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TECHNICAL SPECIFICATION

FOR

33kV GAS INSULATED SWITCHGEAR

PROJECT	**75MW VISAKH REFINERY MODERNIZATION PROJECT (VRMP)**
CUSTOMER	**M/S HINDUSTAN PETROLEUM CORPORATION LIMITED,VIZAG,A.P**
CONSULTANT	**ENGINEERS INDIA LIMITED**

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TABLE OF CONTENTS

Sl. No.	Description
1.0	Intent of Specification
2.0	Site Conditions
3.0	Scope of Work
4.0	Codes and Standards
5.0	Order of Priority
6.0	General Requirements
7.0	Technical Requirements
8.0	Inspection, Testing and Acceptance
9.0	Documentation
10.0	Guarantee
11.0	Quality Plan
12.0	Packing and Dispatch
13.0	Special Conditions
14.0	Check List for Bid Submission
15.0	List of Material codes as per enquiry

LIST OF ANNEXURES

Sl. No.	Annexure	Description
1	Annexure-1A	Standard Specification for HV Gas Insulated Switchboards
2	Annexure-1B	Standard Specification for Numerical Relays
3	Annexure-1C	Data Sheet for HV Gas Insulated Switchgear
4	Annexure-2A	Reference Schematics
5	Annexure-2B	Electrical Control Philosophy
6	Annexure-3	Switchboard SLD
7	Annexure-4	I/O Signals List
8	Annexure-5	Sub-vendor List
9	Annexure-6	Feeder List
10	Annexure-7	Deviation Format
11	Annexure-8	Inspection Test Requirements
12	Annexure-9	Price Format
13	Annexure-10	Package Execution Milestones/ Schedule
14	Annexure-11	List of Spares and Tools & Tackles
15	Annexure-12	Documents to be submitted after award of contract
16	Annexure-13	Check List for Bid Submission

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1.0 INTENT OF SPECIFICATION

This specification covers the design, manufacture, assembly and testing at manufacturer's works; packing and transportation to site; supervision of erection, testing and commissioning of 33kV Gas Insulated Switchgear and Substation Automation System complete with all accessories for efficient and trouble-free operation.

It is not the intent to specify completely herein all details of the equipment; nevertheless, the equipment shall be complete and operative in all respects and shall confirm to the highest standard of engineering, design and workmanship.

2.0 SITE CONDITIONS

Sl. No.	Description	Data
1	Project	75MW Visakh Refinery Modernization Project (VRMP), HPCL Vizag, A.P
2	Site Location	Visakhapatnam , Andhra Pradesh
3	Elevation Above MSL	Less than 5.56m above Mean Sea Level
4	Maximum Ambient Temperature	45°C
5	Minimum Ambient Temperature	12.5°C
6	Design Ambient Temperature	45°C
7	Site Environment	Humid, Highly Corrosive
8	Relative Humidity	95%
9	Seismic Zone	Zone-III as per IS-1893 Part-1

3.0 SCOPE OF WORK

3.1 33kV GIS Switchgear

3.1.1 Supply of 33kV GIS Switchboard as per enquiry specification.

3.1.2 Supply of Cable termination accessories such as plug in type/Termination kits on GIS end for Incoming cable termination, Cable Glands for HT (if applicable), Cable glands for LT Power cables, lugs for LT, Control and signal cables etc. at 33kV GIS end.

3.1.3 Supply of all commissioning spares required during testing & commissioning shall be in the scope of 33kV GIS vendor. As per Annexure-11

3.1.5 Supply of special tools and tackles as per Annexure-11

3.1.6 Supply of feeder Differential relay, CTs and Differential cable (FO cable/Pilot wire as applicable). The above shall be supplied for both 33kV GIS end as per SLD and customer's 33kV SWGR-270 end by 33kV GIS vendor.

3.1.7 Supply of feeder Transformer cum Differential relay and CTs. The above shall be supplied for 33kV GIS end as per 33kV SLD. On customer side only CTs (11kV level) shall be supplied as loose by 33kV GIS vendor and same will be installed (By others) in customer's 11kV board (SWGR-200). Control cable as required from 33kV GIS to SWGR-200 shall be supplied by BHEL.

