

## SECTION -PROJECT

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### 1.0 GENERAL

#### 1.1 PREMBLE

Power Grid Corporation of India Ltd. (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 implementing the following Transmission Schemes through RTM Route:

- i) Installation of 400kV, 125MVAR Reactor at Jeypore (POWERGRID) S/S associated with Eastern Region Expansion Scheme-49.
- ii) Installation of 1 x 200MVA, 220/132kV Transformer at Purnea (POWERGRID) S/S associated with Eastern Region Expansion Scheme-52.

#### 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.

### 2.0 SCOPE

#### 2.1 The broad scope of this specification covers Establishment/Extension of following substations for elements detailed below:

| S. No. | Scope  |
|--------|--|
| 1.     | <b>Extn. of 400kV Jeypore (POWERGRID) S/S</b> <ul style="list-style-type: none"><li>• 420kV, 1x125MVAR Bus Reactor: 1Nos (Owner supplied)</li><li>• 400kV Bus Reactor Bay: 1 no (Bay No <b>421 (tie)</b> in Outdoor GIS)</li><li>• Associated GIS Bus Duct</li></ul> |
| 2.     | <b>Extn. of 220/132kV Purnea (POWERGRID) S/S</b> <ul style="list-style-type: none"><li>• 220/132kV, 1x 200MVA ICT: 1 No</li><li>• 220kV ICT Bay: 1 No (AIS)</li><li>• 132kV ICT Bay: 1 No (in GIS) (Through GIS Bus duct 3 Phase (3 Ph)</li></ul>                    |

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**2.2 The detailed scope of work of the substation package is brought out in subsequent clauses of this section.**

### **2.2.1 Extn. of 400kV Jeypore (POWERGRID) S/S**

2.2.1.1 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) Gas Insulated Switchgear:**

The existing 400/220kV Jeypore Substation is of AIS cum Indoor GIS type. The proposed extension for 400 kV Bay is to be done through **outdoor** GIS which includes creation of 1 no. Tie bay (bay no. 421) to complete existing diameter which currently has two AIS main bays connected to two main buses..

The 400kV GIS bay under present scope shall be placed outdoor at suitable location near existing 400kV GIS building.

400kV SF6 gas insulated switch gear shall have arrangement as per SLD. The Switchgear (50 Hz) shall be complete with all necessary terminal boxes, SF6 gas filling, interconnecting power and control wiring, grounding connections, gas monitoring equipment & piping and support structures along with necessary base plate & foundation bolts. In addition all necessary platforms, supports, ladders and catwalks etc. as required for operation & maintenance work shall also be supplied.

GIS Switchgear and control gear shall be suitable for installation in the open air, i.e. capable of withstanding wind, rain, snow (if applicable), dirt deposits, condensation, ice and hoar frost.

**i. 420kV GIS Tie bay module/equipment** as per BPS and description given below:

**SF6 gas-insulated metal enclosed Tie Bay module, each set comprising of the following:**

- i. One (1) number 3-phase, SF6 insulated circuit breaker without PIR complete with operating mechanism.
- ii. Three (3) numbers 1-phase, 3-core, multi ratio, current transformers (CTA) on one side of circuit breaker.
- iii. Three (3) numbers 1-phase, 3-core, multi ratio, current transformers (CTA) on other side of circuit breaker
- iv. Two (2) numbers 3-phase, single pole, group operated isolator switches, complete with manual and motor driven operating mechanisms.
- v. Two (2) numbers 3-phase, single pole, group operated safety grounding switches, complete with manual and motor driven operating mechanisms.
- vi. Gas monitoring devices, barriers, pressure switches, UHF PD Sensors, support structures etc. as required.
- vii. Local Control Cubicle.

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### ii. **Gas Insulated Bus (GIB) Ducts:**

400kV GIB (outdoor) ducts (including support structures along with foundation bolts, gas monitoring devices, gas barrier, pressure switch, UHF PD sensor) as per BPS. The GIB duct length shall be optimized further without affecting the switchyard arrangement and bay orientation and also any of the functional requirements specified.

iii. 420kV SF6 to air bushing as per **BPS** (Bid Price Schedule).

iv. Mandatory Spares as per BPS (Bid Price Schedule).

### **400kV Outdoor GIS requirement**

- a. Outdoor GIS along with LCC panel shall be mounted on a common raised platform with the plinth height of 750mm from the FGL.
- b. Outdoor GIS shall have protective coating (suitable greasing and/or painting of the flanges/enclosures) for outdoor application with High Pollution Level environmental conditions. The sealing provided between flanges of various enclosures shall be such that long term tightness is achieved for outdoor duty. The Weatherproofing and corrosion protection for outdoor GIS shall be ensured by GIS manufacturer.
- c. GIS bay shall be dispatched from the factory in assembled form (phase wise) to the extent possible so as to facilitate minimum assembly requirement at site. For GIS assembly at site proper temporary dust free clean GIS assembly room shall be established.
- d. As the GIS is expected to be installed and erected in outdoor, GIS manufacturer shall provide the detailed GIS erection procedure for outdoor installation keeping in view the stringent requirement of clean environment and submit the same for approval.
- e. For outdoor GIS, manufacturer shall submit the maintenance procedures for the flange protection (e.g. the refill of grease) to avoid corrosion issues.
- f. LCC Panels shall be installed with canopy on the outdoor raised GIS platform.
- g. Outdoor Local Control Cabinet (LCC), GIS Equipment Marshalling boxes/operating mechanism boxes & terminal boxes shall be made of stainless steel of at least 1.5 mm thickness or aluminium enclosure of at least 1.6 mm thickness and shall be dust, water and vermin proof. Stainless steel used shall be of grade SS304 or better and shall be type tested for at least IP-55 degree of protection.
- h. It is preferable that CB motor drives for GIS bays shall be AC power operated. In case the contractor offers DC power operated drives for their GIS, Contractor shall provide suitable AC-DC convertor for CB motor drive.
- i. The design of the outdoor GIS equipment for specified rating shall take in to consideration the Cyclic temperature (and pressure) changes of the SF6 gas contained by the gas tight compartments, caused by the change of the loading current (the temperature rise of the high-voltage current carrying parts) or more frequently by the change of the solar radiation (the temperature rise of the enclosures).
- j. Any other equipment/material required to complete the specified GIS scope of work.

