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## **VOLUME-II**

### **TECHNICAL SPECIFICATION (PART-B)**

#### **FOR**

**Substation portion under Reconductoring Package-OH01 for 400kV Bays upgradation at Samba (POWERGRID) & Kishenpur (POWERGRID) Substations under “Transmission Scheme for evacuation of power from Ratle HEP (800MW) & Kiru HEP (624MW)” : Part B to be developed under RTM mode.**

**POWERGRID CORPORATION OF INDIA LTD.  
(A Government of India Enterprises)**

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## SECTION-PROJECT

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## SECTION-PROJECT

### 1.0 GENERAL

1.1 Power Grid Corporation of India Limited (POWERGRID), a Govt. of India Enterprise is responsible for bulk Power transmission of electrical energy from various Central Govt. Power Projects to various utilities/beneficiaries and interconnecting regional grids, operating and maintaining the National electrical grid of India. It is established with mandate of "We will become a Global Transmission Company with Dominant Leadership in Emerging Power Markets with World Class Capabilities by:

- World Class: Setting superior standards in capital project management and operations for the industry and ourselves.
- Global: Leveraging capabilities to consistently generate maximum value for all stakeholders in India and in emerging and growing economies.
- Inspiring, nurturing and empowering the next generation of professionals.
- Achieving continuous improvements through innovation and state of the art technology.
- Committing to highest standards in health, safety, security and environment." as its mission.

1.2 POWERGRID is undertaking the implementation of following transmission system under RTM route:

#### **Transmission Scheme for evacuation of power from Ratle HEP (800MW) & Kiru HEP (624MW)" : Part B**

The following ISTS elements are envisaged under above said Transmission System

#### **I. Transmission Line Part**

- i) Reconductoring of 400kV (Twin Zebra) Kishenpur –Kishtwar Section (up to LILO Point) with Twin HTLS (2100 MVA) (formed after LILO of Kishenpur-Dulhasti line at Kishtwar S/s)
- ii) Bypassing both ckts of 400kV Kishenpur –Samba D/c line (Twin) & 400kV Samba – Jalandhar D/c line (Twin) (0.5 km) at Samba and connecting them together to form 400kV Kishenpur-Jalandhar D/c direct line (Twin)

#### **II. Substation Bay Upgradation**

- i) **Upgradation of existing 4 Nos. of 400kV Bays from 2000A to 3150A at Samba S/S {Vacated after bypassing of 400kV Kishenpur-Samba D/C & 400kV Jalandhar - Samba D/C Line}.**
- ii) **Upgradation of existing 1 No. of 400kV Bay from 2000A to 3150A at Kishenpur S/S for 400kV Kishenpur-Kishtwar T/L**

#### **III. Communication System**

- i) Redundant Communication System for Dulhasti (NHPC) & Kishtwar (Sterlite) stations by installing OPGW on 400kV Kishenpur – Kishtwar S/c Line and FOTE at Dulhasti & Kishenpur.

This specification (Part-B) covers the Substation bay upgradation works(1.2 II above). For the Transmission Line Part associated with Reconductoring Package OH01, the detail scope & technical requirement are given in separate section of technical specification (Part-A).

- 1.3 It is the intent of this specification to describe primary features, materials, and design & performance requirements and to establish minimum standards for the work. The specification is not intended to specify the complete details of various practices of manufactures/ bidders, but to specify the requirements with regard to performance, durability and satisfactory operation under the specified site conditions.
- 1.4 The work to be done under this specification shall include all labour, plant, equipment, material and performance of all work necessary for the complete installation and commissioning of switchyard. All apparatus, appliances, material and labour etc. not specifically mentioned or included, but are necessary to complete the entire work or any portion of the work in compliance with the requirements implied in this specification is deemed to be included in the scope of contractor.
- 1.5 Before proceeding with the construction work the Contractor shall fully familiarize himself with the site conditions and General arrangements & scheme etc. Though the Employer shall endeavor to provide the information, it shall not be binding for the Employer to provide the same. The bidders are advised to visit the substation sites and acquaint themselves with the topography, infrastructure and also the design philosophy. The bidder shall be fully responsible for providing all equipment, materials, system and services specified or otherwise which are required to complete the construction and successful commissioning, operation & maintenance of the substation in all respects. All materials required for the Civil and construction/installation work including cement and steel shall be supplied by the Contractor. Complete design (unless specified otherwise in specification elsewhere) and detailed engineering shall be done by the Contractor.