3.1.8 Feeder differential relay (P543) in outgoing feeder meant for 71-HV-111 in 33kV GIS SLD will be free issued to 33kV GIS vendor. Further installation and integration in relay network of 33kV GIS by vendor. However, relays for other protections as per SLD is 33kV GIS vendor.

3.1.9 For above 3.1.6 to 3.1.8 distance (for cable) between 33kV GIS and customer switchgear 400Mtrs shall be considered.

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3.2 Supply of Substation Automation System (SAS)

a) Complete software and Hardware required for substation automation system such as Redundant Data concentrators for Generator relays, 66kV GIS, 33kV GIS,11kV Switchgear, Generator Transformers, Grid/Power Transformers,415V LT switchgear, DC system, UPS, VFD, & Solar roof top etc. with required desktop HMIs, Laptops with software, GPS, FO/Cu cables, UPS, printer and provision for hook-up of electrical control, monitoring and status signals to ECS system & DCS system and other systems as per specification requirements.
b) The Dual Redundant data concentrators shall be complete with desktop 2nos operator stations, 1 no engineering station along with managed ethernet switches including complete computer furniture such as PC and printer table, chairs, GPS for all EHV, HV & MV switchboards, Generator Relays.
c) 2 no.s Laptop with required software, hardware, accessories and material shall be supplied. System configuration shall be latest proven model and upgradeable. Laptop and HMI PC shall be of the latest configuration and processor as available at the time of purchase subject to approval by BHEL/HPCL.
d) Dedicated UPS (2x100%) with UPS Rack trolley for above systems.
e) Complete cables such as FO cables outside the HSR red box and FO/CAT6 cables for looping of relays. These cables shall be laid in HDPE duct and same shall be supplied along with cables. Complete accessories required for FO cables/CAT6 cables along LIU/Hub shall be supplied vendor. All the cables FO & Cu shall be armoured type.
f) 2 No. Laser Jat-colour A3, A4 printer (1 for HMI & 1 extra) shall be provided configured for line-by-line printing.
g) Any other accessories which are not specified here but required for completing SAS system package shall be taken care of vendor.
h) Following are minimum Godrej/Pyrotech furniture shall be supplied by vendor.

S.No	Hardware	Quantity
1.	HMI PC Tables	3 sets
2.	Laser jet A3 Printer table	2 sets
3.	Laptop Tables	2 nos.+ 2 nos. extra
4.	Revolving officers chairs	7 sets
5.	UPS Rack trolley	2 sets

3.3 Services

3.3.1 **Supervision of Erection/Installation of 33kV GIS including Substation Automation system.**

3.3.2 **Complete Testing and Commissioning of 33kV GIS at site by Bidder.**

For 33kV GIS testing and commissioning, following works to be completed as bare minimum at site

i) SF6 Gas filling
j) Control voltage and polarity check
k) Spring charging Motor checks
l) Breaker checks
m) Disconnector & Earth Switch checks.
n) Position Indicator checks
o) Mechanical Interlocking checks
p) Busbar conductivity measurement test

q) High Voltage pressure test
r) IR checks
s) Test & checking of control schemes
t) Operation test of Breaker
u) Testing and checking of interlocking schemes and protection relays.
v) Gas leakage verification
w) Final Handing over to customer

Arranging all necessary tools, tackles and equipment for testing & commissioning shall be bidder's responsibility. GIS shall be said to be installed and mechanically complete after circuit testing, primary & secondary injection testing.

3.3.3 **Services for Testing and Commissioning of protection relays and complete Substation automation system at site. Scope shall be as follows:**

a) Testing & commissioning of Numerical Relays including Relay parameterization and configuration. (Numerical relays which are in the scope of Bidder)

b) Testing & commissioning of SAS (like Data Concentrators, switches, HMIs (OWS/EWS), GPS, Laptops etc.) system including termination of network/optical cables (complete with all end connectors, tees etc. as required)

c) For network/optical cables which are in the bidder's scope, the laying of cables shall be in BHEL scope. However, Optical cable will be laid under bidder's supervision. Splicing and Termination shall be in bidder's scope.

d) Site acceptance Tests (SAT) and handing over to customer

e) Arranging all necessary tools , tackles and equipment for protection and communication testing including automatic relay test kit shall be bidder's responsibility.