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- b) **420 kV, 125 MVAR Reactor (Owner Supplied).**  
Supply, erection, testing and commissioning of 420kV, 125 MVAR Reactor is covered under separate package. However, following associated works are covered under the scope of this package:
- i. Civil works for 420kV Reactor foundation complete in all respects, firewalls, earthing connection to main earth mat and earth pits etc. (as required) as per technical specification.
  - ii. Overhead connection of HV and Neutral bushings of 420kV Reactor to substation equipment.
  - iii. HVWS & Hydrant system for 420kV Reactor
  - iv. Supply, laying and termination of cables along with associated accessories from Marshaling box of 420kV Reactor to BMK /Switchyard Panel Rooms/LCC panel/Control Room as per requirement.
- c) 400kV Isolator, Bus Post Insulators and 336kV Surge Arresters as per BPS.
- d) Controlled Switching device for 400kV Circuit breakers as per BPS. Further, re-configuration/re-tuning of CSD (of Siemens make) existing in main bay for controlled switching of Bus Reactor is also included under present scope.
- e) Complete Control, Relay and Protection system as per Section–Control and Relay Panels for 400kV bays under present scope.

Duplicate 400kV Bus Bar Protection scheme (Centralized) of M/s ABB make & model REB670 is existing at Jeypore S/s. Analog (CT) & digital input/output associated with Bays 419 & 420 are already wired & in service with above REB670 bus bar scheme.

The bus reactor envisaged under the present scope shall be connected to the main bay through the creation of a tie bay, thereby completing the one-and-a-half breaker diameter configuration. The main bay located opposite the bus reactor bay is already in service with a STATCOM of M/s Siemens make. Present scope includes supply of CB relay panel for the Tie-bay (421). Further, necessary modifications, wiring/cablings and commissioning etc. required in existing protection panel(s) of Bay#420 & Bay#419 for interfacing with present scope panels including creation of Tie bay (421) to complete a one & half CB diameter (419-421-420) with two AIS main bays (419 & 420) is under the scope of the bidder.

Updating STATCOM SCADA in HMIs (located at both STATCOM Control Room & Main CRB) to include the new Tie Bay (421) is also under present scope.

All changes required in existing schemes, logics etc. for successful operation of present diameter configuration (419-421-420) are included under the present scope.

f) **Augmentation of Existing RTU/Gateway:**

- I. Existing 400/220kV Jeypore S/s is a conventional type of Substation where data is being transferred to Main SLDC/ Back up SLDC/Main RLDC/ Backup RLDC through existing RTU/Gateway (of M/s Siemens make, Model **SICAM A8000-CP 8050**). The data of bays under present scope (w.r.t. Bus Reactor & associated equipment) shall also be transferred to Main SLDC/ Back up SLDC/Main RLDC/ Backup RLDC through existing RTU/Gateway. No work is envisaged at RLDC /SLDC end. The New DI Card and other required items, as per BPS are to be

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supplied and integrated in the existing RTU only including up-dating of system database, displays, development of additional displays and reports as per requirement.

- II. In Existing 400/220kV Jeypore S/s, data transfer to Remote control Centre (RTAMC/NTAMC) is done through existing RTU/Gateway (of M/s Alstom (GE) make model C264). For data transfer of bays under present scope (w.r.t. Bus Reactor & associated equipment) to Remote control Centre (RTAMC/NTAMC), scope required for integration to RCC is covered under BPS line item " BAY CONTROL UNIT INCLUDING INTERFACE ACCESSORIES INTEGRATION WITH NTAMC AS PER TECHNICAL SPECIFICATION" the necessary supply, installation, testing & commissioning related scope shall be deemed to be included in service item for the same. Integration of ODS (On-line Oil Drying system) for 400kV Bus Reactor (being supplied under separate package) with above system is also included under present scope.

Any modification or configuration updating, etc. required in existing BCU of Main Bay is also included under present scope and cost of the same shall be included under service item of code "Bay Control Unit including interface accessories integration with NTAMC as per technical specification." Under activity head "Existing BCU upgradation".

- g) Conventional Type Smoke detection, Fire alarm & Annunciation System for Switchyard panel Rooms. Above work also includes integration of Smoke detectors with existing Fire alarm Panel under present scope. HVWS & Hydrant system for employer supplied 400kV, 3-Phase Reactor. Piping for fire protection system shall be extended from nearest existing Main Header existing in the switchyard.
- h) Air Conditioning System for Switchyard Panel Rooms.
- i) 1.1 kV grade Power & Control cables (and special cables, if any) along with complete accessories including cables for oil filtration units and cabling from common marshaling box of 400kV Reactors to BMK/Switchyard Panel Room/Control Room Building, Power receptacle for oil filtration unit shall also be provided under present scope of work as per BPS. ***Cable sizes shall be used as per Sizing of 1.1kV Power & Control cables specified at Annexure-S1 (Revised) attached with this section.***
- j) The lightning protection (DSLPP) for the complete switchyard under present scope is to be provided by the contractor. The contractor shall design the lightning protection by utilizing the existing structures in switchyard. In case, additional structures (Lightning Masts) are required to meet the lightning protection during detailed engineering, the same shall be payable in MT. The civil works shall be payable as per relevant item of BPS.
- k) Erection Hardware: Insulator strings and associated hardware fittings, Clamps & connectors (including terminal connectors for employer supplied 400kV Reactor), Conductor, Aluminum tubes, Bus bar and earthing material risers, auxiliary earthmat (excluding main earth mat), Bay marshaling box, spacers, cable sealing arrangement, insulating mats, cable supporting angles/channels, Cable Pull pit, Cable trays & covers, Guy arrangement (including insulators and hardware), Earthwire, Junction box, buried cable trenches/pipes for equipment & lighting, all accessories, etc. as required.

