BSES Yamuna Power Limited

NOTICE INVITING TENDER (NIT)
FOR
SUPPLY, ERECTION, TESTING, & COMMISSIONING OF 11KV SWITCHBOARD ALONG WITH ALLIED EQUIPMENTS, ACCESSORIES AND WORKS ON TURNKEY BASIS AT SHASTRI PARK GRID (EAST) IN BYPL, DELHI.
NIT NO: CMC/BY/21-22/RS/MD/27

Due Date for Submission: 06.12.2021, 15:00 HRS

BSES YAMUNA POWER LIMITED (BYPL)
CONTRACTS & MATERIALS DEPT.,
SHAKTI KIRAN BUILDING, KARKARDOOMA,
DELHI-110032
CIN: U40109DL2001PLC111525
WEBSITE: www.bsesdelhi.com

BSES Yamuna Power Limited

INDEX

BSES Yamuna Power Limited

VOLUME – I: INFORMATION TO BIDDER (ITB)

BSES Yamuna Power Limited

SECTION – I: REQUEST FOR QUOTATION

1.00 EVENT INFORMATION

1.01 BSES Yamuna Power Ltd (hereinafter referred to as **"BYPL"**) invites sealed tenders in 2 envelopes for following scope of works:

S No.	Items	Estimate Cost Value In INR	EMD Value In INR
1	SUPPLY, ERECTION, TESTING, & COMMISSIONING OF 11KV SWITCHBOARD ALONG WITH ALLIED EQUIPMENTS, ACCESSORIES AND WORKS ON TURNKEY BASIS AT SHASTRI PARK GRID (EAST) IN BYPL, DELHI.	2.91 Crore	5.82 Lakh

The bidder must qualify the requirements as specified in clause 2.0 stated below.

All envelopes shall be duly super scribed "**BID FOR SUPPLY, ERECTION, TESTING, & COMMISSIONING OF 11KV SWITCHBOARD ALONG WITH ALLIED EQUIPMENTS, ACCESSORIES AND WORKS ON TURNKEY BASIS AT SHASTRI PARK GRID (EAST) IN BYPL, DELHI, NIT NO: CMC/BY/21-22/RS/MD/27 DUE ON 06.12.2021, 15:00 Hrs."**

Bid shall be submitted in two (02) parts. Details of part are as follow:
Part A – Techno Commercial Bid
Part B – Price Bid

1.1. The schedule of specifications with detail terms & conditions can be obtained from address given below against submission of non-refundable demand draft of **₹ 1,180/-** drawn in favour of BSES Yamuna Power Ltd, payable at Delhi or Online transfer of requisite amount through NEFT/ RTGS. The tender documents & detail terms and conditions can also be downloaded from the website www.bsesdelhi.com **--> BSES YAMUNA POWER LTD --> Tender --> Open Tenders**
In case tender papers are downloaded from the above website, then the bidder has to enclose a demand draft covering the cost of bid documents.

1.2. Bids will be received up to **06.12.2021, 15:00 Hrs.** at the address given below.
Part A of the Bid shall be opened on **07.12.2021, 15:00 Hrs.**

Part B of the Bid will be opened in case of Techno-Commercially Qualified Bidders and the date of opening of same shall be intimated in due course. It is the sole responsibility of the bidder to ensure that the bid documents reach this office on or before the last date.

Head of Department
Contracts & Materials Deptt.
BSES Yamuna Power Ltd
Ground Floor
Shaktikiran Building, Karkardooma
Delhi 110032

1.3 BSES Yamuna Power Ltd reserves the right to accept/reject any or all tenders without assigning any reason thereof in the event of following:

a) Tender fee of requisite value.

b) Earnest Money Deposit (EMD) of requisite value & validity is not deposited in shape of Bank Guarantee drawn in favor of BSES Yamuna Power Ltd, payable at Delhi or Online transfer of requisite amount through NEFT/RTGS

c) The offer does not contain prices indicating break-up towards all taxes & duties in prescribed format.

d) Complete Technical details are not enclosed as per the Technical Bid Submission Checklist

e) Tender is received after due date and time.

f) Technical offer contains any prices.

g) Prices are not FIRM and subject to Price Variation.

2.00 QUALIFICATION CRITERIA

The prospective bidder must qualify all of the following requirements and shall be eligible to participate in the bidding who meets following requirements and management has a right to disqualify those bidders who do not meet these requirements.

2.01 **Technical Criteria:**

S. No	Criteria	Documents to be submitted by Bidder
1	The bidder should be manufacturer of 11 KV AIS	Manufacturing and factory incorporation certificate
2	The bidder should have infrastructure in India for providing service & spare support to BYPL. The relevant documents including details of manufacturing units, locations and works from where supply & spares against this tender shall be proposed to be furnished.	a. Details of manufacturing units b. Details of service units
3	The bidder should have established project management, field quality assurance system & safety organization designed to achieve high level of reliability at various stages of field services required for successful erection, testing & commissioning. The bidder should have successfully designed, supplied, installed & commissioned minimum two 11KV AIS Switchboards or higher rating projects in last 5 years. Details of these projects including customer name, PO number (with date), date of completion and rating (Capacity/Voltage etc) shall be provided.	a. Turnkey Purchase order/Work order copy b. Work completion certificate copy
4	Performance certificate for 1 (One) year satisfactory performance from at least 2 executed projects of 11 kV AIS or higher voltage rating should be submitted.	Performance certificate
5	Bidder shall procure equipment from the approved vendor list of BYPL for individual items (attached in Scope of work). The bidder is	Undertaking for Back up support by OEM's

	supposed to have agreement with manufacturer/service provider to provide support to BYPL for any service & spares related issues for time stipulated in the specification or service life of the equipments. The bidder must submit the undertaking for the same.	
6	The bidder must possess valid ISO 9001:2000 certification and valid BIS License or Equivalent International License.	Valid copy of BIS License or Equivalent International License.
7	The bidder should possess valid Electrical Contractor License issued by competent statutory agency to undertake work in NCT Delhi. In case bidder is not having this license, suitable sub-contractor having the valid license shall be engaged for works at site where copy of valid license shall be submitted to BYPL before the start of the work OR Bidder to give the undertaking that it will be obtained by them before the start of the work at site.	a. Electrical Contractor License Copy b. Undertaking if not available

2.02 **Commercial Criteria:**

S No.	Criteria	Documents to be submitted by bidder
1	The bidder must have adequate Financial Stability and status to meet the financial obligation pursuant to the scope of work and shall have average annual turnover of minimum ₹ 200 Crore during last three (3) Financial Years preceding the date of opening of bid	Duly certified CA certificate to be submitted
2	An undertaking (self-certificate) that the bidder has not been blacklisted/debarred by any central/state government institution including electricity boards and also confirm that there is no pending litigation with government on account of executing similar order	Undertaking
3	The bidder should have registered under GST ACT and shall submit copy of GST Registration Number, PAN, PF, ESI in addition to other statuary compliances. The bidder must submit the copy of registrations and submit an undertaking that the bidder shall comply all the statutory compliances as per the applicable laws/rules etc	Relevant Statutory Documents Copy

The subsidiaries of global/Indian companies are also eligible to bid if the qualification requirements stated above are met independently or in combination with parent/sister

concern/group Company. However, the bidder should have an establishment of permanent nature in India.

Notwithstanding anything stated above, BYPL reserves the right to assess bidder's capability to perform the contract, assess the capability and installed capacity of the Bidder for carrying out the supplies, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

3.00 BIDDING AND AWARD PROCESS

Bidders are requested to submit their offer strictly in line with this tender document. **NO DEVIATION IS ACCEPTABLE**. BYPL shall response to the clarifications raised by various bidders and the will be distributed to all participating bidders through website.

3.01 BID SUBMISSION

Please mention our NIT Number: - …… on the Tender and drop the same in our Tender Box placed at:
BSES Yamuna Power Ltd, Reception, Ground Floor, Shaktikiran Building, Karkardooma, Delhi 110032

The bids and the outer envelope shall be addressed to:

Head of Department
Contracts & Materials Deptt.
BSES Yamuna Power Ltd, Shaktikiran Building, Karkardooma, Delhi 110032.

Kindly Note:

- Bidder will inform BYPL through mail within 02 hours from the submission or before the due date & time of submission to TPC & Buyer:
  1. Mr Santosh Singh, E-mail: Santosh.Kum.Singh@relianceada.com
  2. Mr Mahesh Dariyal, E-mail: Mahesh.Dariyal@relianceada.com
- Tender documents shall be submitted at main gate in tender box.
- Authorized person of TPC will collect the documents from tender box at scheduled time of tender submission and verify the bid documents with mails received. A confirmation of receipt shall be sent to bidder through mail by TPC on the same day.
- Bidder has to ensure that tender copy is dropped in correct box designated for tender submission only.
- BYPL shall not be responsible for any wrong placement of tender document by bidder.

BSES Yamuna Power Limited

PART A :: TECHNICAL **BID** comprising of following (1 Original copy + 1 soft copy in pan drive):

S. N	Descriptions	Type of Documents
Commercial :		
1	**Tender Fee - Demand Draft (Rs.1180/-) (Incl GST)**	Non-refundable demand draft for Rs 1180/- in case the forms are downloaded from website
2	**EMD**	In prescribed stamp paper & format
3	**Power-of-Attorney**	In prescribed stamp paper & format
4	**PQR Compliances**	Documentary evidence in support of qualifying criteria like: 1. Details of constitution of the company (Proprietary/Limited/etc along with the details), Memorandum of Association of the company 2. Bidders shall submit the certified annual Balance sheets for the last completed three (3) financial years 3. Supportive document on Positive Net worth. Credit rating/solvency certificate from competent authority. 4. Copies of Orders, Execution /Performance Certificate & Other Documents to support qualification Criteria
5	**Signed Tender document**	Original Tender documents duly stamped & signed on each page as token of acceptance
6	**Black listing undertaking**	Bidder should submit a Self-undertaking signed by its Authorized Signatories that the Bidder or any of their sub-contractor has not been blacklisted/barred by any Govt. Organization or Regulatory Agencies in India or abroad.
7	**Commercial Terms and Conditions**	Acceptance on Commercial Terms and Conditions viz Delivery schedule/period, Payment terms, PBG etc.
8	**Acceptance on Reverse Auction**	Duly signed Acceptance Form For Participation In Reverse Auction Event as per attached format
9	**Bid Form (Unpriced) Duly Signed**	Duly Signed Bid Form as per attached format
10	**Un price Bid Duly Signed**	Duly Signed Un price Bid as per attached format
Technical:		
11	**Technical Details/ Filled in GTP/Drawings**	Bidder shall submit duly filled GTP with all Technical documents and Drawings.
12	**Type Test Reports**	Bidders shall submit the copy of type test reports in their technical bids in support of technical specifications
13	**Testing Facilities**	Bidder shall submit the details of testing facilities available at their works/factory.
14	**Organization Chart & Manpower Details.**	Bidder shall submit the details of Organization & Manpower with qualification and experience.
15	**Pan drive**	Bidder shall submit above all document (technical bid) in Pan drive also.

PART B **:: FINANCIAL BID** comprising of (01 original only)

- Price strictly in the Format enclosed indicating Break up of basic price, taxes & duties, transportation etc

3.02 TIME SCHEDULE

The bidders should complete the following within the dates specified as under:

S.No.	Steps	Due date
1	Last Date of Sale of Bid Documents	01.12.2021
2	Last Date of receipt of pre-bid queries, if any (Queries to be submitted via e-mail)	30.11.2021, 15:00HRS
3	Last Date of Receipt of Bid Documents	06.12.2021, 15:00HRS
4	Date & Time of Opening of PART A - Technical and Commercial Bid	07.12.2021, 15:00HRS

This is a two part bid process. Bidders are to submit the bids in 2(Two) parts
Both these parts should be furnished in separate sealed covers super scribing NIT no. DUE DATE OF SUBMISSION, with particulars as **PART-A TECHNICAL BID & COMMERCIAL TERMS & CONDITIONS** and **Part-B FINANCIAL BID** and these sealed envelopes should again be placed in another sealed cover which shall be submitted before the due date & time specified.

Part – A:: Technical Bid should not contain any cost information whatsoever and shall be submitted within the due date**.**

PART B:: This envelope will be opened internally after techno-commercial evaluation and only of the qualified bidders.

Notwithstanding anything stated above, the Purchaser reserves the right to assess bidder's capability to perform the contract, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

REVERSE AUCTION CLAUSE: Purchaser reserves the right to use the online reverse Auction as optional tool through SAP – SRM as an integral part of the entire tendering Process. All the bidders who are techno-commercially qualified on the basis of tender Requirements shall participate in reverse auction.

Notwithstanding anything stated above, the Purchaser reserves the right to assess bidder's capability to perform the contract, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final. Bidder to submit their acceptance as per format attached ANNEXURE-C

BIDS RECEIVED AFTER DUE DATE AND TIME MAY BE LIABLE TO REJECTION

4.00 AWARD DECISION

4.01 The purchaser reserves all the rights to award the contract to one or more bidders so as to meet the delivery requirement or nullify the award decision without any reason.

4.02 Splitting of tendered quantity in two or more bidders: BSES reserves the right to split the tender quantity amongst techno-commercially qualified bidders on account of delivery requirement in tender, quantity under procurement etc.
Splitting of tender quantity amongst more than one bidder shall be governed by below mentioned guidelines:

a) For the purpose of splitting, the offers of all the bidders whose "Post Reverse Auction prices" are within price consideration zone of 10% above "post reverse auction L-1 rate" shall be considered eligible.

b) The tender quantity shall be split in following ratio:
   (i) In cases where no bidder falls within price consideration zone of 10% above post RA L-1 rate or none of the eligible bidders accept the post RA L-1 rate, 100% quantity shall be ordered on post RA L-1 bidder
   (ii) If the quantity is to be split among 2 bidders, it will be done in the ratio of 60:40 on L1 price.
   (iii) If the quantity is to be split among 3 bidders, it will be done in the ratio of 40:30:30 on L1 price.
   (iv) Any deviation in regards to above will have deviation approval from management.

4.03 In the event of your bid being selected by purchaser (and / or its affiliates) and you subsequent DEFAULT on your bid; you will be required to pay purchaser (and / or its affiliates) an amount equal to the difference in your bid and the next lowest bid on the quantity declared in NIT/RFQ.

4.04 In case any supplier is found unsatisfactory during the delivery process, the award will be cancelled and BYPL reserves the right to award other suppliers who are found fit.

