

Amendment-V dated 04.05.2022 on the Request for Proposal Document and Transmission Service Agreement issued for selection of bidder as Transmission Service Provider to establish “System Strengthening Scheme for Eastern and North Eastern Regions” through tariff based competitive bidding process

Sl No.	Clause No.	Existing Provision	New / Revised Clause
1	Clause No 6 of Annexure C of Technical Specifications of Transmission System in RFP & TSA	6. A) For power line crossing of 400 kV or above voltage level, if crossed over & above the existing line, large angle & dead end towers (i.e. D/DD/QD) shall be used on either side of power line crossing.	6. A) For power line crossing of 400 kV or above voltage level, if crossed over the existing line, large angle & dead end towers (i.e. D/DD/QD) shall be used on either side of power line crossing.
2	Clause No 2.3.5 of Annexure C of Special Technical Requirement for Substation in RFP & TSA	New Clause Inserted	<u>Surge Arresters (GIS)</u> <u>For 245 kV system, 216 kV Station Medium (SM) class gapless type Surge arresters conforming to IEC 60099-4 in general shall be provided. Other characteristics of Surge arrester shall be chosen in accordance with system requirements. Surge arresters shall be provided at line entrances, near transformers & Reactor so as to achieve proper insulation coordination. A leakage current monitor with surge counter shall be provided with each surge arrester.</u>
3	New Clause No 2.3.6 of Annexure C of Special Technical Requirement for Substation	<u>SF6 to Air Bushing</u> 	<u>SF6 to Air Bushing</u>

	in RFP & TSA		
4	Clause No 2.5 of Annexure C of Special Technical Requirement for Substation in RFP & TSA	<p>Protection Relaying & Control System</p> <p>The protective relaying system proposed to be provided for transmission lines, auto-transformers, reactors and bus bars to minimize the damage to the equipment in the events of faults and abnormal conditions, is dealt in this section. All main protective relays shall be numerical type with IEC 61850 communication interface and should have Interoperability during integration of numerical relays to communicate over IEC61850 protocol with RTU/SAS/IEDs of different OEMs. All numerical relays shall have in-built disturbance recording feature.</p> <p>.....</p>	<p>Protection Relaying & Control System</p> <p>The protective relaying system proposed to be provided for transmission lines, auto-transformers, reactors and bus bars to minimize the damage to the equipment in the events of faults and abnormal conditions, is dealt in this section. All main protective relays shall be numerical type with IEC 61850 communication interface <u>and should have Interoperability during integration of numerical relays to communicate over IEC61850 protocol with RTU/SAS/IEDs of different OEMs</u> and should have Interoperability during integration of numerical relays to communicate over IEC61850 protocol with RTU/SAS/IEDs of different OEMs. All numerical relays shall have in-built disturbance recording feature.</p> <p>.....</p>
5	Clause No 3.1 of Annexure C of Special Technical Requirement for Substation in RFP & TSA	<p>AC & DC power supplies</p> <p>.....</p> <p>(ii) Banka Substation Extension:</p> <p>2 sets of 220V battery banks for control & protection and 2 sets of 48 V battery banks for PLCC/ communication equipment shall be provided for extension of Banka substation. Each battery bank shall have a float-cum-boost charger. Battery shall be of VRLA type.</p>	<p>AC & DC power supplies</p> <p>.....</p> <p>(ii) Banka Substation Extension:</p> <p>2 sets of 220V battery banks for control & protection and 2 sets of 48 V battery banks for PLCC/ communication equipment shall be provided for extension of Banka substation. Each battery bank shall have a float-cum-boost charger. Battery shall be of VRLA type. <u>Sizing of</u></p>