## **2.0 SCOPE OF WORK**

### **2.1 Upgradation of 400kV bay Equipment's at Samba end**

#### **400kV**

- Switching Scheme: One and half Scheme (I-type)
- Fault Level to be considered: 63 kA for 1 sec

The detailed scope of work is brought out in subsequent clauses of this section. Rating of various equipment's shall be as per BPS. Refer Annexure-IV for Bay Details.

#### **2.1.1 ELECTRICAL EQUIPMENTS, SWITCHYARD ERECTION EQUIPMENTS & ACCESSORIES:**

Design, engineering, manufacture, testing at manufacturer's works, supply including transportation and insurance, unloading, storage, erection, testing and commissioning at site the following equipment/items, complete in all respects:

##### **A. 400kV AIR INSULATED SWITHGEAR:**

400kV Circuit Breakers (including support structure), Isolators, Current Transformers, Wave traps as per BPS. Existing 400kV Circuit Breakers, Isolators, Current

Transformers & Wave Trap shall be dismantled and replaced with new equipment of 3150A current rating.

Dismantled equipment shall be handed over to site incharge and kept in store area within substation premises, as per direction of site I/c of Samba substation. The cost towards dismantling of said equipment are deemed to be included in cost of erection for respective equipment in BPS.

**B. CONTROL, RELAY AND PROTECTION:**

Augmentation of CRP is not envisaged under present scope.

**C. ERECTION HARDWARE:**

**Scope included under BPS item of Erection Hardware:**

- Replacement of all current carrying path of 400kV Line bays including replacement of Jack-bus interconnection due to upgradation from 2000A to 3150A using HTLS conductor (or its equivalent conductor). This scope includes supply & installation of requisite quantity HTLS conductor as required for completion of scope.
- Quad ACSR Bersimis conductors for Droppers/ Jumpers for carrying Line current & 4.5" AL. IPS Tube for Equipment interconnection shall be under present scope of contract.
- Associated Erection hardware including clamps & connectors of 3000A/3150A current rating.
- **Insulator strings & associated hardware fittings:** Existing String Hardware & Insulator shall be re-used. However, supply of clamps/connectors for the HTLS conductor on String Hardware is under present scope.  
Contractor is to ensure safe dismantling of the String Hardware & Insulator & any damage to String Hardware & Insulator shall be replenished by contractor with new ones, without any additional, cost implication to Employer.
- Earthing material risers, Bay marshalling box, spacers, cable sealing arrangement, insulating mats, cable supporting angles/channels, Cable Pull pit, Cable trays & covers, Earthwire, Junction box, buried cable trenches/pipes for equipment & lighting, all accessories, etc. as required. etc. as required is covered under present scope.
- All clamps & connectors as required for complete commissioning of above elements under 1.2 II above is in scope of bidder. Conductors dismantling and re-installation is in scope of contractor.
- All dismantled materials shall be handed over to POWERGRID, within Samba substation.

**D. EARTHMAT:**

The Main Earthmat is existing for 400 kV bay under present scope. All the equipment, structures, cable trenches, auxiliary earthmat for isolators etc. shall be earthed by connecting them to the main Earthmat by the contractor & the cost of the same shall be deemed to be included in respective BPS items of Erection Hardware.

- E. Digital Protection Coupler** (suitable for interfacing with E1 port of SDH equipment), FO Boxes, gantry, signal converters, communication cables etc. at the Samba S/s for both ends of following lines (**Refer Annexure IV**):

400kV Samba – Nakodar line

400kV Samba – Jalandhar-3 line

400kV Samba – Kishtwar-1 line

400kV Samba – Kishenpur-3 line

**F. POWER & CONTROL CABLES:**

- a. 1.1kV grade Power & Control cables along with complete accessories. Cable sizes shall be used as per Sizing of 1.1kV Power & Control cables specified at Annexure-S1 (Revised) attached with this section.
- b. Existing Control & Power cables from CRP/CRB/Panel room to Common MBs of Circuit Breakers, Isolators & Current Transformers shall be retained. Dismantling of existing cable and installation of New Cables from common MB to respective equipment of 400KV Bays (as per **Annexure-Bay Details**), shall be under present scope.

- G.** Any other item/design/drawing for completion of scope of works.

**2.1.2** Design, engineering, manufacturing, testing and supply including transportation & insurance, storage of mandatory spares at site as per BPS. Detailed break-up of Mandatory spares shall be as per **Annexure-II**.