5.00 MARKET INTEGRITY

We have a fair and competitive marketplace. The rules for bidders are outlined in the Terms & Conditions. Bidders must agree to these rules prior to participating. In addition to other remedies available, we reserve the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the Terms & Condition. Bidders who violate the marketplace rules or engage in behavior that disrupts the fair execution of the marketplace restricts a bidder to length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace.
- Breach of the terms of the published in Request for Quotation/NIT.

6.00 SUPPLIER CONFIDENTIALITY

All information contained in this RFQ is confidential and shall not be disclosed, published or advertised in any manner without written authorization from BYPL. This includes all bidding information submitted.

All RFQ documents remain the property of BYPL and all suppliers are required to return these documents to BYPL upon request.

Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

BSES Yamuna Power Limited

7.00 CONTACT INFORMATION

Technical clarification, if any, as regards this RFQ shall be sought in writing and sent by e-mail/post/courier to following addresses. The same shall not be communicated through phone

Address	Name/ Designation	E-mail Address
Technical		
CES Dept. 3rd Floor, B-Block, BSES Yamuna Power Ltd Shaktikiran Building, Karkardooma, Delhi 110032	Gaurav Sharma Asst. VP (HOD-CES)	gaurav.a.sharma@relianceada.com
	Srinivas Gopu GM (CES)	srinivas.gopu@relianceada.com
	Abhishek Harsh DGM (CES)	abhishek.harsh@relianceada.com
Commercial		
C&M Dept. 3rd Floor, A-Block, BSES Yamuna Power Ltd Shaktikiran Building, Karkardooma, Delhi 110032	Robin Sebastian VP (HOD-C&M)	robin.sebastian@relianceada.com
	Rajesh Srivastava Addl. VP (Head-Procurement)	rajesh.r.srivastava@relianceada.com
	Mahesh Dariyal Asst. Manager (C&M)	mahesh.dariyal@relianceada.com

SECTION – II: INSTRUCTION TO BIDDERS

A. GENERAL

1.00 BSES Yamuna Power Ltd, hereinafter referred to as "The Purchaser" are desirous of implementing the various Systems Improvement/Repair & Maintenance works at their respective licensed area in Delhi The Purchaser has now floated this tender for procurement of material notified earlier in this bid document.

2.00 SCOPE OF WORK

The scope shall include Design, Manufacture, testing at works conforming to the Technical Specifications/IS along with Packing, Forwarding, Transportation and Unloading and proper stacking at Purchaser's stores/site.

3.0 DISCLAIMER

3.01 This Document includes statements, which reflect various assumptions, which may or may not be correct. Each Bidder/Bidding Consortium should conduct its own estimation and analysis and should check the accuracy, reliability and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.

3.02 Neither Purchaser nor its employees will have any liability whatsoever to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage whatsoever which may arise from or be incurred or suffered in connection with anything contained in this Document, any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Purchaser or its employees, or otherwise a rising in any way from the selection process for the Supply.

3.03 Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy itself that Documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.

3.04 This Document and the information contained herein are Strictly Confidential and are for the use of only the person(s) to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient's professional advisors).

4 COST OF BIDDING

The Bidder shall bear all cost associated with the preparation and submission of its Bid and Purchaser will in no case be responsible or liable for those costs.

B. BIDDING DOCUMENTS

5.01 The Scope of Work, Bidding Procedures and Contract Terms are described in the Bidding Documents. In addition to the covering letter accompanying Bidding Documents, the Bidding Documents include:

(a) Request for Quotation (RFQ)
(b) Instructions to Bidders
(c) General Terms & Conditions of Contract (T&C)
(d) Delivery schedule
(e) Price Formats & Summary T&C
(f) Bid Form
(g) Acceptance Format – RA
(h) EMD BG Format
(i) Vendor code of conduct
(j) Appendix
(k) Technical Specifications (TS)

5.02 The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, Terms and Specifications. Failure to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.

6.0 **AMENDMENT OF BIDDING DOCUMENTS**

6.01 At any time prior to the deadline for submission of Bids, the Purchaser may for any reasons, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment.

6.02 The Amendment shall be part of the Bidding Documents, pursuant to Clause 5.01, and it will be notified in web site **www.bsesdelhi.com** and the same will be binding on them.

6.03 In order to afford prospective Bidders reasonable time in which to take the Amendment into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of Bids. The same shall be published as a corrigendum in website **www.bsesdelhi.com**

6.04 Purchaser shall reserve the rights to following:
a) extend due date of submission,
b) modify tender document in part/whole,
c) cancel the entire tender

6.05 **Bidders are requested to visit website regularly for any modification/clarification/corrigendum/addendum of the bid documents.**

C. PREPARATION OF BIDS

7.0 LANGUAGE OF BID

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

8.0 DOCUMENTS COMPRISING THE BID

The Bid prepared and submitted by the Bidder shall comprise the following components:

(a) Bid Form, Price & other Schedules (STRICTLY AS PER FORMAT) and Technical Data Sheets completed in accordance with Technical Specification.

(b) All the Bids must be accompanied with the required EMD as mentioned in the Section-I against each tender.

(c) Tender documents duly stamped and signed on each page by authorized signatory.

9.0 BID FORM

9.01 The Bidder shall submit one "Original" and one "Copy" of the Bid Form and the appropriate Price Schedules and Technical Data Sheets duly filled in as per attached specification enclosed with the Bidding Documents.

9.02 **EMD**

Pursuant to Clause 8.0(b) above, the bidder shall furnish, as part of its bid, a EMD amounting to as specified in the Section-I. The EMD is required to protect the Purchaser against the risk of Bidder's conduct which would warrant forfeiture.

. The EMD shall be denominated in any of the following form**:**

(a) Bank Guarantee drawn in favour of BSES Yamuna Power Ltd, payable at Delhi.

(b) EMD shall be valid for One Hundred Twenty (120) days after due date of submission drawn in favour of BSES Yamuna Power Ltd

The EMD may be forfeited in case of:

(a) the Bidder withdraws its bid during the period of specified bid validity

or

(b) the case of a successful Bidder, if the Bidder does not

(i) Accept the Purchase Order, or

(ii) Furnish the required performance security BG.

10.0 **BID PRICES**

10.01 Bidders shall quote for the entire Scope of Supply with a break-up of prices for individual items. The total Bid Price shall also cover all the Supplier's obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of Design, Supply, Transportation to site, all in accordance with the requirement of Bidding Documents the Bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total Price.

10.02 The prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during execution of the supply work, breakup of price constituents, should be there.

Prices quoted by the Bidder shall be **"Firm"** and not subject to any price adjustment during the performance of the Contract. **A Bid submitted with an adjustable price/ Price Variation Clause will be treated as non -responsive and rejected.**

11.0 **BID CURRENCIES**

11.01 Prices shall be quoted in Indian Rupees Only.

12.0 **PERIOD OF VALIDITY OF BIDS**

12.01 Bids shall remain valid for 120 days from the due date of submission of the Bid.

12.02 Notwithstanding Clause12.01 above, the Purchaser may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and the responses thereto shall be made in writing and sent by post/courier

13.0 **ALTERNATIVE BIDS**

13.01 Bidders shall submit Bids, which comply with the Bidding Documents. Alternative Bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the Bidding Documents.

14.0 **FORMAT AND SIGNING OF BID**

14.01 The original Bid Form and accompanying documents (as specified in Clause 5.0), clearly marked "Original Bid" plus one copy must be received by the Purchaser at the date, time and place specified pursuant to Clauses 15.0 and 16.0. In the event of any discrepancy between the original

and the copies, the original shall govern.

14.02 The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written Power-of-Attorney accompanying the Bid. The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the bid. A bid by a person who affixes to his signature the word 'President', 'Managing Director', 'Secretary', 'Agent' or other designation without disclosing his principal will be rejected.

The Bidder's name stated on the Proposal shall be the exact legal name of the firm.

14.03 The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

D. SUBMISSION OF BIDS

15.0 SEALING AND MARKING OF BIDS

15.01 Bid submission: One original & one Copy (hard copies) of all the Bid Documents shall be sealed and submitted to the Purchaser before the closing time for submission of the bid.

15.02 The Technical Documents and the EMD shall be enclosed in a sealed envelope and the said envelope shall be superscribed with — "Technical Bid & EMD". The price bid shall be inside another sealed envelope with superscribed "Financial Bid". Both these envelopes shall be sealed inside another big envelope. All the envelopes should bear the Name and Address of the Bidder and marking for the Original and Copy. The envelopes should be superscribed with — "Tender Notice No. & Due date of opening".

15.03 The Bidder has the option of sending the Bids in person. Bids submitted by Email/Telex/Telegram /Fax will be rejected. No request from any Bidder to the Purchaser to collect the proposals from Courier/Airlines/Cargo Agents etc shall be entertained by the Purchaser.

16.0 DEADLINE FOR SUBMISSION OF BIDS

16.01 The original Bid, together with the required copies, must be received by the Purchaser at the address on or before the due date & time of submission.

16.02 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with Clause 6.0,in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended

17.0 ONE BID PER BIDDER

17.01 Each Bidder shall submit only one Bid by itself. No Joint venture is acceptable. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

18.0 **LATE BIDS**

18.01 Any Bid received by the Purchaser after the deadline for submission of Bids prescribed by the Purchaser, pursuant to Clause 16.0, will be declared "Late" and may be rejected and returned unopened to the Bidder.

19.0 **MODIFICATIONS AND WITHDRAWAL OF BIDS**

19.01 The Bidder is not allowed to modify or withdraw its Bid after the Bid's submission subject to any corrigendum/addendum/modifications in the tender documents uploaded in website.

E. EVALUATION OF BID

20.0 **PROCESS TO BE CONFIDENTIAL**

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Purchaser's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

21.0 **CLARIFICATION OF BIDS**

To assist in the examination, evaluation and comparison of Bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

22.0 **PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS**

22.01 Purchaser will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order. Purchaser may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

22.02 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

22.03 Prior to the detailed evaluation, Purchaser will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

22.04 Bid determined as not substantially responsive will be rejected by the Purchaser and/or the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non - conformity.

23.0 **EVALUATION AND COMPARISON OF BIDS**

23.01 The evaluation of Bids shall be done based on the delivered cost competitiveness basis.

23.02 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes: In the first stage, the Bids would be subjected to a responsiveness check. The Technical & qualifying Proposals and the Conditional ties of the Bidders would be evaluated.

Subsequently, the Financial Proposals along with Supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids shall be considered for final evaluation.

23.03 The Purchaser's evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:

(a) Delivery Schedule

(b) Conformance to Qualifying Criteria

(c) Deviations from Bidding Documents

Bidders shall base their Bid price on the terms and conditions specified in the Bidding Documents.

The cost of all quantifiable deviations and omissions from the specification, terms and conditions specified in Bidding Documents shall be evaluated. **The Purchaser will make its own assessment of the cost of any deviation for the purpose of ensuring fair comparison of Bids.**

23.04 Any adjustments in price, which result from the above procedures, shall be added for the purposes of comparative evaluation only to arrive at an "Evaluated Bid Price". Bid Prices quoted by Bidders shall remain unaltered.

F. AWARD OF CONTRACT

24.0 CONTACTING THE PURCHASER

24.01 If any Bidder wishes to contact the Purchaser on any matter related to the Bid, from the time of Bid opening to the time of contract award, the same shall be done in writing only.

24.02 Any effort by a Bidder to influence the Purchaser and/or in the Purchaser's decisions in respect of Bid evaluation, Bid comparison or Contract Award, will result in the rejection of the Bidder's Bid.

25.0 THE PURCHASER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

Submission of bids shall not automatically construe qualification for evaluation. The Purchaser reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at anytime prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Purchaser's action.

26.0 AWARD OF CONTRACT

The Purchaser will award the Contract to the successful Bidder whose Bid has been Determined to be the lowest-evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to satisfactorily perform the Contract. Purchaser reserves the right to award order to

other bidders in the tender, provided it is required for timely execution of project & provided he agrees to come to the lowest rate. Purchaser reserves the right to distribute the entire tender quantity at its own discretion without citing any reasons thereof.

27.0 **THE PURCHASER'S RIGHT TO VARY QUANTITIES**

The Purchaser reserves the right to vary the quantity i.e. increase or decrease the numbers/quantities without any change in terms and conditions during the execution of the Order.

28.0 **LETTER OF INTENT/ NOTIFICATION OF AWARD**

The letter of intent/ Notification of Award shall be issued to the successful Bidder whose bids have been considered responsive, techno-commercially acceptable and evaluated to be the lowest (L1). The successful Bidder shall be required to furnish a letter of acceptance within 7 days of issue of the letter of intent /Notification of Award by Purchaser.

29.0 **PERFORMANCE BANK GAURANTEE**

Within 15 days of the receipt of Notification of Award/ Letter of Intent from the Purchaser, the successful Bidder shall furnish the Performance Bank Guarantee for an amount of 10% (Ten percent) of the Contract Price. The Performance Bond shall be valid for a period of 24 months from the date of Commissioning or 30 months from the date of last receipt whichever is earlier plus 3 months claim period. Upon submission of the performance security BG, the EMD shall be released.

30.0 **CORRUPT OR FRADULENT PRACTICES**

30.01 The Purchaser requires that the Bidders observe the highest standard of ethics during the procurement and execution of the Project. In pursuance of this policy, the Purchaser:

(a) Defines, for the purposes of this provision, the terms set forth below as follows:

(i) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

(ii) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non -competitive levels and to deprive the Purchaser of the benefits of free and open competition .

(b) Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

(c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.

30.02 Furthermore, Bidders shall be aware of the provision stated in the Terms and Conditions of Contract.

BSES Yamuna Power Limited

APPENDIX I

(FORMAT FOR EMD BANK GUARANTEE)

(To be issued in a Non Judicial Stamp Paper of Rs.50/-purchased in the name of the bank)

Whereas [*name of the Bidder*] (herein after called the "Bidder") has submitted its bid dated [*date of submission of bid*] for the supply of [*name and/or description of the goods*] (here after called the "Bid").

KNOW ALL PEOPLE by these presents that WE [name of bank] at [*Branch Name and address*], having our registered office at [*address of the registered office of the bank*] (herein after called the "Bank"), are bound unto BSES Yamuna Power Ltd., with its Corporate Office at Shaktikiran Building, Karkardooma, Delhi -110032, (herein after called —the "Purchaser") in the sum of Rs…… (Rupees…….. only) for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents.

