr><td>3.</td><td>a) Valve Rotor</td><td>Casting/WPFS</td><td>St plate</td><td>ASTM 537 Cl II modified</td><td>300 max</td></tr><tr><td></td><td>b) Rotor trunnion</td><td>Forging</td><td></td><td></td><td></td></tr><tr><td></td><td>c) Valve Body</td><td>Casting/WPFS</td><td>St plate</td><td></td><td>300 max</td></tr><tr><td></td><td>Seal</td><td></td><td></td><td>equivalent</td><td></td></tr><tr><td>2.</td><td>Seal seat</td><td></td><td>Sst 13-4 or better</td><td>ASTM 743 Gr/CA-6NM</td><td>300-400</td></tr></table> | he Guide vane opening shall be selected in order to meet the required output, ence kindly request you to modify the clause as proposed below.<br><br>.2.1 Guaranteed max. Output at rated head (201.80 m) **within 85% guide ane opening** and at rated speed of 300 rpm.<br>.2.2 Guaranteed max. Output at rated head (201.80 m) **within full guide ane opening** and at rated speed of 300 rpm<br><br>.3.1 Guaranteed max. Output at rated head (201.80 m) **within 85% guide vane opening** and at rated speed of 300 rpm<br>A.3.2 Guaranteed max. Output at rated head (201.80 m) **within full guide vane opening** and at rated speed of 300 rpm | Accepted.<br>The clause shall stand ammended accordingly. |
| 26 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section IV<br>TDS01 – Turbine and MIV | A.02 & A.03 | A.02 Guaranteed output at generator terminal for the following heads:<br>A.03 Guaranteed turbine output for the following heads: | 3 of 16 | A.2.7 Guaranteed max. Output at 75% of rated head<br>A.2.8 Guaranteed max. Output at 50% of rated head<br><br>&<br><br>A.3.5 Guaranteed max. Output at 75% of rated head<br>A.3.6 Guaranteed max. Output at 50% of rated head | As project net head range is fixed (201.8m to 199.80m), so kindly delete the ouput guarantee requirement at 75% & 50% of rated head. | Guaranteed max output at 75% and 50% of rated head, sought in the TDS shall be provided for information only. |
| 27 | Particular Technical Specifications-Mechanical<br>Volume II<br>Section IV<br>TDS01 – Turbine and MIV | A.06 | A.06 Turbine Discharge for the following outputs: | 3 of 16 | A.6.1 Guaranteed max. Output at rated head (153.3 m) m3/sec<br>A.6.2 Guaranteed rated Output at rated head (153.3m) m3/sec<br><br>A.6.5 Guaranteed max. Output at 75% of rated head m3/sec<br>A.6.6 Guaranteed max. Output at 50%of rated head m3/sec | 1. The request discharge value in clause A.06 shall be for information purpose. Kindly update the TDS accordingly.<br>2. The specified net head in cluase A.6.1 & A.6.2 is not correct, kindly update the same.<br>3. As project net head range is fixed (201.8m to 199.80m), so kindly delete the guarantee requirement at 75% & 50% of rated head in cluase A.6.5 & A.6.6 | No. 1. Accepted.<br>No. 2. Rated head shall stand correted as 201.8 m., as specifiied elsewhere in the bid document.<br>NO.3. Values in the TDS shall be provided for information only. |
| 28 | Particular Technical Specifications-Electrical<br>Volume II<br>Section IV<br>TDS01 – Turbine and MIV | A.12 | A.12 Max. Water Hammer Pressure: % of rated head | 4 of 16 | A.12 Max. Water Hammer Pressure: % of rated head | Maximum water hammer pressure shall be defined in trem of % of maximum static head as specifed in clause 1.11 of Volume II Section-II ; M-1 Turbine and MIV. Kindly update the clause as:<br>A.12 Max. Water Hammer Pressure: **% of maximum static head** | Unit for Max. water hammer pressure sought in the TDS shall stand corrected as " % of max. static head'. |
| **B. Turbine** | | | | | | | |
| 29 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.8 | Silt considerations and Turbine Performance | 10 of 83 | As a consequence, desilting chamber has not been provided in Heo HEP because already desilted clear water will be available downstream of Pauk Dam. At Heo intake also invert level of Intake structure has been kept 3.5 m above river bed level/ invert level of under sluice bays to prevent any entry of silt in the waterways. This structure isolates the entrance of the waterways from the silt deposits. Therefore, very little silt in quantity and no one of size higher than 200µ will find its way towards turbine. | As very little silt in quantity and no one of size higher than 200µm as per the information provided in the tender specification. VH do not considered any HVOF coating on the Turbine parts. | Accepted. HVOF coating on turbine parts is not envisaged. |
| 30 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.7 | Transient behavior data | 10 of 83 | Noise:<br>The maximum noise level at any place at 1.0 m (One meter) distance shall not exceed 90 dB. | The maximum noise level at any operating conditions at any place 1.0 m distance from turbine shaft shall not exceed 90 db. It shall be excluding the transient conditions.<br>Please review the requirement and confirm. | The maximum noise level when operating near the rated output shall not be higher than 90 dB at 1.0 Metre distance.<br>For transient conditions, maximum noise level of 95 dB is agreed. |
| 31 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.9 | Smooth, stable and Quiet and Noise Limit | 11 of 83 | The maximum noise level at any place 1.0 m distance from turbine shaft shall not exceed 90 db. | | |
| 32 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.9 | Smooth, stable and Quiet and Noise Limit | 11 of 83 | Turbines design shall be such as would ensure smooth and quiet operation with minimum vibrations, pressure pulsations, power fluctuations and noise etc. The vibrations amplitude at the shaft shall not exceed Zone – A values specified in ISO-10816 and ISO 7919-5. | The vibrations amplitude at the shaft shall be as per the values specified in ISO- 20816-5. The standards ISO-10816 and ISO 7919-5 shall be read as ISO-20816-5 now. | Accepted |

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| 33 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.24 | Design and Construction | 22 of 83 | Design Stress Limits:<br>Under the most severe operating conditions, the unit stresses in the materials shall not exceed the values shown in table<br><br>**Material** / **Maximum Unit Stress** (in Tension / in Compression)<br>Cast iron: One-tenth (1/10) of the ultimate strength / 700 kg/sq. cm.<br>Steel Forgings, Cast Steel and Alloy Cast Steel: One-fifth (1/5) of the ultimate strength or one-third (1/3) of the yield strength, whichever is lower / One-fifth (1/5) of the ultimate strength or one-third (1/3) of the yield strength, whichever is lower<br>Plate Steel for principal parts subject to hydraulic stresses: One-fourth (1/4) of the ultimate strength / One-fourth (1/4) of the ultimate strength<br><br>For other materials, not covered in table used in the construction of the turbine and associated equipment, the maximum stresses in tension or compression due to the most severe conditions occurring in normal operation shall exceed neither one-fifth of the yield strength of the material. Maximum stresses in shear shall not exceed 210 kg/sq. cm. in components made of cast iron and shall not exceed 60% of the allowable stresses in tension for other materials. | The design stress limit shall be followed as for the conditions occurring in normal operation shall not exceed one-half (1/2) of the yield strength of the material and for the most severe operating conditions like pressure test and runaway speed etc. the stresses shall not exceed three-fourth (3/4) of the yield strength.<br><br>For other materials, not covered in table used in the construction of the turbine and associated equipment, the maximum stresses in tension or compression due to the most severe conditions occurring in normal operation shall exceed one-half (1/2) of the yield strength of the material.<br><br>Please review the requirement and confirm the above mentioned stress criteria as followed for the hydro turbines world wide based on the advanced tool/ software's calculations. | Bid stipulation shall prevail. |
| 34 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.24 | Design and Construction | 24 of 83 | Material selection and standards:<br><br>Stay ring and stay vanes: Carbon steel fabricated from steel plate: ASTM A 537 class II or ASTM A 516 GR 70<br><br>Bottom ring, spiral casing, head cover, draft tube cone: Carbon steel fabricated from steel plate: ASTM A 537 class II or ASTM A 516 GR 70<br><br>Bearing housing: Carbon steel fabricated from steel plate: ASTM A 283 Grade C<br>Guide vane servomotor body, piston and rings: Carbon steel casting/fabricated from steel plate: ASTM 286 Grade WCC ASTM A 537 Class II or ASTM A 516 Grade 70 | Material IS 2062 E250/ E350, IS S235 J2/ 355 J2/ Equivalent for stay ring & Stay Vanes, Spiral Casing, Draft Tube Cone, Discharge ring, Bearing Housing, Bottom Ring, Head Cover, Servomotor Body, Piston & Rings shall also be acceptable in addition to the mentioned in tender specification as these standard materials for the similar type of Turbines are accepted worldwide also and worked successfully. | Bid stipulation shall prevail. |
| 35 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.24 | Design and Construction | 25 of 83 | Material selection and standards:<br><br>Coupling bolts: Alloy steel Ni-Cr-Mo forged: ASTM A 434 Class BD<br><br>Fasteners on parts required frequent dismantling: Stainless steel | For coupling bolts/ shear element material shall also be considered as 34CrNiMo6/ 42CrMo4/ Equivalent.<br><br>For other parts the bolts material shall be considered as A4-70, C3-80, 8.8 OR Equivalent.<br><br>Above bolt/ coupling materials are standard materials for all type of hydro turbine and successfully accepted globally. | Bid stipulation shall prevail. |
| 36 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.25 | Fixed/embedded component | 26 of 83 | Spiral case:<br>The embedding of the spiral casing in concrete is proposed to be carried out with the suitable pressure to withstand maximum possible hydraulic and other forces acting on it. | Embedment hydraulic pressure during spiral casing concreting shall be 70% of minimum static head.<br>Please review the requirement and confirm. | Bid stipulation shall prevail. |
| 37 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.25 | Fixed/embedded component | 27 of 83 | d. Four (4) nos. pipes through stay vanes equipped with removable, readily accessible strainers for gravity drainage of turbine leakage water collecting on the top covers and on stay vane upper flange area etc. The pipes shall not impair the strength of the stay vanes. | Stay Vane profile is hydraulic path and It is not recommended to provide pipe/hole through stay vane and weaken the strength of the particular vane compared to others.<br>Please review the requirement and confirm. | Bid stipulation shall prevail. |
| 38 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.25 | Fixed/embedded component | 28 of 83 | Minimum Limit of supply of Draft Tube liner shall be tentatively 9050 mm from the unit center line or up to the point where velocity is 4.0m/sec, whichever is longer higher. | As per IS:5496 standard, limit should be up to 6.0 m/sec.<br>Please review the requirement and confirm. | Bid stipulation shall prevail. |
| 39 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.26 | Stationary/removable components | 29 of 83 | The draft tube cone except the upper one meter height shall be made of weld fabricated plate steel of at least 25 mm thick and shall be suitably reinforced. The upper one meter height of the draft tube cone shall be made of steel plate of at least 25 mm thickness including 10 mm cladding of 13Cr-4Ni or better stainless steel over the steel plate or made entirely of 13Cr-4Ni or better stainless steel. | Draft tube cone thickness shall be as per the bidder standard design practice followed for the similar hydro turbine design. Also, its detailed calculation shall be done during the detailed Engineering. Please review the requirement and confirm. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |

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| 40 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.26 | Stationary/removable components | 30 of 83 | Head cover<br><br>Provision shall be made for supplying grease under pressure to bronze regulating ring bearings. | As self-lubricated bearings & bushings shall be provided, therefore no need to kept the provision for supplying grease under pressure to bronze regulating ring bearings. Please review the requirement and confirm. | Accepted.<br>The line "Provision shall be made for supplying grease under pressure to bronze regulating ring bearings", shall stand deleted. |
| 41 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.26 | Stationary/removable components | 30 of 83 | Head cover<br><br>Replaceable 13Cr-4Ni stainless steel facing plates of minimum 30mm thickness in suitable sections shall be provided on the inner surface of the head cover and lower face of the head cover coming in contact with water.Fixing arrangement of liner by suitable stainless steel bolts shall be done from non-water side so as not to be susceptible to silt erosion/damage and shall be easily accessible for maintenance. Bolts for holding the liner shall nor pierce the liner all through. | Bolting of facing ring with Head cover shall be as per the bidder standard design practice. Stainless steel screw of facing plate shall be done from water side due to assembly/disassembly feasibility point of view. Whereas to avoid water contact with screws, screw bore cavity shall be filled with steel putty before machining.<br>Please review the requirement and confirm. | Bid stipulation shall prevail. |
| 42 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.26 | Stationary/removable components | 31 of 83 | Head cover<br><br>The head cover shall be designed to pass through the wound generator in one piece during erection and dismantling and with the runner and shaft in place. | If head cover would be designed in two or more sections then it would not be pass through the wound generator in one piece. However, it would be easily dismantle and assemble in sections. Please review the requirement and confirm. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 43 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.26 | Stationary/removable components | 32 of 83 | Bottom Ring<br><br>Replaceable 13Cr-4Ni stainless steel facing plates of minimum 30mm thickness in suitable sections shall be provided on the inner surface of the bottom ring coming in contact with water and upper horizontal surface of the bottom ring. Fixing arrangement of liner by suitable stainless steel bolts of facing plate shall be done from non-water side so as not be susceptible to silt erosion/ damage and shall be easily accessible for maintenance. Bolts for holding the liner shall not pierce the liner all through. | Bolting of facing ring with Bottom ring shall be as per the bidder standard design practice. Stainless steel screw of facing plate shall be done from water side due to assembly/disassembly feasibility point of view. Whereas to avoid water contact with screws, screw bore cavity shall be filled with steel putty before machining.<br>Please review the requirement and confirm. | Bid stipulation shall prevail. |
| 44 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.28 | Rotating parts, guide bearings and seals | 36 of 83 | Runner<br><br>Replaceable 13Cr-4Ni stainless steel labyrinth seals shall be fixed to the runner both at the top and bottom ends with the help of stainless steel fasteners to reduce the leakages. | Arrangement of labyrinth is depending on the hydraulic profile of the runner. In many cases rotating labyrinth stays integral part of the Runner Crown & band. So accordingly, there would not be any spare item for integral rotating labyrinth. Kindly keep both the options open. | Shall be examined during detail engineering |
| 45 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.28 | Rotating parts, guide bearings and seals | 36 of 83 | Turbine Shaft<br><br>The critical speed of the combined turbine and generator and generator rotating parts shall be calculated by the Contractor and first critical speed shall be at least 25% above the maximum runaway speed. | The mentioned requirement is very much on higher side. We recommend that first critical speed of combined rotating parts of turbine and generator shall be at least 20% higher than the maximum turbine runaway speed.<br>Please review the requirement and confirm. | The critical speed of the shaft at balanced condition shall be 25% over the runaway speed |
| 46 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.20 | Other Guarantees | 18 of 83 | Cooling Water Failure Duration Withstand Capacity<br><br>The turbine guide bearing shall be designed & guaranteed to withstand operation for a period of at least 15 minutes for the condition of cooling water supply getting cut off for any reason without suffering or incurring any damage after which period the turbine shall be signaled to stop and shall come down to stand still safely. | The requirement for 15 minutes on higher side. It shall be for the 10 minutes for the compact and efficient design of the turbine.<br>Please review the requirement and confirm. | Bid stipulation shall prevail. |
| 47 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.28 | Rotating parts, guide bearings and seals | 37 of 83 | Turbine Guide Bearing<br><br>The bearing shall be capable of being operated continuously, without any damage to pads & without causing any detrimental effect on future operation of the machine under following conditions:<br>• Continuous at any speed up to 110 percent rated load under normal operating condition.<br>• For at least (15) minutes at any speed up to 110 percent rated load , without cooling water supply.<br>• For fifteen (15) minutes at any speed up to maximum runaway speed, with cooling water supply.<br><br>The coils shall be free from leakage when tested in the shop under a pressure of 10.0 bars for a period of 1/2 hour. | The mentioned conditions shall be as follow:<br><br>• For at least (10) minutes at any speed up to 110 percent rated load , without cooling water supply.<br>• For ten (10) minutes at any speed up to maximum runaway speed, with cooling water supply.<br><br>The requirement for 15 minutes on higher side, Please review the requirement and confirm.<br><br>Test pressure of the coils shall be around 5 to 6 bar. 10 bar test pressure is on higher side. Please review the requirement. | Bid stipulation shall prevail. |