All erection hardware item required for connection of Outdoor GIS (Tie bay) in the existing diameter with the existing two main bays (AIS) shall be quoted under BPS item "ERECTION H/W FOR MISCELLANEOUS WORK AS PER TECHNICAL SPECIFICATION".

- l) Existing Main Earthmat is to be extended for bays under present scope. All the equipments (including employer supplied 400kV Reactor), cable trenches, auxiliary earthmat for isolators etc. shall be earthed by connecting them to the main Earthmat.

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m) LED based Outdoor Illumination & Outdoor Receptacle (As per BPS): LED based Lighting and illumination for the switchyard area under present scope and LED based illumination for Switchyard Panel Rooms shall be provided by the contractor.

n) LT Switchgear (Extension):

- **415V A.C. Distribution Board (ACDB I& II):**

Distinct vertical/Wall mounted panels equipped with the following modules in each panel for the present scope:

Extension of existing ACDB panels at existing CRB (for each section of ACDB):

i) 250A, 4 pole MCCB module - 1 nos.

To be installed in New ACDBs (for each section of ACDB):

i) 250A, 4 pole MCCB module - 1 nos.

ii) 63A, 4 pole MCCB module - 3 nos.

iii) 32A, 4 pole MCCB module - 1 nos.

Extension of existing DCDB panels at existing CRB (for each DCDB 1 and DCDB 2):

i) 100A, 2 pole MCCB module - 1 nos.

To be installed in New DCDBs (For each DCDB 1 and DCDB 2):

i) 100A, 2 pole MCCB module - 1 nos.

ii) 63A, 2 pole MCCB module - 2 nos.

iii) 32A, 2 pole MCCB module - 2 nos.

- ACDB and DCDB extension panels shall be placed in SPR being constructed under present scope. Location of SPR shall be finalized during detailed engineering.

- Necessary cabling and connections from existing 415 V ACDBs and 220V DCDBs (placed in CRB) to new ACDB and DCDB extension panels (to be placed in new SPR building under present scope) shall be in the scope of the contractor and shall be included in respective BPS line item of Power & Control Cables.

o) Augmentation of Visual monitoring system (VMS) for 400kV bay under present scope, and their integration with existing Substation VMS system. The bidder shall provide 2 (Two) Number of color IP camera, with PAN, TILT and ZOOM facilities, suitably located in the switchyard for monitoring of 400kV bays and equipment under present scope. The scope of bidder shall include providing all Items, Accessories, Line Interface units, Fiber patch cords, Power supply units, Junction Boxes, Cables, Fiber Optic Cables, Hardware and Software, etc., as are applicable to the product design, to meet functional requirements. Compatibility enhancement of exiting VMS system, as needed, shall be done to integrate visual monitoring for 400kV bay under present scope with existing Visual monitoring system of the station. A copy of specification for Visual Monitoring system is enclosed at Specific Requirement Rev 10, which shall, be read only for the Augmentation scope of existing VMS system.

p) Dismantling of BPI: Existing BPI along with structures, Al tube and associated connectors shall be dismantled for connection of Outdoor GIS (Tie module). Dismantled items shall be handed over to POWERGRID site store.

Price for the above work shall be quoted in BPS item "Dismantling of 400kV BPI".

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### q) **LATTICE AND PIPE STRUCTURES (GALVANIZED):**

- i. The scope shall include fabrication, proto-assembly, supply including transportation & insurance, unloading, storage, erection and commissioning of towers, beams and equipment support structures including nuts, bolts, fasteners, and foundation bolts complete in all respect.
- ii. The fabrication drawings of towers and beams shall be provided by Employer during detailed engineering. Equipment support structures except support structures for Circuit Breaker shall be provided as per Employer's drawings during detailed engineering.
- iii. In case POWERGRID provides the Single Line Diagram (SLD) of the structures, contractor shall prepare the fabrication drawing based on the SLD and submit for approval. In case of equipment support structure, the attachment of stool and fixing of MOM box etc. shall be taken care by the contractor as per the requirement of the equipment.
- iv. In the bid price schedule, the structures, nuts, bolts and fasteners & foundation bolts are indicated in Metric Ton (MT) and shall be paid as per respective items of BPS.
- v. The civil works shall be payable as per relevant item of BPS.
- vi. Proto-corrected drawings and Bill of Materials of all structures shall be in the scope of Contractor.
- vii. 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 design & drawings during detailed engineering.

r) Any other equipment/material required to complete the specified scope.

2.2.1.2 Design, engineering, manufacture, testing and supply including transportation & insurance, storage of mandatory spares at site as per BPS.

#### **2.2.1.3 Civil works:**

**A.** The design of foundation shall be based on the soil investigation report and other parameters as per relevant IS codes & technical specification.

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

- (i) Foundation of non-Standard structures (if any) envisaged during detailed engineering. The design of foundation shall be based on the soil investigation report and other parameters as per relevant IS code & technical specification.
- (ii) **Site levelling work:** The item site levelling works includes Contouring of the present scope of switchyard area within the substation boundary as per technical specification. The final area of levelling may be less than the contouring area, which will be decided during detailed engineering.