Sealed with the Common Seal of the said Bank this_____ day of_____ 20____.

The conditions of this obligation are:

1 If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or

2. If the Bidder, having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity:

(a) fails or refuses to execute the Contract Form, if required; or

(b) fails or refuses to furnish the performance security, In accordance with the Instructions to Bidders/ Terms and Conditions;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that is its demand the purchaser will note that amount claimed by it is due to it, owing to the occurrence of one or both of the two condition(s), specifying the occurred condition or condition(s).

This guarantee will remain in force up to and including One Hundred Twenty (120) days after the due date of submission bid, and any demand in respect thereof should reach the Bank not later than the above date.

(Stamp & signature of the bank)

Signature of the witness

BSES Yamuna Power Limited

BID FORM

To

Head of Department
Contracts & Material Deptt.
BSES Yamuna Power Ltd
Shaktikiran Building, Karkardooma,
Delhi 110032

Sir,

1 We understand that BYPL is desirous of procuring…….. for it's licensed distribution network area in Delhi

2 Having examined the Bidding Documents for the above named works, we the undersigned, offer to deliver the goods in full conformity with the Terms and Conditions and technical specifications for the sum indicated in Price Bid or such other sums as may be determined in accordance with the terms and conditions of the contract. The amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

3 If our Bid is accepted, we under take to deliver the entire goods as) as per delivery schedule mentioned in Section IV from the date of award of purchase order/letter of intent.

4 If our Bid is accepted, we will furnish a performance bank guarantee for an amount of 10% (Ten)percent of the total contract value for due performance of the Contract in accordance with the Terms and Conditions.

5 We agree to abide by this Bid for a period of 120 days from the due date of bid submission and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

6 We declare that we have studied the provision of Indian Laws for supply of equipments/materials and the prices have been quoted accordingly.

7 Unless and until Letter of Intent is issued, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

8 We understand that you are not bound to accept the lowest, or any bid you may receive.

9 There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract.

Dated this..... day of..... 20XX

Signature..... In the capacity of ……

.....duly authorized to sign for and on behalf of

(IN BLOCK CAPITALS) .....

BSES Yamuna Power Limited

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder)

BSES Yamuna Power Ltd (hereinafter referred to as **"BYPL"**) intends to use the reverse auction through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are found as techno commercial qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. BYPL shall provide the user id and password to the authorized representative of the bidder. (Authorization letter in lieu of the same be submitted along with the signed and stamped acceptance form)
2. BYPL will make every effort to make the bid process transparent. However, the award decision by BYPL would be final and binding on the bidder.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of BYPL, bid process, bid technology, bid documentation, bid details, and etc.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs; power failure or any other reason shall not be the responsibility of BYPL.
6. In case of intranet medium, BYPL shall provide the infrastructure to bidders, further, BYPL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case of an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out rightly rejected by BYPL.
8. The bidder shall be prepared with competitive price quotes on the day of the reverse auction event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR Landed Cost basis at BYPL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by BYPL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all-inclusive prices offered during conclusion of the auction event for arriving at contract amount.

Signature & seal of the Bidder

BSES Yamuna Power Limited

ANNEXURE - SCHEDULE OF DEVIATIONS

Vendor shall refrain from taking any deviations on this TENDER. Still in case of any deviations, all such deviations from this tender shall be set out by the Bidder, Clause by Clause in this schedule and submit the same as a part of the Technical Bid.

Unless **specifically** mentioned in this schedule, the tender shall be deemed to confirm the BYPL's specifications:

SL NO	Clause No.	Page No.	NIT Clause descriptions	Details of Clarification/deviation with justifications

BSES Yamuna Power Limited

Technical Bid Submission Check List

S. No.	Description	BYPL Requirement	Bidder's Compliance
1	**Tender No.**	Required	
2	**Technical Specification reference number**	Required	
3	**Communication Details**		
3.1	Name of the Bidder	Required	
3.2	Name of Authorized contact person	Required	
3.3	Contact No. of Authorized contact person	Required	
3.4	E-mail id of Authorized contact person	Required	
4	**Document Submission Format**		
4.1	Documents shall be submitted in Box file/spiral binding. Any other format is not acceptable	Required	
4.2	Index of documents with page numbers for each document	Required	
4.3	Separator with document description shall be provided before each document	Required	
5	**Qualifying Requirement Compliance**		
5.1	Summary of compliance of qualifying criteria in tabular form along with summary of documentary proof provided	Required	
5.2	Detailed Documents supporting compliance of qualifying criteria	Required	
6	**Drawings/ Documents as per Technical Specification.**		
6.1	Signed copy of technical specification	Required	
6.2	Type Test reports of offered model/ type/ rating	Required	
6.3	Guaranteed Technical particulars (GTP)	Required	
6.4	Deviation Sheet	Required	
6.5	Detailed Drawings	Required	
6.6	Manufacturer's quality assurance plan	Required	
6.7	Other drawing/ documents mentioned in technical specification	Required	
7	**Soft copy of complete technical bid in pen drive**	Required	
8	**Samples as per technical specification.**	Required	

Note: Submission of Technical bid check list along with all items mentioned in the check list is mandatory. Order of documents shall be strictly as per the technical bid check list. Bids with incomplete/ wrong information are liable for rejection.

BSES Yamuna Power Limited

VENDOR CODE OF CONDUCT

Purchaser is committed to conducting its business in an ethical, legal and socially responsible manner. To encourage compliance with all legal requirements and ethical business practices, Purchaser has established this Vendor Code of Conduct (the "Code") for Purchaser's Vendors. For the purposes of this document, "Vendor" means any company, corporation or other entity that sells, or seeks to sell goods or services, to Purchaser, including the Vendor's employees, agents and other representatives.

Fundamental to adopting the Code is the understanding that a business, in all of its activities, must operate in full compliance with the laws, rules and regulations of the countries in which it operates. This Code encourages Vendors to go beyond legal compliance, drawing upon internationally recognized standards, in order to advance social and environmental responsibility.

I. Labour and Human Rights

Vendors must uphold the human rights of workers, and treat them with dignity and respect as understood by the international community.

. Fair Treatment - Vendors must be committed to a workplace free of harassment. Vendors shall not threaten workers with or subject them to harsh or inhumane treatment, including sexual harassment, sexual abuse, corporal punishment, mental coercion, physical coercion, verbal abuse or unreasonable restrictions on entering or exiting company provided facilities.

. Antidiscrimination - Vendors shall not discriminate against any worker based on race, colour, age,gender,sexual orientation, ethnicity, disability, religion, political affiliation, union membership, national origin, or marital status in hiring and employment practices such as applications for employment, promotions, rewards, access to training, job assignments, wages, benefits, discipline, and termination. Vendors shall not require a pregnancy test or discriminate against pregnant workers except where required by applicable laws or regulations or prudent for workplace safety. In addition, Vendors shall not require workers or potential workers to undergo medical tests that could be used in a discriminatory way except where required by applicable law or regulation or prudent for workplace safety.

. Freely Chosen Employment - Forced, bonded or indentured labour or involuntary prison labour is not to be used. All work will be voluntary, and workers should be free to leave upon reasonable notice. Workers shall not be required to hand over government-issued identification, passports or work permits as a condition of employment.

. Prevention of Under Age Labor - Child labor is strictly prohibited. Vendors shall not employ children. The minimum age for employment or work shall be 15 years of age, the minimum age for employment in that country, or the age for completing compulsory education in that country, whichever is higher. This Code does not prohibit participation in legitimate workplace apprenticeship programs that are consistent with Article 6 of ILO Minimum Age Convention No. 138 or light work consistent with Article 7 of ILO Minimum Age Convention No. 138.

. Juvenile Labor - Vendors may employ juveniles who are older than the applicable legal minimum age for employment but are younger than 18 years of age, provided they do not perform work likely to jeopardize their health, safety, or morals, consistent with ILO Minimum Age Convention No. 138.

. Minimum Wages - Compensation paid to workers shall comply with all applicable wage laws, including those relating to minimum wages, overtime hours and legally mandated benefits. Any Disciplinary wage deductions are to conform to local law. The basis on which workers are being paid is to be clearly conveyed to them in a timely manner.

. Working Hours - Studies of good manufacturing practices clearly link worker strain to reduced productivity, increased turnover and increased injury and illness. Work weeks are not to exceed

maximum set by local law. Further, a work week should not be more than 60 hours per week, including overtime, except in emergency or unusual situations. Workers should be allowed at least one day off per seven-day week.

. Freedom of Association - Open communication and direct engagement between workers and management are the most effective ways to resolve workplace and compensation issues. Vendors are to respect the rights of workers to associate freely and to communicate openly with management regarding working conditions without fear of reprisal, intimidation or harassment. Workers' rights to join labour unions seek representation and or join worker's councils in accordance with local laws should be acknowledged.

II. Health and Safety

Vendors must recognize that in addition to minimizing the incidence of work-related injury and illness, a safe and healthy work environment enhances the quality of products and services, consistency of production and worker retention and morale. Vendors must also recognize that ongoing worker input and education is essential to identifying and solving health and safety issues in the workplace.

The health and safety standards are:

. Occupational Injury and Illness - Procedures and systems are to be in place to prevent, manage, track and report occupational injury and illness, including provisions to: a) encourage worker reporting; b) classify and record injury and illness cases; c) provide necessary medical treatment; d) investigate cases and implement corrective actions to eliminate their causes; and e) facilitate return of workers to work.

. Emergency Preparedness - Emergency situations and events are to be identified and assessed, and their impact minimized by implementing emergency plans and response procedures, including: emergency reporting, employee notification and evacuation procedures, worker training and drills, appropriate fire detection and suppression equipment, adequate exit facilities and recovery plans.

. Occupational Safety - Worker exposure to potential safety hazards (e.g., electrical and other energy sources, fire, vehicles, and fall hazards) are to be controlled through proper design engineering and administrative controls, preventative maintenance and safe work procedures (including lockout/ragout), and ongoing safety training. Where hazards cannot be adequately controlled by these means, workers are to be provided with appropriate, well-maintained, personal protective equipment. Workers shall not be disciplined for raising safety concerns.

. Machine Safeguarding - Production and other machinery is to be evaluated for safety hazards. Physical guards, interlocks and barriers are to be provided and properly maintained where machinery presents an injury hazard to workers.

. Industrial Hygiene - Worker exposure to chemical, biological and physical agents is to be identified, evaluated, and controlled. Engineering or administrative controls must be used to control overexposures. When hazards cannot be adequately controlled by such means, worker health is to be protected by appropriate personal protective equipment programs.

. Sanitation, Food, and Housing - Workers are to be provided with ready access to clean toilet, facilities potable water and sanitary food preparation, storage, and eating facilities. Worker dormitories provided by the Participant or a labour agent are to be maintained clean and safe, and provided by the Participant or a labour egress, hot water for bathing and showering, and adequate heat and ventilation and reasonable personal space along with reasonable entry and exit privileges.

. Physically Demanding Work - Worker exposure to the hazards of physically demanding tasks, including manual material handling and heavy or repetitive lifting, prolonged standing and highly repetitive or forceful assembly tasks is to be identified, evaluated and controlled.

III. Environmental

Vendors should recognize that environmental responsibility is integral to producing world class products In manufacturing operations, adverse effects on the environment and natural resources are to be minimized while safeguarding the health and safety of the public.

The environmental standards are:

. Product Content Restrictions - Vendors are to adhere to applicable laws and regulations regarding prohibition or restriction of specific substances including labeling laws and regulations for recycling and disposal. In addition, Vendors are to adhere to all environmental requirements specified by Purchaser.
. Chemical and Hazardous Materials -Chemical and other materials posing a hazard if released to the environment are to be identified and managed to ensure their safe handling, movement storage, recycling or reuse and disposal.
. Air Emissions - Air emissions of volatile organic chemicals, aerosols, corrosives, particulates, ozone depleting chemicals and combustion by-products generated from operations are to be characterized, monitored, controlled and treated as required prior to discharge.
. Pollution Prevention and Resource Reduction -Waste of all types, including water and energy, are to reduced or eliminated at the source or by practices such as modifying production, maintenance and facility processes, materials substitution, conservation, recycling and re-using materials.
. Wastewater and Solid Waste - Wastewater and solid waste generated from operations industrial processes and sanitation facilities are to be monitored, controlled and treated as required prior to discharge or disposal.
. Environmental Permits and Reporting - All required environmental permits (e.g. discharge monitoring) and registrations are to be obtained, maintained and kept current and their operational and reporting requirements are to be followed.

IV. Ethics

Vendors must be committed to the highest standards of ethical conduct when dealing with workers, Vendors, and customers.
. Corruption, Extortion, or Embezzlement - Corruption, extortion, and embezzlement, in any form, are strictly prohibited. Vendors shall not engage in corruption, extortion or embezzlement in any form and violations of this prohibition may result in immediate termination as an Vendor and in legal action.
. Disclosure of Information - Vendors must disclose information regarding its business activities, structure financial situation, and performance in accordance with applicable laws and regulations and prevailing industry practices.
. No Improper Advantage - Vendors shall not offer or accept bribes or other means of obtaining undue or improper advantage.
. Fair Business, Advertising, and Competition - Vendors must uphold fair business standards in advertising, sales, and competition.
. Business Integrity - The highest standards of integrity are to be expected in all business interactions. Participants shall prohibit any and all forms of corruption, extortion and embezzlement. Monitoring and enforcement procedures shall be implemented to ensure conformance.
. Community Engagement - Vendors are encouraged to engage the community to help foster social and economic development and to contribute to the sustainability of the communities in which they operate.
. Protection of Intellectual Property - Vendors must respect intellectual property rights; safeguard customer information; and transfer of technology and know-how must be done in a manner that protects intellectual property rights.

V. Management System

Vendors shall adopt or establish a management system whose scope is related to the content of this Code. The management system shall be designed to ensure (a) compliance with applicable laws, regulations and customer requirements related to the Vendors' operations and products; (b)

conformance with this Code; and (c) identification and mitigation of operational risks related to this Code. It should also facilitate continual improvement.

The management system should contain the following elements:

. Company Commitment - Corporate social and environmental responsibility statements affirming Vendor's commitment to compliance and continual improvement.

. Management Accountability and Responsibility - Clearly identified company representative[s]responsible for ensuring implementation and periodic review of the status of the management systems.

. Legal and Customer Requirements - Identification, monitoring and understanding of applicable laws, regulations and customer requirements.

