

**Amendment –XIII dated 03.07.2023 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish “Transmission system for evacuation of power from Luhri Stage-I HEP” through tariff based competitive bidding process**

| Sl. No            | Clause No.  | Existing Provisions   | New / Revised Clause   |       |                   |                                      |                   |  |                   |                          |                   |  |                   |  |                   |   |                   |   |                   |   |  |      |       |                   |                                      |                   |  |                   |                          |                   |  |                   |  |                   |   |                   |   |                   |   |
|-------------------|---|---|--|-------|-------------------|--------------------------------------|-------------------|--|-------------------|--------------------------|-------------------|--|-------------------|--|-------------------|---|-------------------|---|-------------------|---|--|------|-------|-------------------|--------------------------------------|-------------------|--|-------------------|--------------------------|-------------------|--|-------------------|--|-------------------|---|-------------------|---|-------------------|---|
| 1.                | 2.7.1 of RFP  | The Bidders should submit the Bids online through the electronic bidding platform before the Bid Deadline i.e., on or before 1200 hours (IST) on <b>03.07.2023</b> . In addition to the online submission, the Bidder with lowest Final Offer will be required to submit original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14 before issuance of Lol  | The Bidders should submit the Bids online through the electronic bidding platform before the Bid Deadline i.e., on or before 1200 hours (IST) on <b>24.07.2023</b> . In addition to the online submission, the Bidder with lowest Final Offer will be required to submit original hard copies of Annexure 3, Annexure 4 (if applicable), Annexure 6 (if applicable) and Annexure 14 before issuance of Lol |       |                   |                                      |                   |  |                   |                          |                   |  |                   |  |                   |   |                   |   |                   |   |  |      |       |                   |                                      |                   |  |                   |                          |                   |  |                   |  |                   |   |                   |   |                   |   |
| 2.                | 2.7.2 of RFP  | Important timelines are mentioned below: <table border="1" data-bbox="371 722 1196 1316"> <thead> <tr> <th>Date</th> <th>Event</th> </tr> </thead> <tbody> <tr> <td><b>19.06.2023</b></td> <td>Issue of final RFP Project Documents</td> </tr> <tr> <td><b>03.07.2023</b></td> <td>Submission of Bid (Online submission of Bid through electronic bidding portal)</td> </tr> <tr> <td><b>03.07.2023</b></td> <td>Opening of Technical Bid</td> </tr> <tr> <td><b>11.07.2023</b></td> <td>Shortlisting and announcement of Qualified Bidders on bidding portal</td> </tr> <tr> <td><b>12.07.2023</b></td> <td>Opening of Financial Bid - Initial Offer</td> </tr> <tr> <td><b>13.07.2023</b></td> <td>Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders.</td> </tr> <tr> <td><b>18.07.2023</b></td> <td>Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer</td> </tr> <tr> <td><b>21.07.2023</b></td> <td>Selection of Successful Bidder and issue of LOI</td> </tr> </tbody> </table> | Date   | Event | <b>19.06.2023</b> | Issue of final RFP Project Documents | <b>03.07.2023</b> | Submission of Bid (Online submission of Bid through electronic bidding portal) | <b>03.07.2023</b> | Opening of Technical Bid | <b>11.07.2023</b> | Shortlisting and announcement of Qualified Bidders on bidding portal | <b>12.07.2023</b> | Opening of Financial Bid - Initial Offer | <b>13.07.2023</b> | Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders. | <b>18.07.2023</b> | Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer | <b>21.07.2023</b> | Selection of Successful Bidder and issue of LOI | Important timelines are mentioned below: <table border="1" data-bbox="1290 722 2114 1316"> <thead> <tr> <th>Date</th> <th>Event</th> </tr> </thead> <tbody> <tr> <td><b>10.07.2023</b></td> <td>Issue of final RFP Project Documents</td> </tr> <tr> <td><b>24.07.2023</b></td> <td>Submission of Bid (Online submission of Bid through electronic bidding portal)</td> </tr> <tr> <td><b>24.07.2023</b></td> <td>Opening of Technical Bid</td> </tr> <tr> <td><b>01.08.2023</b></td> <td>Shortlisting and announcement of Qualified Bidders on bidding portal</td> </tr> <tr> <td><b>02.08.2023</b></td> <td>Opening of Financial Bid - Initial Offer</td> </tr> <tr> <td><b>03.08.2023</b></td> <td>Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders.</td> </tr> <tr> <td><b>08.08.2023</b></td> <td>Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer</td> </tr> <tr> <td><b>11.08.2023</b></td> <td>Selection of Successful Bidder and issue of LOI</td> </tr> </tbody> </table> | Date | Event | <b>10.07.2023</b> | Issue of final RFP Project Documents | <b>24.07.2023</b> | Submission of Bid (Online submission of Bid through electronic bidding portal) | <b>24.07.2023</b> | Opening of Technical Bid | <b>01.08.2023</b> | Shortlisting and announcement of Qualified Bidders on bidding portal | <b>02.08.2023</b> | Opening of Financial Bid - Initial Offer | <b>03.08.2023</b> | Electronic reverse auction (Financial Bid – Final Offer) for the Qualified Bidders. | <b>08.08.2023</b> | Submission of original hard copies of Annexure 3, Annexure 4, Annexure 6, as applicable and Annexure 14 by the bidder with lowest Final Offer | <b>11.08.2023</b> | Selection of Successful Bidder and issue of LOI |
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| <b>10.07.2023</b> | Issue of final RFP Project Documents  |   |  |       |                   |                                      |                   |  |                   |                          |                   |  |                   |  |                   |   |                   |   |                   |   |  |      |       |                   |                                      |                   |  |                   |                          |                   |  |                   |  |                   |   |                   |   |                   |   |
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| .       |   | <b>31.07.2023</b>   | Signing of RFP Project Documents and transfer of Luhri Power Transmission Limited   | <b>21.08.2023</b>                | Signing of RFP Project Documents and transfer of Luhri Power Transmission Limited |   |   |  |   |         |                                  |   |   |   |  |  |  |
| 3.      | 2.13.1 of RFP   | .....<br>Opening of Envelope (Technical Bid): 1230 hours (IST) on <b><u>03.07.2023</u></b><br>.....<br>Opening of Initial Offer: Initial Offer shall be opened by the Bid Opening Committee in presence of the Bid Evaluation Committee at 1230 hours (IST) on <b><u>12.07.2023</u></b> in the office of CEA.   | .....<br>Opening of Envelope (Technical Bid): 1230 hours (IST) on <b><u>24.07.2023</u></b><br>.....<br>Opening of Initial Offer: Initial Offer shall be opened by the Bid Opening Committee in presence of the Bid Evaluation Committee at 1230 hours (IST) on <b><u>02.08.2023</u></b> in the office of CEA. |                                  |   |   |   |  |   |         |                                  |   |   |   |  |  |  |
| 4.      | Scope of Work of RFP & TSA document   | <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Scope of the Transmission Scheme</th> <th>Scheduled COD in months from Effective Date</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station along with 125 MVAR (420kV) Bus Reactor at Nange (GIS) PS(1-Ph units along with one spare unit)<br/><br/> <ul style="list-style-type: none"> <li>315MVA, 400/220kV ICT: 2 nos.</li> <li>(7x105 MVA including 1 spare ICT)</li> </ul> </td> <td><b><u>Matching time frame of Luhri Stage-I HEP i.e. 24th April, 2025</u></b></td> </tr> </tbody> </table> | Sl. No.   | Scope of the Transmission Scheme | Scheduled COD in months from Effective Date                                       | 1 | Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station along with 125 MVAR (420kV) Bus Reactor at Nange (GIS) PS(1-Ph units along with one spare unit)<br><br><ul style="list-style-type: none"> <li>315MVA, 400/220kV ICT: 2 nos.</li> <li>(7x105 MVA including 1 spare ICT)</li> </ul> | <b><u>Matching time frame of Luhri Stage-I HEP i.e. 24th April, 2025</u></b> | <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Scope of the Transmission Scheme</th> <th>Scheduled COD in months from Effective Date</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station along with 125 MVAR (420kV) Bus Reactor at Nange (GIS) PS(1-Ph units along with one spare unit)<br/><br/> <ul style="list-style-type: none"> <li>315MVA, 400/220kV ICT: 2 nos.</li> <li>(7x105 MVA including 1 spare ICT)</li> </ul> </td> <td><b><u>Matching time frame of Luhri Stage-I HEP i.e. August, 2026</u></b></td> </tr> </tbody> </table> | Sl. No. | Scope of the Transmission Scheme | Scheduled COD in months from Effective Date | 1 | Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station along with 125 MVAR (420kV) Bus Reactor at Nange (GIS) PS(1-Ph units along with one spare unit)<br><br><ul style="list-style-type: none"> <li>315MVA, 400/220kV ICT: 2 nos.</li> <li>(7x105 MVA including 1 spare ICT)</li> </ul> | <b><u>Matching time frame of Luhri Stage-I HEP i.e. August, 2026</u></b> |  |  |
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|  |   |   |  |   |   |  |
|--|---|---|--|---|---|--|
|  |   | <ul style="list-style-type: none"> <li>• 400kV ICT bays: 2 nos.</li> <li>• 220kV ICT bays: 2 nos.</li> <li>• 400 kV, 125 MVAR Bus Reactor # – 1 no.</li> <li>• 400 kV Bus Reactor bay- 1 no.</li> <li>• 400 kV Line Bays- 2 nos.</li> </ul> <p>Future provisions: Space for</p> <ul style="list-style-type: none"> <li>• 400/220kV ICTs (315 MVA with single phase units) along with associated bays: 3 nos.</li> <li>• 400 kV line bays along with switchable line reactor: 3 nos.</li> <li>• 220 kV line bays: 10 nos.</li> <li>• 220kV bus sectionalizer: 1 set</li> </ul> |  |   | <ul style="list-style-type: none"> <li>• 400kV ICT bays: 2 nos.</li> <li>• 220kV ICT bays: 2 nos.</li> <li>• 400 kV, 125 MVAR Bus Reactor # – 1 no.</li> <li>• 400 kV Bus Reactor bay- 1 no.</li> <li>• 400 kV Line Bays- 2 nos.</li> </ul> <p>Future provisions: Space for</p> <ul style="list-style-type: none"> <li>• 400/220kV ICTs (315 MVA with single phase units) along with associated bays: 3 nos.</li> <li>• 400 kV line bays along with switchable line reactor: 3 nos.</li> <li>• 220 kV line bays: 10 nos.</li> <li>• 220kV bus sectionalizer: 1 set</li> </ul> |  |
|  | 2 | Nange (GIS) Pooling Station – Koldam 400 kV D/C line (Triple snowbird) (only one circuit is to be terminated at Koldam while second circuit would be connected to bypassed circuit of Koldam – Ropar/Ludhiana 400kV D/C line)   |  | 2 | Nange (GIS) Pooling Station – Koldam 400 kV D/C line (Triple snowbird) (only one circuit is to be terminated at Koldam while second circuit would be connected to bypassed circuit of Koldam – Ropar/Ludhiana 400kV D/C line)   |  |
|  | 3 | 1 no. of 400kV line bay at Koldam S/S for termination of Nange (GIS) Pooling Station – Koldam 400 kV line along with 125 MVAR (420kV) Bus Reactor at Koldam S/s (1-Ph units along with one spare unit)  |  | 3 | 1 no. of 400kV line bay at Koldam S/S for termination of Nange (GIS) Pooling Station – Koldam 400 kV line along with 125 MVAR (420kV) Bus Reactor at Koldam S/s (1-Ph units along with one spare unit)  |  |
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|          |              |  |  |                      |                  |                 |  |
|----------|--------------|--|--|----------------------|------------------|-----------------|--|
| document | ROP-E-GA-001 | n Overall Layout - Plan                      |  |                      |                  |                 |  |
|          | ..           | .....  | .....  | .....                | .....            | .....           |  |
|          | 27           | -  | Visual Monitoring System   | -                    | -                | -               | No available in the existing substation. |