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| 48 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.20 | Other Guarantees | 18 of 83 | Operating Temperature Limits<br><br>The maximum guide bearing metal temperature under permissible range of turbine under 110% of full Load condition shall not exceed 70°C but during normal operation should be around 65°C to 70°C. | Seems there is a discrepancy in temperature limits for Bearings in Turbine & Generator PTS. We recommend temperature limits as per Generator PTS clause number 1.4.5.2 for Turbine Guide Bearing also,<br><br>i) Maximum permissible operating temperature ≤70°C.<br>ii) Alarm temperature 75°C<br>iii) Trip temperature 80°C<br><br>Kindly confirm the same. | Operating temperature limits mentioned in clause 1.20 shall stand ammended to figures mentioned in clause 1.28. |
| 49 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.28 | Rotating parts, guide bearings and seals | 38 of 83 | Turbine Guide Bearing<br><br>That the normal working metal pad temperature shall not exceed 65°C for turbine operating at all loads up to the permitted load. The high temperature alarm and unit trip shall be set at 70°C and 75°C respectively. The oil temperature in operation shall be relatively lower.<br><br>The lubricating oils system shall be designed so that the temperature of the bearing metal and bearing oil shall not exceed 70°C and 65°C respectively under continuous operation in any operating conditions. | | |
| 50 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.28 | Rotating parts, guide bearings and seals | 38 of 83 | Shaft seals<br><br>The seal shallbe so arranged that it may be serviced without disturbing the bearing or dewatering the draft tube. | It shall be noted that the partial dismantling of the turbine guide bearing is required to service the shaft seal. Also, from safety point of view, de-watering of the draft tube is required as considerable head will act on the shaft seal from tail race side during the maintenance/ inspection of the shaft seal. | Shall be examined during detail engineering |
| 51 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.33 | Drawings, Documents and Design Calculations | 54 of 83 | Non-Destructive Tests<br><br>5. Spiral casing and stay rings welds shall be 100% radio-graphically tested with back up ultrasonic examination as required. All major welds shall be dye penetrated or magnetic particle tested as well as ultrasonically tested. Defects in welds disclosed by ultrasonic or radiographic testing or dye penetrant/magnetic particle testing will be completely removed by chiseling. | It shall be noted that the ultrasonic examination is sufficient for the weld examinations. Also radio-graphically tested is neither environmental friendly nor living being supportive. Hence radio-graphical testing shall be avoided.<br>Please review the requirement and confirm. | 100% Ultrasonic testing of weld joints of Spiral Case and Stay Ring shall be accepted. |
| 52 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.36 | Sequence of installation | 58 of 83 | Erection of embedded parts<br><br>Concrete support out line for the spiral case and any other concrete supporting structures required shall be designed by the contractor and will be provided for the first stage concrete to suit the turbine design. The Contractor shall furnish and install all supporting columns, jack base plates and base plates bolds, jacks, levelling screws, tie road, turn- buckles and anchor loops to which the tie rod for the various embedded parts will be attached. | It shall be noted that the supporting column and supporting structures for the turbine parts are not considered in bidders scope of supply. However, jack base plates and base plates bolts, jacks, levelling screws, tie road, turn-buckles and anchor loops to which the tie rod shall be provided for the spiral case. | Noted |
| 53 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.36 | Sequence of installation | 59 of 83 | Erection of embedded parts<br><br>The necessary pumps and piping for providing the hydrostatic pressure and for circulating and cooling the water during embedment shall be furnished by the contractor. The pressure shall be maintained on the spiral case until the concrete and grout has sufficiently cured (about 7 days) | Hydrostatic pressure shall be done as per standard IS 7418.<br>Keeping the pressure for 7 days will cause permanent deformation in the spiral case. It shall be considered as per<br>IS 7418 that is 30 minutes.<br>Also, the concreting pressure shall be maintained on the spiral case until the concrete and grout has sufficiently cured<br>Please review the requirement and confirm. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 54 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.37 | Tests during installation and pre commissioning | 60 of 83 | Hydrostatic pressure test<br><br>A hydrostatic pressure test of the spiral case and stay ring shall be conducted before concreting for each unit at a hydrostatic pressure of 1.5 times maximum internal design pressure. The pressure shall be gradually applied in increments not exceeding five (5) bars until the test pressure is obtained and shall be maintained for 1 hour. After complete inspection of the components for leaks the pressure will be reduced to 1 bar. The pressure cycle will be repeated 3 times. On the last fourth (4) cycles, the test pressure shall be maintained for not less than 8 hours and then reduced to prescribe pressure and maintained at that pressure during the spiral case concreting operation. | | |
| **C. Main Inlet Valve (MIV)** | | | | | | | |

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| 55 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.41 | Basic Data/Other Data for Spherical Valves Design and Installation.<br>Basic Data | 69 of 83 | In balanced conditions with practically equal pressure on both sides of disc as well as when the differential pressure across the valve is 50%. | We recommend for considering 40% diffrential pressure across the valve before starting opening operation, based on we experience in previous projects.<br><br>Kindly accept we proposal for 40% diffrential pressure. | Bid stipulation shall prevail. |
| 56 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.42 | General Description and Operation of the Main Inlet Valves | 70 of 83 | The closing operation of the MIVs shall ensure positive and reliable closure with the counter weights. Service seal shall engage with seat when the valve closes. The maintenance seal of the valve shall be applied after closure of valve by counter weight.The maintenance seal of the valve shall be applied after closure of valve by counter weight. There shall be provision of applying the maintenance seals by moving the maintenance seal seat by hydraulic cylinders mounted on the periphery of valve body spaced equally to ensure the application of seal uniformly without deflection of the seat. There shall be provisions for locking the maintenance seal seat against maintenance seal so that one could safely work on the downstream side for replacement of service seal etc. In addition mechanical lock for this maintenance seal shall also be provided for longer maintenance period..... | Maintenance seal seat will be operated by tapped water from upstream penstock via hydraulic seal control panel.<br>Provision of manual locking of maintenance seal will be provided. | |

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| 57 | PTS-Mechanical Volume II Section-II ; M-1 Turbine and MIV | 1.43 | Special Provisions in Design, Materials and Construction of Valve to Withstand Silt Abrasion | 71 of 83 | MIV – MATERIALS OF CONSTRUCTION OF COMPONENTS: | ASTM A240 Type 316L and X3CrNiMo13-4+QT780 / EN10250-4 materials will be offered for Maintenance /Service seal and seal seat respectively. These materials are better in comparison to materials asked in specs. | Bid stipulation shall prevail. |
| 58 | PTS-Mechanical Volume II Section-II ; M-1 Turbine and MIV | 1.43 | Special Provisions in Design, Materials and Construction of Valve to Withstand Silt Abrasion | 71 of 83 | MIV – MATERIALS OF CONSTRUCTION OF COMPONENTS: | Valve Body & Rotor :<br>We propose cast fabricated design with casting material as ASTM A216 Gr WCC / IS 1030 and plate material as S355 J2+N. These materials are better in combination for structural stability and wealdability.<br><br>Valve body & rotor are welded construction of mixed parts consisting of plates / casting / forgings. Various parts shall be made of plate or castings or forging depending upon thickness, shape, material availability, suitability for design & construction etc. which will be decided during detail Engineering stage.<br><br>Trunnion :<br>we will provide valve trunnions made of high strength alloy steel forging to meet the design requirement. Proposed material is superior & is having higher tensile / yield strength as compared to specified material<br>Forged -EN10250-4, GradeX3CrNiMo13-4 + QT 780 /EN 10250-3, 34CrNiMo6<br>Plate - ASTM 240 Type UNS41500<br><br>Kindly accept we proposal. | |
| 59 | PTS-Mechanical Volume II Section-II ; M-1 Turbine and MIV | 1.43 | Special Provisions in Design, Materials and Construction of Valve to Withstand Silt Abrasion | 71 of 83 | MIV – MATERIALS OF CONSTRUCTION OF COMPONENTS:<br>4. Bypass valve body \| Casting \| Crst \| 1456 Gr. A \| - | We propose equivalent material and exact material will be confirmed during detail engineering.However main valve body will be of ASTM A216 Gr.WCB / equivalent | Bid stipulation shall prevail. |
| 60 | PTS-Mechanical Volume II Section-II ; M-1 Turbine and MIV | 1.43 | Special Provisions in Design, Materials and Construction of Valve to Withstand Silt Abrasion | 71 of 83 | MIV – MATERIALS OF CONSTRUCTION OF COMPONENTS:<br>5. Bypass valve Needle and seat \| \| Sst 13-4 or better \| ASTM 743 Gr/CA-6NM \| 300-400 | We propose slide valve in place of needle valve.<br>Matreials for main components are as follow:<br>ASTM A473 Type 410 Annealed, X12Cr13, Annealed, EN 10250-4) / equivalent. | |
| 61 | PTS-Mechanical Volume II Section-II ; M-1 Turbine and MIV | 1.43 | Special Provisions in Design, Materials and Construction of Valve to Withstand Silt Abrasion | 71 of 83 | MIV – MATERIALS OF CONSTRUCTION OF COMPONENTS:<br>8. Servomotor cylinder \| Casting/WPFS \| St plate \| ASTM-405 \| | We propose sevomotor cylinder, made up of material as follow:<br>E355 / ST52.2 - EN10305 / Equivalent | Bid stipulation shall prevail. |
| 62 | PTS-Mechanical Volume II Section-II ; M-1 Turbine and MIV | 1.43 | Special Provisions in Design, Materials and Construction of Valve to Withstand Silt Abrasion | 74 of 83 | **Provisions for Facilitating Maintenance Replacement of Worn Out Working Parts:**<br><br>Replacement and repair of maintenance seal shall normally be carried after dewatering upstream of MIV by closing Penstock Guard valve. The life period of maintenance seal shall not be less 15 years. | We are not gaurantee for any parts upto 15 years as parts may detoriate due to combination of various factors viz. silt content in water, no. of operations (Opening/Closing), flow variation, etc.<br>Kindly accept. | Bid stipulation shall prevail. |
| 63 | PTS-Mechanical Volume II Section-II ; M-1 Turbine and MIV | 1.44 | Construction Details: Bearings | 74 of 83 | ….....Bidder shall give details of the self lubricated bearings together with details of past applications similar to Punatsangchhu HEP. Bearing shall be capable of safely supporting the weight of the valve rotor and forces caused by water pressure and shall be capable of operating the valve smoothly. Ingress of silt into the bearing shall be prevented by suitable seal arrangement on the water side end of the bearing sleeve. | we have no information of Punatsangchhu HEP. Kindly provide detail material list of Punatsangchhu HEP. | The sentence may be read as .:"Bidder shall give details of the self lubricated bearings together with details of past applications similar to Heo HEP" |
| 64 | PTS-Mechanical Volume II Section-II ; M-1 Turbine and MIV | 1.44 | Construction Details: Bearings | 74 of 83 | **Seals:**<br><br>2. The maintenance seal installed on the upstream side, shall enable maintenance of service seal without the penstock on upstream side being emptied when the valve is in closed and rotor is in locked position. Seal shall be designed and made of materials which are suitable for a satisfactory service life for a minimum of 15 years. | We are not gaurantee for any parts upto 15 years as parts may detoriate due to combination of various factors viz. silt content in water, no. of operations (Opening/Closing), flow variation, etc.<br>Kindly accept. | Bid stipulation shall prevail. |

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| 65 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.44 | Construction Details: Servomotors | 76 of 83 | .....The servomotor shall be of swinging/ balancing type having heavy supporting plates with anchor bars, fastening etc. for mounting it on its foundation bolts. The servomotors shall be attached to the MIV body flange thus obviating the need for separate foundations and alignment. | Due to bigger size and higher pressure rating of Spherical valve i.e. DN2750 PN29.1. Body mounted servomotor will lead to excessive loads on Valve body structure and concrete foundation. Size of servomotor will also be bigger, so we recommend to go floor mounted servomotors.<br><br>we will provide floor mounted servomotors. Kindly accept we proposal. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 66 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.45 | By-Pass Valve Arrangment | 77 of 83 | a) Two hydraulically operated needle type valve of suitable diameter not less than 250 mm whose seat shall be of stainless steel material of proven design permitting easy replacement. | Hydraulic operated slide valve in place of needle valve shall be allowed .<br><br>we will offer hydraulically operated slide valve of same specification in place of needle valve.<br><br>Kindly accept we proposal. | |
| 67 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.45 | By-Pass Valve Arrangment | 77 of 83 | ….....By-pass pipe line shall be properly clamped /secured to avoid any vibrations during operation. The detailed drawings and calculation for working out the size and specifications shall be supplied with Bid. | The detailed drawings and calculation will be provided during detail engineering. | Accepted. |
| 68 | PTS-Mechanical<br>Volume II Section-II ; M-1<br>Turbine and MIV | 1.46 | Air Release and Anti Vacuum Valves: Safety Arrangments | 80 of 83 | 2 It will be possible to invert the opening and closing movement of the valve in any position by activating the corresponding control circuit. | This functionality is only possible by providing manual command from local control panel and only during emergency condition.<br><br>However exact operation stratergy will be discussed during detail engineering phase . | |
| **D. Generator** | | | | | | | |
| 69 | Volume II Section-II : E-1<br>Generator, Exciter &<br>Associated Auxilliaries | 1.2 | 1.2 - Type and rating of Generator | 3 of 67 | Rated Output - 103.5MVA (with 10% O.L.)<br>Continuous overload capacity - 10% | We understand that the Rated Output = 94.117 MVA<br>and continuous overload capacity = 103.5 MVA (10% of Rated Output)<br>Kindly Confirm. | Confirmed, rated output = 94.117 MVA and continous overload capacity = 103.5 MVA |
| 70 | Volume II Section-II : E-1<br>Generator, Exciter &<br>Associated Auxilliaries | 1.2 | 1.2 - Type and rating of Generator | 3 of 67 | Inertia constant (H) = Minimum 3.0 MW-Sec/MVA | We understand that this inertia constant value is for complete Generating unit (Turbine + Generator) at maximum power.<br>Kindly confirm. | The inertia constant of the generating unit shall be min. 4.0 kW-sec per kVA |
| 71 | Volume II Section-II : E-1<br>Generator, Exciter &<br>Associated Auxilliaries | 1.2<br>1.4.1.1<br>1.4.5.1 | 1.2 - Type and rating of Generator<br>1.4.1 - General<br>1.4.5 - Thrust & guide Bearings | 3 of 67<br>8 of 67<br>12 of 67 | -Bearing arrangement - Suspended type<br>-The Bearing arrangement of Generator shall be Suspended type with a guide Bearing and a thrust cum guide Bearing above the Generator rotor.<br>-The generator shall have a combined thrust and guide bearing located above the rotor and a guide bearing below the rotor. | For machines with rated speed of 300 rpm of similar capacity, it is preferable to have construction semi-umbrella type (as per IEC 60034-7) IM 8225.<br>Main advantages for this type of construction are:<br>- The thrust load gets transferred directly to concrete<br>- Maintenance friendly<br>- Better power unit stability due to combined thrust & guide bearing in center of power unit<br><br>Same design is also used in your Khandong HEP and Kameng HEP | Bid stipulation shall prevail. |
| 72 | Volume II Section-II : E-1<br>Generator, Exciter &<br>Associated Auxilliaries | 1.2.2.2 | 1.2.2 - Insulation & temperature rise limits | 4 of 67 | Generator stator and rotor winding temperature rise (above cooled air temperature), while delivering continuously 88 MW (110% of rated output), with inlet cooling water temperature of 25 deg C, shall not exceed 85 deg C for Stator and 90 deg C for Rotor.<br>The temperature rise shall be at worst permissible operating condition i.e. with ± 5% voltage variation and (-) 5% to (+) 3% frequency variation. The temperature rise limits specified above are inclusive of correction factors for adopted voltage of stator winding. | As per IEC 60034-1: 2023, clause 7.4, NOTE-1, The temperature-rise limits apply at the rating point only and may be progressively exceeded as the operating point moves away from the rating point. For conditions at the extreme boundaries of combined voltage & frequency variation, the temperature rises and temperatures typically exceed the limits specified by approximately 10 K.<br>Kindly accept. | Bid stipulation shall prevail. |
| 73 | Volume II Section-II : E-1<br>Generator, Exciter &<br>Associated Auxilliaries | 1.2.5.3 | 1.2.5 - Quality of Wave form & Poly-phase symmetry | 4 of 67 | The telephonic factor shall not exceed 1.5 percent according to I.S. 4722 / IEC60034-1 | As per latest edition of IEC standards (IEC60034-1), Telephonic Harmonic Distortion (THD) ≤5% is applicable. There is no requirement of THF,<br>Kindly accept. | Bid stipulation shall prevail. |
| 74 | Volume II Section-II : E-1<br>Generator, Exciter &<br>Associated Auxilliaries | 1.2.7.2<br>1.10.4.1 | 1.2.7 Runaway Speed Withstand Capability | 5 of 67<br>43 of 67 | The runaway speed test shall be conducted at site and shall be considered successful if, after undergoing the test for two minutes, no injury/damage is apparent.<br>Iv) Runaway speed test (at the option of the purchaser) | VH do not recommend runaway speed test due to invastive nature of the test.<br>Kindly accept. | Bid stipulation shall prevail. However, final decision regarding conducting of Runaway speed test shall be taken during detailed engineering stage.. However, final decision regarding conducting of Runaway speed test shall be taken during detailed engineering stage.. |