. Risk Assessment and Risk Management - Process to identify the environmental, health and safety and labour practice risks associated with Vendor's operations. Determination of the relative significance for each risk and implementation of appropriate procedural and physical controls to ensure regulatory compliance to control the identified risks.

. Performance Objectives with Implementation Plan and Measures - Areas to be included in a risk assessment for health and safety are warehouse and storage facilities, plant/facilities support equipment, laboratories and test areas, sanitation facilities (bathrooms), kitchen/cafeteria and worker housing /dormitories. Written standards, performance objectives, and targets an implementation plans including a periodic assessment of Vendor's performance against those objectives.

. Training - Programs for training managers and workers to implement Vendor's policies, procedures and improvement objectives.

. Communication - Process for communicating clear and accurate information about Vendor's performance, practices and expectations to workers, Vendors and customers.

. Worker Feedback and Participation - Ongoing processes to assess employees' understanding of and obtain feedback on practices and conditions covered by this Code and to foster continuous improvement.

. Audits and Assessments - Periodic self-evaluations to ensure conformity to legal and regulatory requirements, the content of the Code and customer contractual requirements related to social and environmental responsibility.

. Corrective Action Process - Process for timely correction of deficiencies identified by internal or external assessments, inspections, investigations and reviews.

. Documentation and Records - Creation of documents and records to ensure regulatory compliance and conformity to company requirements along with appropriate confidentiality to protect privacy.

The Code is modeled on and contains language from the Recognized standards such as International Labour Organization Standards (ILO), Universal Declaration of Human Rights (UDHR), United Nations Convention against Corruption, and the Ethical Trading Initiative (ETI) were used as references in preparing this Code and may be useful sources of additional information

BSES Yamuna Power Limited

GENERAL CONDITIONS OF CONTRACT (GCC-SUPPLY)

BSES Yamuna Power Limited

GENERAL CONDITIONS OF CONTRACT (GCC)-SUPPLY

The General Condition of Contract shall form a part of specifications, contract document.

1.0 General Instructions

1.01 All the Bids shall be prepared and submitted in accordance with these instructions.

1.02 Bidder shall bear all costs associated with the preparation and delivery of its Bid, and the Purchaser will in no case shall be responsible or liable for these costs.

1.03 The Bid should be submitted by the Bidder in whose name the bid document has been issued and under no circumstances it shall be transferred/sold to the other party.

1.04 The Purchaser reserves the right to request for any additional information and also reserves the right to reject the proposal of any Bidder, if in the opinion of the Purchaser, the data in support of RFQ requirement is incomplete.

1.05 The Bidder is expected to examine all instructions, forms, terms & conditions and specifications in the Bid Documents. Failure to furnish all information required in the Bid Documents or submission of a Bid not substantially responsive to the Bid Documents in every respect may result in rejection of the Bid. However, the Purchaser's decision in regard to the responsiveness and rejection of bids shall be final and binding without any obligation, financial or otherwise, on the Purchaser.

2.0 Definition of Terms

2.01 "Purchaser" shall mean BSES Yamuna Power Limited, on whose behalf this bid enquiry is issued by its authorized representative / officers.

2.02 "Bidder" shall mean the firm who quotes against this bid enquiry issued by the Purchaser. "Supplier" or "Supplier" shall mean the successful Bidder and/or Bidders whose bid has been accepted by the Purchaser and on whom the "Letter of Acceptance" is placed by the Purchaser and shall include his heirs, legal representatives, successors and permitted assigns wherever the context so admits.

2.03 "Supply" shall mean the Scope of Contract as described.

2.04 "Specification" shall mean collectively all the terms and stipulations contained in those portions of this bid document known as RFQ, Commercial Terms & Condition, Instructions to Bidders, Technical Specifications and the Amendments, Revisions, Deletions or Additions, as may be made by the Purchaser from time to time.

2.05 "Letter of Acceptance" shall mean the official notice issued by the Purchaser notifying the Supplier that his proposal has been accepted and it shall include amendments thereto, if any, issued by the Purchaser. The "Letter of Acceptance" issued by the Purchaser shall be binding on the "Supplier" The date of Letter of Acceptance shall be taken as the effective date of the commencement of contract.

2.06 "Month" shall mean the calendar month and "Day" shall mean the calendar day.

2.07 "Codes and Standards" shall mean all the applicable codes and standards as indicated in the Specification.

2.08 "Offer Sheet" shall mean Bidder's firm offer submitted to BYPL in accordance with the specification.

2.09 "Contract" shall mean the "Letter of Acceptance/Purchase Order" issued by the Purchaser.

2.10 "Contract Price" shall mean the price referred to in the "Letter of Acceptance/Purchase Order".

2.11 "Contract Period" shall mean the period during which the "Contract" shall be executed as agreed between the Supplier and the Purchaser in the Contract inclusive of extended contract period for reason beyond the control of the Supplier and/or Purchaser due to force majeure.

2.12 "Acceptance" shall mean and deemed to include one or more of the following as will be stipulated in the specification:

a) The written acceptance of material by the inspector at suppliers works to ship the materials.
b) Acceptance of material at Purchaser site stores after its receipt and due inspection/ testing and release of material acceptance voucher.
c) Where the scope of the contract includes supply, acceptance shall mean issue of necessary equipment / material takeover receipt after installation & commissioning and final acceptance.

3.0 Contract Documents & Priority

3.01 Contract Documents: The terms and conditions of the contract shall consist solely of these RFQ conditions and the offer sheet.

4.0 Scope of Supply -General

4.01 The "Scope of Supply" shall be on the basis of Bidder's responsibility, completely covering the obligations, responsibility and supplies provided in this Bid enquiry whether implicit or explicit.

4.02 Bidder shall have to quote for the Bill of quantities as listed in Volume-II of this RFQ.

4.03 Quantity variation and additional requirement if any shall be communicated to successful bidder during project execution.

4.04 All relevant drawings, data and instruction manuals.

5.0 Quality Assurance and Inspection

5.01 Immediately on award of contract, the bidder shall prepare detailed quality assurance plan / test procedure identifying the various stages of manufacture, quality checks performed at each stage, raw material inspection and the Customer hold points. The document shall also furnish details of method of checking, inspection and acceptance standards / values and get the approval of Purchaser before proceeding with manufacturing. However, Purchaser shall have right to review the inspection reports, quality checks and results of suppliers in house inspection department which are not Customer hold points and the supplier shall comply with the remarks made by purchaser or his representative on such reviews with regards to further testing, rectification or rejection, etc.

5.02 Witness and Hold points are critical steps in manufacturing, inspection and testing where the supplier is obliged to notify the Purchaser in advance so that it may be witnessed by the Purchaser. Final inspection is a mandatory hold point. The supplier to proceed with the work past a hold point only after clearance by purchaser or a witness waiver letter from BYPL.

5.03 The performance of waiver of QA activity by Purchaser at any stage of manufacturing does not relieve the supplier of any obligation to perform in accordance with and meet all the requirements of the procurement documents and also all the codes & reference documents mentioned in the procurement document nor shall it preclude subsequent rejection by the purchaser.

5.04 On completion of manufacturing the items can only be dispatched after receipt of dispatch Instructions issued by the Purchaser.

5.05 All in-house testing and inspection shall be done with out any extra cost. The in-house inspection shall be carried out in presence of BSES/BSES authorized third party inspection agency. Cost of Futile/abortive visit(s) shall be debited from the invoices.

5.06 Purchaser reserves the right to send any material being supplied to any recognized laboratory for testing, wherever necessary and the cost of testing shall be borne by the Bidder. In case the material is found not in order with the technical requirement / specification, the charges along with any other penalty which may be levied is to be borne by the bidder. To avoid any complaint the supplier is advised to send his representative to the stores to see that the material sent for testing is being sealed in the presence of bidder's representative.

6.0 INSPECTION & TEST CHARGES:

6.01 GOODS shall be inspected by BUYER and/or third party inspection agency nominated by BUYER. Inspection shall carry out stage wise/final inspection as per agreed QA /QC procedure.
In addition, inspection of GOODS shall be carried out at our Site/stores. SELLER shall, however, repair/replace the damaged/rejected GOODS to the satisfaction of BUYER at no extra cost.

6.02 Inspection charges are included in total order value, however BUYER will bear third party inspection charges. In case of futile/abortive visit of BUYER's inspector at SELLER'S works, the cost towards the same shall be debited from the SELLER's invoices.

6.03 GOODS covered by this PURCHASE ORDER shall not be dispatched in whole or in part until SELLER has received a written Release for Shipment Notice from BUYER or their designated representative.

6.04 Inspection call shall be raised minimum 15(fifteen) days in advance from delivery schedule mentioned in PO and duly filled Format issued by BYPL

7.0 HANDLING AND STORAGE:

7.01 Material Safety Data Sheet (MSDS), detail handling & storage instruction sheet/manual, wherever applicable, to be furnished before commencement of supply and one copy is to be submitted in store/site with First Lot.

8.0 Packing, Packing List & Marking

8.01 **Packing:** Supplier shall pack or shall cause to be packed all Commodities in crates/boxes/drums/containers/cartons and otherwise in such a manner as shall be reasonably suitable for shipment by road or rail to BYPL, Delhi/New Delhi stores/site without undue risk of damage in transit.

8.02 **Packing List:** The contents of each package shall be itemized on a detailed list showing the exact weight, extreme outside dimensions (length, width & weight) of each container/box/drum/carton, Item SAP Code, PO No & date. One copy of the packing list shall be enclosed in each package delivered.

9.0 Prices/Rates/Taxes

9.01 **Price basis for supply of materials**

a) Bidder to quote their prices on Landed Cost Basis and separate price for each item for supply to BYPL Delhi/New Delhi stores inclusive of packing, forwarding, loading at manufacturer's premises, payment of GST, Freight, any other local charges. **Octroi is presently not applicable in Delhi and however if applicable shall be reimbursed at actuals.**

b) The above supply prices shall also include unloading at BYPL Delhi/New Delhi stores/site.

c) Transit insurance will be arranged by Purchaser; however bidder to furnish required details in advance for arranging the same by Purchaser

10.0 TAXES & DUTIES:

10.01 Prices for Goods are on Ex- Works basis. For the Goods covered under the GST laws, all taxes that are applicable under CGST, SGST, UGST, IGST and GST Compensation Cess shall be payable extra.

10.02 For the Goods not covered in the GST laws, the applicable ED, VAT / CST shall be payable extra at applicable rates.

10.03 GSTIN of BSES YAMUNA POWER LTD - 07AABCC8569N1Z0
CST No of BSES YAMUNA POWER LTD -07740254593
TIN NO of BSES YAMUNA POWER LTD - 07740254593
PAN NO of BSES YAMUNA POWER LTD - AABCC8569N

10.04 At the end of each month, the SELLER must submit their detail of invoices and amount thereof to the concerned officer in charge, within 07 days after the close of the respective month of which supply relates. Non submission of the said request would be treated as good as that the SELLER has no requirement of reconciliation.

11.0 INVOICING INSTRUCTIONS:

11.01 Invoices in triplicate [1) Original for recipient, 2) Duplicate for Transporter, 3) Triplicate for supplier] shall be made out and delivered to the following address: BSES YAMUNA POWER LIMITED, SHAKTI KIRAN BUILDING, KARKARDOOMA, DELHI-110032.
MDCC will be released separately for Capex & Opex. Invoice will be submitted by supplier as per the MDCC.

11.02 Vendor shall obtain GST registration in the State from where the supply will be carried out. Vendors supplying Goods to the Purchaser shall have a valid GST registration number and shall submit GST Tax Invoice and other documents as per SGST Act, CGST Act, IGST Act, UTGST Act, GST Compensation Cess Act and Rules made there under. Failure to submit GST Tax Invoice shall

be liable for withholding SGST, CGST, IGST, UTGST, GST Compensation Cess amount charged by the vendor while releasing the payment.

11.03 Invoice in the name of BSES YAMUNA Power Limited & address of the store/site mentioned in the MDCC. Invoice should contain all information as required under GST Invoice, Debit Note and Credit Rules. The government has notified rules of invoicing under GST along with a template of invoice(GST INV-01) covering the elements such as supplier's details, GSTIN No, HSN Codes, item details, GST tax rates, etc that need to be presented by the supplier.

11.04 Vendor to carefully examine and charge relevant CGST / SGST, UGST, IGST and GST compensation cess as applicable to the transactions.

11.05 Timely provision of invoices / Debit Notes / Credit Notes:

11.05.1 Vendor to timely provide invoice / Debit note / Credit note to enable Purchaser to claim tax benefit on or before stipulated time period. All necessary adjustment entries (Credit Note, Purchase Returns, Debit Notes) shall be made within the time lines prescribed under the GST Laws.

11.05.2 In case of receipt of advance, the Vendor undertakes to raise the tax invoice. Purchaser, upon payment of advance, shall issue payment voucher as per applicable GST laws and rules. Four copies of the invoices need to be provided by suppliers and wherever the law requires, an Electronic Reference Number for each invoice.
Documents and devices to be carried by a person-in-charge of a conveyance under.

12.0 Terms of payment and billing

12.01 For Supply of Equipments:

Part 1) 90% of basic value with 100% taxes and duties shall be paid in 45 days from the date of receipt and acceptance of GOODS at STORES/SITE on presentation of following documents:

a) Signed copy of accepted Purchase Order (for first payment)
b) LR / RR / BL as applicable
c) Challan as applicable
d) Two (02) copies of Supplier's detailed Recipient Invoice showing Commodity description, quantity, unit price, total price and basis of delivery, and being 100% of the value of the consignment claimed.
e) Two (02) copies of Supplier's transporter invoice duly receipted by BYPL Stores & Original certificate issued by BYPL confirming receipt of the subject material at Stores/Site and acceptance of the same as per the provisions of the contract.
f) Two (02) copies Packing List / Detailed Packing List
g) Approved Test certificates / Quality certificates, if applicable
h) Certificate of Origin, if applicable
i) Material Dispatch Clearance Certificate (MDCC)
j) Insurance Policy / Certificate, if applicable
k) Warranty / Guarantee Certificate, if applicable
l) Check list for bill submission.

Part 2) Balance 10% of basic value shall be paid in 30 days from the date of successful testing, commissioning and handing over of individual 11KV switchboard duly certified by BYPL Engineer-in-Charge.

In case of receipt of material at store & not erected ,tested & commissioned within six(06) month from the date of receipt of material at store, Balance 10% of basic value retained shall be released against the GRN.