		<p style="text-align: center;">Namsai Substation Extension:</p> <p>Existing 110V battery banks and battery chargers for control & protection system and 48V battery banks for PLCC/ communication equipment shall be replaced with required size of battery and battery chargers to cater the existing, the present scope and future scope of the substation. Each battery bank shall have a float-cum-boost charger. Battery shall be of VRLA type.</p> <p>.....</p>	<p><u>220 V battery and battery charger for control and protection shall be done based on the number of bays specified (including future bays) and computation of capacity of battery shall be as per CEA (Technical Standards for construction of Electrical plants and Electrical Lines) Regulation no. 43(3) (a)(i). 48 V battery bank shall have at least 10 hour battery backup.</u></p> <p style="text-align: center;">Namsai Substation Extension:</p> <p>Existing 110V battery banks and battery chargers for control & protection system and 48V battery banks for PLCC/ communication equipment shall be replaced with required size of battery and battery chargers to cater the existing, the present scope and future scope of the substation. Each battery bank shall have a float-cum-boost charger. Battery shall be of VRLA type. <u>Computation of capacity of battery for control and protection shall be as per CEA (Technical Standards for construction of Electrical plants and Electrical Lines) Regulation no. 43(3) (a)(i). 48 V battery bank shall have at least 10 hour battery backup.</u></p> <p>.....</p>
6	Clause No 1.0 of Annexure C of Special Technical	<p>.....</p> <p>(v) The integration of new communication equipment under present scope with existing</p>	<p>.....</p> <p>(v) The integration of new communication equipment under present scope with existing</p>

	Requirement for Communication in RFP & TSA	regional level centralized NMS shall be the responsibility of TSP. Configuration work in existing centralized NMS for integration of new Communication equipment is not in scope of TSP and shall be carried out by respective regional ULDC, however all necessary support to integrate new Communication equipment with the Centralized NMS shall be ensured by TSP.	regional level centralized NMS shall be the responsibility of TSP. Configuration work in existing centralized NMS for integration of new Communication equipment is not in scope of TSP <u>and shall be carried out by respective regional ULDC</u> , however all necessary support to integrate new Communication equipment with the Centralized NMS shall be ensured by TSP.
7	Clause No 2.0 of Annexure C of Special Technical Requirement for Communication in RFP & TSA	Kathalguri (NEEPCO) - Namsai (PG) 220kV D/C line On Kathalguri – Namsai 220kV D/c line one (1) no. OPGW cable containing 24 Fibres (24F) is to be installed & commissioned by the TSP on <u>one</u> E/W peak <u>in place of conventional earth wire.</u> The TSP shall install this OPGW from gantry of Kathalguri up to the gantry of Namsai (PG) S/s with all associated hardware including Vibration Dampers, mid-way Joint Boxes and finally termination in Joint Boxes (called OPGW Hardware hereafter) ends Substations. Repeater equipment is not envisaged for the Kathalguri (NEEPCO) – Namsai (PG) 220kV D/C line.	Kathalguri (NEEPCO) - Namsai (PG) 220kV D/C line On Kathalguri – Namsai 220kV D/c line one (1) no. OPGW cable containing 24 Fibres (24F) is to be installed & commissioned by the TSP on <u>the</u> E/W peak. The TSP shall install this OPGW from gantry of Kathalguri up to the gantry of Namsai (PG) S/s with all associated hardware including Vibration Dampers, mid-way Joint Boxes and finally termination in Joint Boxes (called OPGW Hardware hereafter) ends Substations. Repeater equipment is not envisaged for the Kathalguri (NEEPCO) – Namsai (PG) 220kV D/C line.
8	Clause No 3.0 of Annexure C of Special Technical Requirement for	Upgradation of existing 132kV Namsai (POWERGRID) S/s to 220 kV (with 220kV side as GIS)	Upgradation of existing 132kV Namsai (POWERGRID) S/s to 220 kV (with 220kV side as GIS)