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- a) The Quantity of earthwork cutting & filling, borrowed earth and FGL shall be proposed by vendor for approval of POWERGRID based on the approved contour level drawing and site HFL/FGL data.
  - b) Mode of measurement of this item is in Cum of earthwork as per BOQ and technical specification. The contouring of the present scope switchyard area as per technical specification is also deemed to be included in quoted rates of this item.
  - c) HFL data duly verified by POWERGRID Site is required to be arranged by contractor for finalization of FGL (Finished Ground Level).
- (iii) Foundation for Bus duct supporting structures outside GIS & GIS (SF6/Air) bushing and outdoor GIS module.
- (iv) **Other miscellaneous requirements & scope:**
- a) Stone spreading and anti-weed treatment in the switchyard for area under present scope. Layout for the same shall be developed by the contractor.
  - b) Providing & laying of non-woven Geo-synthetics fabric of minimum 200 GSM in separation layer between sub grade and stone spreading in switchyard.
  - 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.
  - d) For all building leaving labor hut, all doors except fire escape doors, windows, glazed partitions shall be of UPVC type.
  - e) Slope protection wall/Retaining wall (if any)- design & drawing pertaining to slope protection work & retaining wall(if required) shall be finalized during detailed reengineering.
  - f) Dismantling & re-erection of existing fencing.
  - g) Dismantling of existing RCC road (if any).
  - h) Dismantling of Drain (if any)
  - i) Dismantling of RCC if any
- (v) Any other item/design/drawing required for successful completion of the scope of works.
- C. The scope of civil work shall include but not be limited to the following based on **drawings developed by POWERGRID:**
- i. **Soil investigation report** of existing Sub-Station area is to be provided to successful bidder by employer during detailed engineering.
  - ii. LM & Equipment support structure: LM and Equipment support structure (except Support structure for Circuit Breaker shall be as per manufacturer's design which is deemed to be included in the cost of respective CB) shall be provided as per Employer's drawings during detailed engineering.
  - iii. Foundation for LM & Equipment support structures: The foundations of these structures include embedment/grouting of foundation bolts.

*Technical Specification, Section – Project (Rev.0)*

*400kV GIS Extn Substation Package SS-157 (including Transformer) for (a) Extn. of 400kV Jeypore (POWERGRID) S/S  
(b) Extn. of 220/132kV Purnea (POWERGRID) S/S*

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- iv. **Switchyard Cable Trenches:** Cable trenches including cable trenches in Reactor/Transformer area along with covers including road/rail crossing, sump pits, culverts etc. shall be constructed as per POWERGRID standard drawings provided in tender.
- a. However, Cable trench layout shall be prepared by vendor for approval of POWERGRID based on the cable trench sections available in Tender Drawings.
  - b. Mode of measurement: Cable Trenches shall be measured in running meters. The rate shall include the cost of all works such as excavation, PCC, RCC, Reinforcement Steel, Miscellaneous Structural Steel, inserts, embedment, NP-3 RCC Hume pipes in crossings sumps, RCC cover etc required as per technical specification and drawings for successful completion of work are deemed to be included in quoted rate.
- v. **Bituminous Road including Road Crossing**  
Bituminous Road including approach road (if any), shall be constructed as per POWERGRID standard drawings provided in tender. However, Road layout shall be prepared by vendor for approval.
- vi. **Drains:** Drain layout including peripheral drains if any required along the boundary shall be prepared by vendor and to be submitted for approval of POWERGRID based on the standard sections. Diversion of existing Nallah/ Surface runoff, if required, the design & drawing of drains shall be prepared by contractor along with the drain layout and same shall be submitted to POWERGRID for approval. Payment shall be made under respective items of BPS.”
- vii. pits, culverts etc. shall be constructed as per POWERGRID standard drawings provided in tender.
- viii. **Switchyard Panel Room:**  
The drawings pertaining to Switchyard Panel Room are attached as a part of tender drawings. Structural drawings shall be provided to the successful bidder during detailed engineering.
- ix. **Foundation of Reactor:**  
Foundation of Reactors including Rail cum road, unloading platform, jacking pad, Oil tank, pulling blocks, sump pit, gratings, Fire wall etc as per technical specification
- x. **Switchyard barbed wire fencing:** Fence layout shall be prepared by vendor and to be submitted for approval of POWERGRID based on the standard sections
- D.** For buildings, the complete civil works including internal and external finishing, stone soling for flooring, plinth protection, drain along plinth protection, electrical conduit and junction boxes, fan boxes, Miscellaneous structural steel cable transit system etc. required to complete the building in all respect as per the drawing shall be payable in the plinth area rate. However, the quantity of the earthwork (excavation, backfilling, disposal etc.), concrete (all types), reinforcement steel, shall be measured and paid under respective items under BPS.

### **2.2.2 Extn. of 220/132kV Purnea (POWERGRID) S/S**

- 2.2.2.1 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.

*Technical Specification, Section – Project (Rev.0)*

*400kV GIS Extn Substation Package SS-157 (including Transformer) for (a) Extn. of 400kV Jeypore (POWERGRID) S/S  
(b) Extn. of 220/132kV Purnea (POWERGRID) S/S*

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### a) **132kV Gas Insulated Switchgear:**

The SF6 gas insulated switch gear (50 Hz) shall be of the indoor metal-enclosed type.

- The existing 132kV SF6 gas insulated switch gear is of **M/s Hyosung** make and has Double main bus bar arrangement.
- Under Present scope, Extension of existing 132kV GIS Main Buses-I & II are envisaged for connection with present scope 132kV GIS bay, which is going to be placed in the available space in existing 132kV GIS Hall. The extension piece interface modules (for connection between present scope bus duct and existing bus duct) shall be as per BPS.

132kV SF6 gas insulated switch gear shall have Double main breaker bus bar arrangement. The Switchgear shall be complete with all necessary terminal boxes, SF6 gas filling, interconnecting power and control wiring, grounding connections, gas monitoring equipment & piping and support structures along with necessary base plate & foundation bolts. In addition, all necessary platforms, supports, ladders and catwalks etc. as required for operation & maintenance work shall also be provided.

- a) 132kV GIS modules/Equipment description shall be as per Annexure-III (Specific requirement Rev 10).