12.02 Purchaser has the right to recover tax loss, interest and penalty suffered due to any non-compliance of tax laws by the Vendor. In the event, Purchaser is not able to avail any tax credit due to any short coming on the part of the Vendor (which otherwise should have been available to Purchaser in the normal course), then the Vendor at his own cost and effort will get the short coming rectified. If for any reason the same is not possible, then the Vendor will make 'good' the loss suffered by Purchaser due to the tax credit it lost . In such event, any amount paid to the Vendors shall be first attributable to the tax (GST) charged in the invoice and the balance shall be considered towards the 'value' of supply of goods/ services.

12.03 Purchaser shall deduct "Tax Deducted at Source" wherever applicable and at the rate prescribed under the GST Laws or any other Indian law and remit the same to the Government. Necessary TDS certificates as per law shall be issued by the purchase to the vendor.

12.04 Any liability arising out of dispute on the tax rate, classification under HSN, calculation and payment of tax to the Government will be to the Vendor's account.

12.05 Where the supply of Goods are liable to GST under reverse charge mechanism, then the supplier should clearly mention the category under which it has been registered and also that "the liability of payment of GST is on the Recipient of Supply".

13.0 TAX INDEMNITY CLAUSE:

13.01 Vendor (along with its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement) agrees that it will be solely responsible for performing all compliances and making payments of all taxes (direct tax or indirect tax including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability arising either out of laws/ regulations applicable in India and overseas or because of a demand/ recovery initiated by any revenue authority under laws/ regulations applicable in India or overseas.

13.02 In case any tax liability (including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability becomes payable by Purchaser due to failure of the Vendor, or any of its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement, to comply with the relevant laws/ regulations applicable in India or overseas, Vendor undertakes to indemnify Purchaser for an amount equal to amount payable by Purchaser.

13.03 Further, Vendor undertakes to keep Purchaser indemnified at all times against and from all other actions, proceedings, claims, loss, damage, costs and expenses which may be brought against Purchaser or suffered or incurred by Purchaser and which shall have arisen either directly or indirectly out of or in connection with failure of The Vendor, or any of its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement, to comply with relevant obligations/ compliance under any law/ regulations applicable in India and overseas.

13.04 The parties agree to follow the following process in case any communication of demand, arising out non-compliance by Vendor (along with its affiliates in India or overseas including any agent/ third party contractor or any other person appointed by such affiliates for the purpose of this agreement), is received by Purchaser :

13.04.1 On Purchaser receiving any communication from a competent authority demanding tax liability (including but not limited to income-tax, transfer pricing, value added tax, SGST, CGST, IGST, UTGST, GST Compensation Cess custom duty, excise duty, Research and Development Cess, etc.), cesses, interest, penalties or any other tax/ duty/ amount/ charge/ liability, Purchaser shall, within 5 common working days from the date of receipt of such communication (save where the period to respond to the relevant authority is less than five days, in which case, as soon as reasonably possible) inform Vendor in writing of such communication.

13.04.2 Pursuant to receiving communication from Purchaser, Vendor shall suggest to accept the communication and pay the demand amount to the competent authority. In such an event, Vendor shall reimburse such amount paid to Purchaser within 5 working days from the date of payment by Purchaser to the competent authority.

13.04.3 If Vendor advises in writing and Purchaser agrees to dispute the demand, then Purchaser shall dispute the matter with competent authority as per due process prescribed under the regulations and Purchaser shall not pay the Tax Demand. In such scenario, cost of litigation including but not limited to Counsel cost, filing fees, other related charges, should be reimbursed by Vendor to Purchaser. Additionally, If any coercive steps of recovery are initiated by the department, then Purchaser would pay such amount (including by way of adjustment of refunds due to it) and the same would be reimbursed by Vendor within 5 working days from date of such recovery from Purchaser. Purchaser will take all necessary steps to avoid such recovery measures.

13.04.4 On determination of the demand through an Order issued by a Tribunal or any other similar Authority, by whatever name called, under any law applicable in India or overseas, if the demand or any part thereof becomes payable and is paid by Purchaser, then Vendor undertakes to reimburse such amount to Purchaser within 10 days from the date of payment. Alternatively, if on determination of the demand through an Order, no amount is payable by Purchaser then any refund arising to Purchaser due to such an Order shall be passed on to Vendor within 10 days from the date of receipt of refund.

14.0 The Micro, Small and Medium Enterprises (MSME):

14.01 If the SELLERS establishment is covered under the purview of The Micro, Small and Medium Enterprises Development Act, 2006, he shall declare so within the bid of its status failing which it will be presumed that it is a non-MSME unit. Also submit a copy of Udyog Aadhaar (UA) if available.

15.0 Price Validity

15.01 All bids submitted shall remain valid, firm and subject to unconditional acceptance by Delhi for 120 days from the due date of submission. For awarded suppliers, the prices shall remain valid and firm till contract completion.

16.0 Performance Guarantee

16.01 To be submitted within fifteen (15) days from the date of issuance of the Letter of Award/PO, supplier shall establish a performance bond in favor of BYPL in an amount not less than ten percent (10%) of the total price of the Contract (the "Performance Bond"). The Performance Bond shall be valid for a period of 24 months from the date of Commissioning or 30 months from the date of last dispatch whichever is earlier plus 3 months claim period.

16.02 Bank guarantee shall be drawn in favour of BSES Yamuna Power Ltd as applicable. The performance Bank guarantee shall be in the format as specified by BYPL.

17.0 Forfeiture

17.01 Each Performance Bond established under Clause 10.0 shall contain a statement that it shall be automatically and unconditionally forfeited without recourse and payable against the presentation by BYPL of this Performance Bond, to the relevant bank referred to above, together with a simple statement that supplier has failed to comply with any term or condition set forth in the Contract.

17.02 Each Performance BG established under will be automatically and unconditionally forfeited without recourse if BYPL in its sole discretion determines that supplier has failed to comply with any term or condition set forth in the contract.

18.0 Release

18.01 All Performance Bonds will be released without interest within seven (7) days from the last date up to which the Performance Bond has to be kept valid (as defined in Clause 10.0) except for the case set forth in Clause 21.0.

19.0 Defects Liability Period/Guarantee/Warranty

19.01 The bidder to Guarantee the materials / items supplied against any defect of failure, which arise due to faulty materials, workmanship or design for the entire defects liability period. The Defect liability period shall be 60 months from the date of commissioning or 66 months from the date of delivery whichever is earlier.

19.02 If during the Defects Liability Period any GOODS are found to be defective, they shall be promptly replaced or rectified by BIDDER at its own cost (including the cost of dismantling and (reinstallation) on the instructions of BUYER and if removed from SITE for such purpose, shall be removed and re-delivered to SITE by BIDDER at its own cost.

20.0 Return, Replacement or Substitution.

20.01 BYPL shall give Supplier notice of any defective Commodity promptly after becoming aware thereof. BYPL may in its discretion elect to return defective Commodities to Supplier for replacement, free of charge to BYPL, or may reject such Commodities and purchase the same or similar Commodities from any third party. In the latter case BYPL shall furnish proof to Supplier of the cost of such substitute purchase. In either case, all costs of any replacement, substitution, shipping, labour and other related expenses incurred in connection with the return and replacement or for the substitute purchase of a Commodity hereunder should be for the account of Supplier. BYPL may set off such costs against any amounts payable by BYPL to Supplier. Supplier shall reimburse BYPL for the amount, if any, by which the price of a substitute Commodity exceeds the price for such Commodity as quoted in the Bid. BUYER at its sole discretion shall have the opinion to dispose the material or GOODS so rejected and not taken back within forty-five days from the date of intimation of rejection.

21.0 Effective Date of Commencement of Contract:

21.01 The date of the issuance of the Letter of Acceptance/Purchase Order shall be treated as the effective date of the commencement of Contract.

22.0 Time – The Essence Of Contract

22.01 The time and the date of completion of the "Supply" as stipulated in the Letter Of Acceptance / Purchase order issued to the Supplier shall be deemed to be the essence of the "Contract". The Supply has to be completed not later than the aforesaid Schedule and date of completion of supply.

23.0 The Laws and Jurisdiction of Contract:

23.01 The laws applicable to this Contract shall be the Laws in force in India.

23.02 All disputes arising in connection with the present Contract shall be settled amicably by mutual consultation failing which shall be finally settled as per the rules of Arbitration and Conciliation Act, 1996 at the discretion of Purchaser. The venue of arbitration shall be at Delhi in India

24.0 Events of Default

24.01 Events of Default. Each of the following events or occurrences shall constitute an event of default ("Event of Default") under the Contract:

(a) Supplier fails or refuses to pay any amounts due under the Contract;

(b) Supplier fails or refuses to deliver Commodities conforming to this RFQ/ specifications, or fails to deliver Commodities within the period specified in P.O. or any extension thereof

(c) Supplier becomes insolvent or unable to pay its debts when due, or commits any act of bankruptcy, such as filing any petition in any bankruptcy, winding-up or reorganization proceeding, or acknowledges in writing its insolvency or inability to pay its debts; or the Supplier's creditors file any petition relating to bankruptcy of Supplier;

(d) Supplier otherwise fails or refuses to perform or observe any term or condition of the Contract and such failure is not remediable or, if remediable, continues for a period of 30 days after receipt by the Supplier of notice of such failure from BYPL.

25.0 Consequences of Default.

(a) If an Event of Default shall occur and be continuing, BYPL may forthwith terminate the Contract by written notice.

(b) In the event of an Event of Default, BYPL may, without prejudice to any other right granted to it by law, or the Contract, take any or all of the following actions;

(i) present for payment to the relevant bank the Performance Bond;

(ii) purchase the same or similar Commodities from any third party; and/or

(iii) recover any losses and/or additional expenses BYPL may incur as a result of Supplier's default.

26.0 Penalty for Delay

26.01 If supply of items / equipments is delayed beyond the supply schedule as stipulated in purchase order then the Supplier shall be liable to pay to the Purchaser as penalty for delay, a sum of 1%

(one percent) of the basic (ex-works) price for every week delay of undelivered units or part thereof for individual mile stone deliveries.

26.02 The total amount of penalty for delay under the contract will be subject to a maximum of ten percent (10%) of the basic (ex-works) price of total undelivered units.

26.03 The Purchaser may, without prejudice to any method of recovery, deduct the amount for such damages from any amount due or which may become due to the Supplier or from the Performance Bond or file a claim against the supplier.

22.4 If Penalty is levied as per the Order terms & conditions; BYPL will raise Invoice of the penalty amount along with applicable GST rates. Accordingly, after set off of the penalty Invoice amount, net payment shall be made.

27.0 VARIATION IN TAXES, DUTIES & LEVIES

27.1 The total order value shall be adjusted on account of any variations in Statutory Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period only. In case of reduction in taxes, duties and levies, the benefits of the same shall be passed on to BUYER.

27.2 No other Taxes, Duties & Levies other than those specified above will be payable by BUYER except in case of new Levies, Taxes & Duties imposed by the Competent Authorities by way of fresh notification(s) subsequent to the issue of PURCHASE ORDER but within the stipulated delivery period.

27.3 Notwithstanding what is stated above, changes in Taxes, Duties & Levies shall applied only to that portion of PURCHASE ORDER not executed on the date of notification by Competent Authority. Further, changes in Taxes, Duties & Levies after due date of Delivery shall not affect PURCHASE ORDER Terms and Value.

27.4 PURCHASE ORDER value shall not be subject to any variation on account of variation in Exchange rate(s).

28.0 TAXES & DUTIES ON RAW MATERIALS & BOUGHT OUT COMPONENTS:

28.01 Taxes & Duties on raw materials & bought out components are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

28.02 Taxes & Duties on raw materials & bought out components procured indigenously are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

29.0 Force Majeure

29.01 General

An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control directly or indirectly, of the Party affected, but only if and to the extent that:

(i) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions, due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected party's ability to perform its obligations under this Contract and to mitigate the consequences thereof.

(ii) For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.
(iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract.
(iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause.

29.02 Specific Events of Force Majeure subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements :
(i) The following events and circumstances :
a) Effect of any natural element or other acts of God, including but not limited to storm, flood, earthquake, lightning, cyclone, landslides or other natural disasters.
b) Explosions or fires
(ii) War declared by the Government of India, provided that the ports at Mumbai are declared as a war zone.
(iii) Dangers of navigation, perils of the sea.

29.03 Notice of Events of Force Majeure If a force majeure event prevents a party from performing any obligations under the Contract in part or in full, that party shall:
i) Immediately notify the other party in writing of the force majeure events within 7(seven) working days of the occurrence of the force majeure event
ii) Be entitled to suspend performance of the obligation under the Contract which is affected by force majeure event for the duration of the force majeure event.
iii) Use all reasonable efforts to resume full performance of the obligation as soon as practicable
iv) Keep the other party informed of all such efforts to resume full performance of the obligation on a regular basis.
v) Provide prompt notice of the resumption of full performance or obligation to the other party.

29.04 Mitigation of Events of Force Majeure Each Party shall:

(i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure including recourse to alternate methods of satisfying its obligations under the Contract;
(ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and
(iii) Keep the other Party informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.

29.05 Burden of Proof In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Agreement. The burden of proof as to whether or not a force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.

29.06 Termination for Certain Events of Force Majeure. If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 3 months, the Parties shall promptly discuss in good faith how to proceed with a view to reaching a solution on mutually agreed basis. If a solution on mutually agreed basis cannot be arrived at within a period of 30 days after the expiry of the period of three months, the Contract shall be terminated after the said period of 30

days and neither Party shall be liable to the other for any consequences arising on account of such termination.

29.07 Limitation of Force Majeure event. The Supplier shall not be relieved of any obligation under the Contract solely because cost of performance is increased, whether as a consequence of adverse economic consequences or otherwise.

29.08 Extension of Contract Period due to Force Majeure event The Contract period may be extended by mutual agreement of Parties by way of an adjustment on account of any period during which an obligation of either Party is suspended due to a Force Majeure event.

29.09 Effect of Events of Force Majeure. Except as otherwise provided herein or may further be agreed between the Parties, either Party shall be excused from performance and neither Party shall be construed to be in default in respect of any obligations hereunder, for so long as failure to perform such obligations shall be due to and event of Force Majeure."

30.0 Transfer And Sub-Letting

30.01 The Supplier shall not sublet, transfer, assign or otherwise part with the Contract or any part thereof, either directly or indirectly, without prior written permission of the Purchaser.