**2.1.3 COMMUNICATION SYSTEM:**

The broad Scope of the procurement of FO based Communication Equipment at Samba, Jalandhar and Nakodar shall include planning, designing, engineering, supply, transportation, insurance, delivery at site, unloading, handling, storage, installation, termination, testing, training and demonstration for acceptance, commissioning and documentation for:

1. SDH Equipment along with suitable interfaces and line cards.
2. All cabling, wiring, Digital Distribution frame patch facilities and interconnection to the supplied equipment at the defined interfaces.
3. System integration of all supplied subsystem.
4. Integration with the existing communication system based on SDH and PDH of employer
5. Integration of supplied subsystem with SCADA system, PLCC equipment, PABX of RLDC/SLDC, VOIP (SIP compliant) for voice.
6. Fibre Optic Approach Cable (FOAC), GI pipe, GI Elbow, GI Flexible conduit and Fibre Optic Distribution Panel (FODP) for Samba, Jalandhar and Nakodar.
7. Integration of new Communication equipment in the existing regional Network Management System. All required support to existing NMS vendor for integration of new Communication equipment.

**2.1.4 PIPE STRUCTURES (GALVANIZED):**

Scope: - All Equipment support structures (except support structure for circuit breaker).

- a) All required galvanized Equipment support structures except support structures for Circuit Breaker shall be provided as per Employer's drawings during detailed engineering.
- b) The support structure for Circuit Breaker shall be as per manufacturer's design & shall be deemed to be included in the cost of respective CB.
- c) Fabrication, proto-assembly, supply including transportation & insurance, unloading, storage, erection and commissioning of equipment support structures including nuts, bolts, fasteners and foundation bolts complete in all respect.
- d) Proto-corrected drawings and Bill of Materials of all equipment support structures etc. shall be in the scope of Contractor.
- e) The proto corrected drawings along with BOM are to be witnessed and certified by the contractor. Certified proto corrected drawings along with BOM shall be submitted to POWERGRID for information only. Contractor shall provide editable soft copies of drawings (**including Proto-corrected Shop-floor DWG in AUTOCAD**) & BOMs during detailed engineering.

### 2.1.5 CIVIL WORKS:

A. The scope of civil work shall include but not be limited to the following based on **drawings developed by POWERGRID:**

- a. **Foundation of All 400kV Equipment (as finalized during detailed engineering).**
- b. **Support Structure of 400kV Equipment except Circuit Breaker.**
- c. **Foundation for lighting poles, bay marshalling boxes, panels and control cubicles wherever required. The cost of these foundations shall deem to be included in erection/installation of corresponding item/ equipment of BPS.**

The foundations of these structure are including of embedment/grouting of foundation bolts.

B. The scope of civil work shall include but shall not be limited to the following based on drawings developed by the contractor and submitted to employer for approval:

- a. Dismantling of existing equipment foundations/ removal of existing structure (if required during detail engineering) and disposal of debris.
- b. Removal and respreading of Stones in switchyard, Switchyard PCC after providing anti-weed treatment in the switchyard. The layout for the same shall be developed by the contractor.
- c. Repair of road, fencing, cable trenches & drain damaged (excluding normal wear & tear) during construction work shall be in bidder's scope. No extra cost shall be paid on this account.
- d. Any other item/design/drawing required for successful completion of the scope of works shall be in bidder's scope

C. LATTICE AND PIPE STRUCTURES (GALVANIZED):

All Equipment support structures except support structure for circuit breaker shall be as employer's drawings. The Support structure for Circuit Breaker shall be as per manufacturer's design.

D. Design, engineering, manufacture, testing and supply including transportation & insurance, storage of mandatory spares at site as per BPS. The Break-up of Mandatory Spares shall be as per Annexure-II.

Any other items not specifically mentioned in the specification but required for erection, testing and commissioning (at location specified by EIC, i.e. Engineer Incharge) and satisfactory operation of the substation are deemed to be included in the scope of the specification unless specifically excluded.

## **2.2 Upgradation of 400kV bay Equipment at Kishenpur end**

### **400kV**

- Switching Scheme: One and half Scheme (I-type)
- Fault Level to be considered: 63 kA for 1 sec

The detailed scope of work is brought out in subsequent clauses of this section. Rating of various equipment's shall be as per BPS . Refer **Annexure-IV** for Bay Details

### **2.2.1 ELECTRICAL EQUIPMENTS, SWITCHYARD ERECTION EQUIPMENTS & ACCESSORIES:**

Design, engineering, manufacture, testing at manufacturer's works, supply including transportation and insurance, unloading, storage, erection, testing and commissioning at site the following equipment/items, complete in all respects:

#### **A. 400kV AIR INSULATED SWITHEGEAR:**

400kV Circuit Breakers (including support structure), Isolators, Current Transformers, Wave traps as per BPS. Existing 400kV Circuit Breakers, Isolators, Current Transformers & Wave Trap shall be dismantled and replaced with new equipment of 3150A current rating.