3.3.4 **33kV Cable Plug & socket / Kit Erection & Termination at 33kV GIS end shall be by 33kV GIS vendor. All tools & accessories as required for cable termination shall be taken care by GIS supplier.**

3.3.5 **Training for SIX OWNER's Engineers for a period of at least seven days for each at manufacturer's works for 33kV GIS, Numerical relays & Data concentrators is included in 33kV GIS vendor scope.**

3.3.6 **Training for TEN OWNER' s Engineers for a period of at least seven days for each at Site for 33kV GIS, Numerical relays & Data concentrators is included in 33kV GIS vendor scope.**

3.3.7 Time required for testing and commissioning of 33kV GIS & SAS system as described above will be presumed by vendor and quote accordingly. Per day quotation for testing & commissioning is not acceptable.

3.4 Any other item is required for completion of package and not covered in this specification shall be taken care by vendor.

3.5 Mandatory Spares:

Mandatory spares should be supplied along with main equipment and shall be offered for inspection along with main equipment. For list, refer Annexure-11.

4.0 CODES AND STANDARDS:

4.1 The equipment to be furnished under this specification shall be in accordance with the applicable section of the latest version of the following BIS/IEC/ISO standards unless otherwise specified:

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Standard	Description
IS: 1248	Direct acting indicating analogue electrical measuring instruments and their accessories
IS: 2071	High Voltage Test Technique
IS: 2705	Current transformers
IS: 3156	Voltage transformers
IS: 5082	Material data for aluminium bus bars
IS: 5578	Guide for marking of insulated conductors
IS: 9920	Switches and switch isolators for voltages above 1000 V
IS: 9921	AC disconnectors (isolators) and earthing switches for voltage above 1000V
IS: 11353	Guide for uniform system of marking and identification of conductors & apparatus terminals
IS: 12729	Common high voltage switchgear and control gear standard
IS: 13118	General requirements for circuit breakers for voltages above 1000 V
IS: 13703	Low voltage fuses for voltages not exceeding 1000V AC or 1500V DC.
IEC 60059	IEC Standard Current Rating
IEC 60060	High voltage test techniques
IEC 60099-4	Metal - Oxide surge arresters without gaps for a.c. systems
IEC 60114	Recommendation for heat treated al alloy bus bar material of al. Magnesium —silicon type.
IEC 60137	Bushings for alternating voltages above 1000 V
IEC 60255	Electrical Relays
IEC 60270	High voltage test techniques - Partial discharge measurement
IEC 60376	Specification of technical grade sulphur hexafluoride (SF6) for use in electrical equipment
IEC 60480	Guidelines for the checking and treatment of sulphur hexafluoride (SF6) taken from electrical equipment and specification for its re-use
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IEC 60694	Common specification for high voltage switchgear and control gear standards
IEC 61243-1	Live working - Voltage detectors — capacitive type to be used for voltages exceeding 1 kV a.c.
IEC 61869-1	Instrument transformers/General requirements
IEC 61869-2	Additional requirements for current transformers
IEC 61869-3	Additional requirements for inductive voltage transformers

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IEC 62271- 4	Handling procedures for sulphur hexafluoride (SF6) and its mixtures
IEC 62271-100	High voltage alternating current circuit breakers
IEC 62271-102	Alternating current disconnectors (isolators) and earthing switches
IEC 62271-110	High voltage switchgear and controlgear - Inductive load switching
IEC 62271-200	AC metal-enclosed switchgear & control gear for rated voltages Above 1 kV and up to and including 52 kV
IEEE 80	IEEE Guide for safety in AC substation grounding

4.2 In case of imported equipments, Standards of the country of origin shall be applicable if these standards are equivalent or stringent than the applicable Indian Standards.