### b) **Gas Insulated Bus (GIB) Ducts:**

132kV GIB (outdoor) ducts (including support structures along with foundation bolts, gas monitoring devices, gas barrier, pressure switch, UHF PD sensor) as per BPS. The GIB duct length shall be optimized further without affecting the switchyard arrangement and bay orientation and also any of the functional requirements specified. Outdoor Bus duct shall be measured from outer edge of the wall of the 132kV GIS Hall/Building & Shall be paid separately, against respective BPS items.

- c) 132kV SF6 to air bushing as per **BPS** (Bid Price Schedule).
- d) Mandatory Spares for 132kV GIS as per BPS.
- e) Any other equipment/material required to complete the specified GIS scope of work.

### b) **220/132kV Transformer and its associated accessories:**

- i. 1x200MVA, 220/132kV, 3-ph Transformers including insulating oil, all fittings, accessories including Online-Drying System (ODS), Digital RTCC relays and Panel (as detailed below), foundation bolts and cables as per technical specification.
- ii. Digital RTCC relays & Panel: The parallel operation of existing 3 nos. 220/132kV Transformers at Purnea S/s are commissioned using Analog RTCC Panels. The requirement of present scope shall include supply of 4 nos. Digital RTCC relays along with its Digital RTCC panel as per technical specification (1 no. relay each for existing 220/132kV ICT-1, ICT-2 and ICT-3; 1 no. relay for 220/132kV ICT-4 to be supplied under present scope) for successful parallel operation of all 4 transformer units. The present scope shall also include all types of cables (Power, Control, shielded twisted pair cable for 4-20mA signal, FO & any special cable) between the existing Transformer' OLTC MB/Transformer MB/RTCC panel to new Digital RTCC relays & panels, any wiring modification in existing panel as per RTCC scheme requirement to implement successful parallel operation of all 4 Transformer units through Digital RTCC relays.

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- iii. All cables (Power, Control, shielded twisted pair cable for 4-20mA signal, FO & any special cable required from Transformer unit(s) to cooler control cabinet/Marshalling box/Drive Mechanism box/any other cubicle (as applicable)) is also covered in the scope of work.

c) **AIS Equipment:**

**220kV AIS Equipment:**

Circuit Breaker, Isolator, Current Transformer, Bus Post Insulators and 216kV Surge Arresters.

**132kV AIS Equipment:**

Bus Post Insulators and 120kV Surge Arresters.

- d) Complete Control, Relay and Protection system as per Section–Control and Relay Panels for bays under present scope.

i) **Augmentation of 220kV Bus Bar Protection:**

220kV Centralized Bus Bar Protection scheme of M/s Alstom make & model-P747 is existing at 220/132kV Purnea (POWERGRID) S/S.

The Input cards are available in existing 220kV bus bar protection for bays under present scope for augmentation. Necessary shifting /modification, wiring/cabling, augmentation and integration with 220kV Bus bar protection, for completion of 220kV Bus Bar protection is under present scope and same is to be quoted under “Augmentation of existing 220kV bus bar protection scheme” service item of BPS.

**ii) Augmentation of 132kV Bus Bar Protection:**

132kV De-Centralized Bus Bar Protection scheme of M/s Siemens make & model-P7SS52 is existing at 220/132kV Purnea (POWERGRID) S/S.

Peripheral units of Decentralized Bus bar protection system for present scope are available at site. The scope shall cover shifting of these peripheral units from existing panels to present bays panels including necessary modifications, wiring and commissioning for completion of the bus bar protection scheme. Any modification required in the existing protection scheme is also included in the present scope.

Further, necessary modifications, wiring/cabling, and commissioning etc. for completion of the bus bar protection augmentation for bays under present scope shall be carried out by contractor. Any modification required in the existing protection scheme is included in the present scope.

Cost of the above shall be deemed to be included under Augmentation of Busbar BPS item in Installation schedule and no additional cost shall be admissible on account of above.

e) **SUBSTATION AUTOMATION SYSTEM:**

Augmentation of Substation Automation System for bays as per BPS (bay as defined in technical specification, Section-Substation Automation System): Existing Purnea Substation is equipped with substation automation system (based on IEC-61850).

Make & Model of existing SAS: **Siemens**

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### 220 kV:

Main Bays: 1 Nos.

### 132 kV:

Main Bays: 1 Nos.

Under present scope, the Bidder shall include BCUs required for bays mentioned above, including all necessary hardware & software to integrate with the existing substation automation system. The scope of bidder shall include but not limited to integration of IEDs under present scope of work with existing substation automation (which is based on IEC 61850) and capability enhancement of same as required, including updating of system database, displays, development of additional displays and reports as per requirement.

Any upgradation of hardware and software for above integration shall be in the scope of contractor including license fee (if any).

Necessary configuration of data at Gateway for remote operation from NTAMC/RTAMC & supervision from SLDC/RLDC/RTAMC/NTAMC is included in present scope. However, no work is envisaged at remote end (SLDC/RLDC/RTAMC/NTAMC) under the present scope.

Integration of ODS (On-line Oil Drying system) based on IEC-61850 for 220/132kV transformer with substation automation system is also included under present scope.

- f) NIFPS & Hydrant system for 220/132kV, 200MVA Transformer. Piping for fire protection system shall be extended from nearest existing Main Header existing in the switchyard.