	Communication in RFP & TSA	<p><u>(iv) The FOTE mentioned above in (II) shall be integrated by TSP with the FOTE at Control room which is envisaged to communicate with respective control center.</u></p> <p>(v) The integration of new communication equipment under present scope with exiting regional level centralized NMS shall be the responsibility of TSP. Configuration work in existing centralized NMS for integration of new Communication equipment is not in scope of TSP, however all necessary support to integrate new Communication equipment with the Centralized NMS shall be ensured by TSP.</p> <p>(vi) The maintenance of all the communication equipment including FOTE, FODP, approach cable, DCPS alongwith Battery Bank shall be the responsibility of TSP.</p>	<p>(iv) The integration of new communication equipment under present scope with exiting regional level centralized NMS shall be the responsibility of TSP. Configuration work in existing centralized NMS for integration of new Communication equipment is not in scope of TSP <u>and shall be carried out by respective regional ULDC</u>, however all necessary support to integrate new Communication equipment with the Centralized NMS shall be ensured by TSP.</p> <p>(v) The maintenance of all the communication equipment including FOTE, FODP, approach cable, DCPS alongwith Battery Bank shall be the responsibility of TSP.</p>
9	Clause No 4.0 of Annexure C of Special Technical Requirement for Communication in RFP & TSA	<p>Extension at Kathalguri (NEEPCO) switchyard: 2 nos. of GIS line bays for termination of Kathalguri (NEEPCO) - Namsai (POWERGRID) 220 kV D/C line</p> <p>.....</p> <p>(v) The integration of new communication equipment under present scope with existing regional level centralized NMS shall be the responsibility of TSP. Configuration work in existing centralized NMS for integration of new Communication equipment is not in scope of TSP, however all necessary support to integrate new Communication equipment with the Centralized</p>	<p>Extension at Kathalguri (NEEPCO) switchyard: 2 nos. of GIS line bays for termination of Kathalguri (NEEPCO) - Namsai (POWERGRID) 220 kV D/C line</p> <p>.....</p> <p>(v) The integration of new communication equipment under present scope with existing regional level centralized NMS shall be the responsibility of TSP. Configuration work in existing centralized NMS for integration of new Communication equipment is not in scope of TSP <u>and shall be carried out by respective regional ULDC</u>, however all necessary support to integrate</p>

		NMS shall be ensured by TSP.	new Communication equipment with the Centralized NMS shall be ensured by TSP.
10	RFP & TSA	<p>SPECIAL TECHNICAL REQUIREMENT FOR SUBSTATION</p> <p>Details with respect to Kathalguri (NEEPCO) Substation</p> <ol style="list-style-type: none"> 1. <u>Space for construction of 220kV line bays is available for 01 (one) no. Ckt (wide around 14M in approx.). In case of further extension, the old maintenance building needs to be dismantled/ demolished by the TSP.</u> 2. <u>No spare capacity in the existing LT transformer.</u> 3. <u>No spare feeders are available in the existing ACDB & DCDB.</u> 4. <u>Battery Bank with adequate capacity needs to be installed / provided separately for operation of the proposed bays.</u> 5. <u>No spare available in the existing bus bar protection.</u> 6. <u>The existing fire hydrant system could not be extended for the proposed bays.</u> 	<p>SPECIAL TECHNICAL REQUIREMENT FOR SUBSTATION</p> <p>Details with respect to Kathalguri (NEEPCO) Substation</p> <ol style="list-style-type: none"> 1. <u>Space availability for additional bays (under present scope of work) is approximately 20x70 m² (without dismantling major structure). In case of further extension, the old maintenance building needs to be dismantled/ demolished by the TSP thereafter making the available space to be approximately 35x75 m².</u> 2. <u>No spare capacity is available in the existing LT transformer. Out of the 4 Nos. of 2 MVA, 6.6/0.433 kV Transformers, the two transformers (having emergency DG supply for essential load) shall be upgraded to higher capacity to cater to the load requirement of all the bays. The existing foundation shall be modified accordingly by TSP, if needed.</u> 3. <u>No spare feeders are available in the existing ACDB. TSP to install additional</u>

Developer shall install a new firefighting system for the proposed bays.

7. Additional module/panel needs to be installed for data telemetry (Real time data) for the proposed bays.

SI No.	Drawing Title
1	General Arrangement Drawing
2	Single Line Diagram
3	Layout Drawing
4	Plant Layout
5	Earth mesh Layout
6	Structural Layout/ Drawing
7	Trench Layout
8	Lighting Mast Details
9	Beam Details
10	Column Details
11	CT Details
12	VT Details
13	Isolator/CT/Arresters Details
14	Switchyard Details (Site Data)

Note: Bidders are also advised themselves to visit Kathalguri S/s to acquaint themselves with the existing system and facilities.

panels in existing ACDB for the additional bays (under present scope of work) as there are no additional feeders available. For DCDB (220V and 48V) TSP shall make use of the available feeders in the existing DCDB.