4.3 The equipment shall also confirm to the provisions of Indian Electricity Rules and other statutory regulations currently in force in the country.

4.4 In case Indian Standards are not available for any equipment, Standards issued by the IEC/ BS/ VDE/ IEEE/ NEMA or equivalent agency shall be applicable.

5.0 ORDER OF PRIORITY

5.1 In case of any contradictions between various referred Standards/ Specifications/ Data Sheets/ Statutory Regulations/ enclosed annexures, the following sequence shall be followed as order of priority. In case of conflict between requirements specified in various documents, the more stringent one shall be followed.

1. *Statutory Regulations*
2. *This specification:*
   - (i) *PY55294*
   - (ii) *Standard Specification of HT Gas Insulated Switchboards (Annexure-1A) / Standard Specification of Numerical relays & SAS (Annexure-1B)*
   - (iii) *Feeder List (Annexure-6) (Refer Notes below)*
   - (iv) *Switchboard SLDs (Annexure-3) (Refer Notes below)*
   - (v) *Other Annexures*
3. *Codes and Standards*

Note: For metering, protection and fitments, details as provided in Switchboard SLDs and PY55294 , Annexure-1A&1B have to be followed.

5.2 In case of further contradiction among above documents, it is bidder's responsibility to highlight the same during bid stage itself. Else, BHEL's decision shall be final during execution. The same shall be complied without any time / cost implication to BHEL.

6.0 GENERAL REQUIREMENTS

6.1 The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.

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6.2 Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment at least for 15 years from the date of supply.

6.3 Vendor shall give a notice of at least one year to the end user of equipment and BHEL before phasing out the product/ spares to enable the end user for placement of order for spares and services.

6.4 In case of relays manufactured outside India, the Relay manufacturer through their Indian establishment or associate in India shall provide application, testing, commissioning, after sales service and other necessary support for minimum of 15 years to customer. Their Indian establishment or associate company in India shall also maintain adequate inventory of each type of relay or spares to meet the requirement arising during project execution and plant operation. Relay manufacturer shall possess a signed MOU with their Indian associate for providing customer support.

6.5 Only major relays, meters and controls are indicated in the Switchboard SLDs. Any auxiliary relays, timers, switches, contactors, contacts, indications etc. as required while developing the control schematics or felt necessary for safe operation, even if these are not specifically mentioned, shall be supplied without any time and price implications.

7.0 TECHNICAL REQUIREMENTS

7.1 Operating Conditions

Sl. No.	Description	Data
1	Voltage	As specified in Switchboard SLD (with voltage variation +10% to -10%)
2	Number of Phases & Wires	3-phase, ***3-wire***
3	Frequency	50Hz ± 3%
4	Switchboard Fault Level	40kA for 1 sec.
5	System Earthing	Solidly Earthed
6	Auxiliary Supply	240V ± 10%, 1-ph, 50Hz AC; 110V -15% +10% DC
7	Control Supply	i. 110V DC- for protection metering and control ii. 110V DC- circuit breaker spring charging motor iii. 110V DC- Motor drive for disconnectors and earth switches iv. 415V AC TPN- gas handling and filling unit/ cart v. 240V AC SPN–for space heaters, cubicle lamps etc.
8	Power supply for spring charging motor	110V DC -15% +10%

7.1.1 The 33kV Gas insulated switchboard shall be suitable for continuous operation of two incomers and bus coupler under NC (Normally closed) condition.

7.2 33kV Gas Insulated Switchboard

7.2.1 The switchgear shall be an indoor gas-insulated, Copper Bus-bar material, metal clad cubicle design with single bus bar system as per datasheet, assembled to form free standing, self supporting dead front structure. Vertical units shall be assembled to form a continuous line-up of uniform height. It shall be suitable for local and remote control through Local/ Remote selector switch. It shall be designed to ensure optimum continuity and

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reliability of supply as well as safety during operation.33kV GIS will be located in the Air-conditioned room.