|          | .....        |  |  |                      |                  |                 |  |
|          | ROP-E-GA-001 | Overall Layout - Plan                        |  |                      |                  |                 |  |
|          | ..           | .....  | .....  | .....                | .....            | .....           |  |
|          | 27           | -  | Visual Monitoring System   | -                    | -                | -               | No available in the existing substation. |
|          | <b>28.</b>   | <b>:</b>                                     | <b><u>Soil Investigation report</u></b>                                    | <b>:</b>             | <b>:</b>         | <b>:</b>        | <b>:</b>                                 |
|          | <b>29.</b>   | <b><u>SVP0100 92-PSTCL-ROP-E-CAB-001</u></b> | <b><u>400/220 kV AIS Substation – Outdoor Area Cable trench Layout</u></b> | <b><u>1 of 1</u></b> | <b><u>R1</u></b> | <b><u>1</u></b> | <b><u>:</u></b>                          |
|          | <b>30.</b>   | <b><u>SVP0100 92-PSTCL-ROP-E-CAB-003</u></b> | <b><u>400/220 kV AIS Substation – Detail for Cable trench Sections</u></b> | <b><u>1 of 2</u></b> | <b><u>R0</u></b> | <b><u>1</u></b> | <b><u>:</u></b>                          |
|          | <b>31.</b>   | <b><u>SVP0100 92-PSTCL-</u></b>              | <b><u>400/220 kV AIS Substation – Detail for</u></b>                       | <b><u>1 of 1</u></b> | <b><u>R0</u></b> | <b><u>1</u></b> | <b><u>:</u></b>                          |



|   |  |  | <u>Technical Requirements (GTR)</u>  |  |  |  |
|---|--|--|--|--|--|--|
|   |  |  |  |  |  |  |
| 6 | Specific technical requirement of Substation of RfP & TSA document | <p><b>B.3.6 GIS hall</b></p> <p>The Gas Insulated Switchgear (GIS) of each voltage along with other associated equipment shall be housed inside the GIS building separately. The panels i.e. Bay level units, bay mimic, relay and protection panels, RTCC panels, PLCC panels, panels for telecommunication system etc. are to be placed in a separate room in the GIS building. The size of the room shall be such that all the panels for the bays under present scope shall be accommodated. The panel room shall be air-conditioned. Further, the temperature of the room shall be monitored through substation automation system by providing necessary temperature transducers. Ventilation system of suitable capacity shall be provided for each GIS hall.</p> <p>One EOT Crane of suitable capacity for erection &amp; Maintenance of largest GIS component/assembly and all plant installed in the GIS switchgear room shall be provided in each GIS hall. The crane shall be capable of fulfilling all special requirements for erection &amp; maintenance of GIS equipment. The capacity of the crane shall be sized to lift the heaviest GIS switchgear component.</p> | <p><b>B.3.6 GIS hall</b></p> <p>The Gas Insulated Switchgear (GIS) of each voltage along with other associated equipment shall be housed inside the GIS building separately. The panels i.e. Bay level units, bay mimic, relay and protection panels, RTCC panels, PLCC panels, panels for telecommunication system etc. are to be placed in a separate room in the GIS building. The size of the room shall be such that all the panels for the bays under present scope shall be accommodated. The panel room shall be air-conditioned. Further, the temperature of the room shall be monitored through substation automation system by providing necessary temperature transducers. Ventilation system of suitable capacity shall be provided for each GIS hall.</p> <p>One EOT Crane of suitable capacity for erection &amp; Maintenance of largest GIS component/assembly and all plant installed in the GIS switchgear room shall be provided in each GIS hall. The crane shall be capable of fulfilling all special requirements for erection &amp; maintenance of GIS equipment. The capacity of the crane shall be sized to lift the heaviest GIS switchgear component.</p> |  |  |  |

|   |   |  |  |
|---|---|--|--|