Dismantled equipment shall be handed over to site incharge and kept in store area within substation premises, as per direction of site I/c of Kishenpur substation. The cost towards dismantling of said equipment are deemed to be included in cost of erection for respective equipment in BPS.

#### **B. CONTROL, RELAY AND PROTECTION:**

Augmentation of CRP is not envisaged under present scope.

#### **C. ERECTION HARDWARE:**

##### **Scope included under BPS item of Erection Hardware:**

- Replacement of all current carrying path of 400kV Line bays including replacement of Jackbus interconnection due to upgradation from 2000A to 3150A using HTLS conductor (or its equivalent conductor). This scope includes supply & installation of requisite quantity HTLS conductor as required for completion of scope.
- Quad ACSR Bersimis conductors for Droppers/ Jumpers for carrying Line current & 4.5" AL. IPS Tube for Equipment interconnection shall be under present scope of contract.
- Associated Erection hardware including clamps & connectors of 3000A/3150A current rating.
- **Insulator strings & associated hardware fittings:** Existing String Hardware & Insulator shall be re-used. However, supply of clamps/connectors for the HTLS conductor on String Hardware is under present scope.

Contractor is to ensure safe dismantling of the String Hardware & Insulator & any damage to String Hardware & Insulator shall be replenished by contractor with new ones, without any additional, cost implication to Employer.

- Earthing material risers, Bay marshalling box, spacers, cable sealing arrangement, insulating mats, cable supporting angles/channels, Cable Pull pit, Cable trays & covers, Earthwire, Junction box, buried cable trenches/pipes for equipment & lighting, all accessories, etc. as required. etc. as required is covered under present scope.
- All clamps & connectors as required for complete commissioning of above elements under 1.2 II above is in scope of bidder. Conductor's dismantling and re-installation is in scope of conductor
- All dismantled materials shall be handed over to POWERGRID, within Kishenpur substation

**D. EARTHMAT:**

The Main Earthmat is existing for 400 kV bay under present scope. All the equipment, structures, cable trenches etc. shall be earthed by connecting them to the main Earthmat by the contractor & the cost of the same shall be deemed to be included in respective BPS items of Erection Hardware.

- E. Digital Protection Coupler** (suitable for interfacing with E1 port of SDH equipment), FO Boxes, gantry, signal converters, communication cables etc. at the Samba S/s for both ends of following lines (**Refer Annexure IV**):

400kV Kishenpur – Kishtwar-2 line

**F. POWER & CONTROL CABLES:**

1.1kV grade Power & Control cables along with complete accessories. Cable sizes shall be used as per Sizing of 1.1kV Power & Control cables specified at Annexure-S1 (Revised) attached with this section.

Existing Control & Power cables from CRP/CRB/Panel room to Common MBs of Circuit Breakers, Isolators & Current Transformers shall be retained. Dismantling of existing cable and installation of New Cables from common MB to respective equipment of 400KV Bays ( as per **Annexure-IV-Bay Details**), shall be under present scope.

- G.** Any other item/design/drawing for completion of scope of works.

2.2.2 Design, engineering, manufacturing, testing and supply including transportation & insurance, storage of mandatory spares at site as per BPS. Detailed break-up of Mandatory spares shall be as per **Annexure-II**.

2.2.3 **COMMUNICATION SYSTEM:**

The broad Scope of the procurement of FO based Communication Equipment at Kishenpur and Dulhasti shall include planning, designing, engineering, supply, transportation, insurance, delivery at site, unloading, handling, storage, installation, termination, testing, training and demonstration for acceptance, commissioning and documentation for:

1. SDH Equipment along with suitable interfaces and line cards.
2. All cabling, wiring, Digital Distribution frame patch facilities and interconnection to the supplied equipment at the defined interfaces.
3. System integration of all supplied subsystem.
4. Integration with the existing communication system based on SDH and PDH of employer.
5. Integration of supplied subsystem with SCADA system, PLCC equipment, PABX of RLDC/SLDC, VOIP (SIP compliant) for voice.
6. Fibre Optic Approach Cable (FOAC) , GI pipe, GI Elbow, GI Flexible conduit and Fibre Optic Distribution Panel (FODP) for Kishenpur and Dulhasti
7. Integration of new Communication equipment in the existing regional Network Management System. All required support to existing NMS vendor for integration of new Communication equipment.

#### 2.2.4 **PIPE STRUCTURES (GALVANIZED):**

Scope: - All Equipment support structures (except support structure for circuit breaker).