7.2.2 Minimum degree of enclosure protection:

Switchboard	IP Class
For low voltage compartments	IP 4X
For gas compartments	IP 65

7.2.3 All the equipment described in this specification is intended for continuous duty at the specified ratings under the specified ambient conditions.

7.2.4 33kV Gas Insulated Switchboards shall be suitable for 3-phase, 3-wire system. Three phase buses shall be provided. The vertical dropper/interconnection bus bars shall be suitably sized for short time current rating of the main bus bar or circuit current rating, whichever is higher.

7.2.5 Indication Lamps shall be of Clustered LED type.

7.2.6 Protection relays shall be numerical type as specified on the Switchboard SLDs. All other relays shall be electromagnetic type.

7.2.7 The enclosure for the SF6 gas and associated circuit elements shall be made from non-magnetic material. The type of material and thickness shall also be such so as to keep heating due to induced circulating currents to a minimum. Enclosures of the same phase shall be electrically interconnected, and shall be earthed at appropriate places.

7.2.8 Need for Inter panel wiring of all switchboards at site shall be minimized and such wiring shall be plug type only for ease of installation at site.

7.2.9 Breaker control switches, Selector switches shall be hardwired type.

7.2.10 Suitable terminals shall be provided in the respective panels for interfacing incoming contacts from remote (ECP, SCAP). Current rating of these remote contacts shall be 5A, 110V DC or 240V AC.

7.2.11 The ECS & SCAP interface signals shall be marshalled individually for each feeder of the Switchboards.

7.2.12 Signals shall be provided as per attached ECS typical I/O lists. *These lists duly filled up with TB nos. and/or address details, for each Feeder/Bus Coupler/PT shall be furnished by the vendor during detailed engineering.*

7.2.13 All potential free contacts and analogue input signals including unused contacts/ports shall be duly wired to the terminal block in the respective panel.

7.2.14 Painting shall be as per the specification, Paint shade shall be RAL 7032 for exterior.

7.2.15 Cable glands for LT power 3-core cables shall be weatherproof double compression nickel plated brass type (ET) with check nuts and PVC shrouds. Cable glands for 1-core cables shall be weatherproof double compression aluminium type (ET) with check nuts and PVC shrouds. Cable lugs shall be of tinned copper heavy duty crimped type.

7.2.16 Voltage transformers will have continuous over voltage of 1.2 and over voltage factor of 1.9 for 30secs.

7.2.17 Positive indications will be provided for breaker closing and opening status

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7.2.18 Control & Operation Philosophy

- 33kV GIS will be controlled from remote control panel SCAP/ECS. 33 kV GIS switchboards shall have one local/remote control selector switch. When selector switch is selected in remote mode, control shall be transferred to hard-wired synchronizing panel (SCAP). All the control, monitoring and annunciation functions shall be realized in the 33kV GIS as per Electrical Control Philosophy attached as Annexure 2B and I/O list as per Annexure-04.

  Necessary Synchronization equipment shall be considered in 33kV GIS for synchronization of Incomers/Bus-coupler for parallel operation.

7.3 Numerical Relays & Ethernet Switches

7.3.1 All numerical relay shall have RS232/RJ45/USB port on the front for hooking laptop. The rear numerical relays shall have dual ports suitable for IEC 61850 HSR for communication with HSR Box & further communication with Data concentrator/HMI through Managed Ethernet switch.

7.3.2 Communication between relay and IEC61850 HSR Box/switches shall be provided as Redundant communication architecture as per attached architecture in Annexure-1B.
Each Numerical Relay shall be provided with *dual port* for ensuring full redundant communication with *required number of redundant* Ethernet switches, provided in switchboard.
Numerical relays shall communicate using IEC 61850-HSR protocol.
For hooking up to Data Concentrator/ HMI/gateway for upper level connectivity, redundant communication link through two switches within the ring. Ethernet switch shall have dual DC power supply.

Ethernet switches shall be suitable for satisfactory operation inside the switchboards taking account of switchboard temperature rise and the site conditions specified. 20% ports in each Ethernet switch shall be kept as spare.

