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**TECHNICAL SPECIFICATION****1.0 Scope**

This Technical Specification covers the requirements for the supply of spares, specialized services, supervision, testing, and restoration of the damaged 400 kV GIS Current Transformer (CT) Compartment – GC.03.L3/A (T2 CT Compartment) at the 2 × 660 MW Ennore SEZ Supercritical Thermal Power Project.

The scope broadly includes supply of replacement GIS components, deployment of GIS experts and specialized tools, dismantling, inspection, replacement, reassembly, SF<sub>6</sub> gas handling, testing, commissioning support, and restoration of the affected GIS compartments, including associated adjoining Circuit Breaker and Disconnecter compartments, to a condition ready for pre-commissioning and energization.

The offered materials and services shall comply with this specification, applicable IEC/IS standards, OEM recommendations, and the reference documents listed below.

**Reference Documents**

Purchase Order No. 277P161, dated 31.10.2017

Gas Single Line Diagram (SLD): TB-378-316-101-01, Rev.02

Ennore GIS Failure Report dated 02.06.2026

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**1.1 Project Information**

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|------------------------|--------------------------------------------------------------------------------|
| <b>Project</b>         | <b>400 kV GIS at 2 × 660 MW Ennore SEZ Supercritical Thermal Power Project</b> |
| <b>Customer</b>        | TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION (TANGEDCO)                  |
| <b>Consultant</b>      | DESEIN Private Limited, New Delhi                                              |
| <b>Main Contractor</b> | BHEL                                                                           |

**2.0 Bill of Quantities (BOQ)**

The detailed Bill of Quantities forms **Annexure-BOQ** of this specification.

The detailed Bill of Quantities (BOQ) is furnished separately as **Annexure-BOQ** and is intended for commercial purposes only. The Contractor shall provide all materials, consumables, manpower, tools, testing equipment, and incidental services necessary for the complete and satisfactory execution of the work, whether or not specifically listed in the BOQ.

**3.0 Documents to be Submitted**

The Contractor shall submit the following documents for review/approval by BHEL/TANGEDCO, as applicable:

- Detailed Repair Methodology and Procedure.
- OEM recommended HV Test Procedure under said repair conditions
- Commissioning Checklists.
- Completion Report.

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#### 4.0 Inspection and Testing

All supplied materials shall be new and shall undergo routine and acceptance tests at the manufacturer's works in accordance with applicable IEC/IS standards and OEM requirements.

The materials shall be offered for inspection by BHEL and/or TANGEDCO in accordance with the approved Quality Assurance Plan (QAP), wherever applicable.

Following completion of site activities, the Contractor shall carry out or supervise all necessary mechanical, electrical, gas-tightness, functional, and commissioning tests required to demonstrate satisfactory restoration of the reference GIS Bay.

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#### 5.0 Scope of Supply

The scope of supply shall include all equipment, components, accessories, consumables, and materials required for replacement and restoration of the damaged 400 kV GIS CT compartment, including but not limited to:

- CT Housing complete with Core.
- CT Primary Conductor Assembly.
- Non-permeable CT Bushing (Circuit Breaker Side).
- Gaskets, O-rings, filter bags and associated sealing accessories.
- SF<sub>6</sub> Gas in returnable cylinders, where specified.
- Consumables, fasteners, and miscellaneous items required for complete restoration.
- Any additional material necessary for successful completion of the work.

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#### 6.0 Scope of Services

The Contractor shall provide all specialized services required for successful execution of the work, including but not limited to:

- Deployment of qualified 1 number GIS Experts and 2 number skilled GIS Fitters.
- Supervision of dismantling and reassembly of the GIS compartment.
- Inspection and assessment of damaged components.
- Cleaning and restoration of the adjoining Circuit Breaker and Disconnectors gas compartments affected during the repair.
- Guidance and supervision of SF<sub>6</sub> gas recovery, evacuation, refilling, and leak testing.
- Deployment of specialized tools, testing equipment, and tackles.
- Mechanical, electrical, functional, and commissioning tests.
- Technical support until successful restoration of the GIS and readiness for pre-commissioning.