Conventional Type Smoke detection, Fire alarm & Annunciation System for Switchyard panel Rooms. Above work also includes integration of Smoke detectors with existing Fire alarm Panel under present scope

- g) 1.1 kV grade Power & Control cables (and special cables, if any) along with complete accessories including cables for oil filtration units and cabling from common marshaling box of 220/132kV Transformer to BMK/Switchyard Panel Room/GIS room/Control Room Building, Power receptacle for oil filtration unit shall also be provided under present scope of work as per BPS. ***Cable sizes shall be used as per Sizing of 1.1kV Power & Control cables specified at Annexure-S1 (Revised) attached with this section.***
- h) The lightning protection (DSLPP) for the complete switchyard under present scope is to be provided by the contractor. The contractor shall design the lightning protection by utilizing the existing structures in switchyard and also the structures under present scope.
- i) Erection Hardware: Insulator strings and associated hardware fittings, Clamps & connectors (including terminal connectors for 220/132kV transformer), Conductor, Aluminum tubes, Bus bar and earthing material risers, auxiliary earthmat (excluding main earth mat), Bay marshaling box, spacers, cable sealing arrangement, insulating mats, cable supporting angles/channels, Cable Pull pit, Cable trays & covers, Guy arrangement (including insulators and hardware), Earthwire, Junction box, buried cable trenches/pipes for equipment & lighting, all accessories, etc. as required.
- j) Existing Main Earthmat is to be extended for bays under present scope. All the equipments including 220/132kV Transformer, cable trenches, auxiliary earthmat for isolators etc. shall be earthed by connecting them to the main Earthmat.

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k) LED based Outdoor Illumination & Outdoor Receptacle (As per BPS): LED based Lighting and illumination for the switchyard area under present scope and LED based illumination for Switchyard Panel Rooms shall be provided by the contractor.

l) Air Conditioning System for Switchyard Panel Room

m) **LT Switchgear (Extension):**

- **415V A.C. Distribution Board (ACDB I& II):**

Distinct vertical/Wall mounted panels equipped with the following modules in each panel for the present scope:

Extension of existing ACDB panels at existing CRB (for each section of ACDB):

i) 250A, 4 pole MCCB module - 1 nos.

To be installed in New ACDBs (for each section of ACDB):

i) 250A, 4 pole MCCB module - 1 nos.

ii) 63A, 4 pole MCCB module - 3 nos.

100A, 4 pole MCCB module - 2 nos.

Extension of existing DCDB panels at existing CRB (for each DCDB 1 and DCDB 2):

i) 100A, 2 pole MCCB module - 1 nos.

To be installed in New DCDBs (for each DCDB 1 and DCDB 2):

i) 100A, 2 pole MCCB module - 1 nos.

ii) 63A, 2 pole MCCB module - 2 nos.

iii) 32A, 2 pole MCCB module - 3 nos.

- ACDB and DCDB extension panels shall be placed in existing Control room building.
- Necessary cabling and connections from existing 415 V ACDB and 220V DCDB (placed in CRB) to new ACDB and DCDB extension panels (to be placed in existing CRB) shall be in the scope of the contractor and shall be included in respective BPS line item of Power & Control Cables.

n) Augmentation of Visual monitoring system (VMS) for Bays under present scope, and their integration with existing Substation VMS system. The bidder shall provide 3 (Three) Number of color IP camera, with PAN, TILT and ZOOM facilities, suitably located in the switchyard for monitoring of 220kV and 132kV equipment under present scope. The scope of bidder shall include providing all Items, Accessories, Line Interface units, Fiber patch cords, Power supply units, Junction Boxes, Cables, Fiber Optic Cables, Hardware and Software, etc., as applicable to the product design, to meet functional requirements. Compatibility enhancement of exiting VMS system, as needed, shall be done to integrate visual monitoring for 220kV and 132kV bays/equipment under present scope with existing Visual monitoring system of the station. A copy of specification for Visual Monitoring system is enclosed at Specific Requirement Rev 10, which shall be read only for the Augmentation scope of existing VMS system.

o) **LATTICE AND PIPE STRUCTURES (GALVANIZED):**

a) Fabrication, proto-assembly, supply including transportation & insurance, unloading,

## SECTION -PROJECT

storage, erection and commissioning of towers, beams and equipment support structures including nuts, bolts, fasteners and foundation bolt complete in all respect shall be in scope of contractor.

- b) Towers, Beams and Equipment support structures except CB support structure shall be provided as per Employer's drawings. CB support structure shall be as per CB manufacturer's design.
- c) In case POWERGRID provides the Single Line Diagram (SLD) of the structures, contractor shall prepare the fabrication drawing based on the SLD and submit for approval.
- d) In the bid price schedule, the structures, nuts, bolts and fasteners & foundation bolts are indicated in Metric Ton (MT) and shall be paid as per respective items of BPS.
- e) Proto-corrected drawings and Bill of material of all structures like towers, beams, LM and equipment support structures etc. shall be in the scope of contractor.
- f) 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.
- g) The Contractor shall provide editable soft copies of drawings during detailed engineering.
- p) Any other equipment/material required to complete the specified scope.

2.2.2.2 Design, engineering, manufacture, testing and supply including transportation & insurance, storage of mandatory spares at site as per BPS.

### 2.2.2.3 Civil works:

- A. The design of foundation shall be based on the soil investigation report and other parameters as per relevant IS codes & technical specification.
- B. The scope of civil work shall include but shall not be limited to the following based on **drawings developed by the contractor:**

#### (i) Other miscellaneous requirements & scope:

- a) Stone spreading and anti-weed treatment including PCC in the switchyard for area under present scope. Layout for the same shall be developed by the contractor.  
Stone has already been laid in some portion of the switchyard area under present scope. In this area scope shall be Removal, cleaning and washing of existing stone, refurbishing additional stone (if required) and re-spreading after doing anti-weed treatment & PCC.
- b) 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.

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- c) All civil works including foundations associated with erection of SF6 gas insulated metal enclosed switchgear along with its SF6 bus ducts up to the outer edge of the wall of GIS building. Civil works including all foundations for all equipment inside GIS building.
  - d) The cable trenches inside GIS halls & associated LCC/Relay rooms.
  - e) Foundation for Bus duct supporting structures outside GIS Hall & GIS (SF6/Air) bushing.
  - f) Any type of dis-mantling work required for successful execution of works.
- (ii) Any other item/design/drawing required for successful completion of the scope of works.
- (iii) NON-STANDARD Structures, if required during detailed engineering.
- C. The scope of civil work shall include but not be limited to the following based on **drawings developed by POWERGRID** :
- (i) **RCC Road including Road Crossing**  
RCC Road including approach road (if any), shall be constructed as per POWERGRID standard drawings provided in tender. However, Road layout shall be prepared by vendor for approval.  
  