7.3.3 The requirement of Numerical relays and integration shall be in compliance with the requirements given in specification of Numerical relays (Annexure-1B).

7.3.4 Numerical Relays shall be of latest version, communicable type with non-volatile memory, comprehensive unit providing protection, metering and control.

7.3.5 Laptop shall be of the latest configuration and processor as available at the time of purchase subject to approval by BHEL..

7.3.6 The no. of Digital Inputs (DIs) / Digital Outputs (DOs) in the Numerical Relays shall be *sufficient* for implementing all necessary logics (see Annexure-2A) and providing signals indicated in I/O Lists (see Annexures-4 & 2B). In view of the possibility of change in breaker logics during detailed engineering, *20% extra DIs/DOs* shall be considered in Numerical Relays *over what is deemed sufficient* to implement the supplied logic diagrams. No price/time implication on account of change in breaker logics or change in NR DIs/DOs during detailed engineering will be entertained. *However, minimum 24 DIs and 12 DOs shall be provided for numerical relays envisaged in incomers, bus couplers and outgoing feeders.*

7.3.7 All cables and associated accessories required for implementing a functional Ethernet Switch with the prescribed architecture shall be provided by the Vendor.

All cabling required for the interconnection of Numerical Relays with the HSR Switches shall be done at the vendor works itself.

In case, it is not possible to supply the Switchboard to site with all NRs interconnected to the HSR Switches and some Inter panel cabling is required to be done at site, then the same shall be done by the Vendor at site without any time and cost implication to BHEL.

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8.0 INSPECTION, TESTING AND ACCEPTANCE

8.1 Inspection, testing and acceptance requirements shall confirm to Standard Specifications of 33kV Gas Insulated switchboard (Annexure-1A) and Numerical Relays(Annexure-1B).

8.2 Before raising inspection call, manufacturer shall submit all the test reports/ certificates for the equipment.

8.3 During fabrication, the switchgear package shall be subjected to inspection by Owner or by an agency authorized by the Owner. Manufacturer shall furnish all necessary information concerning the supply to Owner's inspectors. Owner/BHEL may make multiple visits during manufacturing and testing for review of progress, quality documents verification, verification of materials in compliance to specifications/standards. Owner/BHEL may make final visit for final inspection and verification of shipment documents. The same shall be included in the manufacturing quality assurance plan. Actual visits and inspection shall be as per the approved manufacturing quality assurance plan.

8.4 All routine and acceptance tests as per IS standards and Standard Manufacturing Quality Plan shall be carried out at manufacturer's works under his care and expense.

8.5 All equipments supplied by vendor shall be of proven design and shall be type tested as per IS, IEC standards. The requisite type test certificates shall be submitted during technical bid submission and type test certificates shall not be older than 5 years from the date of bid submission. In case valid test certificates are not available or are older than 5 years, vendor shall conduct tests free of cost and without any delivery implications. In case BHEL / Customer / Consultant insist the tests, the tests shall be done with price implication. Unit rates shall be quoted by vendor as optional.

8.6 Inspection of switchgear HV portion coming from principal (Manufacturer) shall be at works of (principal) manufacturer before dispatch to india. The inspection team shall comprise customer/consultant/BHEL for inspection duration of 7 days. Travel expenses, accommodation expenses, local traveling expenses food charges etc shall be arranged by EIL/BHEL/Owner on their own cost. Routine test will be carried out on each type of the panel not on complete lot.

8.7 For Numerical Relays, the following tests shall be performed and/ or Test Certificates submitted for concurrence by BHEL:

1. Temperature withstand
2. Electromagnetic compatibility (EMC)
3. Disturbance immunity
4. HV withstands test for insulation
5. Impulse voltage test
6. Functional tests and Communication integrity
7. Relay characteristics verification
8. Degree of protection
9. Mechanical stress/ vibration test

9.0 DOCUMENTATION

9.1 Documents to be submitted along with the technical bid/ offer:

1. Deviation schedule (Refer Annexure-7)
2. Switchboard GA with dimensions and weights
3. Un-priced price format (Refer Annexure- 09)
4. Type test certificates as per IS standards not older than 5 years for switchboards which are similar in configuration to the switchboards present in this Project.
5. Check List (Refer Annexure-13). *Details are specified at Cl. 14.0 of this specification.*

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Technical offer of the bidder will be evaluated only on the basis of deviation schedule and Price Format. Nature of Deviations shall only be of Design/ Manufacturing constraints and non-availability of items/ components/ makes in market.