- a) All required galvanized Equipment support structures except support structures for Circuit Breaker shall be provided as per Employer's drawings during detailed engineering.
- b) Fabrication, proto-assembly, supply including transportation & insurance, unloading, storage, erection and commissioning of equipment support structures including nuts, bolts, fasteners and foundation bolts complete in all respect.
- c) Proto-corrected drawings and Bill of Materials of all equipment support structures etc. shall be in the scope of Contractor.
- d) The proto corrected drawings along with BOM are to be witnessed and certified by the contractor. Certified proto corrected drawings along with BOM shall be submitted to POWERGRID for information only. Contractor shall provide editable soft copies of drawings (**including Proto-corrected Shop-floor DWG in AUTOCAD**) & BOMs during detailed engineering.

#### 2.2.5 **CIVIL WORKS & SUPPORT STRUCTURE:**

**A.** The scope of civil work shall include but not be limited to the following based on **drawings developed by POWERGRID:**

- a. **Foundation of All 400kV Equipment (as finalized during detail engineering).**
- b. **Support Structure of 400kV Equipment except Circuit Breaker.**
- c. **Foundation for lighting poles, bay marshalling boxes, panels and control cubicles wherever required. The cost of these foundations shall deem to be included in erection/installation of corresponding item/ equipment of BPS.**

The foundations of these structure are including of embedment/grouting of foundation bolts.

**B.** The scope of civil work shall include but shall not be limited to the following based on drawings developed by the contractor and submitted to employer for approval:

- a. Dismantling of existing equipment foundations/ removal of existing structure (if required during detail engineering) and disposal of debris.
- b. Removal and respreading of Stones in switchyard, Switchyard PCC after providing anti-weed treatment in the switchyard. The layout for the same shall be developed by the contractor.
- c. Repair of road, fencing, cable trenches & drain damaged (excluding normal wear & tear) during construction work shall be in bidder's scope. No extra cost shall be paid on this account.
- d. Any other (minor) item/design/drawing required for successful completion of the scope of works shall be in bidder's scope

**C. LATTICE AND PIPE STRUCTURES (GALVANIZED):**

All Equipment support structures except support structure for circuit breaker shall be as employer's drawings. The Support structure for Circuit Breaker shall be as per manufacturer's design.

- D.** Design, engineering, manufacture, testing and supply including transportation & insurance, storage of mandatory spares at site as per BPS. The Break-up of Mandatory Spares shall be as per Annexure-II.

Any other items not specifically mentioned in the specification but required for erection, testing and commissioning (at location specified by EIC, i.e. Engineer Incharge) and satisfactory operation of the substation are deemed to be included in the scope of the specification unless specifically excluded.

**3.0 SPECIFIC EXCLUSIONS**

Following items of work are specifically excluded from the scope of the specifications:

- a) Employer's site office and stores.
- b) Approach Road

**4.0 PHYSICAL AND OTHER PARAMETERS**

Location of the Substation - The location of substation is indicated below:

Sl. no.	Name of Substation	Name of State	Nearest Rail Head
1	400KV Samba S/S (Longitude 75.17258333 Latitude 32.52398056 )	Jammu & Kashmir	(Ghagwal-6.5km: Local Train) Samba-12km
2	400kV Kishnepur S/S ( Longitude 75.13479167 Latitude 32.78209167)	Jammu & Kashmir	(Manwal 5km: Local Train) Ramnagar-12km

For design purposes, meteorological data shall be considered as mentioned below:

SN	Name of Sub-station	Altitude	Snow fall	Seismic Zone	Wind Zone	Min./Max. Ambient Temperature	Coastal Area Consideration
1	Samba	Less than 1000 meter above mean sea level (MSL)	NIL	As per IS 1893	As per National Building Code (NBC) 2016	0/50 deg. C	NO
2	Kishenpur	Less than 1000 meter above mean sea level (MSL)	NIL	As per IS 1893	As per National Building Code (NBC) 2016	0/50 deg. C	NO

## 5.0 SCHEDULE OF QUANTITIES

The requirement of various items/equipments and civil works are indicated in Bid price Schedules.

All equipment's/items, Structures and civil works for which quantities have been given in the BPS on unit rate basis shall be payable accordingly. During actual execution, any variation in such quantities shall be paid based on the unit rate under each item incorporated in Letter of award.

Wherever the quantities of items/works are indicated in Set/LOT/LS, the bidder is required to estimate the quantity required for entire execution and completion of works and incorporate their price in respective Bid price schedules. For erection hardware items, Bidders shall estimate the total requirement of the works and indicate module-wise lump sum price bay wise and include the same in relevant Bid price schedules. Any material/works for the modules not specifically mentioned in the description in BPS, as may be required shall be deemed to be included in the module itself.