Dismantling of Existing Road wherever required.
  - (ii) **Cable Trenches:**  
Cable trenches shall be constructed as per POWERGRID standard drawings provided in tender. However, Cable trench layout shall be prepared by vendor for approval of POWERGRID based on the standard sections.
  - (iii) **Drains**  
Drain layout including peripheral drains if any required along the boundary shall be prepared by vendor and to be submitted for approval of POWERGRID based on the standard sections.
  - (iv) **Switchyard Panel Room**  
The drawings pertaining to Switchyard Panel Room are attached as a part of tender drawings. Structural drawings shall be provided to the successful bidder during detailed engineering.
  - (v) **Transformers:**  
  
Foundation of Transformer including Rail cum road, unloading platform, jacking pad, Oil tank, pulling blocks, gratings, common oil pit etc. as per technical specification.
  - (vi) **Rail Cum Road**
  - (vii) **Equipment Support Structures**  
  
220/132 kV Equipment support structures.
  - (viii) **Foundations of 220/132 kV Equipment Support Structure:**
    - a) 220/132 kV Equipment support structure foundations including 220 kV CB foundation.
    - b) The foundations of these structure include embedment/grouting of foundation bolts.

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**(ix) Gantry tower and beam Structure:**

- a) Structure drawing for Gantry tower, and beam.

**(x) Foundations of Towers:**

- a) Foundations of Towers.
- b) The foundations of these structures include embedment/grouting of foundation bolts.

**D.** For buildings, the complete civil works including internal and external finishing, stone soling for flooring, plinth protection, drain along plinth protection, electrical conduit and junction boxes, fan boxes, cable transit system etc. required to complete the building in all respect as per the drawing shall be payable in the plinth area rate. However, the quantity of the earthwork (excavation, backfilling, disposal etc.), concrete (all types), reinforcement steel, shall be measured and paid under respective items under BPS

2.3 Any other items not specifically mentioned in the specification, but which are required for erection, testing and commissioning and satisfactory operation of the substation are deemed to be included in the scope of the specification unless specifically excluded.

2.4 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.

2.5 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 (for existing substations) 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. The complete design (unless specified otherwise in specification elsewhere) and detailed engineering shall be done by the Contractor based on conceptual tender drawings.

2.6 The Contractor shall also be responsible for the overall co-ordination with internal/external agencies, project management, loading, unloading, handling, moving to final destination for successful erection, testing and commissioning of the substation/switchyard.

2.7 Design of substation and its associated electrical & mechanical auxiliaries systems includes preparation of single line diagram, electrical layout, foundation & cable trench layouts (including invert levels), erection key diagrams, direct stroke lightning protection, electrical and physical clearance diagrams, Control and protection schematics, wiring and termination schedules, design of firefighting system, outdoor lighting/illumination and other relevant drawings & documents required for engineering of all facilities within the fencing to be provided under this contract, are covered under the scope of the Contractor.

2.8 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.

*Technical Specification, Section – Project (Rev.0)*

*400kV GIS Extn Substation Package SS-157 (including Transformer) for (a) Extn. of 400kV Jeypore (POWERGRID) S/S  
(b) Extn. of 220/132kV Purnea (POWERGRID) S/S*

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### 3.0 SPECIFIC EXCLUSIONS

The following items of work are specifically excluded from the scope of the specifications

#### A) 400/220kV Jeypore S/S

- i) Employer's site office and stores.
- ii) Transit camp.
- iii) Store building.
- iv) Supply, erection, testing & commissioning of 420kV, 125MVAr Reactor.
- v) Tarriff Meter(s)
- vi) Battery and Battery charger
- vii) Approach Road and Boundary Wall

#### B) 220/132kV Purnea S/S extn.

- i) Employer's site office and stores.
- ii) Transit camp.
- iii) Store building.
- iv) Tarriff Meter(s)
- v) Battery and Battery charger
- vi) Approach Road and Boundary Wall

### 4.0 PHYSICAL AND OTHER PARAMETERS

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

| Sr. No | Name of Substation    | Name of State | Nearest Rail Head |
|--------|-----------------------|---------------|-------------------|
| 1.     | 400/220kV Jeypore S/S | Odisha        | Jeypore           |
| 2.     | 220/132kV Purnea S/S  | Bihar         | Katihar jn.       |

#### 4.2 Meteorological data

The meteorological data are as below

| Station Name                  | 400/220kV Jeypore S/S                           | 220/132kV Purnea S/S extn |
|-------------------------------|---|---------------------------|
| Altitude                      | Less than 1000 meter above mean sea level (MSL) |                           |
| Snow fall                     | NIL   |                           |
| Seismic Zone                  | As per IS 1893 (Part 1)                         |                           |
| Wind Zone                     | NBC 2016  |                           |
| Min./Max. Ambient Temperature | 0 / 50 degree centigrade                        |                           |
| Coastal Area consideration    | No  |                           |

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4.3 Fault level shall be considered as mentioned below:

| Sl. No. | Name of Substation         | 400kV          | 220kV          | 132kV          |
|---------|----------------------------|----------------|----------------|----------------|
| 1.      | 400/220kV Jeypore S/S      | 63kA for 1 Sec | NA             | NA             |
| 2.      | 220/132kV Purnea S/S extn. | NA             | 50kA for 1 Sec | 40kA for 1 Sec |

### 5.0 SCHEDULE OF QUANTITIES

The requirement of various items/equipments and civil works are indicated in Bid price Schedules. All equipments/items, Structures and civil works for which quantities have been given in the BPS shall be payable on unit rate basis. 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.