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#### 7.0 Special Tools and Testing Equipment

The Contractor shall arrange all specialized returnable tools, testing equipment, tackles, and accessories required for execution of the work, including but not limited to:

- Circuit Breaker Trolley.
- CT Analyzer.
- Contact Resistance Measurement (CRM) Test Kit.
- Partial Discharge (PD) Analyzer.
- Specialized GIS erection and maintenance tools.
- Torque tools and measuring instruments.

- Other tools and equipment necessary for successful completion of the work.

The Circuit Breaker Timing Test Kit and DILO SF<sub>6</sub> Gas Handling Cart available with BHEL shall be made available for execution of the work and are excluded from the Contractor's scope.

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### 8.0 High Voltage Testing

The bidder shall confirm the necessity of High Voltage testing, proposed test voltage, test methodology, and applicable acceptance criteria along with the technical bid.

**Note:** Provision of the HV Test Kit with Operator is an optional item and may be deleted if arranged separately by BHEL.

Where included in the Contractor's scope, the Contractor shall arrange the High Voltage Test Kit with qualified operator and carry out successful Power Frequency High Voltage Testing of the repaired GIS compartment.

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### 9.0 Purchaser's Scope

BHEL shall provide the following for execution of the work:

- Site access and necessary work permits.
- Semi-skilled fitters and electricians.
- Overhead crane and available site handling facilities.
- Local accommodation and local transportation for bidder's engineer & fitter
- DILO SF<sub>6</sub> Gas Handling Cart.
- Siemens supplied Circuit Breaker Timing Test Kit.