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| 75 | Volume II Section-II : E-1 Generator, Exciter & Associated Auxilliaries | 1.2.8.2 & 1.2.8.3 | 1.2.8 - Guarantees on Efficiency & Output | 5 of 67<br>6 of 67 | In clause 1.2.8.2 the efficiencies of the generator shall be guaranteed at outputs of 110%, 100%, 75% and 50% of rated output.<br>And in clause The minimum guaranteed value of weighted average efficiency shall be 98.5 percent. | As a global practice only WAE to be guaranteed.<br>kindly accept.<br>And considering the weighing factors, the expected WAE is quite high, we propose to make it 98.0%.<br>kindly accept. | The Guaranteed Weighted Average Efficiency of the Turbine and Generator as per formula given in the Bid Specifications shall not be less than 93.5% and 98% respectively.<br>Guaranteed efficiency of the Generator operating at the rated head and rated output shall not be less than 98.5 percent. |
| 76 | Volume II Section-II : E-1 Generator, Exciter & Associated Auxilliaries | 1.4.2.1 | 1.4.2 - Stator | 9 of 67 | Core lamination sheets with a loss coefficient of not more than 1.1 watt/kg at one (1) tesla shall be used. | Stator core lamination material shall be left to manufactures to select suitably as per design meeting the guaratee parameters.<br>Kindly accept. | Bid stipulation shall prevail. |
| 77 | Volume II Section-II : E-1 Generator, Exciter & Associated Auxilliaries | 1.4.4.7 | 1.4.4 - Generator Shaft | 11 of 67 | The critical speed of the shaft at balanced condition shall be sufficiently (not less than 30%) higher than the runaway speed. | As per global practice in hydro, first critical speed can be at least 20% above the maximum runaway speed. Also as per IEC 60034-33 standard, it is 10%, we recommend to acceptance value is 20%,<br>Kindly accept. | The critical speed of the shaft at balanced condition shall be 25% over the runaway speed |
| 78 | Volume II Section-II : E-1 Generator, Exciter & Associated Auxilliaries | 1.4.5.2 | 1.4.5 - Thrust & guide Bearings | 12 of 67 | i) Maximum permissible operating temperature ≤70˚C.<br>ii) Alarm temperature 70˚C.<br>iii) Trip temperature 80˚C. | Considering the size and speed of machine:<br>a) Thrust bearing metal temp : 80º C with 85º C (alarm)/ 90º C (trip)<br>b) Guide bearing metal temp : 70º C with 75º C (alarm)/ 80º C (trip)<br>Kindly accept. | Bid stipulation shall prevail. |
| 79 | Volume II Section-II : E-1 Generator, Exciter & Associated Auxilliaries | 1.4.6.1 | 1.4.6 - Generator Cooling | 14 of 67 | The surface air coolers shall have sufficient capacity to maintain an air temperature not exceeding 30 deg C at the outlet of coolers with water inlet temperature of 25 deg C when one cooler is out of service and the unit is operating at 110% rated MVA at rated power factor and rated voltage. | -For Air to water cooler design, there is a practical limit of cold air temperature above the cold water temperature which is 12 to 13 K. As per tender requirement of cold water temperature of 25˚ C, it is not feasible to achive 30˚ C air temperature,<br>Please clarify.<br>-As per IEC 60034-1: 2023, table 10 remark 'a' for the project altitude of 1177.5 m (Floor Elevation), reference air temperature will be 38˚ C.<br>Please confirm.<br>-Also, this reference temperature of 38˚ C is applicable for rated condition when all coolers are working at rated MVA, power factor and rated voltage.<br>Kindly accept. | As per IEC. |
| 80 | Volume II Section-II : E-1 Generator, Exciter & Associated Auxilliaries | 1.10.1.6 | 1.10 - Shop Assembly, Inspection & Tests | 39 of 67 | ii) Two randomly selected winding bars shall be subjected to accelerated life test at increased voltage and temperatures (to be mutually agreed at a later stage). | Please note that qualified insulation system will be used in the generators for the project.<br>Test report of similar or higher rating shall be submitted.<br>Kindly accept. | Bid stipulation shall prevail. |
| 81 | Volume II Section-II : E-1 Generator, Exciter & Associated Auxilliaries | 1.10.3 | 1.10.3 - Pre-commissioning & commissioning test at site | 42 of 67 | xxviii) 24 hours magnetizing test of stator core. | Short time magnetization test for 1 hour at 1 Tesla is sufficient for detection of hot spot in the newly built stator core, This is standard practice globally.<br>Kindly accept. | Bid stipulation shall prevail. |
| **E. Balance of Plant - Electrical (BOPE)** | | | | | | | |
| 82 | Particular Technical Specifications-Electrical Volume II Section-II ; E-4 , SCADA System | 4.3.15 | Fiber Optic System for OPGW System | 20 of 55 | The telecommunication network shall be mainly based on the use of fiber optic system including fiber optic cables, optical SDH equipment and associated accessories. As a general principle, the fiber optic system shall be designed to be fully redundant. It means that SDH equipment shall be provided in a 1+1 protection configuration (or dual redundant transmitter/ receiver): namely each SDH terminal shall comprise two redundant transmitters/ receivers. Optical Distribution Frame and Primary Digital Multiplexers shall be provided as per system requirement as detailed in various Chapters. | This clause refers to the Optical Line terminal equipments whereas there is no details mentioned in any of the chapters of Technical specifications.<br><br>Kindly clarify the scope with respect to the above under E&M. | OPGW and OPGW terminal equipment shall not be within present scope of work.<br>Required interfacing with OPGW terminal equipment shall be within the contract scope. |
| 83 | Particular Technical Specifications-Electrical Volume II Section-II ; E-5 , GIS and GIB | 5.2.1 | General Requirements | 8 of 50 | • Study report of VFTO generated for GIS installation | VFTO study is commonly performed for 400 kV and above voltage levels for GIS, therefore it is requested to kindly delete the requirement. | Bid stipulation shall prevail. |
| 84 | Particular Technical Specifications-Electrical Volume II Section-II ; E-5 , GIS and GIB | 5.3.2 | Circuit Breakers - (2) Main Characteristics | 19 of 50 | - Number of closing coils No. 2 | The reputed suppliers have the standard type tested design with two nos. of trip coils and one no. of closing coil for circuit Breakers of GIS.<br><br>Kindly accept the same. | Accepted. |

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| 85 | Particular Technical Specifications-Electrical Volume II Section-II ; E-6 , Distribution Transformer | 6.1 Point no.9 | TECHNICAL PARAMETERS OF DRY TYPE TRANSFORMER | 18 of 25 | Maximum Losses (Inclusive of all tolerance)<br>- No load losses at rated voltage : 2.0 kW(max.)<br>- Load Losses at principal tap rated capacity : 7.0 kW (max.)<br>- Total losses : 9.0 kW (max.) | There are three ratings of Distribution Transformers i.e 630 kVA, 1500 kVA and 160 kVA. Hence, the losses also to mentioned seprately.<br><br>Please clarify the same. | For 630kVA-<br>Maximum Losses (Inclusive of all tolerance)<br>- No load losses at rated voltage : 2.0 kW(max.)<br>- Load Losses at principal tap rated capacity : 7.0 kW (max.)<br>- Total losses : 9.0 kW (max.)<br>For 1500kVA-<br>Maximum Losses (Inclusive of all tolerance)<br>- No load losses at rated voltage : 2.8 kW(max.)<br>- Load Losses at principal tap rated capacity : 14 kW (max.)<br>- Total losses : 16.8 kW (max.)<br>For 160kVA-<br>Maximum Losses (Inclusive of all tolerance)<br>- No load losses at rated voltage : 0.28 kW(max.)<br>- Load Losses at principal tap rated capacity : 1.7 kW (max.)<br>- Total losses : 2.38 kW (max.) |
| 86 | Particular Technical Specifications-Electrical Volume II Section-II ; E-7 , HT and LT Switchgear | 7.5 | Design Methodology / Criteria for 33 kV and 415 V Switchgear : 33 kV Overhead Transmission Line | 8 of 30 | 33 kV Overhead Transmission Line<br>Approximately 5 km long 33 kV single circuit transmission line using “ACSR DOG” conductor shall be constructed with one no. earth wire strung on steel tubular poles from powerhouse to Upstream area (HRT Intake area & Valve house location) including Tapping arrangement at Intake and Valve house area, Lightning Arrestors, Horn Gap Fuses & Air break Switches, insulators etc. and provision for stringing of ADSS cable and mounting of street Lights on pole | You shall certainly agree that Heo HEP has a separate package for 220 kV transmission line and it is always preferable to include the 33 kV transmission line in that package instead of including it in E&M scope. Moreover, E&M contractors are not experienced to take the responsibility of right -of- way, survey, clearance and significant civil work. On the contrary, Transmission line package contractor are well experienced in the same.<br><br>Hence, it is requested to kindly exclude the 33 kV Line, ADSS and street lighting as mentioned in the clause from the scope of E&M contractor and include the same in main package of transmission line contractor. | Refer MoM of Pre-bid meeting Dtd. 15.05.25 on Tato -I HEP.<br>The same shall be applicable for Heo HEP, also. |
| 87 | Particular Technical Specifications-Electrical Volume II Section-II ; E-11 , Illumination System | 11.3.2<br><br>11.5.2 | Outdoor lighting<br><br>Switchyard Outdoor Areas | 4 of 20<br><br>8 of 20 | i) Approach Roads to Powerhouse<br>ii) Approach road from Powerhouse to Dam site and other areas<br>iii) 245 kV Pothead yard Area & its approach road,<br><br>Road*: The length of the road from Power House to surge shaft is 500m. | As it is not clear from the specifications, what total length of the approach roads to be considered for lighting, it is requested to clarify the same. | Illumination requirement for approaches to Power House, Dam Site, Valve House, Pothead yard shall be 500 m each. |
| 88 | Particular Technical Specifications-Electrical Volume II Section-II ; E-14 ,Earthing and Lightning Protection System | 14.5 | DESIGN OF EARTHING SYSTEM | 4 of 13 | | Kindly provide the preliminary soil resistivity of the following areas for earthing material estimation:<br>- Power house<br>- Tailrace Area<br>- Transformer / GIS Hall<br>- Pothead Yard<br>- Intake area | The bidder shall have to measure the resistivity on his own and design the earthing system subsequent to the purchaser’s approval<br>Refer clause 14.5 of PTS, Vol-II, Sec-II, E-14.. |
| 89 | Particular Technical Specifications-Electrical Volume II Section-II ; E-16 , Silent Emergency DG Sets | 16.1.1 | Silent DG sets | | iv) Two (2) auto and manual synchronizing Panel | As there is no parallel operation of DG set at any location i.e. Power house and Intake area, there is no requirement for synchronizing panel.<br><br>Kindly remove the same. | Accepted.<br>Clause 16.1.1 iv) of PTS, Vol-II, Sec-II, E-16 stands deleted. |
| **F. General** | | | | | | | |
| 90 | Volume-II, Section-I, G-1, General Tech. Specification | 0.3 | Standards | 2 | Although Indian or IEC standards for workmanship material and plant have been selected generally in these specifications as a basis of reference, other standards and recommendations of standard international organisations will be acceptable provided they ensure equal or higher quality than those specified, and provided, furthermore, that the Contractor submits for approval, detailed standards which he proposes to use. | We request you to modify this Paragraph as "Although Indian or IEC standards for workmanship material and plant have been selected generally in these specifications as a basis of reference, other standards and recommendations of standard international organisations will be acceptable provided they ensure equal or higher quality than those specified, and provided, furthermore, that the Contractor submits for approval, ~~detailed standards~~ extracts of the standard which he proposes to use, as Standards are copyright products and cannot be shared".<br><br>Please accept the above modification in the specification and confirm. | Bid stipulation shall prevail. |
| 91 | Volume-II, Section-I, G-1, General Tech. Specification | 0.7 | Design Co-ordination Meeting | 9 | The Contractor will be called upon to attend design co-ordination meetings with the Corporation and their Consultants during the currency of the Contract. | The Contractor will be called upon to attend design co-ordination meetings with the Corporation and their Consultants during the ~~currency~~ tenure of the Contract.<br><br>Please accept the above modification in the specification and confirm. | Accepted. |