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

The 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 substation shall be designed considering current ratings/conductor configuration as indicated below:

| Sl. No | Description of bay        | 400/220kV Jeypore S/S |        | 220/132kV Purnea S/S |       |
|--------|---------------------------|-----------------------|--------|----------------------|-------|
|        |                           | 400kV                 | 220 kV | 220kV                | 132kV |
| 1.     | Bus Bar                   | 3000A                 | -      | Twin ACSR            | 2000A |
| 2.     | Line bay                  | NA                    | NA     | NA                   | NA    |
| 3.     | ICT bay                   | NA                    | NA     | 1600A                | 1250A |
| 4.     | Bus Reactor bay           | 3150A                 | -      | NA                   | NA    |
| 5.     | Switched Line Reactor Bay | NA                    | -      | NA                   | NA    |

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6.2 Following switching schemes are proposed for the substations envisaged under this specification:

| Name of s/s           | 400kV                              | 220 kV                   | 132 kV      |
|-----------------------|------------------------------------|--------------------------|-------------|
| 400/220kV Jeypore S/S | One & half breaker scheme (D type) | NA                       | NA          |
| 220/132kV Purnea S/S  | NA                                 | Double main and Transfer | Double main |

6.3 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.

6.4 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

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.

|    |   |        |
|----|---|--------|
| 1  | Section-Project                             | Rev 00 |
| 2  | Section-General Technical Requirement (GTR) | Rev 15 |
| 3  | SECTION- TRANSFORMER (UPTO 400 KV CLASS)    | Rev 13 |
| 4  | Section GIS                                 | Rev 5A |
| 5  | Section-Switchgear- CB                      | Rev 12 |
| 6  | Section-Switchgear- ISO                     | Rev 13 |
| 7  | Section-Switchgear- Instrument Transformer  | Rev 12 |
| 8  | Section-Switchgear-Surge Arrester           | Rev 13 |
| 9  | Section-Power and Control Cables            | Rev 06 |
| 10 | Section-Lighting System                     | Rev 07 |
| 11 | Section-Fire Protection System              | Rev 06 |
| 12 | Section – LT Switchgear                     | Rev 05 |
| 13 | Section-Air Conditioning System             | Rev 04 |
| 14 | Section-Switchyard Erection                 | Rev 10 |
| 15 | Section- Structures                         | Rev 07 |
| 16 | Section-Civil Works                         | Rev 12 |
| 17 | Section-Control and Relay Panels            | Rev 09 |
| 18 | Section-Substation Automation System        | Rev 04 |
| 19 | Section- RTU                                | Rev 03 |

In case of any discrepancy between Section-PROJECT and Section-GTR and other technical specifications on 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, the requirement of individual equipment section shall prevail.

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### 8.0 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. The breakup of mandatory spares is enclosed at Annex-II.

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 purposes 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 are 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.

### 9.0 SPECIFIC REQUIREMENT

**9.1** 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.

**9.2** 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 |

**9.3** In BOQ line item “420kV, 3000A, 63kA, Single phase, SF6 Gas Insulated Bus Duct (GIB) outside GIS Hall alongwith associated support structure”, duct shall be measured from end flange of Tie bay module Isolator.

**9.4** The 220/132kV Transformer envisaged under present scope for Purnea substation shall be operated in parallel with existing Transformers. For parallel operation with existing transformer, the impedance, OLTC connection & range and the winding configuration (if necessary) are to be matched. Rating plates of existing Transformers have been enclosed in tender drawings. Percentage Impedance of existing Transformers are mentioned as below:

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| Tap no.   | ICT-1   | ICT-2   | ICT-3   |
|-----------|---------|---------|---------|
| 1 (Max)   | 9.15 %  | 9.2 %   | 10.21 % |
| 9(Normal) | 11.41 % | 11.49 % | 12.07 % |
| 13(Min)   | 13.02 % | 13.09 % | 13.53 % |

- 9.0** Establishment of CCTV System for Construction Monitoring of entire switchyard shall be as per Sl. No. A.7 of SPECIFIC REQUIREMENT Rev. no 10 enclosed at Annex-III.
- 9.1** In Section-GTR and other technical specifications, the term ‘Employer and/or ‘Purchaser may be read as Employer
- 9.2** Minimum specified creepage distance for insulator string/ long rod insulators/ outdoor bushings shall be 31 mm/kV.
- 9.3** 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.
- 9.4** **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.

- 9.5** **Clause under Sl. No. 13.9 of GTR (REV NO 15) is modified as follows:**

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.

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

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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.

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

**9.8** All substations proposed to be established or extended 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 equipments at *New and extension substations under the subject package* shall be supplied with minimum creepage distance of 31mm/kV.

**9.9** Clause 3.4.6 of Section Air Conditioning Rev 04 is proposed to be modified as below:

### Required Features of Various Components

The compressor shall be very reliable, trouble free and long life i.e. hermetically sealed Scroll or Rotary type of reputed make suitable for continuous operation. Compressor should be installed on vibration isolated mountings or manufacturer's recommended approved mounting. Valve shall be provided for charging/topping up of refrigerant. The bidder shall furnish details of their compressor indicating the MTBF, life of compressor and continuous run time of compressor without failure. The contractor shall also furnish details of all accessories i.e. refrigeration system, evaporator coil, condenser coil, evaporator blower, filter, cabinet, indoor supply and return grill etc. during detailed engineering.

**9.10** 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                                |

*Technical Specification, Section – Project (Rev.0)*

*400kV GIS Extn Substation Package SS-157 (including Transformer) for (a) Extn. of 400kV Jeypore (POWERGRID) S/S (b) Extn. of 220/132kV Purnea (POWERGRID) S/S*

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|    |   |    |
|----|---|----|
| 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 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.