31.0 Recoveries

31.01 When ever under this contract any money is recoverable from and payable by the bidder, the purchaser shall be entitled to recover such sum by appropriating in part or in whole by detecting any sum due to which any time thereafter may become due from the supplier in this or any other contract. Should the sum be not sufficient to cover the full amount recoverable the bidder shall pay to the purchaser on demand the remaining balance.

32.0 Waiver

32.01 Failure to enforce any condition herein contained shall not operate as a waiver of the condition itself or any subsequent breach thereof.

33.0 Indemnification

33.01 Notwithstanding contrary to anything contained in this RFQ, Supplier shall at his costs and risks make good any loss or damage to the property of the Purchaser and/or the other Supplier engaged by the Purchaser and/or the employees of the Purchaser and/or employees of the other Supplier engaged by the Purchaser whatsoever arising out of the negligence of the Supplier while performing the obligations under this contract.

34.0 Problem Troubleshooting & Restoration In Warranty Period For A Particular Equipment:

34.01 a) Service Engineer Availability to Attend, Identify & Restore Defects (Minor) Of Equipments under Guarantee Period within 48 Working Hours (Exclusion of Material Support Cases)
b) Spare Material Delivery For Restoration Of Grid Equipment (Major Defect) Under Guarantee Period Within Two Weeks. Seller must keep Requisite Inventory of Critical Switchgear Spares & Other Equipment's Covered in Guarantee Period to Restore Equipment within Two Weeks.
c) In Case Of Complete Replacement of Equipment, Complete Equipment to Be Replaced Within a Period Of 4 Weeks.

35.00 DOCUMENTATION

35.01 The Bidder shall procure all equipment from BYPL approved sources as per attached specifications. The Bidder's shall submit 5 copies of Material/Type Test Certificates, O&M Manuals, and Approved & As-built drawings, related to various equipment. The Bidder's shall ensure for the strict compliance to the specifications and Field Quality Procedures issued by BYPL Engineer in-charge.

36.0 Limitation of Liability

36.01 Except as provided otherwise in the Contract and except for willful misconduct or gross negligence, neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or any other indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract. The total liability of the Contractor to the Purchaser under the Contract shall not exceed the Contract Value. Except that this Clause shall not limit the liability of the Contractor:

(a) Under any other provisions of the Contract which expressly impose a greater liability,

(b) In cases of fraud, willful misconduct or illegal or unlawful acts, or

(c) In cases of acts or omissions of the Contractor which are contrary to the most elementary rules of diligence which a conscientious Contractor would have followed in similar circumstances.

37.0 Liability of Contractors

37.01 Subject to the due discharge of its obligations under the Contract and except in case of gross negligence or willful misconduct on the part of the Contractor or on the part of any person acting on behalf of the Contractor, with respect to any loss or damage caused by the Contractor to the Purchaser's property or the Site, the Contractor shall not be liable to the Purchaser for the following:

(a) For any indirect or consequential loss or damage; and

(b) For any direct loss or damage that exceeds:

(i) The total payments made and expected to be made to the Contractor under the Contract including reimbursements, if any; or

(ii) The insurance claim proceeds which the Contractor may be entitled to receive from any insurance purchased by the Contractor to cover such a liability, whichever is higher.

37.02 This limitation of liability shall not affect the Contractor's liability, if any, for damage to any third party, caused by the Contractor or any Person or firm acting on behalf of the Contractor in executing the Works.

37.03 Notwithstanding anything contained in the Contract, the Contractor shall not be liable for any gross negligence or willful misconduct on the part of the Purchaser or any of its affiliates, any vendor, or any party, other than Contractor and/or, its directors, officers, agents or representatives or its affiliates, or Subcontractor, or the vendor or any third party engaged by it.

37.04 Notwithstanding anything contained in the Contract, including but not limited to approval by the Purchaser of any drawings, documents, vendor list, supply of information or data or the participation of the Purchaser in any meeting and/or discussion or otherwise, shall not absolve the Contractor from any of its liabilities or responsibilities arising in relation to or under the Contract.

38.0 Intellectual Property Rights and Royalties

38.01 The Contractor shall indemnify the Purchaser and the Purchaser's Representative from and against all claims and proceedings on account of infringement (or alleged infringement) of any patent rights, registered designs, copyright, design, trademark, trade name, know-how or other intellectual

property rights (hereinafter collectively referred to as "Intellectual Property Rights") in respect of the Works, Contractor's Equipment, machines, Works method, Plant, Materials, or anything whatsoever required for the execution of the Works and from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. In the event of infringement of any Intellectual Property Rights of any third party as a result of the execution of the Works (or any part thereof) by the Contractor, the Contractor shall rectify, modify or replace, at its own cost, the Works, Plant or Materials or anything whatsoever required for the Works so that infringement ceases to exist or, in the alternative, the Contractor shall procure necessary rights/ licenses from the affected third party so that there is no infringement of Intellectual Property Rights.

38.02 The Contractor shall be promptly notified of any claim made against the Purchaser. The Contractor shall, at its cost, conduct negotiations for the settlement of such claim, and any litigation or arbitration that may arise from it. The Purchaser or the Purchaser's Representative shall not make any admission which might be prejudicial to the Contractor, unless the Contractor has failed to take over the conduct of the negotiations, litigation or arbitration within a reasonable time after having been so requested. In the event of Contractor failing to act at the Purchaser's Representative's notice, the Purchaser shall be at full liberty to deduct any such amount of pending claim from any amount due to the Contractor under the Contract or any other contract and the balance portion of claim shall be treated as debt due from the Contractor.

38.03 All Intellectual Property Rights in respect of any Plant, Materials, Drawings and Designs, plans, documents, specifications, data, materials, know how, charts, information, etc., provided to the Contractor by the Purchaser pursuant to this Contract for the execution of the Works, belongs to and shall continue to belong to the Purchaser and the Contractor shall not have any rights in the same other than the limited right for its use for the purpose of execution of the Works.

38.04 Intellectual Property Rights in respect of any Plant, Materials, Drawings and Designs, plans, calculations, drawings, documents, know-how and information relating to the Works which are proprietary to the Contractor and/ or its third party licensors ("Contractor's IPR") shall continue to vest with the Contractor and/ or its third party licensors and the Contractor shall grant and/ or procure from its third party licensors, at its own cost, a worldwide, perpetual, royalty free, non-exclusive license (along with the right to sub-license) to use and reproduce such Contractor's IPR for the use, operation, maintenance and repair of the Works.

38.05 If any patent, trademark, trade name, registered design or software is developed by the Contractor or its Subcontractor specifically for the execution of the Works, then all Intellectual Property Rights in respect of such design, trademark, trade name or software shall be the absolute property of the Purchaser and shall not be utilized or retained by the Contractor (or its Subcontractors) for any purpose other than with the prior written consent of the Purchaser.

38.06 If the Contractor uses proprietary software (whether customized or off the shelf) for the purpose of storing or utilizing records in relation to the Works, the Contractor shall obtain at its own expense, the grant of a worldwide, royalty-free, perpetual licence or sublicence (including the right to sublicense) to use such software, in favour of the Purchaser provided that the use of such software under the licence or the sublicense may be restricted to use any such software only for the design, construction, reconstruction, manufacture, installation, completion, reinstatement, extension, repair and operation of the Works or any part thereof.

38.07 If any software is used by the Contractor for the execution of the Works over which the Contractor or a third party holds pre-existing title or other rights, the Contractor shall obtain for the Purchaser, a worldwide, royalty free, perpetual license for the right to use and apply that software (together with any modifications, improvements and developments thereof).

39.00 Commissioning Spares

39.01 Commissioning Spares shall be deemed to be included in the quoted prices.

40.0 Transit Insurance:

40.01 Transit Insurance shall be arranged by the Bidder.

40.02 DAMAGE / LOSS OF CARGO IN TRANSIT: Vendor shall be solely responsible for coordinating with the concerned insurance company for procuring insurance for material and/or Goods, processing claim lodgment and settlement. Notwithstanding the insurance cover, in case of loss / damage to material and/or Goods, in any manner and for any cause whatsoever, Vendor shall cause the damaged cargo to be replaced and delivered to the Purchaser with new material and/or Goods within 30 days of such loss / damage. The Vendor shall be solely responsible for all expenses in relation to the replacement and delivery in such circumstances.

41.0 Acceptance:

41.01 Vendor confirms to have gone through the Policy of BYPL on legal and ethical code required to be followed by vendors encapsulated in the "Vendor Code of Conduct" displayed on the official website of BYPL (www.bsesdelhi.com) also, which shall be treated as a part of the contract/PO/WO.
Vendor undertakes that he shall adhere to the Vendor code of Conduct and also agrees that any violation of the Vendor Code of Conduct shall be treated as breach of the contract/PO/WO.
In event of any such breach, irrespective of whether it causes any loss/damage, Purchaser (BYPL) shall have the right to recover loss/damage from Vendor.
The Contractor/Vendor herby indemnifies and agrees to keep indemnified the Purchaser (BYPL) against any claim/litigation arising out of any violation of Vendor Code of Conduct by the Contractor/Vendor or its officers, agents & representatives etc.

41.02 Acceptance of the CONTRACT implies and includes acceptance of all terms and conditions enumerated in the CONTRACT in the technical specification and drawings made available to Contractor consisting of general conditions, detailed scope of work, detailed technical specification, detailed equipment drawing and complete scope of work.

41.03 Contractor and Company contractual obligation are strictly limited to the terms set out in the CONTRACT. No amendments to the concluded CONTRACT shall be binding unless agreed to in writing for such amendment by both the parties

41.04 We expect your services and supplies are aligned to our Vision, Mission and Values. Please refer to the following link to know about our Vision, Mission and Values; https://www.bsesdelhi.com/web/bypl/about-bses

BSES Yamuna Power Limited

GENERAL CONDITIONS OF CONTRACT (GCC-ETC)

BSES Yamuna Power Limited

GENERAL TERMS & CONDITIONS - ERRECTION, TESTING, & COMISSIONING

1. DEFINITIONS and INTERPRETATION:

The following terms shall have the following meanings:

1.1 "Company": means BSES Yamuna Power Ltd, a company incorporated under the Companies Act 1956 and having its office at BSES Yamuna Power Limited having its office at Shaktikiran Building, Karkardooma, Delhi -110032, which expression shall include its authorized representatives, agents, successors and assigns.

1.2 "Contractor": shall mean the successful Tenderer / vendor to whom the contract has been awarded

1.3 "Rate": The unit rates for the work to be carried out at site shall be as per finalized unit rates through tender. The finalized rates shall be firm for the entire duration of work to be carried out by the Contractor under the work order and are not subject to escalation for any reason whatsoever.

1.4. CONTRACT SPECIFICATION: The terms "CONTRACT Specification" shall mean the Technical specification of the work as agreed by you and description of work as detailed in Annexure-I enclosed herewith and all such particulars mentioned directly/referred to or implied as such in the contract.

1.5 SITE: The terms "Site" shall mean the working location in BYPL area. Under this tender, working location shall be as mentioned elsewhere.

1.6 ENGINEER IN CHARGE: "Engineer In-charge" means the Company's authorized representative for the purpose of carrying out the work.

2. EXAMINATION OF SITE AND LOCAL CONDITIONS:

The contractor is deemed to have visited the site of the work and ascertained therefore all site conditions and information pertaining to his work. The company shall not accept any claim whatsoever arising out of the difficult site/terrain/local conditions, if any.

3. LANGUAGE AND MEASUREMENT:

The CONTRACT issued to the contractor by the company and all correspondence and documents relating to the CONTRACT placed on the Contractor shall be written in English language.

Metric System shall be followed for all dimension, units etc.

4. SCOPE OF WORK:

The scope of work under this contract shall include the turnkey execution on End to End Basis , including manufacturing, inspection & testing, dispatches, loading , unloading ,storage at site, erection & installation, testing of the installation, commissioning ,handing over to the purchaser.

A Separate order will be placed for supply & ETC which inter-alia includes the Scope of Work as mentioned/required for satisfactory operation of the Scheme shall be in Bidder's scope. Bidder(s) must provide goods and services that conform to these specifications for the entire term of the agreement.

All the labour, cranes, tool and tackles, and technical supervision etc. are including in your scope of work. Adequate number of engineers, supervisors and labours shall be posted at site and the list of the same along with certificate of Qualification of technical staff should be submitted by the Contractor to the Engineer In Charge for checking the adequacy immediately (with in seven days) after award of contract.

All loading/unloading, of materials at work-site shall be your responsibility. Involvement of Crane/Hydra/Tractor/Trailer for this type of work shall be in your scope.

The scope shall also include installation, transportation, loading & unloading of free-issued materials if any and transportation of scrap (generated at Site), balance free-issued material, dismantled material from site to BYPL store including loading & unloading and no additional charges shall be paid against these activities.

After completion of E/T/C work , contractor has to obtain BYPL's clearance certificate of the electrical installation.

5. RATES:

The rates finalized for this order shall be firm for the entire duration of work carried out by the Contractor under the order and are not subject to any variation and escalation for any reason whatsoever.

The cost of insurance during loading/unloading of materials/ equipments during its storage and handling/erection at site for installation is included in the contractor's scope and value is included in the unit rates finalized.

6. TAXES AND DUTIES:

Prices are inclusive of all taxes and duties including labour cess and GST as applicable. However, IT as per applicable rate will be deducted from your bills as Tax Deduction at Source (TDS).
The total order value shall remain **FIRM** and shall only be adjusted on account of any variations in Statutory Taxes, duties and Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period.

7. BILL SUBMISSION PROCEDURE:

All bills shall be submitted to the Engineer In charge for certification. Bills shall be complete in all respect including ESI / HR compliance, Quality compliance, HSE compliance, Store compliance, Finance compliance etc. An established procedure is followed at site. Incomplete bills / invoices will not be considered for processing payments.

8. TERMS OF PAYMENT:

Payment shall be made as under:
i) 100% payment shall be due after 30 days of submission of your bills, after installation of material at site, along with work completion certificate at our office. The work completion certificate shall be issued by Engineer-In-Charge by certifying that the work has been completed in full satisfaction.

Company shall make payments of the bills either; By crossed cheque or by electronic transfer directly to Contractor's designated bank account.

9. COMPLETION PERIOD:

The contract shall remain valid for the period of one year. Work shall be completed within 30 days from the date of issue or order / intimation.

The rates of E/T/C shall be valid for the quantity ordered against this tender only.