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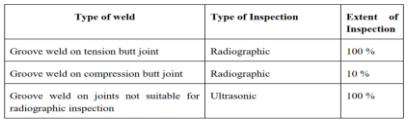
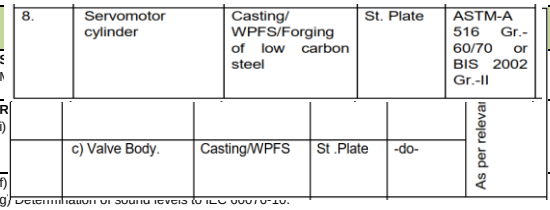
| 92 | Volume-II, Section-I, G-1, General Tech. Specification | 2.1.1 | Mandatory Spare Parts | 29 | At least the quantity of general spare parts specified in various subsections of the Particular Technical Specifications (Volume-II, Section II) and the Schedule of Requirements (Volume II, Section III) shall be included in the Total Tender Price and consequently in the Scope of Works of the Contract. | Volume II, Section III is for Tender drawings and Schedule of Requirements is missing in the tender document. Please clarify or provide the Schedule of Requirements. | Schedule of Requirement are part of PTS and may be seen in Vol-II, Sec-II, E-21 and M-13 |
| 93 | Volume-II, Section-I, G-1, General Tech. Specification | 3.4 | Quality of Materials and Plant | 33 | Any steel castings which have been repaired by welding with the Engineer's consent shall be subjected (after the final heat treatment) to whatever crack detection, dye-penetration, ultra-sonic, X-ray (radiography) or any other tests which the Engineer may require. | Any steel castings which have been repaired by welding with the Engineer's consent shall be subjected (after the final heat treatment) to whatever crack detection, dye-penetration, ultra-sonic, ~~X-ray (radiography)~~ or any other tests which the Engineer may require.<br><br>Please delete the requirement of X-ray (radiography) as above and confirm. | Bid stipulation shall prevail. |
| 94 | Volume-II, Section-I, G-1, General Tech. Specification | 3.5 | Noise | 33 | The noise level caused by the installed plant shall not exceed the following values if not otherwise stated in the Particular Technical Specifications:<br>– machine hall, workshops, etc. max. 80 dB(A) at any place 1 m distant from operating plant. | – machine hall, workshops, etc. max. 90 dB(A) at any place 1 m distance from operating plant.<br><br>Please accept the above proposal and confirm. | Please refer Sl. 32 of these queries. |
| 95 | Volume-II, Section-I, G-1, General Tech. Specification | 3.11.3.2 | Non-Destructive Examinations | 41 |  <br>Type of weld / Type of Inspection / Extent of Inspection<br>Groove weld on tension butt joint / Radiographic / 100 %<br>Groove weld on compression butt joint / Radiographic / 10 %<br>Groove weld on joints not suitable for radiographic inspection / Ultrasonic / 100 % | Radiographic testing of weld joints is not recommended as radiography poses health issues of the persons, in view of this we proposes to have ultrasonic testing of all type of weld joints which fulfils all the design and quality requiremnts.<br><br>Please review and accept. | Agreed. |
| 96 | Volume-II, Section-I, G-1, General Tech. Specification | 4.1 | General | 50 | Revolving parts shall be truly balanced both statically and dynamically that when running at normal speed and at any load p to the maximum, there will be no vibration due to lack of such balance. | Please note that the rotating parts shall be balanced as per design application and applicable standards.<br><br>Please confirm. | Bid stipulation shall prevail. |
| 97 | Volume-II, Section-I, G-1, General Tech. Specification | 6.1.2 | Standards | 80 | If the Contractor intends to apply Standards and Regulations other than those specified, he shall provide the Engineer with two (2) sets of such documents, which shall be complete, unabridged and written in the Contract Language. | If the Contractor intends to apply Standards and Regulations other than those specified, ~~he shall provide the Engineer with two (2) sets of such documents, which shall be complete, unabridged and written in the Contract Language.~~ He shall provide the extract of the applicable standard written in contract language.<br><br>Please accept the above modification in the specification and confirm. | Bid stipulation shall prevail. |
| 98 | Volume-II, Section-III, Tender Drawings | | | | Tender drawings are in pdf format | Request you to please provide the tender drawings in AutoCAD format. | Available Auto CAD drawings attached. |
| 99 | Volume-II, Section-IV, Technical Data Sheets | | | | Technical Data Sheets are in pdf format | Request you to please provide the Technical Data Sheets in Word / Excel format. | Technical Data Sheet in WORD file attached |
| **G. Quality** | | | | | | | |
| 100 | Volume-II, Section-I, G-1, General Tech. Specification | 5.4.11 | | 63 |  <br>8. / Servomotor cylinder / Casting/ WPFS/Forging of low carbon steel / St. Plate / ASTM-A 516 Gr.-60/70 or BIS 2002 Gr.-II<br>c) Valve Body. / Casting/WPFS / St .Plate / -do- / As per relevai | Kindly note that Only Insulation resistance is applicable. Polarization Index is not applicable as per IS 325. | Bid stipulation shall prevail. |
| 101 | Volume-II, Section-II, E-2, Generator Transformer | 2.6.43 | | 51 | | Kindly note that this test is a special test and applicable for 3-phase transfomers only.<br>Further, it is a special test as per IEC60076-1 , Therefore test would be performed on any one Transformer | Shall be finalised during detailed engineering. |
| 102 | Volume-II, Section-II, E-2, Generator Transformer | 2.6.43 | | 51 | f)<br>g) Determination of sound levels to IEC 60076-10.<br>h) Measurement of the harmonics of the no-load current.<br>i) Determination of capacitance, windings to earth and between windings.<br>j) Measurement of insulation resistance to earth and loss angle of insulation system. | Kindly note that these tests are special tests( Not a Routine Test) as per IEC60076-1 .Therefore test would be performed on any one Transformer | Shall be finalised during detailed engineering. |
| 103 | Volume-II, Section-II, E-2, Generator Transformer | 2.6.43 | | 52 | t) Measurement of no load current at 500V, 1KV, 2.5KV, 5KV and 10KV | This test is not applicable as per IEC60076-1 | Bid stipulation shall prevail. |
| 104 | Volume-II, Section-II, E-2, Generator Transformer | 2.6.43 | | 52 | u) Tank vacuum test.<br>v) Tank pressure test | Kindly note that this is a design test as per CBIP manual of Transformer. Therefore, Test will be performed on any one Transfomer tank. | Bid stipulation shall prevail. |
| 105 | Volume-II, Section-II, E-2, Generator Transformer | 2.6.44 | | 52-53 | Short Circuit, Temperature Rise & Impulse Test | We propose to accept equivalnent reports in liue of conducting the test | Bid stipulation shall prevail. |
| 106 | Volume-II, Section-II, E-2, Generator Transformer | 3.6.37 | | 55 | Stage inspection will be carried out by Purchaser on Core, Winding, core-coil assembly & Tank during the manufacturing stages of the transformer. The manufacturer will have to call for the stage inspection and shall arrange the inspection at manufacturer's premises or manufacturer's sub-supplier's premises, as applicable, free of cost. Stage Inspection shall be witnessed by the purchaser or any third-party inspector engaged by the purchaser. | We propose to accept stage Inspection reports in liue of conducting the test | Bid stipulation shall prevail. |

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| 107 | Volume-II, Section-II, E-3 11 kV Isolated Phase Bus Duct and Accessories | 3.15.2 | | 37 | b) Test for radio interference according to the procedure of measurement set forth in NEMA publication No. 107 " Method of measurement of Radio influence voltage (RIV) of high voltage apparatus" unless such measurement has been made on metal clad bus including at least one flexible or expansion connector and one "L" of substantial design;<br>The maximum radio influence voltage shall not exceed 100 micro volts at 1000kHz; | Pl.note that Radio Interference Test is generally applicable for Voltage class above 33 kV. Since our Bus duct is designed for 11kV Voltage Class, Therefore, this test is not applicable.Moreover, IS:8084 ( Standard for Bus Duct), doesn't calls for any Radio Interference test. Kindly accept. | Bid stipulation shall prevail.<br>The clause referred by the bidder is from earlier cancelled tender of Heo HEP. Bidder may refer to the specification for Bid No. 477 Dtd. 26.02.2025 |
| 108 | Volume-II, Section-II, E-3 11 kV Isolated Phase Bus Duct and Accessories | 3.15.2 | | 39 | b) Milli volt drop test on samples; | Kindly note that as per IS:8084, Milli-Volt drop test is not a part of routine Test. Hence we prpose to accept calculation for the same. | Bid stipulation shall prevail.<br>The clause referred by the bidder is from earlier cancelled tender of Heo HEP. Bidder may refer to the specification for Bid No. 477 Dtd. 26.02.2025 |
| 109 | Volume-II, Section-II, E-3 11 kV Isolated Phase Bus Duct and Accessories | 3.15.2 | | 39 | b) Dye penetration examination of all shop welded joints and radiographic examination on 2% butt weld joints including joints on flexible and plates / busbars / enclosures. | Pl.note that as par IS:8084, these tests are not a part of routine test. However, we will submit in-process report for the same for review. Kindly accept. | Shall be finalised during detailed engineering.<br>The clause referred by the bidder is from earlier cancelled tender of Heo HEP. Bidder may refer to the specification for Bid No. 477 Dtd. 26.02.2025 |
| 110 | Volume-II, Section-II, E-3 11 kV Isolated Phase Bus Duct and Accessories | 3.15.2 | | 40 | **d) SITE COMMISSIONING TESTS**<br>• Milli-volt drop test on all joints. | This test is applicable on sample length.Test conducted on similar type of bus duct shall be submitted for review.This test is not feasible on entire length at site. | Bid stipulation shall prevail.<br>The clause referred by the bidder is from earlier cancelled tender of Heo HEP. Bidder may refer to the specification for Bid No. 477 Dtd. 26.02.2025 |
| 111 | Volume-II, Section-II, E-5 GIS and GIB | 5.4.3 | | 42,43, 44 | **Acceptance Tests**<br>1) Pressure test;<br>5) Current transformers<br>6) Voltage transformers<br>7)Surge arresters | we propose to accept test reports for the same. Kindly accept. | Bid stipulation shall prevail. |
| 112 | Volume-II, Section-II, E-6 Distribution Transformer | 6.13.1 | | 21 | g) Lightning impulse test<br>h) Temperature rise test | Kindly note that these tests comes under type test.Therefore, we rroposes to accept equivalent rating of Type test reports | As per IS/IEC.<br>Shall be examined during detail engineering. |
| 113 | Volume-II, Section-II, E-6 Distribution Transformer | 6.13.2 | | 22 | 2b) Measurement of exciting current at 120% of rated voltage; | Pl. note that as per IEC60076-11, This test is applicable for 110% of rated voltage. Kindly accept. | Accepted. |
| 114 | Volume-II, Section-II, E-6 Distribution Transformer | 6.13.3 | | 22 | C. Special tests<br>short circuit, measurement of acoustic level, and Partial discharge and other special tests as per the standards. | we Propose to accept equivalent rating of these special Test reports | Bid stipulation shall prevail. |
| 115 | Volume-II, Section-II, E-8 DC System | 8.8.2 | | 32 | All tests shall be conducted in accordance with the relevant IEC and BIS in the presence of the representatives of purchaser/ consultant. The bidder shall give 45 days notice regarding readiness of equipment for inspection. | Please note that 45 days intimation time period is more. we will notify end customer 15 days before the final inspection. Kindly accept | Bid stipulation shall prevail. |
| 116 | Volume-II, Section-II, E-8 DC System | 8.8.9.2 | | 35 | vii) Milli-volt drop test | Kindly note that Milli-Volt drop test is applicable on Breakers.<br>In DCDB, component will be MCBs only. Therefore, this test is not applicable | Bid stipulation shall prevail. |
| 117 | Volume-II, Section-II, E-8 DC System | 8.8.9.3 & 8.8.9.4 | | 35 | Type Tests | In DCDB having MCBs only. Therefore, Type test will not be applicable | Bid stipulation shall prevail. |
| 118 | Volume-II, Section-II, E-10 Pothead Yard Equipment | 10.4.2.3 | | 43 | **Special Acceptance Test**<br>• Thermal stability test on three sections (IEC 7.2.2)<br>• Aging & Energy Capability test on block (procedure to be mutually agreed).<br>• Watt loss test. | Please note that these tests are not a part of Routine test. Therefore, internal report carried out by the supplier shall be shared for review. Kindly accept. | Bid stipulation shall prevail. |
| 119 | Volume-II, Section-II, E-18 UPS System | 8.9 | | | Tests for Battery | Kindly note that batteries being boughtout item, it is not feasible to offer the acceptance test . Therefore, manufacture's certificate will be shared as received. | Bid stipulation shall prevail. |
| 120 | Volume-II, Section-II, E-18 UPS System | 18.9 | | 20 | **UPS Power distribution board**<br>**B. Tests**<br>ii. Bum – In Test for Printed Circuit Boards (PCB):<br>iii. Heat Run Test: | Pl. note that we proses to accept type test report for review. Kindly accept. | Bid stipulation shall prevail. |
| 121 | Volume-II, Section-II, E-1, Generator and Excitation System | 1.10.1.6 | | 39 | **Tests on Generators**<br>vii) Trial assembly of bottom bracket housing, arms, brake jack units to the extent possible. | Please note that Bottom Bracket and arms shall be trial assembled at manufacture works. However, Brake and Jack unit will be assembled at site which is a standard industrial practice. | Bid stipulation shall prevail. |
| 122 | Volume-II, Section-II, M-1, Turbine and MIV | 1.33 | | 52 | On each piece being tested at least one tensile test and three notched bar impact tests shall be performed…….and six notched bar impact tests shall be performed on opposite directions of the tested piece.<br>For notched bar impact test, the impact value shall be obtained at plus (+) 200C ambient temperature unless mentioned otherwise. | Please note that applicable material test as per approved drawing during detailed Engg shall be followed. Kindly accept. | Shall be examined during detail engineering. |

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| 123 | Volume-II, Section-II, M-1, Turbine and MIV | 1.33 | | 52 | Representative Samples of each heat of the plate steel …... average energy value of each set of three specimen shall not be less than 20J with any of the specimen having an energy value no less than 15 J. | Please note that applicable material test as per approved drawing during detailed Engg shall be followed. Kindly accept. | Shall be examined during detail engineering. |
| 124 | Volume-II, Section-II, M-1, Turbine and MIV | 1.33 | | 53 | **• Shaft**<br>• Tensile test on two axial and samples (A).<br>• Notch bar impact tests at 200C ambient temperature (A). | Please note that applicable material test as per approved drawing during detailed Engg shall be followed. Kindly accept. | Shall be examined during detail engineering. |
| 125 | Volume-II, Section-II, M-1, Turbine and MIV | 1.33 | | 54 | **Non-Destructive Tests**<br>5. Spiral casing and stay rings welds shall be 100% radio-graphically tested with back up ultrasonic examination as required. | Please note that UT & RT both are suitable to detect internal discontinuities. UT is preferred over RT due to health hazards. UT in lieu of RT is acceptable by all customer as a standard practice. So kindly accept the same. | Bid stipulation shall prevail. |
| 126 | Volume-II, Section-II, M-1, Turbine and MIV | 1.37 | | 60 | **Tests during installation and pre commissioning**<br>Hydrostatic pressure test<br>On the last fourth (4) cycles, the test pressure shall be maintained for not less than 8 hours and then reduced to prescribe pressure and maintained at that pressure during the spiral case concreting operation. | Please note that the test procedure as per approved drawing during detailed Engg shall be followed. Kindly accept. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 127 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.37<br>3.38 | | 30<br>32 | **b) Mechanical Tests**<br>Such tests include the determination of the yield strength, UTS, elongation/contraction and impact strength in aged/non-aged condition as required. Bend test of plates and sheets will also be performed as required<br>**TESTS ON STEEL PLATES**<br>b) Three ISO, V-notch toughness test at 0degC in the thickness direction | Please note that applicable material test as per approved drawing during detailed Engg shall be followed. Kindly accept. | Bid stipulation shall prevail. |
| 128 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.41 | | 34 | **INSPECTION & TESTS AT SITE**<br>All welding done at site shall be subjected to 100% radiographic examination to detect cracks, blow holes etc. | Please note that UT & RT both are suitable to detect internal discontinuities. UT is preferred over RT due to health hazards. UT in lieu of RT is acceptable by all customer as a standard practice. So kindly accept the same. | 100% Ultrasonic testing of weld joints of BFV shall be accepted. |
| 129 | Volume-II, Section-II, M-4, EOT Cranes | 4.18.3 | | 19 | **Material Tests:**<br>Such tests include the determination of …. in aged / non-aged condition as required. Bend test of plates and sheets will also be performed as required. | Please note that applicable material test as per approved drawing during detailed Engg shall be followed. Kindly accept. | Bid stipulation shall prevail. |
| 130 | Volume-II, Section-II, M-4, EOT Cranes | 4.20.1 | | 21 | **FIELD ASSEMBLY, ERECTION, TESTING AND COMMISSIONING:**<br>All welding done at site shall be subject to 100 % radiographic examination. | Please note that UT & RT both are suitable to detect internal discontinuities. UT is preferred over RT due to health hazards. UT in lieu of RT is acceptable by all customer as a standard practice. So kindly accept the same. | 100% Ultrasonic testing of weld joints of EOT Crane shall be accepted. |
| 131 | Volume-II, Section-II, M-4, EOT Cranes | 4.20.2 | | 23 | **B) Rated Load Tests:**<br>**Deflection**<br>Deflection of the bridge girders with 100% and 125% of full load keeping the trolley at the centre of the crane span shall be measured and should be within the limits prescribed in the standards and as guaranteed in this specification. | Please note that as per IS:3177 deflection test is performed at safe working load (100% load). Kindly accept | Shall be as per IS: 3177. |
| 132 | Volume-II, Section-II, M-6, Fire Fighting System | 6.11.1 | | 13 | **Shop Tests:**<br>The pump, pipes, valves, Deluge system, sprinkler system, automatic detectors etc. to be supplied shall.....The Contractor is required to submit type test certificates and routine test reports of equipment | Please note that Type test certificate is not applicable for Pumps, pipes, valves, etc. Please note that type test of applicable system of similar rating shall be submitted for review. Kindly accept. | Bid stipulation shall prevail. |
| 133 | Volume-II, Section-II, M-11, Cooling Water System | 11.8.2 | | 8 | **Type Tests:**<br>Type tests shall verify that cooling water pumps, motors, filters, separators, valves and control panels perform satisfactorily at the rating assigned. The equipment proposed according to this specification shall be type tested at typical units in accordance with the relevant Indian / International standards. | Please note that Type test certificate is not applicable for pumps, filters, separators, valves and control panels. Please note that type test of applicable system of similar rating shall be submitted for review. Kindly accept. | Bid stipulation shall prevail. |
| **H. Pressure Shaft (Penstock) Butterfly valve** | | | | | | | |