|   |   |  | <p><b><u>Further, space for 06 nos. 220kV line bays alongwith space for bus extension module including space for associated line and communication panels for termination of line from generating station shall be kept in the 220kV GIS building to be constructed under present scope.</u></b></p> <p><b><u>Both the 400kV &amp; 220kV GIS building shall be suitable for expansion such that future adjacent GIS bays can be installed from either side of GIS building as per layout requirement.</u></b></p>  |
| 7 | SPECIFIC TECHNICAL REQUIREMENTS FOR SUBSTATION of RFP & TSA documents | <p>B.4.0 General Facilities</p> <p>.....</p> <p><b><u>h) New Point inserted.</u></b></p> | <p>B.4.0 General Facilities</p> <p>.....</p> <p><b><u>h) At 400 kV Koldam S/s, following to be noted:</u></b></p> <ol style="list-style-type: none"> <li><b><u>1. Sufficient space is available in around Bay- 13 to place three nos 1-ph units of bus reactors (125 MVA) along with one 1-ph spare reactor.</u></b></li> <li><b><u>2. For transportation and maintenance of the bus reactor, construction of inter connection road from peripheral road to internal road of switchyard and construction of rail cum road from internal road of switchyard at Bay-13 to bus reactor including spare unit shall be in TSP scope. Drawing indicating the scope of road and rail cum road is attached at Appendix C.</u></b></li> <li><b><u>3. The existing HVW fire fighting system is not adequate for providing extension of fire fighting header line for the bus reactor in the RFP scope. TSP shall install separate firefighting system or augment at existing firefighting system as per Central Electricity Authority (Measures</u></b></li> </ol> |

|   |   |  | <p><u>relating to Electricity Supply and Security) Regulations, 2023 and amendment thereof.</u></p> <p>4. <u>The existing unused bay equipment's of Bay No: 13 shall be dismantled and handed over to NTPC. Necessary bay control and protection panels for the 125 MVar bus reactor (bay#13) including integration with existing SAS shall be in TSP scope.</u></p> <p>5. <u>TSP to ensure that the availability of at least one line (Koldam-Ludhiana 400 kV line) shall be maintained during the construction of Nange-Koldam S/C line and also bypassing of existing Ludhiana line. TSP to plan the implementation works in such a way that availability of the transmission system is hampered at the minimum.</u></p> |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
|---|---|--|---|---------------------------|----------------------------|--|---------------|---------------|----|--------------------------|-------|-------|----|-------------------------------------|-------|-------|----|-----------------|------|------|----|--------------|---|---|----|-------------------------|--|--|----|---|---------|---------|--|--------|---------------------------|----------------------------|--|--------------------------|---------------|---------------|----------------------|----|--------------------------|-------|-------|--------------|----|-------------------------------------|-------|-------|--------------|----|-----------------|-------|------|-------------|----|--------------|---|---|----------|----|-------------------------|--|--|--|
| Specific technical requirement of Substation of RfP & TSA documents |   | <p><b>B.1.1 Insulation Coordination</b></p> <p>The system design parameters for substations/switchyards shall be as given below:</p> <table border="1" data-bbox="338 847 1189 1409"> <thead> <tr> <th rowspan="2">Sl. No</th> <th rowspan="2">Description of parameters</th> <th colspan="2">400/220kV Nange substation</th> </tr> <tr> <th>400 kV System</th> <th>220 kV System</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>System operating voltage</td> <td>400kV</td> <td>220kV</td> </tr> <tr> <td>2.</td> <td>Maximum voltage of the system (rms)</td> <td>420kV</td> <td>245kV</td> </tr> <tr> <td>3.</td> <td>Rated frequency</td> <td>50Hz</td> <td>50Hz</td> </tr> <tr> <td>4.</td> <td>No. of phase</td> <td>3</td> <td>3</td> </tr> <tr> <td>5.</td> <td>Rated Insulation levels</td> <td></td> <td></td> </tr> <tr> <td>i)</td> <td>Impulse withstand voltage for (1.2/50 micro sec.)