10. CLEANLINESS:

All debris shall be removed and disposed of at assigned areas on daily basis. Surplus excavated earth shall be disposed of in an approved manner. In short, you shall be fully responsible for keeping the work site clean at all times. In case of non- compliance, company shall get the same done at Contractor's risk and costs.

11. COMMISSIONING & ACCEPTANCE TEST:

After completion of the work, the Contractor shall conduct trial run/ operation in the presence of Engineer In charge. During such trial run the system shall be operated under the supervision of the Contractor. If any rectification/modification required during this period the Contractor shall do all necessary measures.
On satisfactory completion of above, the system shall be deemed to have energized and placed in commercial operation. The Engineer In Charge will issue an acceptance certificate.

12. WORK COMPLETION CERTIFICATION, HANDING OVER:

The work carried out by the Contractor under this order has to be certified by Engineer In-charge for satisfactory completion of work allotted to the contractor with respect to specifications / Field Quality Procedures as per applicable standards. In case of modification/correction to be carried out, contractor shall carry out the said modifications/correction without additional cost. The Contractor shall remain in close contact with Engineer In-Charge at site to report the general findings of the fieldwork during the initial as well as later stage of the work at site.

13. PENALTY AND LIQUIDATED DAMAGES:

14.1 Penalty: A penalty of 2.5% of bill amount shall be levied in each case of non-compliance of safety practices and site cleanliness.

14.2 Liquidated Damages: In the event of any delay in completion of the work beyond the stipulated time given by in order due to reasons solely attributable to the Contractor, the Contractor shall pay to the Company liquidated damages.

If the Contractor failed perform the services within the time period specified in the order, the Company shall, without prejudice to its other remedies under the contract, deduct liquidated damages a sum equivalent to 0.5 % of the basic order value for each week or part there of delay until the actual date of completion up to a maximum deduction of 5% of basic order value. Once the maximum is reached to Company may consider termination of contract without any liabilities to Company.

Engineer In charge should specifically mention the amount of LD levied on the bill of contractor.

14. SAFETY CODE:

The Contractor shall ensure adequate safety precautions at site as required under the law of the land and shall be entirely responsible for the complete safety of their workman as well as other workers at site and premises. The contractor shall not deploy any worker below the age of 18 years.

The contractor shall observe the safety requirements as laid down in the contract and in case of sub-contract (only after written approval of company), it shall be the responsibility of main contractor that all safety requirements are followed by the employees and staff of the sub-contractor.

The contractor employing two hundred employees or more, including contract workers, shall have a safety co-ordinator in order to ensure the implementation of safety requirements of the contract and a contractor with lesser number of employees, including contract workers, shall nominate one of his employees to act as safety co-ordinator who shall liaise with the safety officer on matters relating to safety and his name shall be displayed on the notice board at a prominent place at the work site.

The contractor shall be responsible for non-compliance of the safety measures, implications, injuries, fatalities and compensation arising out of such situations or incidents.

In case of any accident, the contractor shall immediately submit a statement of the same to the owner and the safety officer, containing the details of the accident, any injury or casualities, extent of properly damage and remedial action taken to prevent recurrence and in addition, the contractor shall submit a monthly statement of the accidents to the owner at the end of each month.

15. STATUTORY OBLIGATIONS:

The Contractor shall take all steps as may be necessary to comply with various Acts, Rules, including but not limited to The Child Labour (Prohibition & Regulation) Act, 1986, The Contract Labour (Regulation & Abolition) Act, 1970. The Employees Pension scheme , The Employees Provident Funds and miscellaneous provisions Act, 1952 ,The Employees state Insurance Act,1948,The Equal Remuneration Act, The Industrial Dispute Act,1947, The Maternity Benefit Act , 1961, The Minimum Wages Act, 1948, The payment of Bonus Act ,1965, The Payment of Gratuity Act,1972, The Payment of wages Act, 1936, The Shops & Establishment Act, The Workmen's Compensation Act , 1923, Building and Other Construction Workers (Employment and Regulations) Act 1996, Building and Other Construction Workers (Cess) Act 1996, The Employers Liability Act,1938, Indian Electricity Act, 2003 and Indian Electricity Rules, VAT and Service tax etc., and all other applicable laws as amended and rules framed there under including any statutory approval required from the Central/State Govt. Ministry of Labour. Broadly, the compliance shall be as detailed below, but not limited to:

a) An Electrical license.
b) PF Code No. and all employees to have PF A/c No. under PF every Act, 1952.
c) All employees to have a temporary or permanent ESI Card as per ESI Act.
d) ESI Registration No.
e) Sales Tax registration number, if applicable.
f) PAN No.
g) Work Contract Tax Registration Number/ VAT Registration.
h) Labour License under Contract Labour Act (R & A) Act 1970.
i) Delhi Building and other Construction Worker (Regulation of Employment and Conditions of Services) Rules, 2002(B.O.C.W.)

(Bidder responsible for execution of the job should obtain a copy of Labour License before start of the work by the contractor.)

The Contractor must follow:

a) Third party Insurance Policy before start of work.
b) To follow Minimum Wages Act prevailing in the state.
c) The Salary/wages to all deployed manpower is to be distributed through ECS only into the bank accounts of all individuals and not later than 7th of succeeding month. In case of unavoidable circumstances the payment may be made through crossed cheques in the name of the individual and information of all such cases need to be submitted to HR(CMC).
d) To maintain Wage- cum - Attendance Register.
e) To maintain First Aid Box at Site.
f) Latest P.F. and E.S.I. challans pertaining to the period in which work was undertaken along with a certificate mentioning that P.F. and E.S.I. applicable to all the employees has been

deducted and deposited with the Authorities within the time limits specified under the respective Acts.

g) Workman Compensation Policy. {If applicable}.
h) Labour license before start of work. {If applicable}.

Before commencing the work it would be mandatory for the Contractor to furnish the Company the permanent PF code no and ESI of the employees.

16. <u>WORKMAN COMPENSATION</u>:

The Contactor shall take insurance policy under the Workman Compensation Act to cover such workers who are not covered under ESI and PF by the Contractor however engaged to undertake the jobs covered under this order and a copy of this insurance policy will be given to Company for reference and records. This insurance policy shall be kept valid at all times. In case there are no worker involve other than those who are covered under ESI and PF by the Contractor, the Contractor shall certify for the same.

The contractor shall keep the company indemnified at all times, against all claims of compensation under the provision of Workmen Compensation Act 1923 and as amended from time to time or any compensation payable under any other law for the time being workman engaged by the contractor/sub-contractor/sub-agent in carrying out the job involved under this work order and against costs and expenses, if any, incurred by the company in connection therewith and without prejudice to make any recovery.

The company shall be entitled to deduct from any money due to or to become due to the Contractor, moneys paid or payable by way of compensation as aforesaid or cost or expenses in connection with any claims thereto and the Contractor shall abide by the decision of the Company as to the sum payable by the Contractor under the provisions of this clause.

17. <u>STAFF AND WORKMAN:</u>

(I) It shall be responsibility of contractor:

(a) To obtain Contract Labour License from the concerned authorities and maintain proper liaison with them. Necessary Forms for obtaining Labour License would be issued by the company. However you will bear all expenses for obtaining Labour license and registration in PF Department for your scope of work. You will deposit PF of your staff/laborer each month and all related documents should be furnished to us.
(b) To obtain workman insurance cover against deployment of workers etc.

(II) To maintain, proper records relating to workmen employed, in the form of various Registers, namely.

(a) Register of workmen.
(b) Register of muster roll.
(c) Register of overtime.
(d) Register of wages.
(e) Any other register as per latest amendment Labour Act.

(III) To disburse monthly wages to your workers/ supervisors in time and in the presence of Company representatives or as directed by the Labour authorities.

(IV) To maintain proper liaison with the Project authorities, local police and all other government and local bodies.

(V) To pay your workmen at least not less than the minimum prescribed wages as per state/Central Labour laws as may be, applicable. The contractor shall, be responsible for compliance of all the

provisions of minimum Wages Act, PF, ESIC Act workmen Compensation Act and Contract Labour Regulation & Abolition Act the rules made there under. In case of non- Compliance of the statutory requirements. The company would take necessary action at the risk and cost of the Contractor.

(VI) To employ required number of skilled/semi-skilled and unskilled workmen as per site requirement to complete the entire project as per schedule. To provide safety shoes, safety helmets, safety belts, gloves etc. to your worker/staff as per requirement during erection work.

(VII) To employ necessary engineering and supervisory staff for completion of the Project in time. While day-to-day management of the site and supervision of the works shall be the responsibility of your Engineer - In charge, he will report to the our Engineer in charge to assist him to discharge the overall responsibility of the execution of the project.

18. THIRD PARTY INSURANCE:

Before commencing the execution of the work the Bidder shall take third party insurance policy to insure against any damage or loss or injury which may occur to any property / public property or to any person or any employee or representative of any outside Agency/ the company engaged or not engaged for the work of the company, by or arising out of the execution of the work or temporary work or in carrying out of this Agreement. For third party insurance policies, the Bidder shall be responsible for settlement of claims with the underwriters without any liability on the purchaser / owner and will arrange replacements / rectification expeditiously without a waiting settlement by insurance claim at Bidder's own cost.

19. ENVIRONMENTAL, HEALTH & SAFETY PLAN:

Contractor will make ensure that the Environment, Health & Safety (EHS) requirements are clearly understood and faithfully implemented at all levels at site as per instruction of Company. Contractors must comply with these requirements:

a) Comply with all of the elements of the EHS Plan and any regulations applicable to the work.
b) Comply with the procedures provided in the interests of Environment, Health and Safety.
c) Ensure that all of their employees designated to work are properly trained and competent.
d) Ensure that all plant and equipment they bring on to site has been inspected and serviced in accordance with legal requirement and manufacturer's or suppliers' instructions.
e) Make arrangements to ensure that all employees designated to work on or visit the site present themselves for site induction prior to commencement of work.
f) Provide details of any hazardous substances to be brought onsite.
g) Ensure that a responsible person accompanies any of their visitors to site.

All contractor's staff are accountable for the following:

1. Use the correct tools and equipment for the job and use safety equipment and protective clothing supplied, e.g. helmets, goggles, ear protection, etc. as instructed.
2. Keep tools in good condition.
3. Report to the Supervisor any unsafe or unhealthy condition or any defects in plant or equipment.
4. Develop a concern for safety for themselves and for others.
5. Prohibit horseplay.
6. Not to operate any item of plant unless they have been specifically trained and are authorized to do so.

20. TEST CERTIFICATE & QUALITY ASSURANCE:

The Contractor shall procure all equipment from genuine sources as approved by the Company and as per Company specifications. The Contractor shall submit all the test certificates and joint inspection reports related to major equipment wherever applicable. The contractor shall ensure for the strict compliance to the specifications and Field Quality Procedures issued by company / Engineer in-charge.

BSES Yamuna Power Limited

21. SUB-CONTRACTING / SUBLETTING:

CONTRACTOR shall not assign or transfer the whole or any part of this Work Order or any other benefits accruing there from nor shall it subcontract / sublet the whole or any part of the Works without the prior written consent of COMPANY.

In the event the contractor assigns this work order, contractor's assignees shall be bound by the terms and conditions of this work order and shall , if deemed necessary by COMPANY at the time of such assignment, undertake in writing to be so bound by this Work Order.

Notwithstanding the subletting / subcontracting of any portion of the works, contractor shall remain wholly responsible for the carrying out, completion and satisfactory execution of Works in all respects in accordance with this Work Order, specification, approved drawings and data sheets.

22. INDEMNITY:

Contractor shall indemnify and save harmless COMPANY against and from any and all liabilities, claims, damages, losses or expenses arising due to or resulting from:

a) Any breach non-observance or non-performance by contractor or its employees or agents of any of the provisions of this Work Order.
b) Any act or omission of contractor or its employees or agents.
c) Any negligence or breach of duty on the part of contractor, its employees or agents including any wrongful use by it or them of any property or goods belonging to or by COMPANY.

Contractor shall at all times indemnify COMPANY against all liabilities to other persons, including he employees or agents of COMPANY or contractor for bodily injury, damage to property or other loss which may arise out of or in consequence of the execution or completion of Works and against all costs charges and expenses that may be occasioned to COMPANY by the claims of such person.

23. EVENTS OF DEFAULTS:

COMPANY may, without prejudice to any of its other rights or remedies under the Work Order or in law, terminate the whole or any part of this Work Order by giving written notice to the Contractor, if in the opinion of COMPANY, contractor has neglected to proceed with the works with due diligence or commits a breach of any of the provisions of this work order including but not limited to any of the following cases.

a) Failing to complete execution of work within the terms specified in this work order.
b) Failing to complete works in accordance with the approved schedule of works.
c) Failing to meet requirements of specifications, drawings, and designs as approved by COMPANY.
d) Failing to comply with any reasonable instructions or orders issued by COMPANY in connection with the works.
e) Failing to comply with any of the terms or conditions of this work order.

In the event COMPANY terminates this work order, in whole or in part, on the occurrence of any event of default, COMPANY reserves the right to engage any other subcontractor or agency to complete the work or any part thereof, and in addition to any other right COMPANY may have under this work order or in law including without limitation the right to penalize for delay under clause 15.0 of this work order, the

contractor shall be liable to COMPANY for any additional costs that may be incurred by COMPANY for the execution of the Work.

24. RISK & COST:

If the Contractor fails to execute the work as per specification / as per the direction of Engineer's In-charge within the scheduled period and even after the extended period, the contract shall got cancel and company reserves the right to get the work executed from any other source at the Risk & Cost of the Contractor. The Extra Expenditure so incurred shall be debited to the Contractor.

25. ARBITRATION:

To the best of their ability, the parties hereto shall endeavor to resolve amicably between themselves all disputes arising in connection with this LOA. If the same remain unresolved within thirty (30) days of the matter being raised by either party, either party may refer the dispute for settlement by arbitration. The arbitration to be undertaken by two arbitrators, one each to be appointed by either party. The arbitrators appointed by both the parties shall mutually nominate a person to act as presiding arbitrator before entering upon the reference in the event of a difference between the two arbitrators and the award of the said presiding arbitrator in such a contingency shall be conducted in accordance with this provisions of the Indian Arbitration & Conciliation Act, 1996 and the venue of such arbitration shall be in the city of New Delhi only.