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| 134 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.5 | SPECIAL PROVISIONS IN DESIGN, MATERIALS AND CONSTRUCTION OF VALVE TO WITHSTAND SILT ABRASION | 9 of 44 | **MATERIAL OF THE MAJOR COMPONENTS:** | **Valve Body & Disc:**<br>We will provide cast fabricated design with casting material as ASTM A216 Gr WCC / IS 1030 and plate material as S355 J2+N. These materials are better in combination for structural stability and wealdability.<br><br>Valve body & disc are welded construction of mixed parts consisting of plates / casting / forgings. Various parts shall be made of plate or castings or forging depending upon thickness, shape, material availability, suitability for design & construction etc. which will be decided during detail Engineering stage.<br><br>**Trunnion:**<br>We will provide valve trunnions made of high strength alloy steel forging to meet the design requirement. Proposed material is superior & is having higher tensile / yield strength as compared to specified material Forged -EN10250-4, GradeX3CrNiMo13-4 + QT 780 /EN 10250-3, 34CrNiMo6 Plate - ASTM 240 Type UNS41500<br><br>Kindly review the above proposal and confirm. | Bid stipulation shall prevail. |
| 135 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.5 | SPECIAL PROVISIONS IN DESIGN, MATERIALS AND CONSTRUCTION OF VALVE TO WITHSTAND SILT ABRASION | 9 of 44 | **MATERIAL OF THE MAJOR COMPONENTS:** | We will offer equivalent material and exact material will be confirmed during detail engineering. However main valve body will be of ASTM A216 Gr.WCB / equivalent. Please accept. | Bid stipulation shall prevail. |
| 136 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.5 | SPECIAL PROVISIONS IN DESIGN, MATERIALS AND CONSTRUCTION OF VALVE TO WITHSTAND SILT | 9 of 44 | **MATERIAL OF THE MAJOR COMPONENTS:** | We will offer slide valve in place of needle valve.<br><br>Matreials for main components are as follow:<br>ASTM A473 Type 410 Annealed, X12Cr13, Annealed, EN 10250-4) / equivalent.<br>Kindly accept. | Bid stipulation shall prevail. |
| 137 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.5 | SPECIAL PROVISIONS IN DESIGN, MATERIALS AND CONSTRUCTION OF VALVE TO WITHSTAND SILT ABRASION | 9 of 44 | **MATERIAL OF THE MAJOR COMPONENTS:** | We will provide sevomotor cylinder, made up of material as follow:<br>E355 / ST52.2 - EN10305 / Equivalent.<br>Please confirm. | Bid stipulation shall prevail. |
| 138 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.6 | MAINTENANCE & REPLACEMENT OF WORN OUT WORKING PARTS | 10 of 44 | Replacement and repair of service seal shall normally be carried after dewatering upstream of Butterfly Valve by closing the surge shaft gate. The life period of service seal shall not be less than 10 years. | We are not gaurantee for any parts upto 10 years as parts may detoriate due to combination of various factors viz. silt content in water, no. of operations (Opening/Closing), flow variation, etc.<br>Kindly accept. | The life of the seals shall not be less than 10 years.<br>There is no surge shaft gate available in the project.<br>Therefore, BFV must have both service and maintenance seal. |
| 139 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.11 | SEALS | 13 of 44 | The leakage across the down stream side of the seal should not exceed 5 litres/ minute at normal static head of 52.13 mwc including leakage of by-pass valve. The leakage across the service seal during normal static head of 74.40 mwc shall be guaranteed. (Leakage shall be the actual water flowing past the seal when valve is in closed position plus the leakage through the by pass valve in closed position). | Permissible leakge will be as per leakage clause mentioned in IS 7326. Please confirm. | Agreed. . |
| 140 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.11 | SEALS | 14 of 44 | **INLET (UPSTREAM) PIPE**<br><br>To connect the valve to the upstream side of the pressure shaft a suitable length of pipe and diameter equivalent to the diameter of pressure shaft shall be provided. This inlet (upstream) connection pipe of Butterfly Valve shall be fabricated from steel plates conforming to ASTM-A-517 Grade 'F' or its equivalent, which shall also be the material of pressure shaft. On one side, it is to be welded with pressure shaft whereas on the other end, it is to be flange jointed with BFV. The necessary trimming allowance should be provided for cutting and welding at site. It shall also be fitted with flanged openings and cast steel valve for by-pass valve line, and pressure gauges etc. Bidder shall co-ordinate with the pressure shaft supplier. | We propose for offer S355 J2+N for shell and flanges and in case flange thickness is more than flange will be of cast materail ASTM A216 Gr. WCC or IS 1030.<br><br>Kindly accept the above proposal. | Bid stipulation shall prevail. |

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| 141 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.11 | SEALS | 14 of 44 | **OUTLET (DOWNSTREAM) PIPE**<br><br>Down stream connecting pipe of diameter equal to pressure shaft of suitable length shall be of welded steel plate with flange for connecting it to the dismantling joint on one side and the edge prepared for welding at site on the other side to the downstream pressure shaft. Necessary trimming allowance should be provided for cutting and welding at site. Necessary connections, tappings and fittings for pressure gauges, air release valve, anti vacuum valve, drainage valve, 800mm dia manhole and by-pass connections etc. shall be provided. This shall be fabricated from steel plates conforming to ASTM-A-517 Grade 'F' or its equivalent. Bidder shall co-ordinate with the pressure shaft supplier for jointing of outlet pipe. | We propose for offer S355 J2+N for shell and flanges and in case flange thickness is more than flange will be of cast material ASTM A216 Gr. WCC or IS 1030.<br><br>Kindly accept the above proposal. | Bid stipulation shall prevail. |
| 142 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.13 | SERVOMOTORS | 15 of 44 | ..Servomotors shall be capable of producing not less than 1.5 times the required operating torque through levers to the valve trunnions. The operating pressure for oil shall be obtained from a separate oil operated hydraulic power pack for each BF valve. All bearings and bushes shall have provision for lubrication. A throttle device for regulating the opening and closing time of the valve shall be provided..... | We propose self lubricating bearings. It is much better as comapared to forced lubricated bearing.<br>Please confirm. | Accepted. |
| 143 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.14 | BY-PASS VALVE ARRANGEMENT | 16 of 44 | a) Two hydraulically operated plug type valve of suitable diameter not less than 250 mm whose seat shall be of stainless steel material of proven design permitting easy replacement. | We propose to consider hydraulically operated slide valve of same specification as an alternative to plug valve. Please confirm. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 144 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.15 | AIR RELEASE, ANTI VACUUM AND DRAIN VALVE | 17 of 44 | **ANTI VACUUM VALVE:**<br><br>At least two numbers of air inlet/anti-vacuum valve for each pressure shaft shall be provided to operate in conjunction with Butterfly valve to admit air into the pressure shaft on the down stream side of the valve in the event of closure of Butterfly valve. This is necessary to prevent creation of vacuum in the pressure shaft in the event of Butterfly valve closure when three turbines connected to the pressure shaft are operating at the rated discharge. The valve shall be designed for passing required volume of air and its readiness to operate at any moment even after prolonged period of inaction..The operation of the valve shall be such that there shall be no objectionable noise and vibration etc. The parameters for the selection of air inlet valve offered such as vacuum pressure, at which the valve will operate etc., shall be furnished in the bid along with drawings indicating details of construction. Calculation for capacity of anti vacuum valve will be submitted and shall have 100% extra capacity. | We propose two quantity of air release cum anti-vacuum valve. One as service valve and one as standby.<br><br>All the calculation of Air release cum anti-vacuum valve will be submitted during Detail Engineering Phase. Kindly review and accept. | Bid stipulation shall prevail. |
| 145 | Volume-II, Section-II, M-3, Pressure Shaft Valve (BFV) | 3.16 | OVER VELOCITY TRIP MECHANISM AND FLOW MEASURING DEVICE | 18 of 44 | **LATCH ARRANGEMENT:**<br><br>The butterfly valve disc shall be opened by the oil pressure in the servomotor and should be held in the given position by the automatic lock operated by water pressure. | We do not recommend for locking in open position of valve. However, if required manual operated lock will be provided for both open and close condition of valve. Same shall be finlaized during detail engineering phase.<br><br>We propose only offer manual operated lock and not water operated lock . | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| **I. Balance of Plant - Mechanical (BOPm)** | | | | | | | |
| 146 | Volume-II, Section-II, M-1, Electro Mechanical Equipments - Turbine & MIV | 1.42 | General Description and Operation of the Main Inlet Valves | Chapter Page No. 70 / 83,<br><br>PDF file Page No. 70 of 352 | Keeping in view the quantity and characteristics of the silt carried in the water it shall be desanded and filtered first and then only shall go to maintenance seal seat engaging and deengaging chamber. There should be two hydro cyclones and two duplex filters with 100% capacity, working one at a time with necessary values etc. for shutting the idle filter. Further there should be provision of back washing of filters. The desilting system shall be having desilting vessel, duplex filters and purging valve at the lowest portion of the desilting vessel. The water system for closing maintenance seal shall be provided with two isolating valves connected in series on penstock. | Kindly note that hydro cyclone works efficiently for the system where water is continuedly flowing. For the service seal & maintenance seal operation water is not required with continuous flow in the system and there are chances that this hydro cyclone will choke by itself. So we recommend to update the clause and delete the requirement of the hydro cyclone from this paragraph. Additionally in place of two no. of duplex filter (1 W+1S), we recommend to use 2 no. duplex filters in series (Both Working) to eliminate the impurities from the inlet water. Duplex filter has already provided with 2 housing, one as main & other one as standby. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |

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| 147 | Volume-II, Section-II, M-1, Electro Mechanical Equipments - Turbine & MIV | 1.47 | PRESSURE OIL SYSTEM FOR TURBINE INLET VALVES | Chapter Page No. 80 / 83,<br><br>PDF file Page No. 80 of 352 | 1. Each MIV shall be provided with pressure oil system for MIV operation. The operating pressure of the pressure oil system shall be 100kg/cm2. However, it will be determined by the Contractor based upon his experience of similar systems. Each pressure oil system shall consist of oil sump tank, oil pumping unit, oil pressure accumulator (OPU) with nitrogen bottle battery back up, pipes, valves, fittings, instrumentation and switchgear and controls for manual, electrical and automatic operation and sustenance. The nitrogen bottle battery back up for accumulators for MIV operation shall be capable of 2 opening cycles of the MIV without operation of the pumps. | Please allow to use pressure rating of the system as 100-160 Bar, this will make system more compact as mentioned in your contract specification under "Governor Chapter" (Page 31 of 46) to make symmetry among both the HPu's. Addionally it is also to be noted that sizing of the accumulates as mentioned in the TS is on higher side which is practically not required. Opening of the MIV without operation of the pump is not recommended during the operation of the plant. Kindly review the requirement.<br>For MIV closing, counter weight is provided for the fail safe condition in case of any plant emergency. Accumulator is only required for MIV HPU for the purpose of compensate the leakages and dampening purpose. In our view max. of 1 Opening volume for accumulator is sufficient for the safe operation of the MIV HPU. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 148 | Volume-II, Section-II, M-1, Electro Mechanical Equipments - Turbine & MIV | 1.47 | PRESSURE OIL SYSTEM FOR TURBINE INLET VALVES | Chapter Page No. 81 / 83,<br><br>PDF file Page No. 81 of 352 | 2. The tanks shall be totally enclosed and provided with a manhole of 600 mm diameter with oil resistant gas kits, oil level gauge, strainers, breather and connections for filling and draining of oil etc. | Practically as per the current industry practice, size of manhole with 600 mm Dia is not possible. Kindly update the clause as sufficient diameter manhole for the maintenance requirement to be provided. It shall be of about 400 mm. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 149 | Volume-II, Section-II, M-1, Electro Mechanical Equipments - Turbine & MIV | 1.47 | PRESSURE OIL SYSTEM FOR TURBINE INLET VALVES | Chapter Page No. 81 / 83,<br><br>PDF file Page No. 81 of 352 | 2. All split oil shall be channeled to a bottle mounted on the side of the tanks. The sump tanks shall be mounted in a recess or bunkered containment sized to contain all oil in the tank in the event of major breakage. | Please note that Sump / tank shall be so designed or constructed that it shall be installed on surface or floor of the power house. Moreover one leakage tray can be provided but it shall be capable to collect small leakages collected around the HPU during maintenance activities. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 150 | Volume-II, Section-II, M-1, Electro Mechanical Equipments - Turbine & MIV | 1.47 | PRESSURE OIL SYSTEM FOR TURBINE INLET VALVES | Chapter Page No. 81 / 83,<br><br>PDF file Page No. 81 of 352 | 3. Two oil pumping sets shall be mounted on or near the each sump tank, one acting as main and the other as standby. The pump shall be rotary screw/axial/gear/piston/axial type suitable for auto start/stop operation with under the action of pressure switches. Each pumping unit shall be complete with pump, electric motor, necessary starting, control and protection switchgear and devices on wall mounted type panel. The motors shall be suitable for operation on 415 V, 3 phase 50 Hz, AC supply. | Starter Panel shall be part of the Unit Control Board, So this clause needs to be updated accordingly. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 151 | Volume-II, Section-II, M-1, Electro Mechanical Equipments - Turbine & MIV | 1.47 | Oil Pressure Unit - Accumulator | Chapter Page No. 81 / 83,<br><br>PDF file Page No. 81 of 352 | The oil pressure vessels shall be made of fabricated welded plate steel and shall be designed and tested in accordance with ASME code for pressure vessels or any other approved code. The oil pressure unit for turbine and for MIV shall have sufficient oil volume under pressure to meet all the requirements of the respective pressure oil systems i.e. for turbine governing and MIV operation. Means shall be provided to prevent entry of air into the oil system under conditions of lowest oil level. Separate nitrogen bottle battery back up shall be provided for the oil pressure accumulators for the MIV operation | As per this clause requirement, common HPU for MIV & Turbine has been asked for accumulator sizing. Kindly review the requirement for better clarity. Moreover we request you to consider common HPU for MIV & Turbine control. This arrangement will reduce the overall sizing of the auxiliary (HPU) and will definitely reduce the additional plant axially in the plant and will increase the clear space in the power house. | There are separate HPU for MIV and Governor.. |
| 152 | Volume-II, Section-II, M-1, Electro Mechanical Equipments - Turbine & MIV | 1.47 | Design Of Mechanism | Chapter Page No. 82 / 83,<br><br>PDF file Page No. 82 of 352 | Design of the mechanism shall be such that the speed retards at the end of each operation. To close the valve, signal is given to operate the solenoid valve and allow pressure oil to flow out of the cylinder back to the tank. When valve closes to 80% to 90% close position (adjustable), another solenoid valve shall actuate to reduce the flow of return oil and slow down the rate of closing the valve during remaining 10% to 20% of travel. Necessary dampers shall be provided to regulate the speed of operation to arrest the travel of the valve at fully open or closed position. | For the last 5-10% closing stroke, suitable provision in the servomotor shall be made for the servomotor dampening. Separate arrangement shall not be required for this application. Kindly accept. | Shall be examined during detail engineering. |