4. Existing 220 V battery banks and battery chargers for control & protection system and 48 V battery banks for PLCC/ communication equipment shall be replaced with required size of battery and battery chargers to cater the existing, the present scope and future scope of the substation. Each battery bank shall have a float-cum-boost charger. Battery shall be of VRLA type.

5. TSP to replace existing Static type Bus bar protection system with numerical Bus Bar protection system for existing and present scope.

6. TSP to tap/extend firefighting system from fire hydrant pipe available at GT-9 unit. Any additional firefighting system, if needed, may be provided by TSP for present scope.

7. TSP shall house Control, Relay and RTU panel for additional bays in main control

			<p align="center"><u>room of NEEPCO.</u></p> <table border="1"> <thead> <tr> <th align="center">SI No.</th> <th align="center">Drawing Title</th> </tr> </thead> <tbody> <tr><td align="center">1</td><td>General Arrangement Drawing</td></tr> <tr><td align="center">2</td><td>Single Line Diagram</td></tr> <tr><td align="center">3</td><td>Layout Drawing</td></tr> <tr><td align="center">4</td><td>Plant Layout</td></tr> <tr><td align="center">5</td><td>Earth mesh Layout</td></tr> <tr><td align="center">6</td><td>Structural Layout/ Drawing</td></tr> <tr><td align="center">7</td><td>Trench Layout</td></tr> <tr><td align="center">8</td><td>Lighting Mast Details</td></tr> <tr><td align="center">9</td><td>Beam Details</td></tr> <tr><td align="center">10</td><td>Column Details</td></tr> <tr><td align="center">11</td><td>CT Details</td></tr> <tr><td align="center">12</td><td>VT Details</td></tr> <tr><td align="center">13</td><td>Isolator/CT/Arresters Details</td></tr> <tr><td align="center">14</td><td>Switchyard Details (Site Data)</td></tr> </tbody> </table> <p>Note: Bidders are also advised themselves to visit Kathalguri S/s to acquaint themselves with the existing system and facilities.</p>	SI No.	Drawing Title	1	General Arrangement Drawing	2	Single Line Diagram	3	Layout Drawing	4	Plant Layout	5	Earth mesh Layout	6	Structural Layout/ Drawing	7	Trench Layout	8	Lighting Mast Details	9	Beam Details	10	Column Details	11	CT Details	12	VT Details	13	Isolator/CT/Arresters Details	14	Switchyard Details (Site Data)
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11	New Clause in RFP & TSA	<p align="center">SPECIAL TECHNICAL REQUIREMENT FOR COMMUNICATION</p> <p align="center">.....</p>	<p align="center">SPECIAL TECHNICAL REQUIREMENT FOR COMMUNICATION</p> <p align="center">.....</p> <p><u>6.0 Next Generation Firewall (NGFW) Requirement</u></p> <p><u>- TSP shall provide 2 nos. Next Generation</u></p>																														

			<p><u>Firewalls (NGFW); one No. Main & one No. Standby having electrical ethernet interfaces/ports and placed between FOTE & SAS gateway/s at the substation. All ethernet based applications (e.g. PMU, AMR, VOIP, SAS/SCADA etc.) shall be terminated in the firewall ports directly. Each port of firewall shall work as a separate zone. Firewall shall be hardware based with functionality of Block/Allow/drop and IPSec VPN (network encryption).</u></p> <ul style="list-style-type: none"> - <u>Minimum 16 Nos. of ports/interfaces shall be provided in each firewall (i.e. Main & Standby) TSP can use either single firewall or multiple firewalls to meet this interfaces requirement, each for main as well as standby firewall. Minimum throughput of firewall shall be 300 Mbps.</u> - <u>The Firewall shall be managed/ configured as standalone at present and shall also have compatibility to manage/configure through Centralized Management Console (CMC) remotely in future.</u> - <u>OEM Support on 24x7 basis for 7 years shall be provided for all the functions & features of the Firewall.</u> - <u>Firewall shall be tested and certified for ISO15408 Common Criteria for least</u>
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			<p><u>EAL4+. Further, the OEM must certify that it conforms to Secure Product Development Life Cycle requirements as per IEC62443-4-1. The firewall shall generate reports for NERC-CIP Compliance.</u></p> <p>- <u>The specifications for the firewalls are given at Annexure-F.1 and schematic diagram showing firewall placement given at Figure F.1 is placed at Appendix B.</u></p>
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Appendix B