<br/>- Equipment Other than Transformer</td> <td>1425kVp</td> <td>1050kVp</td> </tr> </tbody> </table> | Sl. No  | Description of parameters | 400/220kV Nange substation |  | 400 kV System | 220 kV System | 1. | System operating voltage | 400kV | 220kV | 2. | Maximum voltage of the system (rms) | 420kV | 245kV | 3. | Rated frequency | 50Hz | 50Hz | 4. | No. of phase | 3 | 3 | 5. | Rated Insulation levels |  |  | i) | Impulse withstand voltage for (1.2/50 micro sec.)<br>- Equipment Other than Transformer | 1425kVp | 1050kVp | <p><b>B.1.1 Insulation Coordination</b></p> <p>The system design parameters for substations/switchyards shall be as given below:</p> <table border="1" data-bbox="1256 887 2141 1366"> <thead> <tr> <th rowspan="2">Sl. No</th> <th rowspan="2">Description of parameters</th> <th colspan="2">400/220kV Nange substation</th> <th><u>Koldam substation</u></th> </tr> <tr> <th>400 kV System</th> <th>220 kV System</th> <th><u>400 kV System</u></th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>System operating voltage</td> <td>400kV</td> <td>220kV</td> <td><u>400kV</u></td> </tr> <tr> <td>2.</td> <td>Maximum voltage of the system (rms)</td> <td>420kV</td> <td>245kV</td> <td><u>420kV</u></td> </tr> <tr> <td>3.</td> <td>Rated frequency</td> <td>50 Hz</td> <td>50Hz</td> <td><u>50Hz</u></td> </tr> <tr> <td>4.</td> <td>No. of phase</td> <td>3</td> <td>3</td> <td><u>3</u></td> </tr> <tr> <td>5.</td> <td>Rated Insulation levels</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Sl. No | Description of parameters | 400/220kV Nange substation |  | <u>Koldam substation</u> | 400 kV System | 220 kV System | <u>400 kV System</u> | 1. | System operating voltage | 400kV | 220kV | <u>400kV</u> | 2. | Maximum voltage of the system (rms) | 420kV | 245kV | <u>420kV</u> | 3. | Rated frequency | 50 Hz | 50Hz | <u>50Hz</u> | 4. | No. of phase | 3 | 3 | <u>3</u> | 5. | Rated Insulation levels |  |  |  |
| Sl. No  | Description of parameters   | 400/220kV Nange substation   |   |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
|   |   | 400 kV System  | 220 kV System   |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 1.  | System operating voltage  | 400kV  | 220kV   |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 2.  | Maximum voltage of the system (rms)   | 420kV  | 245kV   |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 3.  | Rated frequency   | 50Hz   | 50Hz  |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 4.  | No. of phase  | 3  | 3   |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 5.  | Rated Insulation levels   |  |   |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| i)  | Impulse withstand voltage for (1.2/50 micro sec.)<br>- Equipment Other than Transformer | 1425kVp  | 1050kVp   |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| Sl. No  | Description of parameters   | 400/220kV Nange substation   |   | <u>Koldam substation</u>  |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
|   |   | 400 kV System  | 220 kV System   | <u>400 kV System</u>      |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 1.  | System operating voltage  | 400kV  | 220kV   | <u>400kV</u>              |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 2.  | Maximum voltage of the system (rms)   | 420kV  | 245kV   | <u>420kV</u>              |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 3.  | Rated frequency   | 50 Hz  | 50Hz  | <u>50Hz</u>               |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 4.  | No. of phase  | 3  | 3   | <u>3</u>                  |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |
| 5.  | Rated Insulation levels   |  |   |                           |                            |  |               |               |    |                          |       |       |    |                                     |       |       |    |                 |      |      |    |              |   |   |    |                         |  |  |    |   |         |         |  |        |                           |                            |  |                          |               |               |                      |    |                          |       |       |              |    |                                     |       |       |              |    |                 |       |      |             |    |              |   |   |          |    |                         |  |  |  |