No cost compensation shall be considered on account of "Set/LOT/LS" items in any case if number of bays specified in section project remains unchanged.

Bidder should include all such items in the bid proposal sheets, which are not specifically mentioned but are essential for the execution of the contract. Item which explicitly may not appear in various schedules and required for successful commissioning of substation shall be included in the bid price and shall be provided at no extra cost to Employer.

## 6.0 BASIC REFERENCE DRAWINGS

- 6.1 The reference drawings, which form a part of the specifications, are given at **Annexure-I**. The bidder shall maintain the phase to earth clearance, phase to phase clearance and sectional clearances, clearances between buses, bus heights but may alter the locations of equipment to obtain the statutory electrical clearances required for the substation.
- 6.2 It is the responsibility of contractor to develop general arrangement drawing, layout drawings, single line drawing, foundation & cable trench layout, erection key diagram & all other layout drawings for present scope of work.

## 7.0 DIFFERENT SECTIONS OF TECHNICAL SPECIFICATION

Employer has standardized its technical specification for various equipment and works for different voltage levels. Items which are not applicable for the scope of this package as per schedule of quantities described in BPS, the technical specification for the items should not be referred to. For the purpose of present scope of work, technical specification (Vol. II) shall consist of following sections and they should be read in conjunction with each other.

For the purpose of present scope of work, technical specification (Vol. II) shall consist of following sections and they should be read in conjunction with each other.

S. No.	Description	Revision
1.	Section – Project	Rev 00
2.	Section - General Technical Requirement	Rev 15
3.	Section-Switchgear- CB	Rev 12
4.	Section-Switchgear- ISO	Rev 13
5.	Section-Switchgear- Instrument Transformer	Rev 12
6.	Section - Power & Control Cable	Rev 06
7.	Section - Switchyard Erection	Rev 10
8.	Section – Structure	Rev 07
9.	Section - Civil Works	Rev 12
10.	Section-PLCC	Rev 05
11.	Specific Requirement (Annexure-III)	Rev 10
12.	Telecomm System	Rev 06

In case of any discrepancy between Section-PROJECT, Section-GTR and other technical specifications regarding the scope of works, Section-PROJECT shall prevail over all other sections. In case of any discrepancy between Section-GTR and individual sections for various equipment's, requirement of individual equipment section shall prevail. In case of any discrepancy between Main body of Section-Project and Annexure(s) of Section-Project, provisions specified in Main body of Section-Project shall prevail.

## 8.0 MANDATORY SPARES

Mandatory Spares shall be included in the bid proposal by the bidder. The prices of these spares shall be given by the Bidder in the relevant schedule of BPS and shall be considered for evaluation of bid. It shall not be binding on the Employer to procure all these mandatory spares.

The bidder is clarified that no mandatory spares shall generally be used during the commissioning of the equipment. Any spares required for commissioning purpose shall be arranged by the Contractor. The unutilized spares if any brought for commissioning purpose shall be taken back by the contractor.

Wherever spares in BPS/Technical Specification have been specified as “each type/each rating/each type & rating”: If the offered spare/spares is sufficient to replace the respective main equipment of all types/ratings, then such offered spare/spares shall be acceptable. It implies that common spare/spare set fulfilling the spare requirement of all types/ratings shall also be acceptable, provided it is configurable at site itself without special assistance of OEM. Mandatory Spares, wherever mentioned, are envisaged for the equipment/items being supplied under the main equipment heads under present scope meeting the requirements of Technical Specifications. The component/sub-component of an equipment/item specified in BPS under Mandatory Spare, which is not applicable as per the offered design of respective main equipment, shall not be referred to.

Mandatory spares shall be supplied as per BPS. Detailed break-up for Mandatory spares of other equipment's shall be as per **Annexure-II**.