Annexure F.1

Specifications of Next Generation Firewall (NGFW)

1. NGFW shall have following features including but not limited to:
Encryption through IPsec VPN (Virtual Private Network), Deep Packet Inspection (DPI), Denial of service (DoS) & Distributed Denial of Service (DDoS) prevention, Port Block/Allow, rules/ policies for block/allow, IP (Internet Protocol) & Media Access Control (MAC) spoofing protection, threat detection, Intrusion Prevention System (IPS), Anti-Virus, Anti-Spyware, Man In The Middle (MITM) attack prevention.
2. The proposed firewall shall be able to handle (alert, block or allow) unknown /unidentified applications e.g. unknown TCP & UDP packets. It shall have the provision to define application control list based on application group and/or list.
3. Firewall shall have feature and also have capability to update the definition/ Signatures of Anti-Virus online as well as offline. Firewall shall also be compatible to update the definitions/signatures through CMC. There shall be a defined process for security patching and firmware up-gradation. There shall be a feature to field validate firmware checksum. The same shall also be validated before using the OEM provided file/binary in the process of firmware up-gradation and security patching
4. Firewall shall have Management Console port to configure remotely.
5. Firewall shall be EMI/EMC compliant in Substation environment as per IEC 61850-3.
6. Firewall shall be rack mounted in existing standard equipment cabinets.
7. Firewall shall have support of SCADA applications (IEC-60870-5-104), IEC, PMU (IEEE C37.118), Sub-Station Automation System (IEC 61850), Ethernet and other substation environment protocols.
8. Client based Encryption/ VPN must support different Operating System platforms e.g. Windows, Linux & Mac.
9. The solution must have content and comprehensive file detection policies, blocking the files as function of their types, protocols and directions.
10. Firewall shall have logging facility as per standard logs/events format. Firewall shall have features to export the generated/stored logs/events in csv (Comma Separated Value) and also any other standard formats for offline usage, analysis and compliance. Firewall shall have suitable memory architecture and solution to store and be able to export all logs/events for a period of last 90 days at any given time.
11. Firewall shall have features and be compatible with local as well as central authentication system (RADIUS, LDAP, or TACACS+) for user account and access right management. It shall also have Role Based User management feature.
12. Firewall shall have the capability to configure sufficient number of VLANs.
13. Firewall shall have the capability to support sufficient number of sessions.
14. Firewall shall have provision to configure multiple IP Sec VPNs, at least 100 nos., (one-to-many or many-to-one). Shall support redundant operation with a similar router after creation of all the IP Sec VPN. IPsec VPN shall be with encryption protocols as AES128, AES256 and hashing algorithms as MD5 and SHA1. IPsec VPN throughput shall be at least 300 Mbps
15. Firewall shall be capable of SNMP v3 for monitoring from Network Management system. It shall also have SNMPv3 encrypted authentication and access security
16. Firewall shall operate in Active/Passive or Active-Active mode with High Availability features like load balancing, failover for firewall and IPsec VPN without losing the session connectivity.
17. Firewall should have integrated traffic shaping (bandwidth, allocation, prioritisation, etc.) functionality
18. Shall support simultaneous operation with both IPv4 and IPv6 traffic

19. Firewall shall be compatible with SNTP/NTP or any other standards for clock synchronization
20. Firewall shall have the features of port as well as MAC based security
21. Firewall shall support exporting of logs to a centralized log management system (e.g. syslog) for security event and information management.
22. Firewall time shall be kept synchronised to official Indian Timekeeping agency, time.nplindia.org.
23. Firewall product shall be provided with all applicable updates at least until 36 months since the applicable date of product shipping to the concerned utility.

Figure F.1

Firewall Placement Diagram