|  |      |  |                              |                              |  |  |  |  |   |
|--|------|--|------------------------------|------------------------------|--|--|--|--|---|
|  |      | and Reactors<br>- for Insulator String   | 1550kVp                      | 1050kVp                      |  |  |  |  |   |
|  | ii)  | Switching impulse withstand voltage (250/2500 micro sec.) dry and wet  | 1050kVp                      | -                            |  |  |  |  | <b><u>1425kVp</u></b>                     |
|  | iii) | One minute power frequency dry withstand voltage (rms)   | <b><u>6650kV</u></b>         | -                            |  |  |  |  | <b><u>1050kVp</u></b>                     |
|  | iv)  | One minute power frequency dry and wet withstand voltage (rms)   | -                            | 460kV                        |  |  |  |  |   |
|  | 6.   | Corona extinction voltage  | 320kV                        | -                            |  |  |  |  |   |
|  | 7.   | Max. radio interference voltage for frequency between 0.5 MHz and 2MHz   | 1000 microvolts at 266kVrms  | 1000 microvolts at 156kVrms  |  |  |  |  |   |
|  | 8.   | Minimum creepage distance for insulator string/ longrod insulators/ outdoor bushings   | 13020 mm (31mm/kV)           | 7595 mm (31mm/kV)            |  |  |  |  |   |
|  | 9.   | Minimum creepage distance for switchyard equipment   | 10500mm (25mm/kV)            | 6125 mm (25mm/kV)            |  |  |  |  |   |
|  | 10.  | Max. fault current   | 63kA                         | 50kA                         |  |  |  |  |   |
|  | 11.  | Duration of fault  | 1 sec                        |                              |  |  |  |  |   |
|  | i)   | Impulse withstand voltage for (1.2/50 micro sec.)<br>- Equipment Other than Transformer and Reactors<br>- for Insulator String | 1425kVp                      | 1050kVp                      |  |  |  |  | <b><u>1550kVp</u></b>                     |
|  | ii)  | Switching impulse withstand voltage (250/2500 micro sec.) dry and wet  | 1050kVp                      | -                            |  |  |  |  | <b><u>1050kVp</u></b>                     |
|  | iii) | One minute power frequency dry withstand voltage (rms)   | <b><u>630kV</u></b>          | -                            |  |  |  |  | <b><u>630kV</u></b>                       |
|  | iv)  | One minute power frequency dry and wet withstand voltage (rms)   | -                            | 460kV                        |  |  |  |  | <b><u>:</u></b>                           |
|  | 6.   | Corona extinction voltage  | 320kV                        | -                            |  |  |  |  | <b><u>320kV</u></b>                       |
|  | 7.   | Max. radio interference voltage for frequency between 0.5 MHz and 2 MHz  | 1000 microvolts at 266kV rms | 1000 microvolts at 156kV rms |  |  |  |  | <b><u>1000 microvolts at 266kVrms</u></b> |
|  | 8.   | Minimum creepage distance for insulator string/ longrod insulators/ outdoor bushings   | 13020 mm (31mm/kV)           | 7595 mm (31mm/kV)            |  |  |  |  | <b><u>13020 mm (31mm/kV)</u></b>          |
|  | 9.   | Minimum creepage   | 10500m                       | 6125                         |  |  |  |  | <b><u>10500mm</u></b>                     |

|  |  |  |  |   |                    |                     |                     |                     |
|--|--|--|--|---|--------------------|---------------------|---------------------|---------------------|
|  |  |  |  | distance for<br>switchyard<br>equipment | m<br>(25mm/k<br>V) | mm<br>(25mm/k<br>V) | <b>(25mm/kV)</b>    |                     |
|  |  |  |  | 10.                                     | Max. fault current | 63kA                | 50kA                | <b><u>63kA*</u></b> |
|  |  |  |  | 11.                                     | Duration of fault  | 1 sec               | <b><u>1 Sec</u></b> | <b><u>1 sec</u></b> |
| <p><i>Note: *63KA shall be considered for equipment rating only.</i></p> |  |  |  |   |                    |                     |                     |                     |