## **9.0 SPECIFIC REQUIREMENTS**

- 9.1** The specific requirements as mentioned at C/ENGG/SPEC/SEC-PROJECT/SPECIFIC REQUIREMENT Rev. No 10 shall also be referred for specified scope of work. Any discrepancy between clause 9.0 Section-PROJECT and Annex-III on scope of works, the requirement stipulated at clause 9.0 of section project shall prevail.
- 9.2** “Minimum specified creepage distance for insulator string/ Long rod insulators/ outdoor bushings shall be 31 mm/kV”.
- 9.3** For Circuit breaker(s) controlling 400kV Transmission line(s), with or without Line Reactor and 765kV Transmission line(s) without Line Reactor, Controlled Switching Device (CSD) suitable for Line Switching Application in lieu of PIR shall also be acceptable.  
The above CSD provided for the transmission line application shall be used for controlled energization to minimize the switching overvoltage in the line during dead-line charging as well as during re-energization as part of auto-reclosure sequence. It is required that the performance of the circuit breaker with CSD for transmission line switching shall be equivalent to or better than that of a circuit breaker equipped with a Pre-Insertion Resistor (PIR).
- 9.4** Technical Qualification Requirements for Contractor's/ Sub-contractors works for Substation portion shall be as follow:
- Bidder must have erected, tested and commissioned as a prime contractor\* under a single contract, at least two (2) nos. AIS^ Circuit Breaker equipped bays of 220kV or above voltage level in one (1) substation or switchyard during last seven (7) years and these bays must be in satisfactory operation# as on the date of NOA.
  - Note-1 (\*) : In case of works executed under a contract that had been awarded on a Joint Venture, the experience of individual Joint Venture partner shall be considered limited to the scope of that partner under the said contract.
  - Note-2 (#): Satisfactory operation means certificate issued by the Employer certifying the operation without any adverse remark.
  - Note-3 (^) : AIS means Air Insulated Substation
  - Note-4 : In case bidder is a holding company, the technical experience referred above shall be of that holding company only (i.e. excluding its subsidiary/group companies). In case bidder is a subsidiary of a holding company, the technical experience referred above shall be of that subsidiary company only (i.e. excluding its holding company).
- 9.5** Relevant/applicable clauses of Specific Requirements as mentioned at C/ENGG/SPEC/SEC-PROJECT/SPECIFIC REQUIREMENT Rev. no. 10 (attached as Annexure-III) shall also be referred for specified scope of work. Any discrepancy between clause 9.0 Section-PROJECT and Specific Requirements as mentioned at C/ENGG/SPEC/SEC-PROJECT/SPECIFIC REQUIREMENT Rev. no. 10 (attached at Annexure-III) on scope of works, the requirement stipulated at clause 9.0 of section project shall prevail.

**9.6 Annexure-S 1 attached at Specific requirement rev 10 stands revised.**

S.No.	Clause No.	Amended As
5.	Clause no 1.1.4	Refer Annexure-S1 (Revised) for METHODOLOGY FOR SIZING OF CABLES attached as Annexure-VI

**9.7** In Section-GTR and other technical specifications, the term ‘Employer and/or ‘Purchaser may be read as Employer

**9.8** The requirement for Enclosure tightness test at low and high temperature for SF<sub>6</sub>-filled CTs of 145kV and above voltage rating, as specified in Clause No. 6.2 (a)(x) of Section: Instrument Transformer (Rev-12), stands deleted.

**9.9 Clause under Sl. No. 13.3 of GTR (REV NO 15) is modified as follow: -**

For new as well as substation extn packages, the contractor must ensure that the open storage platform (as per Drawing No. C-ENGG-CVL-STD-PLATFORM-01, Rev.0) is constructed for storage of outdoor type equipment/material prior to commencement of delivery at site. Outdoor equipment shall be stored on open storage platform, properly covered with waterproof and dustproof covers to protect them from water seepage and moisture ingress.

In case of extn packages wherein vacant outdoor facility is existing at Substation premises, same shall be made available to contractor for storage of equipment without any financial implications. Same shall be allowed with approval of Engineer In-charge subject to availability at the time of execution on as and where basis. Notwithstanding the same, sole responsibility of security & upkeep of storage facilities lies with Contractor.

However, all indoor equipments including control & protection panels, Communication equipments and operating mechanism boxes etc. of outdoor equipments shall be stored indoors.

Storage of equipment on top of another one is not permitted if the wooden packing is used and there is possibility of equipment/ packing damage. Material opened for joint inspection shall be repacked properly as per manufacturer’s recommendations. During storage of material regular periodic monitoring of important parameters like oil level / leakage, SF<sub>6</sub> / Nitrogen pressure etc. shall be ensured by the contractor.

**9.10 Clause under Sl. No. 13.9 of GTR (REV NO 15) is modified as follow:**

For new as well as substation extn packages, the Contractor shall be responsible for making suitable indoor storage facilities, to store all equipment which requires indoor storage.

In case of extn packages wherein vacant indoor facility is existing at Substation premises, same shall be made available to contractor for storage of indoor equipment without any financial implications. Same shall be allowed with approval of Engineer In-charge subject to availability at the time of execution as on and where basis. Notwithstanding the same, sole responsibility of security & upkeep of storage facilities lies with Contractor.

**9.11 New Clause under Sl. No. 13.15 of GTR (REV NO 15) is as follow:**

Contractor is responsible for assessment of existing storage facility/space for adequacy and suitability for intended storage of equipment. In case of non-availability of suitable existing storage facility/space in existing substation premises, the contractor shall make his own necessary arrangements at his own cost so that progress of work is not affected and Employer shall in no case be responsible for any delay in works because of non-availability of storage facility.