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| 153 | Volume-II, Section-II, M-1, Electro Mechanical Equipments - Turbine & MIV | 1.47 | Design Of Mechanism | Chapter Page No. 82 / 83,<br><br>PDF file Page No. 82 of 352 | **Oil Leakage Unit (Separate For Governor And MIV)**<br>Governor and MIV oil leakage tanks, screw type pumps and necessary piping and valves shall be provided and located at suitable location. The tanks shall be provided with suitable gauge glass, level switches for automatic start/stop of the pumps. The pump-motors shall be suitable for 415 V, 3 phase, 50 Hz A.C. supply. An alarm shall also be provided to indicate high oil level in the tanks. The floor mounted panels incorporating all controls etc. shall be provided | As per the system design requirement, separate oil leakage tank is not required. Kindly update this clause as "If applicable". All leakages line from MIV shall be directly connected with main MIV HPU tank. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 154 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.2 | Detailed Scope of Work - Hydraulic Actuator | Chapter Page No. 4/46,<br>PDF file Page No. 104 of 352 | Hydraulic Actuator<br>Three (03) sets of hydraulic actuator units each consisting of following main components:<br>• Main oil distributing valve<br>• Hydro Mechanical Cabinet (HMC) or Proportional (Pilot) Valve<br>• Control Valves<br>• Flow Control Valves<br>• Check Valves<br>• Pressure Switches<br>• Auto Clean Filter Sets<br>• Manifold blocks associated piping and fittings<br>• Other required accessories | 1. Separate Hydraulic Actuator cabinet is not applicable as per latest industry practice for hydraulic pressure unit design. All control valve including proportional valves shall be mounted on HPU tank itself. So kindly update the clause accordingly.<br><br>2. Main Distribution valve is not separate item. Some time it is part of the proportional valve or some time it is not applicable. Details of the same be checked during detailed design stage of the HPU sizing.<br><br>3. Additionally it is also to be noted that filters for HPU with auto-clean feature is not required. We shall provide manual filters with filter elements of optimicron/ betamicron material with filtration rating of 5/6 µm which is standard in latest industrial practice with higher beta ratio to remove impurities from the oil. Kindly update the clause Hydraulic System on page 8 of 46 of this chapter accordingly. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 155 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.2 | Detailed Scope of Work - Oil Pumping Unit | Chapter Page No. 4/46,<br>PDF file Page No. 104 of 352 | One (1) set of Nitrogen charging kit. | Nitrogen changing kit consist of the requisite hose, adaptor and necessary manifold with isolation valve etc. Same is part of the commissioning spares and shall be supplied along with main system and is common for the plant. Kindly confirm the requirement. | Bid stipulation shall prevail. |
| 156 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.20 | Oil Pumps | Chapter Page No. 31/46,<br>PDF file Page No. 131 of 352 | iv. In the suction line, a suitable oil strainer. | At suction line suction strainer is not recommended and cannot be provided. Same may lead to failure of the pump and non working of the pump in case of requirement.<br>One pressure line filter and offline circuit filter shall be provided to maintain the requisite cleanliness in the oil. | Shall be examined during detail engineering. |
| 157 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.20 | Oil Pumps - Oil Sump Tank | Chapter Page No. 33/46,<br>PDF file Page No. 133 of 352 | The sump tank shall be provided with a manhole of 500 mm diameter with a suitable oil resistant gasket for access to the interior of the tank. A suitable oil level glass shall be provided to indicate the level of the oil in the tank, marked with low and high level marks, complete with both hand shut-off valves and automatic means of shutting off oil discharge in the event of breakage. | Practically as per the current industry practice, size of manhole with 600 mm Dia is not possible. Kindly update the clause as sufficient diameter manhole for the maintenance requirement to be provided. It shall be of about 400 mm. | Bid stipulation shall prevail. |
| 158 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.20 | Oil Pumps - Oil Sump Tank | Chapter Page No. 33/46,<br>PDF file Page No. 133 of 352 | A vertical filter screen shall be arranged to divide the sump tank into “clean” and “dirty” oil compartments. All strainers shall be readily removable for cleaning. | There shall be no any filter screen in-between the sump tank. Necessary filters shall be provided outside the tank and shall be installed in pressure line and offline circuit only. Kindly update the clause. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 159 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.20 | Oil Pumps - Oil Sump Tank<br>A) Proportional valve Oil Filtering | Chapter Page No. 33/46,<br>PDF file Page No. 133 of 352 | Suitable dual on line oil filter with changeover and clogging indication shall be provided in actuator supply circuit to ensure that impurities as recommended by the manufacturer are avoided. Clogging indicators with electrical contacts to indicate the clogging of filters shall be provided. Filter elements used shall be cleanable with Petrol | Please Note that filters for HPU with auto-clean feature is not required. We shall provide manual filters with filter elements of optimicron/ betamicron material (Non-Cleanable type) with filtration rating of 5/6 µm which is standard in latest industrial practice with higher beta ratio to remove impurities from the oil. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 160 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.20 | Oil Pumps - Oil Sump Tank<br>B) Main Circuit Oil Filtrering | Chapter Page No. 33/46,<br>PDF file Page No. 133 of 352 | One oil filter shall be provided in the pumps unloading discharge line. Clogging visual indication with electrical contacts to indicate the clogging of filter shall be provided. Filter elements used shall be cleanable with Petrol and easily changeable without affecting the normal operation of the generating units. Main circuit oil filter shall be equipped with one automatic by-pass allowing operation in case of clogging of the filter element. The filter system shall be able to handle the discharge flow of both main and standby Pumps | Two Type of filters shall be provided in the HPU system ;<br><br>1. Pressure Line Filter (1W+1S) in pressure line to the main manifold & Accumulator.<br>2. Offline circuit filter to clean the oil continuously<br><br>All Filters shall be provided with suitable indication to give alarm in case of filter clogging. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 161 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.20 | Oil Pumps - Oil Sump Tank<br>D) Oil Leakage Unit | Chapter Page No. 33/46,<br>PDF file Page No. 133 of 352 | The leakage oil units, if required, shall be provided for the collection of oil leakages from the servomotors and in the event of maintenance for draining the servomotors; oil pipelines and guide bearing. The tank shall be provided with suitable gauge glass, level switches for automatic start/stop of the pumps and provision for alarm in case oil level is high. The units shall be of suitable capacity along with pump-motor, pipes, valves, float switches, and auto provision for start / stop etc. | Please be noted that all return lines for servomotor shall be directly connected with main HPU tank. However one separate oil leakage tank shall be provided along with HPU to collect the leakages from nozzle housing etc. This leakage tank shall not be provided with automatic pump to discharge the contaminated oil back to the HPU. Collected contaminated oil needs to be treated before taking it to the main system. This complete process to be done manually after processing the oil with suitable filtration machine in the plant. | Bid stipulation shall prevail. |

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| 162 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.21 | Oil Pressure Accumulator | Chapter Page No. 34/46, PDF file Page No. 134 of 352 | The leakage oil units, if required, shall be provided for the collection of oil leakages from the servomotors and in the event of maintenance for draining the servomotors; oil pipelines and guide bearing. The tank shall be provided with suitable gauge glass, level switches for automatic start/stop of the pumps and provision for alarm in case oil level is high. The units shall be of suitable capacity along with pump-motor, pipes, valves, float switches, and auto provision for start / stop etc. | Please be noted that all return lines for servomotor shall be directly connected with main HPU tank. However one separate oil leakage tank shall be provided along with HPU to collect the leakages from nozzle housing etc. This leakage tank shall not be provided with automatic pump to discharge the contaminated oil back to the HPU. Collected contaminated oil needs to be treated before taking it to the main system. This complete process to be done manually after processing the oil with suitable filtration machine in the plant. | Bid stipulation shall prevail. |
| 163 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.21 | Oil Pressure Accumulator - Capacity | Chapter Page No. 34/46, PDF file Page No. 134 of 352 | The piston accumulator shall have a total volume of at least fifteen (15) times the combined active volume of the two gate servomotor cylinders of the turbine and shall be designed for a pressure ten (10) percent above the actual maximum system pressure. The size of the accumulator shall be such that it shall be possible to operate the guide vanes 3 times (2"C"+1 "O") from minimum normal oil pressure without the operation of governor oil pumps and without dry nitrogen admission. At the remaining pressure, the governing mechanism should still operate with a safe margin | Specification mentioned under this clause is very much on higher side. Kindly review the requirement.<br><br>As per the TS two statements are mentioned for the selection of the accumulator station :<br><br>"1. The Piston accumulator shall have a total volume of at least fifteen (15) times the combined active volume of the two gate servomotor cylinders of the Turbine"<br><br>This statement is not practically suits for the selection of the high pressure system with N2 based piston type accumulator. in general this statement is used for the Air+Oil vessel design. So kindly delete this line.<br><br>2. The size of the accumulator shall be such that it shall be possible to operate the guide vanes three (3) times (2 "C"+1 "O") from minimum normal oil pressure without the operation of main inlet valve oil pumps and without dry nitrogen admission.<br><br>We request to accept the accumulator sizing as per Sr. No. 2 above or shall be allowed to use as per IEE125 guidelines. | Shall be as per CEA (Technical Standard for construction of Electric Plants and Electric lines) regulations, 2022. |
| 164 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.21 | Oil Pressure Accumulator - Construction & Safety Features | Chapter Page No. 34/46, PDF file Page No. 134 of 352 | The Piston accumulator shall be constructed from plate steel conforming to EN 10028-3 P355NL1 or equivalent in accordance with part UW of the ASME Code for Unfired Pressure Vessels, Section VIII, for the maximum working pressure of the governing system. | Piston accumulator shall be designed and tested in accordance with the pressure equipment directive (PED) - 2014/68/EU. Please accept. | Bid stipulation shall prevail. |
| 165 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.21 | Oil Pressure Accumulator - Construction & Safety Features | Chapter Page No. 34/46, PDF file Page No. 134 of 352 | The accumulator shall be equipped with a pressure gauge, a safety relief valve, pressure transducer, oil level sight gauges, metallic magnetic float pipe type with indication, switches and transmitter. The safety relief valve shall be set to open at 110 percent of the maximum operating oil pressure of the accumulator. The sight gauges shall be long enough to overlap the high and low oil levels by at least 50 mm. The safety relief valve should release nitrogen to atmosphere in a manner not injurious to personnel or equipment in the vicinity of the accumulator. | Please note the following :<br>1. Pressure Gauge & Pressure Transmitter shall be installed on the main inlet pipe of the manifold and accumulator. So separate instrument on accumulator on oil side shall not be required.<br>2. Oil level Sight gauge : Same is not applicable for N2 based high pressure system. Kindly delete this items from this clause or update it as "if applicable". | Bid stipulation shall prevail. |
| 166 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.21 | Oil Pressure Accumulator - Construction & Safety Features | Chapter Page No. 35/46, PDF file Page No. 135 of 352 | All Instruments necessary for proper and safe operation of the unit shall be supplied with at least:<br>a) One oil pressure transmitter<br>b) One oil level transmitter with switch for normal oil level unit start interlock<br>c) Low level switch - alarm<br>d) Low level switch – Unit trip<br>e) Very low level switch – Unit trip and close isolating/ float valve | These all instruments shall be part of the main HPU system. Separate instruments in accumulator station shall not be provided being both the system shall be placed near to each other in power house and remote signal shall be sent to plant SCADA / Governor System for monitoring purpose to ensure the combined healthiness of the HPU as well as accumulator station. | Bid stipulation shall prevail. |
| 167 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.22 | Oil Pressure piping | Chapter Page No. 35/46, PDF file Page No. 135 of 352 | The piping shall be of such size that the maximum oil velocity shall not exceed 3.0 m/sec in the pressure lines and 1.5 m/sec in the return lines. | It is proposed to size the piping as per IEEE 1207, kindly accept. | Bid stipulation shall prevail. |
| 168 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.25 | Shop test | Chapter Page No. 37/46, PDF file Page No. 137 of 352 | At least following tests shall be conducted in the shop of the manufacturer to verify correct assembly and operation of the complete digital governing system:<br>• The following items shall be completely assembled, aligned and matchmarked to ensure correct re-assembly and alignment in the field.<br>• Oil sump and associated piping and devices.<br>• Oil pumps assembly.<br>• Oil pressure tank.<br>• E.H. governor with distributing valve.<br>• Digital governor cabinet. | Complete assembly of the HPU with hydraulic governor for shop testing purpose is not feasible at supplier's work, being these items shall be manufactured at different location and with different supplier. Final complete assembly shall only be possible at site before final commissioning of the project (if required). | Bid stipulation shall prevail. |
| 169 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.25 | Shop test | Chapter Page No. 37/46, PDF file Page No. 137 of 352 | - The oil pressure tank shall be given a shop hydrostatic test at a pressure not less than 1.5 times the maximum design pressure, in accordance with Section-VIII of the ASME Boiler and Pressure Vessel Code.<br>- The pressure tank relief valve setting shall be verified | Hydrostatic test is not possible after assembly at supplier works for accumulator station. Suitable OEM test certificate shall be provided for the accumulator vessel.<br>However if needed, same can be witnessed as stage inspection during the manufacturing of the accumulator station. kindly confirm so that suitable provision can considered for this system. | Bid stipulation shall prevail. |

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| 170 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.28 | Field test | Chapter Page No. 39/46, PDF file Page No. 139 of 352 | Test to verify pump capacity. | Kindly add this add under shop test (Clause 2.25), as instruments for flow measurement shall not be available at site for this clause requirement. | Test to verify pump capacity shall be conducted either at shop or field. |
| 171 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Governor System | 2.30 | Spare parts - Specified spare parts | Chapter Page No. 41/46, PDF file Page No. 141 of 352 | 2. Main distributing valve : 2 nos. of each type<br>10. Jockey oil pump-motor set : 1 no.<br>15. Oil leakage unit pump-motor set : 1 no.<br>16. Leakage unit oil level detector : 1 no.<br>19. Sight glass gauges for pressure and sump tanks : 1 set.<br>25. Nitrogen cylinders 1 set | Kindly update the spare list with following comments;<br>2. Main distributing valve :Not Applicable, Kindly delete<br>10. Jockey oil pump-motor set : (If Applicable) As per Specification<br>15. Oil leakage unit pump-motor set : If Applicable<br>16. Leakage unit oil level detector : If Applicable<br>19. Sight glass gauges for pressure and sump tanks : Not applicable for pressure tank, kindly delete for pressure tank.<br>25. Nitrogen cylinders : This item should not be part of the spares, Kindly review the specification & update the spare list. This item needs not to be made part of the inventory of the project. Moreover this requirement is very much huge in view of the storage of the bottles in power house. Keeping these bottles idle in power house will only cause erosion from inside (As it will be empty bottles for the most of the time) and will harm the system. | Bid stipulation shall prevail. |
| 172 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Pressure Shaft Valve | 3.14 | By-Pass Valve Arrangment | Chapter Page No. 17/44, PDF file Page No. 163 of 352 | A suitable differential pressure transducer should be provided which will provide a signal for the Butterfly valve to open once this pressure on both upstream and downstream of the valve is equalized. Pressure equalizing device and differential pressure transducer shall be interlocked with valve control to preclude valveopening signal before the pressure equalization. | Differential Pressure switch (Mechanical type) shall be installed across the Butterfly valve to give suitable signal for the opening of the valve (Pre-Condition). Kindly update the clause accordingly. | Bid stipulation shall prevail. |
| 173 | Volume-II, Section-II, M-2, Electro Mechanical Equipments - Pressure Shaft Valve | 3.18 | Pressure Oil System | Chapter Page No. 19/44, PDF file Page No. 165 of 352 | The operating power for opening Butterfly valve shall be provided by oil pressure of adequate capacity acting on valve servomotors. This pressure oil shall be supplied by the oil pumps and accumulator system. Butterfly valve shall be provided with a pressure oil system of maximum 100 kg/cm2 for operation. The pressure oil system shall consist of oil sump, oil pumping unit, oil pressure accumulator (OPU), pipes, valve, fittings, instrumentation, switchgear and controls for manual and automatic operation. | Kindly allow pressure as 100-160 bar as mentioned in turbine HPU/OPU to make symmetry among all HPU's. | Accepted. |
| 174 | Volume-II, Section-II, M-3, Electro Mechanical Equipments - Pressure Shaft Valve | 3.18 | Pressure Oil System | Chapter Page No. 20/44, PDF file Page No. 166 of 352 | Two oil-pumping sets shall be mounted on the sump tank, one acting as main and the other as standby. The pump shall be of the variable displacement type suitable for auto start/stop operation with the help of pressure switches. Both the pumps shall be identical. Each pumping unit shall be complete with pump, electric motor, necessary starting, control and protection switchgear & devices mounted in a panel. The motors shall be suitable for operation on 415 V, 3 phase 50 Hz, AC supply. In addition to it, standby hand pump shall also be provided. | Type of pump shall be gear/Variable Displacement / vane as allowed in Turbine & MIV HPU. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 175 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.2.2 | Butterfly Valve House Crane | PTS: M-4 Page-2<br>PDF file Page No. 195 of 352 | A. Capacity (in Tonnes)<br>i) Main As per Requirement<br>ii) Auxiliary As per Requirement<br><br>C. Normal speeds with full loads, in m/minute<br>a) Main hoist<br>i) Hoisting & lowering speed 0-1.0 m/min<br>b) Auxiliary hoist<br>i) Hoisting &lowering speed 0-6.0 m/min<br>c) Trolley Travel 0-12 m/min<br>d) Bridge Travel (long travel) 0-25 m/min | For the butterfly Valve House 1 no. hook is sufficient, kindly review the update the clause accordingly.<br><br>Additionally it is to be noted that speed mentioned for the crane operation is very much on higher side in view of the usage in Butterfly valve house. Kindly consider following speeds for the same :<br>MH : 1 m/min<br>CT : 3 m / min<br>LT : 6 m / min<br>With creep speed for all motions as 10% of main speed. | Bid stipulation shall prevail. |
| 176 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.2.3 | GIS Hall Crane | PTS: M-4 Page-3<br>PDF file Page No. 196 of 352 | A. Capacity (in Tonnes) 10 T or higher, as per requirement<br>B. Span (s) 13500 mm (approx.)<br>C. Normal speeds & with full loads<br>i) Hoisting speed for hook hoist 5 m/min<br>Reduced speed for hook hoist 0.5 m/min<br>ii) Trolley Travel (Cross) 15.0m/min<br>iii) Bridge Travel (long travel) 30.0 m/min | Speed mentioned for the crane operation is very much on higher side in view of the usage in GIS hall. Kindly consider following speeds for the same :<br>MH : 1 m/min<br>CT : 3 m / min<br>LT : 10 m / min<br>With creep speed for all motions as 10% of main speed. | Bid stipulation shall prevail. |
| 177 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.5.2 | Operator's Cabin, Walkway, Ladders and safety guard | PTS: M-4 Page-8<br>PDF file Page No. 201 of 352 | Operator Cabin (for Power House and BFV Crane) | Please be noted that there shall be limited space available in the Butterfly valve House (Underground) and technical point of view also there shall be no requirement for the cabin for the purpose of the installation & erection of the butterfly Valve. Kindly accept butterfly valve house crane without cabin. | Bid stipulation shall prevail. |
| 178 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.5.2 | Operator's Cabin, Walkway, Ladders and safety guard | PTS: M-4 Page-8<br>PDF file Page No. 201 of 352 | Walkways and Ladders | Please be noted that walkway & ladders mentioned under this clause shall be applicable for the walkway structure & ladders in in the crane only, same shall be provided by E&M contractor. However ladder required to access the crane from power house service bay / Butterfly valve house floor / GIS hall floor shall be provided by Civil /Customer | Ladder required to access the crane from power house service bay / Butterfly valve house floor / GIS hall floor shall be provided by NEEPCO. |