| COST ESTIMATE FOR GIS RECTIFICATION WORK AT ENNORE SEZ |                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |        |     | ANNEXURE-BOQ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sr                                                     | PI Item Description                                                                                                                                                                                                                                                                                                                                                  |                                                                      | Unit   | Qty | Remark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>1</b>                                               | <b>GIS : 400KV, GIS COMPONENT (SUPPLY)</b>                                                                                                                                                                                                                                                                                                                           |                                                                      |        |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1.1                                                    | SUPPLY- GIS : 420KV, CT HOUSING WITHOUT CORE, 1-PH                                                                                                                                                                                                                                                                                                                   | TB9614004006                                                         | No     | 1   | CT Housing complete with Core (Excluding Conductor Assembly which is covered in a separate BOQ item below), Single Phase - (GC.03.L3/A (T2-CT Compartment))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1.2                                                    | SUPPLY- GIS : 400KV, CT CONDUCTOR ASSEMBLY, 1-PH                                                                                                                                                                                                                                                                                                                     | TB9614004014                                                         | Set    | 1   | CT Conductor Assembly for above CT, Single Phase - (GC.03.L3/A (T2-CT Compartment))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1.3                                                    | SUPPLY- GIS : 400KV, CT BUSHING                                                                                                                                                                                                                                                                                                                                      | TB9614004026                                                         | No     | 1   | CT Bushing (CB Side)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1.4                                                    | SUPPLY- GIS : 400KV, GASKETS/O-RINGS, FILTER BAG & CONSUMABLES                                                                                                                                                                                                                                                                                                       | TB9614004034                                                         | Set    | 1   | Associated Gasket / O-Rings and Filter Bag & Consumable Required for Repair and Reassembly                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1.5                                                    | SPARES- GIS : 400KV, MANDATORY SPARES SUITABLE FOR GIS-SF6 GAS CYLINDER OF 50KGS/ CYLINDER                                                                                                                                                                                                                                                                           | TB8614000094                                                         | No     | 2   | SF6 Gas in Returnable Cylinder, 50kg Gas. Optional Item – May Be Subject to Deletion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>2</b>                                               | <b>SERVICES- GIS : GAS INSULATED SWITCHGEAR (GIS) AS PER TS</b>                                                                                                                                                                                                                                                                                                      | BHEL shall provide supporting Semi Skilled fitters and electricians. |        |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2.1                                                    | SERVICES- GIS : GIS EXPERT: DEPUTATION OF 1 NO. GIS EXPERT FOR SUPERVISION OF GIS DISMANTLING/RE-ERECTION, AND EXECUTION OF TESTING AND COMMISSIONING. [MOBILIZATION & DEMOBILIZATION COVERED SEPARATELY]                                                                                                                                                            | TB3610004042                                                         | Manday | 20  | SERVICES – GIS Expert: Deputation of 1 Nos. GIS Expert for supervision of dismantling and re erection of GIS equipment, execution of testing and commissioning, and provision of technical support for GIS repair, reassembly, testing, and restoration of the GIS to a condition ready for pre-commissioning. [Note Mobilization & Demobilization of GIS Expert covered in a separate BOQ item]. Mode of Measurement: Payment shall be made on a per day basis, based on the actual number of days the GIS Expert is available at the Ennore Site for execution of the assigned services. BHEL's Scope: BHEL shall provide local accommodation and local transportation at the site free of cost.                                                                                                                     |
| 2.2                                                    | SERVICES- GIS : GIS EXPERT: DEPUTATION OF 2 NO. SKILLED GIS FITTER FOR SUPERVISION OF GIS DISMANTLING/RE-ERECTION, AND EXECUTION OF TESTING AND COMMISSIONING. [MOBILIZATION & DEMOBILIZATION COVERED SEPARATELY]                                                                                                                                                    | TB3610004055                                                         | Days   | 20  | SERVICES – Expert GIS Fitter: Deputation of 02 No. Skilled GIS Fitter for execution of GIS dismantling, re-erection, testing, and commissioning activities. The scope includes assistance in GIS repair, reassembly, testing, and restoration of the GIS to a condition ready for pre-commissioning. [Note Mobilization & Demobilization of GIS Fitter covered in a separate BOQ item]. Mode of Measurement: Payment shall be made on a per day basis, based on the actual number of days the GIS Fitter is available at the Ennore Site for execution of the assigned services. BHEL's Scope: BHEL shall provide local accommodation and local transportation at the site free of cost. BHEL shall provide all required semi-skilled fitters and electricians. Payment on prorata basis if number of fitter not 2 nos |
| 2.3                                                    | SERVICES- GIS : RETURNABLE TOOLS, TESTING EQUIPMENT & T&P: SUPPLY AND DEPLOYMENT OF RETURNABLE SPECIALIZED TOOLS, TESTING EQUIPMENT, AND TACKLES FOR EXECUTION OF WORK, INCLUDING BUT NOT LIMITED TO CB TROLLEY, CT ANALYZER, CRM KIT, AND PD ANALYSER. EXCL. CB TIMING TEST KIT AND GAS HANDLING CART (BY BHEL). [MOBILIZATION & DEMOBILIZATION COVERED SEPARATELY] | TB3610004061                                                         | Days   | 20  | SERVICES – Returnable Tools, Testing Equipment & T&P: Supply and deployment of all required returnable specialized tools, testing equipment, and tackles for execution of the work, including but not limited to CB Trolley, CT Analyzer, CRM Kit, PD Analyser and other necessary tools/equipment. <b>Exclusions: Circuit Breaker Timing Test Kit and Gas Handling Cart shall be provided by BHEL.</b> [Note Mobilization & Demobilization of Tools, Testing Equipment & T&P etc covered in a separate BOQ item below]. Mode of measurement shall be as per number of days GIS Expert available at Ennore Site. Local Accomodation + Local Transportation shall be provided free by BHEL. HV Test Kit is covered in Separate BOQ Item                                                                                 |
|                                                        | <b>Idle Charges</b>                                                                                                                                                                                                                                                                                                                                                  |                                                                      |        |     | BHEL shall provide fitters and electricians. Siemens-supplied tools under the main PO shall be made available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## COST ESTIMATE FOR GIS RECTIFICATION WORK AT ENNORE SEZ