Switchboard dimensions are for fixing Purchaser's tentative room layout. Un-priced price format consists of Items of Main offer and Unit rates for additions/ deletions of supplies/ services/ spares during execution. All fields shall be quoted in this format only.

Note: No price implications shall be entertained for deviations withdrawn during the technical scrutiny. If any deviation is accepted by BHEL during technical scrutiny even then there will be no price implication. Hence, in no case there will be consideration of price implications.

9.2 Offer is liable for rejection when

- The offer is incomplete with respect to above clauses.
- The above documents are not submitted in BHEL's formats.
- Any field is left blank in the Price format.
- Discrepancy is observed between Un-priced and Priced bid.

9.3 Documents to be submitted after award of contract: Refer Annexure - 12.

10.0 GUARANTEE

10.1 The supplier shall be fully responsible in respect of design, selection of components, manufacture, and quality of workmanship and operation of all the equipments, accessories etc. supplied under this scope of contract up to the Guarantee period.

10.2 Guarantee period shall be as per the commercial terms and conditions of the NIT.

11.0 QUALITY PLAN

11.1 Quality Assurance Program

11.1.1 The successful Bidder shall provide and implement a documented Quality Assurance Programme. The Program shall be capable of providing assurance that design, purchasing, manufacturing, loading, shipping, storage, erection, construction, testing and examination of Scope of Supply comply with the requirements of the specifications and documents.

11.1.2 The quality control organization shall follow-up the inspection and testing to ensure adherence to quality of the Scope of Supply and compliance with the Program and with the test procedures. In particular, it shall:

1. Provide all design and engineering Divisions and its Sub vendor with detailed instructions regarding inspection and testing;
2. Organise the tests required in the programme, witness them and issue test certificates;
3. Inspect the Equipment before packing, check the quality of packing and if Equipment and packing are found to comply with the requirements, authorise shipment;
4. Inspect for possible transport damages if any, and prepare and submit repair procedures for approval;
5. Organise and witness all inspection and testing on Site and issue test certificates.

11.1.3 No Equipment shall be packed, prepared for shipment, or dismantled for the purpose of packing for shipment, unless it has been satisfactorily inspected and approved for shipment.

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11.2 Quality Assurance Manual

The successful Bidder's Quality Assurance Program shall be documented in a Quality Assurance Manual. A copy of the Quality Assurance Manual shall be submitted for review and comment.

11.3 Quality Management System

11.3.1 Successful Bidder Quality Management System shall meet the requirements of ISO 9001, "Quality Systems – Model for quality assurance in design / development, production, installation and servicing". The successful Bidder shall demonstrate compliance with this requirement.

11.3.2 Quality Assurance:

1. All routine tests shall be conducted on the equipment at supplier's works.
2. All tests will be witnessed by BHEL and / or BHEL's customer as per the approved QAP. Hence test procedures, list of tests to be conducted shall be submitted as per the documentation schedule.

12.0 PACKING AND DISPATCH

12.1 All the equipments shall be divided into several shipping sections for protection and ease of handling during transportation. The equipment shall be properly packed for selected mode of transportation i.e. by ship / rail or trailer. The panels shall be wrapped in polyethylene sheets before being placed in wooden cases to prevent damage to the finish. Cases shall have skid bottoms for handling. Cases shall be suitable for lifting by cranes. Special precaution notations such as Fragile, This side up, center of gravity, weight, Owner's particulars, Purchase order number etc. shall be clearly marked on the package together with other details as per purchase order.

12.2 The commissioning spare items, mandatory spare items, tools & tackles and cable glands & lugs shall be separately packed. Each packet shall have its respective label on the outside for clear identification.