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| 179 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.5.3 | Mechanical Equipment Details | PTS: M-4 Page-9<br>PDF file Page No. 202 of 352 | Bridge Travel Mechanism (For Power House and Valve House Cranes):<br><br>Bridge Travel Mechanism (For GIS Hall Crane):<br><br>Trolley Travel Mechanism: | Selection of No. of motors shall be as per the design requirement of the respective crane. Mentioned motors in this clause is on higher side. Specially for butterfly valve house crane & GIS hall crane. Kindly review the same and update the clause as it shall be as per the requirement of the crane manufacturer for the safe operation of the crane. | Bid stipulation shall prevail. |
| 180 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.5.4 | Brakes for various drives and motors | PTS: M-4 Page-10<br>PDF file Page No. 203 of 352 | Bridge Travel:<br>i) Main braking by means of frequency speed control of motors down to 0 (regenerative braking);<br>ii) Automatic DC electro-magnetic brake for each motor drive;<br>iii) Foot actuated hydraulically operated brakes for wheels on both sides of bridge of double (2) brake discs. | In place of foot actuated brake we recommend to have thruster type brake only as mentioned for the other motions. This is standard industry practice and is more reliable and fail safe type. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 181 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.7.4 | Control Switches, levelrs and speed control | PTS: M-4 Page-14<br>PDF file Page No. 207 of 352 | Control Switches, Levers and Speed Controls<br><br>The step less controls shall be provided for torque and speed control of motors for the following motions: | Kindly note that arrangement for the stepless speed can only be provided in the cabin only. Stepless control via means of pendant or radio remote is not possible (Bulky arrangement).<br>We request you to consider this stepless arrangement only for the power house crane.<br>For BFV House crane and GIS hall crane it shall be of 2 step speed control i.e. main speed and creep speed (10% of main speed). | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 182 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.8 | Radio Remote Control | PTS: M-4 Page-14<br>PDF file Page No. 207 of 352 | ……Radio Remote control from the floor.<br>However, the GIS Hall Crane shall be provided with Radio Remote Control along with pendant control | For GIS hall crane pendant type control is sufficient. Kindly review and accept. | Bid stipulation shall prevail. |
| 183 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.13 | Illumination & Convinient Outlet | PTS: M-4 Page-17<br>PDF file Page No. 210 of 352 | The permanent AC illumination system on the crane shall consist of four 1000 watt highway beamed flood lighting units to illuminate uniformly the area under the crane. Two 100 watt lighting units in the operator cabin with convenient outlets shall be provided | Capacity of the 1000 Watts highway beam light is on higher side, Kindly accept with latest industry practice of LED lights in place of highway beam lights of about 100W each for the crane flood lights.<br>Addionally for cabin also 2 no. of 40 Watts lights are sufficient. Kindly review and update the respective clause accordingly. | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 184 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | 4.20.5 | Deflection Test | PTS: M-4 Page-24<br>PDF file Page No. 217 of 352 | Deflection of girders with capacitative load to be determined using theodolite or other optical instrument after load has been applied for 15 minutes. | Testing of deflection shall be checked as per IS 3177. Deflection test is not applicable for overload test. Kindly accept. | Shall be as per IS: 3177. |
| 185 | Volume-II, Section-II, M-4, Electro Mechanical Works - EOT Cranes | - | General | - | Spare List | No spare list is mentioned under this chapter. We understand that spare list as mentioned under Schedule of Requirement are applicable for this system. However it is to be clarified that spare metnioned under SOR are applicable for all cranes or it is applicable for only main power house crane. | Spare list is as per SOR and applicable for each crane. |
| 186 | Volume-II, Section-II, M-5, Electro Mechanical Works - Oil Filtration System | 5.1 | Scope<br>Vaccum Type Insulating Oil Handling System | PTS: M-5 Page-1<br>PDF file Page No. 224 of 352 | ii) One (1) 5 cubic meter/min or higher capacity regenerative air dryers of suitable capacity for generator transformers, | As per scope of supply, only regenerative type air dryer is asked. Kindly confirm weather separate compressor is also required for the same or only dryer needs to be supplied under this head.<br><br>Moreover plant service air compressor capacity shall also be on lower side (About 1m3/h capacity max). so same compressor line cannot be used for this requirement. Please clarify. | Compressor, if required for the air dryer, shall be part of the scope of supply. |
| 187 | Volume-II, Section-II, M-5, Electro Mechanical Works - Oil Filtration System | 5.2.2 | Lubricating Oil Handling System | PTS: M-5 Page-1<br>PDF file Page No. 224 of 352 | ……Suitable piping both embedded and exposed, fittings, fixtures etc. shall be supplied for connection to inlet and outlet pipe of bearing housing, oil sump tanks etc. shall be coordinated with the Turbine, Governor, MIV and Generator manufacturers / sub-contractors for dockable type arrangement and provision shall accordingly be incorporated. | As per the scope of supply under this chapter, portable type oil handling system has been asked for this project. Kindly review the specification in respect to the field piping and embedded piping. | Bid stipulation shall prevail. |
| 188 | Volume-II, Section-II, M-5, Electro Mechanical Works - Oil Filtration System | 5.5.5 | Oil Tanks | PTS: M-5 Page-3<br>PDF file Page No. 226 of 352 | The oil tanks shall be cylindrical, of welded steel construction and shall be designed and fabricated from plate steel conforming to ASTM A516 Grade- 60 in accordance with part UW of the ASME Code for Unfired Pressure Vessels, Section VIII, for the design.<br><br>The thickness of tank plate shall be of sufficient size for temperature effect and pressure due to oil. However, it shall not be less than eight (8) mm for shell and ten (10) mm for dish end. The oil tanks shall be vacuum tested and for leakage as well. Paint used shall be oil resistant type. | Since oil storage tanks shall be of non-pressure type. So ASME code for unfired pressure vessel may be deleted from this clause.<br><br>Additionally it is to be noted that these tanks shall only be tested for leakage test as pressure testing is not applicable for these tanks. Thickness of the tank mentioned for the tanks seems on higher side. Same shall be as per design requirement. Kindly review the same. | Shall be examined during detail engineering |

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| 189 | Volume-II, Section-II, M-5, Electro Mechanical Works - Oil Filtration System | 5.5.8 | Transfomer Evacuation System | PTS: M-5 Page-4<br>PDF file Page No. 227 of 352 | Transformer evacuation system consisting of vacuum pumps, roots pump of continuous duty, vapour trap, valves, vacuum hose pipes etc. shall be provided for purpose of evacuating transformer tank and shall have sufficient capacity and evacuation level as already defined, when connected to main transformer tank. Vacuum gauges to monitor vacuum shall also be provided at various stages in the transformer evacuation system. | Please confirm, as per main scope of supply mentioned clause 5.1 & 5.13.1, transformer evacuation system is not asked separately.<br><br>Please confirm that separate system for evacuation system is required and complete insulating oil purification plant with inbuilt transformer evacuation system is sufficient *(One (1) 6000 LPH or higher mobile type mounted insulating oil purifying plants complete with transformer evacuation system, oil hoses, vacuum hoses, hose couplings and other accessories to complete the system)* .<br>Kindly confirm. | Clause 5.5.8 is the description of transformer evacualtion system mentioned under scope at clause 5.1.<br>Clause 5.13.1 is the schedule of requirement for the Insulation Oil Filtration system. |
| 190 | Volume-II, Section-II, M-6, Electro Mechanical Works - Fire Fighting System | 6.1.1 | Fire Protection System | PTS: M-6 Page-1<br>PDF file Page No. 239 of 352 | ix) Automatic inert gas clean agent fire extinguishing system complete with clean agent cylinders, manifolds, directional valves, pipes, discharge nozzles bracket supports, hangers and such other fittings as necessary for the complete installation of the system | Scope is not clear, that for which location this system is applicable /required. Kindly update the clause for exact requirement.<br>We have considered it to Control Room & Office Room Only. Please check & Update. | Refer Clause 6.2.1. |
| 191 | Volume-II, Section-II, M-6, Electro Mechanical Works - Fire Fighting System | 6.2.1 | Layout & Arrangement | PTS: M-6 Page-2<br>PDF file Page No. 240 of 352 | The water for firefighting system will be drawn by gravity from the over ground Fire & Service Water Tank located outside the Power House. The Fire Water Tank is filled through Fire Water pumps, of which one will be main Fire Water Pump and the other stand by, from the header of cooling water system, which in turn draws water from Tail race. | Power Hose layout drawing (Key Plan - Contour Map) showing location of the overhead tank along with L-Section of the tentative piping routing shall be provided to estimate the piping routing & length from overhead tank to the power house and Poth yard area. | Shall be dealt during detailed engineering. |
| 192 | Volume-II, Section-II, M-6, Electro Mechanical Works - Fire Fighting System | 6.2.1 | Layout & Arrangement | PTS: M-6 Page-3<br>PDF file Page No. 241 of 352 | 2 Equipment / Area : Generator Smoke and heat Detectors,<br>Fire sensing Devices : Aspirator Type smoke detectors, Manual pull station<br>Fire Fighting Arrangement : Automatic CO2 Flooding | Fire Protection System is not mentioned under main scope of supply under Clause 6.1.1. Kindly update the clause accordingly. | Refer Clause 1.5 of E-1, Vol-II, Sec-II, PTS, for fire protection system of generator. |
| 193 | Volume-II, Section-II, M-6, Electro Mechanical Works - Fire Fighting System | 6.4.3 | Piping, Valves And Appurtenances | PTS: M-6 Page-5<br>PDF file Page No. 243 of 352 | All required pipes, flanges, fittings, supports, fasteners, valves and other related material necessary for completion of the system shall be supplied as a part of this contract. All embedded and exposed water pipes size 25mm and above shall be made of carbon steel of minimum schedule 40. Pipe size less than 25mm shall be of minimum schedule 80. Gravity drain pipes shall be of minimum schedule 20. The outdoor pipe line shall be preferably Ductile iron type conforming to latest IS/ ISO standard. Heavy duty gate valves suitable in fire application shall be used in fire fighting system for isolation and control. Pipes crossing roads, trenches etc. shall be provided with mild steel sleeves. Water pipes shall be insulated against condensation wherever required with approved type insulation and be provided with vapour proof cover | As per the specification Schedule based pipe with schedule 80 & Schedule 40 has been asked for pipe line size <25 mm and >25 mm respectively.<br>Additionally it is also asked that pipe line shall be of ductile iron confirming to latest IS / Iso standard.<br><br>We request you to clarify the requirement of exact type of piping. In over view piping with Indian Standard with Medium or Heavy duty grade is sufficient (IS 1239 or IS 3589) as per the system pressure design requirement. | Bid stipulation shall prevail. |
| 194 | Volume-II, Section-II, M-7, Electro Mechanical Works - HVAC System | 7.1.2 | Exhaust Air Fans | PTS: M-7 Page-1<br>PDF file Page No. 259 of 352 | i) Required nos. of exhaust air fans for exhaust of air from the Power house with 100% stand by capacity.<br>ii) Required nos. of exhaust air fans for exhaust of air from the toilets, kitchen, battery rooms and mechanical work, each of 100% of required capacity with separate exhaust duct.<br>iii) Required nos. of exhaust air fans for exhaust of smoke/air from all ventilated areas including Powerhouse floors, service bay, Transformer area, bus duct areas, DG Room, GIS Hall etc. with 100% stand by capacity & ducting report. | Exhaust Air Fans with 100% standby capacity is practically not feasible. For this requirement additional cutout for standby fans shall also be required.<br>We request you to review the requirement and maximum by 1 or 2 fans can be considered only for power house exhaust fans. However same should not be applicable for other rooms fans required for exhaust.<br><br>Ducting for exhaust fans shall not be applicable. Kindly update the clause accordingly. | Shall be dealt during detailed engineering. |
| 195 | Volume-II, Section-II, M-7, Electro Mechanical Works - HVAC System | 7.1.4 | Auxiliary System and Miscellaneous Items<br><br>Automatic Control & Regulations | PTS: M-7 Page-1<br>PDF file Page No. 259 of 352<br><br>PTS: M-7 Page-8<br>PDF file Page No. 266 of 352 | ii) Central computerized control panel for HVAC system complete with all wiring, instrumentation and associated accessories etc<br><br>The HVAC system shall be equipped with a fully independent computerized automatic control system for efficient operation, which shall be included in the supply. It should automatically stop the supply of fresh/recirculated air to the affected zone immediately in case of fire detection and initiate smoke extraction. | Control panel for HVAC system shall be of hard wire type. Kindly update the clause.<br><br>In case of malfunctioning of the computerized panel later during the operation of the plant will create problem in the plant and complete computerized control panel needs to be replaced, which is not as per the standard hydro practice.<br>In view of the same request you to accept the MCC panel with hard wire logic system only. | Bid stipulation shall prevail. |
| 196 | Volume-II, Section-II, M-7, Electro Mechanical Works - HVAC System | 7.2.1 | Layout & general Arrangement | PTS: M-7 Page-2<br>PDF file Page No. 260 of 352 | All air-conditioned areas will be maintained at 24 ± 1 deg C and RH 55 ± 5% with split/ window type aircooled air conditioners. All ventilation and air-conditioned areas will be designed to maintain a positive pressure. Air changes in accordance to IS-4720, applicable for Surface Hydel Stations, will also be applicable for this Power House. | Temperature to be marinated for Air Conditioning area are mentioned under this clause.<br>However required values for Ventilation area is not specified anywhere in the specification. Kindly requested to mention the same so that suitable scheme can be considered as per the contract / project requirement.<br><br>Recommendation : For Ventilation area +5 Deg C above ambient temperature condition is to be accepted, this will compact the HVAC system and requirement of the water shall also not be required. However humidity cannot be controlled in this area. | The temperature of ventilated area shall be maintained at max. 5º C above ambient. Number of air changes as per specification shall be maintained. |
| 197 | Volume-II, Section-II, M-7, Electro Mechanical Works - HVAC System | 7.4.12 | Exhaust Air Fans | PTS: M-7 Page-8<br>PDF file Page No. 266 of 352 | Exhaust air fans shall be adjustable axial flow fans. Axial air fans shall be of the multi blade vane type. The vanes shall be adjustable individually at standstill. The hub of the impeller shall be directly coupled to the motor shaft and its diameter adapted to the motor frame. The impeller shall be statically and dynamically balanced. | For Power house all exhaust fans shall be of "Axial Type" as specified in the respective clause. However it is to be noted that fans to be installed in small area like toilets, pantry room, DG room etc. shall be of propeller type and manufacturing shall be as per OEM standard only. Kindly accept. | Accepted. |