## ANNEXURE-BOQ

| Sr       | PI Item Description                                                                                                                                                                   |              | Unit   | Qty | Remark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.4      | SERVICES- GIS : IDLE CHARGES OF GIS EXPERT: IDLE CHARGES FOR GIS EXPERT, ATTRIBUTABLE TO REASONS BEYOND THE CONTRACTOR'S CONTROL, PAYABLE AS PER CONTRACTUAL TERMS.                   | TB3610004075 | Manday | 5   | SERVICES – Idle Charges of GIS Expert: Idle charges for GIS Expert attributable to reasons beyond the contractor's control, payable as per contractual terms. Mode of measurement shall be as per number of days GIS Expert engineer available IDLE at Ennore Site.                                                                                                                                                                                                                                                                 |
|          | <b>Mobilization &amp; Demobilization</b>                                                                                                                                              |              |        |     | BHEL shall provide fitters and electricians. Siemens-supplied tools under the main PO shall be made available.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2.5      | SERVICES- GIS : MOBILIZATION & DEMOBILIZATION OF 1 GIS EXPERT, INCLUDING TRAVEL AND ASSOCIATED EXPENSES. [EXCLUDING LOCAL ACCOMMODATION AND LOCAL TRANSPORTATION AT SITE]             | TB3610004083 | Set    | 1   | Including 1st time Mobilization & Demobilization                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2.6      | SERVICES- GIS : MOBILIZATION & DEMOBILIZATION OF 2 NOS. EXPERT GIS FITTER, INCLUDING TRAVEL AND ASSOCIATED EXPENSES. [EXCLUDING LOCAL ACCOMMODATION AND LOCAL TRANSPORTATION AT SITE] | TB3610004096 | Set    | 1   | Including 1st time Mobilization & Demobilization                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2.7      | SERVICES- GIS : MOBILIZATION & DEMOBILIZATION OF ERECTION TOOLS, SPECIALIZED TESTING EQUIPMENT, TACKLES, AND OTHER T&P REQUIRED FOR EXECUTION OF WORK.                                | TB3610004103 | Set    | 1   | Including 1st time Mobilization & Demobilization                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|          |                                                                                                                                                                                       |              |        |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>3</b> | <b>UNIT REF HV/ POWER FREQUENCY TESTING OF GIS</b>                                                                                                                                    |              |        |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3.1      | SERVICES- GIS : 400KV, REF. UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - HIRING CHARGES OF HV TEST KIT WITH OPERATOR                                                                | TB3614002765 | Days   | 5   | SERVICES – GIS: HV Test Kit with Operator: Deployment of a High Voltage (HV) Test Kit complete with operator for carrying out HV testing of GIS equipment. The scope shall include all necessary testing accessories, cables, connectors, consumables, and execution of High Voltage testing in accordance with the approved testing procedures and applicable standards. Mobilization & Demobilization covered in separate BOQ Item below. Optional Item – May be deleted if BHEL arranges the HV Test Kit with Operator           |
| 3.2      | SERVICES- GIS : MOBILIZATION & DEMOBILIZATION OF HV TEST KIT WITH OPERATOR.                                                                                                           | TB3610004122 | Set    | 1   | SERVICES – Mobilization & Demobilization of HV Test Kit with Operator: Mobilization and demobilization of the HV Test Kit, operator, accessories, and associated equipment required for execution of HV testing. [Note: Unloading, positioning, installation, dismantling, reloading of the HV Test Kit on Vehicle, and manpower assistance during testing shall be provided by BHEL under the supervision and guidance of the HV Test Kit Operator.] Optional Item – May be deleted if BHEL arranges the HV Test Kit with Operator |
| 3.3      | SERVICES- GIS : IDLE CHARGES OF HV TEST KIT WITH OPERATOR.                                                                                                                            | TB3610004134 | Days   | 5   | SERVICES – Idle Charges of HV Test Kit with Operator: Idle charges for the HV Test Kit with operator due to reasons attributable to BHEL or other reasons beyond the contractor's control, payable as per the contractual terms. Optional Item – May be deleted if BHEL arranges the HV Test Kit with Operator                                                                                                                                                                                                                      |