12.3 The *detailed* packing list shall be furnished for BHEL's review and acceptance before seeking dispatch clearance. Vendor shall dispatch the panels generally with all components mounted. If, for reason of preventing transit damage or for any other reasons, the components/ items have to be packed separately and dispatched then such loose items have also to be listed in the packing list. The list shall have references duly tracing them to the respective packing box/ crate. If such loose items are not declared then it shall be deemed that there are no such loose items.

12.4 The equipment may be stored outdoors for long periods before installation. The packing should be suitable for outdoor storage in areas with heavy rains and high ambient temperature unless otherwise agreed.

13.0 SPECIAL CONDITIONS

13.1 Bidder should confirm that "after-sales service" facilities will be made available free of cost for proper commissioning/ maintenance of equipments offered. The vendor should depute their Technician/ Engineer at their cost for rectification of any defects during guarantee/ warranty period.

13.2 Bidder should furnish particulars of their factory or workshop including location and machinery installed with the capacities for manufacturing of the switchgear. Parties who do not have established manufacturing facilities need not quote for the tender.

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13.3 Vendor to confirm that all equipments supplied by vendor are of proven design and are type tested. The requisite type test certificates shall be submitted during technical bid submission/ detailed engineering & type test certificates shall not be older than 5 years from the date of bid submission. In case valid test certificates are not available or are older than 5 years, vendor shall conduct tests free of cost & without any delivery implications. In case BHEL / Customer / Consultant insist the tests, the tests shall be done with price implication. Unit rates shall be quoted by vendor.

13.4 All cabling required for the interconnection of Numerical Relays with the Ethernet Switches in HT Gas insulated switchgear, shall be done at the vendor works itself.

In case, it is not possible to supply the Switchboards to site with all NRs interconnected to the Ethernet Switches and some Interpanel cabling is required to be done at site, then the same shall be done by the Vendor at site without any time and cost implication to BHEL.

14.0 CHECK LIST FOR BID SUBMISSION

14.1 Check List for Bid Submission is provided as Annexure-13 to this Specification.

This Check List shall be followed for submitting the Bid documents. The Check List itself *shall be filled* by the Bidder in entirety and *mandatorily submitted* along with the Offer.

15.0 LIST OF MATERIAL CODES AS PER ENQUIRY

Sl.No.	Description	Quantity	Material code
1)	Supply of 33kV GIS Switchgear as per enquiry specification	1-Set	PY9755294015
2)	Supply of Substation Automation system	1-Set	PY9755294023
3)	Supervision of Erection/Installation of 33kV GIS including Substation Automation system	1-Set	PY9855294033
4)	Complete Testing and Commissioning of 33kV GIS at site	1-Set	PY9855294041
5)	Complete Testing and Commissioning of protection relays and Substation Automation system at site	1-Set	PY9855294050
6)	33kV Cable Plug & socket / Kit Erection & Termination at 33kV GIS end.	1-Set	PY9755294066
7)	Training for Six OWNER's Engineers for a period of at least seven days for each at manufacturer's works for 33kV GIS Switchgear	1-Each	PY9855294076
8)	Training for Six OWNER's Engineers for a period of at least seven days for each at manufacturer's works for Numerical relays	1-Each	PY9855294084
9)	Training for Six OWNER's Engineers for a period of at least seven days for each at manufacturer's works for Data concentrators.	1-Each	PY9755294090
10)	Training for TEN OWNER' s Engineers for a period of at least seven days for each at Site for 33kV GIS Switchgear	1-Each	PY9855294106
11)	Training for TEN OWNER' s Engineers for a period of at least seven days for each at Site for Numerical relays	1-Each	PY9855294114
12)	Training for TEN OWNER' s Engineers for a period of at least seven days for each at Site for Data concentrators	1-Each	PY9855294122
13)	Supply of Mandatory Spares	1-Set	PY9755294139

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RECORD OF REVISIONS

Revision	Date	Revision Details	Revised By	Approved By
00	16.05.2018	Original Issue		J.K.Pattanaik