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| **Sr. No.** | **Volume** | **Clause No.** | **Clause name** | **Page No.** | **Specification as per Bid Document** | **Bidder Query / Clarification** | **NEEPCO Reply** |
| 198 | Volume-II, Section-II, M-7, Electro Mechanical Works - HVAC System | 7.11.1 | Schedule of Requirement - Main Equipment & Accessories | PTS: M-7 Page-11<br>PDF file Page No. 269 of 352 | 7 Lot Air duct distribution system for supply and return air of all HVAC systems, with necessary galvanized sheet metal ducts (for battery room exhaust air system, special rust, acid and corrosion proof ducts etc.), elbows, tees, supports, fixations, including all necessary grills, louvers, outside air louvers, adjusting duct dampers, motorized air dampers, heating and cooling insulations, etc.<br>8 Lot Central computerized control panel for HVAC system complete with all wiring, instrumentation and associated accessories etc | 7. please note that exhaust air duct is not applicable for this system.<br><br>8. necessary centralized control panel is not required, necessary monitoring signal shall be made available in plant SCADA. | Bid stipulation shall prevail. |
| 199 | Volume-II, Section-II, M-8, Electro Mechanical Works - Elevators | 8.5.2<br><br>8.13 | Construction Features - Car Frame<br><br>Emergency Exit | PTS: M-8 Page-2<br>PDF file Page No. 274 of 352<br><br>PTS: M-8 Page-5<br>PDF file Page No. 277 of 352 | Emergency Exit on the Car top<br><br>Car top of the elevator for elevator shall be manufactured with a hinged emergency exit panel held in place with non-removable fastening devices at each corner, manually openable from top of the car and key openable from inside. Exit shall be equipped with electrical contacts that will prevent operation of car when exit door is open and cause the alarm bell to ring. | Emergency exit on car top is more risky and not recommended by elevator supplier. Kindly delete this clause. To access the car top from cabin is itself at challenge for the person to get him self out from the car and moreover after reaching to the car top again person cannot further connect with any of the floor as there shall not be any access ladder in the elevator shaft. Kindly review the requirement and update the respective section accordingly. | Bid stipulation shall prevail. |
| 200 | Volume-II, Section-II, M-10, Electro Mechanical Works - Compressed Air System | 10.1.1 | High Pressure Compressed Air System | PTS: M-10 Page-1<br>PDF file Page No. 297 of 352 | Two (2) sets of HP compressors (One Main and One Standby) complete with Control Cubicle including Motor Starters and Motor Protection Equipment, and other associated accessories for air supply to generator braking, Shaft Seal, fire protection, service air supply points, other permanent/ temporary installations such as draft tube drain valve, purging operation for cyclone separator / strainers etc. | As per the project requirement High pressure compressed air system is not foreseen, in place of high pressure compressed air system we shall provide the low pressure compressed air system which incudes the Compressor, main air vessel and generator vessel for the project requirement. Kindly accept.<br>Note : HPU shall be provided with High pressure N2 bottles for accumulator station in place of air+oil vessel design requirement.<br><br>As asked under clause 10.1.3 Separatre air compressor system shall be provided for Synchronous mode operation.<br><br>Accordingly it is requested to update the Schedule of Requirement (Clause 10.11) | Bid stipulation shall prevail.<br>However, shall be examined during detail engineering. |
| 201 | Volume-II, Section-II, M-10, Electro Mechanical Works - Compressed Air System | 10.1.2 | Low Pressure Compressed Air System | PTS: M-10 Page-1<br>PDF file Page No. 297 of 352 | Service air hoses of length 30 m with necessary connectors etc. located in wall mounted service air enclosure as per approved drawings | Hose length shall be of 15 m each for service requirement as per standard industry design practice. However it is confirmed that sufficient no. of portable hose connections shall be made available in view of the pant maintenance requirement | Accepted. |
| 202 | Volume-II, Section-II, M-10, Electro Mechanical Works - Compressed Air System | 10.9.3 | Specified Spare Parts | PTS: M-10 Page-7<br>PDF file Page No. 303 of 352 | The following specified spare parts, as defined in relevant clause of Contract Document, which shall comprise the total requirement of Firefighting System under this Contract, shall be supplied: | Kindly update the caluse for compressed Air System.<br><br>Additionally as mentioned in the main scope of supply, kindly clarify the spare list separately for Low/High Pressure compressed air system and synchronous condensor mode operation requirement. | Refer clause 10.9.3 for spares of Compressed Air system. |
| 203 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.1 | Scope | PTS: M-11 Page-1<br>PDF file Page No. 309 of 352 | i) Two (2) nos. Centrifugal pumps (1 working + 1 Standby) per unit for raw cooling water circuit, along with local control panel, instrumentation and associated accessories etc.;<br><br>iii) Two (2) nos. automatic back wash duplex strainers (1 working + 1 standby) per unit along with local control panel, instrumentation and associated accessories for cooling water circuit; | i) Complete starter panel for the pump opearation shall be part of the unit control board panel, for local arrangement one local Push Button Station shall be provided. Kindlu accept.<br>Iii) Each filter shall have one working Housing (100%) & one Standby housing (100%) for duplex type filter, so addtional 100% standby filter shall not be required in the system. Kindly review the requirement.<br>Practically contract specification is asking for 300% standby filter for this system. | Bid stipulation shall prevail. |
| 204 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.2.1 | Cooling Water Circuit | PTS: M-11 Page-1<br>PDF file Page No. 309 of 352 | For cooling requirement, water shall be tapped from the Tail pool. Two pumps, two suction backwash duplex strainers, one cyclone separator …..... | Please be noted that duplex filter shall be provided in pump discharge side, in suction side avaiable pressure in the tail pool shall not be sufficient for the autobackwash process.<br><br>Additionally if required one basket stariner of suitable rating may be provided in the pump suction line tapped from the tail pool. Kindly update the respective clause accordingly. | Shall be dealt during detailed engineering. |
| 205 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.3.1 | Basic Dimensions & rating of Cooling Water System | PTS: M-11 Page-2<br>PDF file Page No. 310 of 352 | The major equipment for each unit requiring cooling water are:<br>i) Generator air coolers,<br>ii) Generator thrust and Generator guide bearing (upper and lower) oil coolers.<br>iii) Turbine guide bearing oil coolers,<br>iv) Turbine shaft seals,<br>v) OPU's of Governor and MIV<br>vi) Generator step-up transformers<br>vii) Fire Water Tank Requirement<br>viii) Service Water Connection<br>ix) Any other water requirement; | vii) Fire Water Tank Requirement shall be stand alone system and shall not be part of the cooling water system (Being High Pressure system for tank filling requirement). Kindly update the clause.<br><br>Viii) Service water system is not in scope of E&M contractor. Kindly consider the same in Civil / customer scope of supply. | vii) Accepted.<br><br>viii) As per bid stipulations. |

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| 206 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.3.2 | Pumps | PTS: M-11 Page-3 PDF file Page No. 311 of 352 | Two (2) nos. cooling water pumps per unit each for cooling water circuit shall be provided. Each cooling water pumps shall be of hundred percent (100%) capacity to cater the combined cooling water requirement of one complete generating unit including single phase generator step-up transformers operating at maximum load. Cooling water pump shall also cater to shaft seal requirement as well as the Fire Water Tank requirement and the Service Water requirement. | Separate system for Fire Overhad tank filling shall be provided. This system shall not be part of the cooling water system. Additionally service water requirement shall not be scope of supply for E&M contractor. | 2 nos. submersible pumps with filters, piping & fittings will be provided in the scope of Fire fighting system.<br>Sizing of cooling water system shall include service water requirements (to be finalized during detail engineering). |
| 207 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.3.4 | Cyclone Separator | PTS: M-11 Page-3 PDF file Page No. 311 of 352 | One (1) no. of cyclone separators of sufficient capacity per unit to match the capacity of the cooling water pumps shall be provided.<br>Adequate sensing arrangement shall be provided to sense the pressure drop across the filter for further integration with plant SCADA system. | Highlighted clause is not applicable for cyclone separator. Kindly delete this line from specification. | Accepted.<br>The line " Adequate sensing arrangement shall be provided to sense the pressure drop across the filter for further integration with plant SCADA system", stands deleted. |
| 208 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.4.3 | Automatic Backwash Duplex Filter | PTS: M-11 Page-4 PDF file Page No. 312 of 352 | The automatic back wash duplex strainer shall be designed to arrest debris, tree leaves, pebbles, coarse sand etc. that may appear in the water and shall be suitable for continuous duty. The duplex strainer shall comprise of wedge wire preferably candle type stainless steel filter element and automatic drain valve which shall operate on the basis of both set time and differential pressure. The strainer should have filtration capacity to remove 100 micron and above size of particles at an efficiency of 98% and should be automatic self-cleaning. The pressure drop across the strainer should be less than approximately 0.3 bar. The pressure drop sensing element having communication capability with SCADA. | 1. Filter Housing MOC is not mentioned in the specification. Kindly update the same. MOC shall be of carbon steel for duplex filter housing and element shall be of Stainaless Steel 316 grade as mentioned for shaft seal filter (Automatic Self Cleaning Filter under clause 11.4.4)<br><br>Filtration rating with 100 microns shall chocke the filter very frequently. So we will request you to consider filtartion rating of about 200-300 microns to suit system requirement (Allwable filtration as per the consumer requirement)<br><br>Additionally we request you to install cyclone first and then duplex filter, this will help in fequest chocking of the filter as majot of the impurity shall be removed by cycone seprator itself. | Bid stipulation shall prevail.<br>However, may be discussed during detail engineering. |
| 209 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.4.4 | Cyclone Separator | PTS: M-11 Page-4 PDF file Page No. 312 of 352 | The Cyclone separator shall be centrifugal type cyclone separators to achieve the cleanliness of water to suit the cooling water requirement of turbine, generator, OPU's, transformers coolers.<br>The materials of the cyclone separators casing shall be of stainless steel (AISI 316 or better). The separators shall be of continuous duty with flanged inlet and outlet for use with raw water pumped from draft tube/tail race. | MOC for the cuclone separator may be accepted with carbon steel as considered for automatic self cleaning filter(11.4.5). Kindly review and update the respective clause accoridngly. | Bid stipulation shall prevail.<br>However, may be discussed during detail engineering. |
| 210 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.4.7 | Electro-magnetic Water Flow Switches: | PTS: M-11 Page-5 PDF file Page No. 313 of 352 | Electro Magnetic water flow switches for each outlet from the cooling water pumps shall be provided. All flow switches shall be provided with suitable numbers of independent, adjustable, potential free contacts for low flow alarm and protection purposes. | Since cooling water pump shal be provided with 1W+1S configuration. So one no. Flow switch is sufficient, rather to provide separately for each pump individually. | Bid stipulation shall prevail. |
| 211 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.4.9 | Valve & Piping | PTS: M-11 Page-5 PDF file Page No. 313 of 352 | All embedded and exposed piping 25mm and above shall be of black carbon steel of minimum schedule 40. Pipe size less than 25mm shall be of minimum schedule 80. All gravity drain pipes shall be of minimum schedule 20. The piping and valves shall be in accordance with the "General Technical Specification (GTS)". All required pipes, valves, flanges, fittings, supports, fasteners, and related material shall be supplied as part of this contract. Valve body of all type of valves shall preferably be of cast steel except smaller valves (50 mm and lower) for which the material shall be stainless steel. | Mentioned schdule for cooling water piping is very much on gigher side. Kindly accept piping as per IS 1239 / IS3589 of suitable thickness to suit system pressure design requirement.<br><br>Please confirm that piping to be considered as per this specification or it is to be considered as per GTS (Clause 4.5.2 page 59/110 of pdf) as there is deviation in both the specification. | Bid stipulation shall prevail.<br>Grade of pipe shall be as per clause 11.4.9 of Vol-II, Sec-II, M-11 |
| 212 | Volume-II, Section-II, M-11, Electro Mechanical Works - Cooling Water System | 11.4.11 | Insulation For piping | PTS: M-11 Page-6 PDF file Page No. 314 of 352 | All exposed piping shall be insulated against condensation with approved type insulation/lagging with vapor proof cover. The lagging shall have adequately thick layers of bitumen primer and paints followed by non-asbestos type insulation of approved type and quality. The insulation shall further be covered / protected with multiple layers of vapor barrier insulating paints, poly urethane foam and aluminium sheet of appropriate thickness impact resistant covers made of aluminium sheet of appropriate thickness. The bends and tees shall have prefabricated section of same thickness as that of the straight sections. The cover shall be epoxy painted in accordance with approved color code. | Please recheck the requirement of insulation. Weather complete piping to be insulated agaist condensation or it shall be provided for the specific area of the plant. | Cooling water pipings shall be suiably painted, as stated elsewhere in the specification. |
| 213 | Volume-II, Section-II, M-12, Electro Mechanical Works - Drainage & Dewatering System | 12.3.1 | Unit Dewatering System | PTS: M-11 Page-3 PDF file Page No. 327 of 352 | The capacity of the dewatering pumps will be such that with the main dewatering pump working (without aid from standby pump), the turbine water passage between the downstream Main Inlet Valve and the draft tube Gate can be emptied in less than 4 (Four) hours, taking in to account maximum anticipated leakages through the Spherical Valve seals and through the Draft Tube Gate seals. | Kindly allow 6 hours time to dewater the volume between MIV & DT gate inline to the latest CEA guidelines.<br><br>(3) **Dewatering and drainage system**<br><br>(a) Submersible type of dewatering pumps shall be provided to pump out the water trapped between the penstock gate/main inlet valve and draft tube gate in case of Francis and Kaplan turbines to the dewatering sump when maintenance on the turbine of any unit is required to be carried out. The capacity of the pump shall be chosen in such a way that a single unit can be dewatered within 6 hours operation without raising the level in the sump with all pumps in operation. | Accepted. |
| 214 | | | | | Scope: Dry Type Unit Auxiliary Transformers to cater to the auxiliary load of each unit | We understand that requirement of dry type UAT mentioned in Volume II section-II E-3 clause 3.1(d) is already covered in E-6. This is not the additional requirement of UAT mentioned in E-3. Please confirm. | Confirmed. |

Auto Cad Drawing and Word file of Technical Data Sheet being large in file size is attached in Google drive link given below:

https://drive.google.com/file/d/1CRRbIP6rYEzDTumdVrLr5AGDWzifki7V/view?usp=sharing