**9.12** Clause no C. Section Switchgear -CB Rev 11 of Specific requirement (Rev 10) stands deleted.

**9.13** All substations proposed to be upgraded under the present scope are situated in non-coastal areas. Hence, all the specifications defined for coastal areas in various sections of Technical Specifications shall not be considered applicable. However, creepage distance of all switchyard equipment's at New and extension substations under the subject package shall be supplied with minimum creepage distance of 31mm/kV.

**9.14** Clause under Sl. No. A.5. of SPECIFIC REQUIREMENT (REV NO 10), Clause No. 9.2 of Section GTR rev 15 is modified as follows:

The reports for all type tests as per technical specification shall be furnished by the Contractor along with equipment / material drawings. However, type test reports of similar equipments/ material already accepted in POWERGRID shall be applicable for all projects with similar requirements. The type tests conducted earlier should have either been conducted in accredited laboratory (accredited based on ISO / IEC Guide 25 / 17025 or EN 45001 by the national accreditation body of the country where laboratory is located) or witnessed by POWERGRID/representative authorized by POWERGRID/representative of Utility /representative of accredited test lab/ representative of The National Accreditation Board for Certification Bodies (NABCB) certified agency shall also be acceptable. Unless otherwise specified elsewhere, the type test reports submitted shall be of the tests conducted within the years specified below from the originally scheduled last date of bid submission (Soft Copy). In case the test reports are of the test conducted earlier than the years specified below from the originally scheduled last date of bid submission (Soft Copy)., the contractor shall repeat these test(s) at no extra cost to the Employer: -

S. No.	Name of Equipment	Validity of type test( in years )
1	Power Transformer	10
2	LT Transformer	10
3	Shunt Reactor/Series Reactor /Neutral Grounding Reactor	10
4	OLTC	10
5	Bushing of Power Transformers/Reactors	10
6	Fittings and accessories for Power transformers & Reactors	10
7	Circuit Breaker	15
8	Isolator	15
9	Lighting Arrester	15
10	Wave Trap	15
11	Instrument transformer	15
12	GIS & Hybrid GIS	15
13	LT Switchgear	10
14	Cable and associated accessories	10
15	Relays/BCU/Process Interface units /Standalone Merging unit	10
16	Capacitors	10
17	Battery and Battery charger	10
18	Conductor & Earth wire	10
19	Insulators (Porcelain/Glass)	10

20	Composite Insulators	10
21	PLCC	10

Note:-

1. For all other equipment's validity of type test shall be 10 years from the originally scheduled last date of bid submission (Soft Copy).
2. Equipment shall be supplied from the same manufacturing work, where from the sample unit was manufactured and successfully type tested as per relevant standard.  
Further, where offered equipment is based on the design of technology transfer of Parent organization / Joint Venture (JV), type test reports of Parent organization / Joint Venture (JV) shall also be acceptable for the initial period of 03 years from the date of establishment manufacturing facility for offered equipment provided that the design, material, and manufacturing process of the offered equipment are identical to those of the type-tested sample of the original facility. In such cases, while submitting the Type Test Reports, the Original Equipment Manufacturer (OEM), shall furnish an undertaking with it declaring that there is
  - i. No change in the Design,
  - ii. No change in the material,
  - iii. No change in manufacturing process, and
  - iv. No amendment/revision in the relevant standard as regard to type test conditions, since the type test
3. In case of own manufacturing plant at different location within India, the type test of the original manufacturing works shall also be acceptable for the equipment manufactured and supplied from the different location subject to the following conditions:
  - i. The relevant standard does not bar the same,
  - ii. The equipment being manufactured at different locations shall be identical in design, drawings, specifications, ratings to that of the type tested sample in the original facility (where it was manufactured and successfully type tested),
  - iii. The equipment being manufactured at different locations shall be identical in material & critical components, manufacturing process/ practices, and quality control to that of the type tested sample in the original facility (where it was manufactured and successfully type tested),
  - iv. Also, while submitting the Type Test Reports, the Original Equipment Manufacturer (OEM), shall furnish an undertaking for above conditions (i), (ii) and (iii).

Further, in the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes or due to non-compliance with the requirement stipulated in the Technical Specification or any/all type tests not carried out, same shall be carried out without any additional cost implication to the Employer.

The Contractor shall intimate the Employer the detailed program about the type tests at least two (2) weeks in advance in case of domestic supplies & six (6) weeks in advance in case of foreign supplies.

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