26. FORCE MAJEURE:

27.1 General:

An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control, of the Party affected, but only if and to the extent that:

(i) Such event or circumstance, despite the exercise of reasonable diligence, could not have been prevented, avoided or reasonably foreseen by such Party;

(ii) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions, due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected parties ability to perform its obligations under this Contract and to mitigate the consequences thereof. For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.

(iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract; and

(iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause

27.2 Specific Events of Force Majeure:

Subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements: The following events and circumstances:

(i) Effect of any natural element or other acts of God, including but not limited to storm, flood, earthquake, lightning, cyclone, landslides or other natural disasters, and

(ii) Explosions or fires

(iii) Declaration of the Site as war zone

Any order, regulation, directive, requirement from any Governmental, legislative, executive or judicial authority.

27.3 Notice of Events of Force Majeure:

If a force majeure event prevents a party from performing any obligations under the Contract in part or in full, that party shall:

(i) Immediately notify the other party in writing of the force majeure events within 2 working days of the occurrence of the force majeure event

(ii) Be entitled to suspend performance of the obligation under the Contract which is affected by force majeure event for the duration of the force majeure event

(iii) Use all reasonable efforts to resume full performance of the obligation as soon as practicable

(iv) Keep the other party informed of all such efforts to resume full performance of the obligation on a regular basis.

(v) Provide prompt notice of the resumption of full performance or obligation to the other party.

27.4 Mitigation of events of force majeure:

The Contractor shall:

(i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure, including applying other ways in which to perform the Contract;

(ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and

(iii) Keep the Company informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.

27.5 Burden of proof:
In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Contract. The burden of proof as to whether or not a force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.

27.6 Terminations for certain events of force majeure:

If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 1 (one) month during the Term of the Contract the Contract shall be terminated at the discretion of the Company and neither Party shall be liable to the other for any consequences arising on account of such termination.

27. <u>SECRECY CLAUSE</u>:

The technical information, drawing and other related documents forming part of work order and the information obtained during the course of investigation under this work order shall be the Company's executive property and shall not be used for any other purpose except for the execution of the work order. The technical information drawing, records and other document shall not be copied, transferred, or divulged and/ or disclosed to third party in full/part, not misused in any form whatsoever except to the extent for the execution of this work order.
This technical information, drawing and other related documents shall be returned to the Company with all approved copies and duplicates including drawing/plans as are prepared by the Bidder during the executions of this work order, if any, immediately after they have been used for agreed purpose.
In the event of any breach of this provision, the Bidder shall indemnify the Company against any loss, cost or damage or claim by any party in respect of such breach.

28. TERMINATION:

During the course of the execution, if at any time BSES observe and form an opinion that the work under the order is not being performed in accordance with the terms of this Agreement, BSES reserves its right to cancel this Agreement giving 15 days notice mentioning the reason for the termination of the agreement and BSES will recover all damages including losses occurred due to loss of time from Contractor.

29. QUALITY:

Contractor shall ensure that strict quality is maintained and execution of works under this Work Order and Works are executed in conformity with the Specification.

All tools, tackles, instruments and other equipments used in the execution of the Works shall be duly calibrated as required and Contractor shall maintain proper records of such tools, tackles, instruments and / or equipment.

30. INSURANCE POLICY FOR LIFE COVER:

Before commencing the execution of the work the CONTRACTOR shall take Life insurance policy for the staff engaged by him for this work to insure against any loss of life which may occur during the contract for the work of the COMPANY.
The policy shall have coverage of Rs. 10 Lacs (Table C- Death + Permanent Total Disability + Partial permanent Disability due to external accidents). The premium amount for such life cover policy shall be in contractor scope. The policy document shall be submitted before commencement of the work by the contractor.

31. ACCEPTANCE:

Acceptance of this work order implies and includes acceptance of all terms and conditions enumerated in this work order in the technical specification and drawings made available to you consisting of general conditions, detailed scope of work, detailed technical specification & detailed equipment, drawing. Complete scope of work and the Bidder's and Company's contractual obligation are strictly limited to the terms set out in the work order. No amendments to the concluded work order shall be binding unless agreed to in writing for such amendment by both the parties.
However, during the course of the execution of the work order, if at any time the Company's representative observe and form an opinion that the work under the work order is not being performed in accordance with the terms of this work order, the company reserves its right to cancel this work order forthwith without assigning any reason and the Company will recover all damages including losses occurred due to loss of time from the Bidder.
We request you to please sign the duplicate copy of this work order as a token of your acceptance and return to us.

BSES Yamuna Power Limited

APPENDIX II

FORMAT OF PERFORMANCE BANK GUARANTEE
(To be executed on a Non-Judicial Stamp Paper of appropriate value)

This Guarantee made at _____ this [___] day of [_____] 20XX

1. WHEREAS M/s BSES Yamuna Power Limited, a Company incorporated under the provisions of Companies Act, 1956 having its Registered Office at Shaktikiran Building, Karkardooma, Delhi 110032, India hereinafter referred to as the " Owner ", (which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns).

2. AND WHEREAS the Owner has entered into a contract for _____(Please specify the nature of contract here) vide Contract No. _____dated _____(hereinafter referred to as the "Contract") with M/s._____, (hereinafter referred to as "the Supplier", which expression shall unless repugnant to the context or meaning thereof be deemed to mean and include each of their respective successors and assigns) for providing services on the terms and conditions as more particularly detailed therein.

3. AND WHEREAS as per clause ____of conditions of Contract, the Suppliers are obliged to provide to the Owners an unconditional bank guarantee for an amount equivalent to ten percent (10%) of the total Contract Value for the timely completion and faithful and successful execution of the Contract from **[_____]** *pl. specify the name of Bank)* having its head/registered office at **[_____]** through its branch in _____*(pl. specify the name of Branch through which B.G is issued)* hereinafter referred to as "the Bank", (which expression shall unless it be repugnant to the context or meaning thereof be deemed to include its successors and permitted assigns).

4. NOW THEREFORE, in consideration inter alia of the Owner granting the Suppliers the Contract, the Bank hereby unconditionally and irrevocably guarantees and undertakes, on a written demand, to immediately pay to the Owner any amount so demanded (by way of one or more claims) not exceeding in the aggregate [Rs.].....*(in words)* without any demur, reservation, contest or protest and/or without reference to the Supplier and without the Owner needing to provide or show to the Bank ,grounds or reasons or give any justification for such demand for the sum/s demanded.

5. The decision of the Owner to invoke this Guarantee and as to whether the Supplier has not performed its obligations under the Contract shall be binding on the Bank. The Bank acknowledges that any such demand by the Owner of the amounts payable by the Bank to the Owner shall be final, binding and conclusive evidence in respect of the amounts payable by the Supplier to the Owner. Any such demand made by the Owner on the Bank shall be conclusive and binding, notwithstanding any difference between the Owner and the Supplier or any dispute raised, invoked, threatened or pending before any court, tribunal, arbitrator or any other authority.

6. The Bank also agrees that the Owner at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor without proceeding against the Suppliers notwithstanding any other security or other guarantee that the Owner may have in relation to the Supplier's liabilities.

7. The Bank hereby waives the necessity for the Owner first demanding the aforesaid amounts or any part thereof from the Suppliers before making payment to the Owner and further also waives any right the Bank may have of first requiring the Owner to use its legal remedies against the Suppliers, before presenting any written demand to the Bank for payment under this Guarantee.

8. The Bank's obligations under this Guarantee shall not be reduced by reason of any partial performance of the Contract. The Bank's obligations shall not be reduced by any failure by the Owner to timely pay or perform any of its obligations under the Contract.

9. The Bank further unconditionally and unequivocally agrees with the Owner that the Owner shall be at liberty, without the Bank's consent and without affecting in any manner its rights and the Bank's obligation under this Guarantee, from time to time, to:

(i) vary and/or modify any of the terms and conditions of the Contract;

(ii) Forebear or enforce any of the rights exercisable by the Owner against the Suppliers under the terms and conditions of the Contract; or

(iii) Extend and/or postpone the time for performance of the obligations of the Suppliers under the Contract;

and the Bank shall not be relieved from its liability by reason of any such act or omission on the part of the Owner or any indulgence shown by the Owner to the Suppliers or any other reason whatsoever which under the law relating to sureties would, but for this provision, have the effect of relieving the Bank of its obligations under this Guarantee.

10. This Guarantee shall be a continuing bank guarantee and shall not be discharged by any change in the constitution or composition of the Suppliers, and this Guarantee shall not be affected or discharged by the liquidation, winding-up, bankruptcy, reorganisation, dissolution or insolvency of the Suppliers or any of them or any other circumstances whatsoever.

11. This Guarantee shall be in addition to and not in substitution or in derogation of any other security held by the Owner to secure the performance of the obligations of the Suppliers under the Contract.

12. NOTWITHSTANDING anything herein above contained, the liability of the BANK under this Guarantee shall be restricted to _____*(insert an amount equal to ten percent (10%) of the Contract Value)* and this Guarantee shall be valid and enforceable and expire on _____*(pl. specify date)* or unless a suit or action to enforce a claim under this Guarantee is filed against the Bank on or before the date of expiry.

BSES Yamuna Power Limited

13. On termination of this Guarantee, all rights under the said Guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities hereunder.

14. The Bank undertakes not to revoke this Guarantee during its validity except with the prior written consent of the Owner and agrees that any change in the constitution of the Bank or the Suppliers shall not discharge our liability hereunder.

15. Owner may assign this Guarantee to any Person or body whether natural, incorporated or otherwise under intimation to the Bank. The Bank shall be discharged of its obligations hereunder by performance in accordance with the terms hereof to such assignee without verifying the validity / legality / enforceability of the assignment.

16. This Guarantee shall be governed by the laws of India. Any suit, action, or other proceeding arising out of, connected with, or related to this Guarantee or the subject matter hereof shall be subject to the exclusive jurisdiction of the courts of **Delhi,** India.

Dated this …… day of …….. …20XX at …….

(Signature)

.....
(Name)
.....
(Designation with Bank Stamp)
Attorney as per
Power of Attorney No.....
Date.....

BSES Yamuna Power Limited

BYPL BANK DETAIL WITH IFSC CODE:

1. Name of the Bank:	Axis Bank Limited
2. Branch Name & Full Address:	C-58, Basement & Ground Floor, Preet Vihar, Main Vikas Marg, New Delhi 110092
3. Branch Code:	055
4. Bank Account No:	911020005246583
5. IFSC Code:	UTIB0000055

BSES Yamuna Power Limited

FORMAT OF WARRANTY/GUARANTEE CERTIFICATE

BSES YAMUNA POWER LIMITED Shaktikiran Building, Karkardooma, Delhi -110032.

Ref. Purchase Order No. :

Dear Sir,

We hereby confirm that the.....dispatched to BSES YAMUNA POWER LTD vide invoice no..... DT.....is exactly of the same nature and description as per above mentioned Purchase Order.

We further confirm that we will replace/repair our.....free of cost If found any manufacturing defect during.....months from the date of dispatch of material or.....months from the data of commissioning whichever is earlier.

Vendors Name & Signature

UNDERTAKING GST

The Vendor shall give an undertaking in the following words on each invoice in the absence of which tax payment as on the Vendor's invoice may be withheld.

"The tax component as mentioned in the invoice shall be deposited with GST Department as per law by way of actual payment or by way of legal set off as per law. The turnover billed shall be duly declared in my GST returns a copy of which shall be filed with the Purchaser. Should the input tax credit to the Purchaser be denied by way of any lapse on the part of the Vendor, the same shall be paid on demand and in any case the Purchaser is authorized to deduct the tax equivalent amount from the amount payable to the Vendor"

BSES Yamuna Power Limited

COMMERCIAL TERMS AND CONDITIONS SUMMARY -SUPPLY

Sl No	Item Description	AS PER BYPL	BIDDER'S CONFIRMATION
1	Validity	120 days from the date of submission of bid	
2	Price basis	a) **"Firm"**, FOR Delhi store basis. Prices shall be inclusive of all taxes & duties, freight upto Delhi stores. b) Unloading at stores shall be in vendor's scope c) Transit insurance in Bidders scope	
3	Payment terms	As per NIT	
4	Delivery schedule	GTP/Drawings/QAP/etc to be submitted within 15 days to the concern official in BYPL for Transmittal approval. BYPL shall approve/ provide comments on the submitted drawings within 15 days of first submission. Delivery shall be completed within 3 Months from the LOI/PO date.	
5	Defect Liability period	60 months after commissioning or 66 months from the last date of dispatch, whichever is earlier	
6	Penalty for delay	1% per week of delay of the basic (ex-works) price of undelivered units or part thereof subject to maximum of 10% of total basic (ex-works) price of undelivered units	
7	Performance Bank Guarantee	10% of total PO value valid for 24 months after commissioning or 30 months from the last date of dispatch, whichever is earlier plus 3 months towards claim period	

BSES Yamuna Power Limited

COMMERCIAL TERMS AND CONDITIONS SUMMARY -I/T/C

Sl No	Item Description	AS PER BYPL	BIDDER'S CONFIRMATION
1	Validity	120 days from the due date of submission	
2	Price basis	a) Firm, basis. Prices shall be inclusive of all taxes & duties b) GST shall be paid extra at actual	
3	Payment terms	100% payment will be due after 30 days of submission of bills along with work completion certificate.	
4	Validity of Contract/Schedule of completion	Valid for one year. Work shall be completed within 30 days from the date of issue or order / intimation	
5	Penalty for delay	0.5 % of the basic order value for each week or part there of delay until the actual date of completion up to a maximum deduction of 5% of basic order value	

BSES Yamuna Power Limited

VOLUME – II

PRICE BID FORMAT

BSES Yamuna Power Limited

GRAND SUMMARY

ALL PRICES IN INR (₹)

Item Name/Work	Quantity	Supply Price Landed	ITC price Landed	Total Cost (C=A+B)	Total Cost (D=C*Q)
	(Q)	(A)	(B)		
SUPPLY, ERECTION, TESTING, & COMMISSIONING OF 11KV SWITCHBOARD ALONG WITH ALLIED EQUIPMENTS, ACCESSORIES AND WORKS ON TURNKEY BASIS AT SHASTRI PARK GRID (EAST) IN BYPL, DELHI.	1 Lot				

The Un-priced bid should be marked as **"Quoted"** and to be submitted with Part – A

We declare that the following are our quoted prices in INR for the entire switchboard.

Date: Bidders Name:

Place: Bidders Address:

Signature: …… Designation: ……..

Printed Name: …… Common Seal: …….

BSES Yamuna Power Limited

PRICE FORMAT – SUPPLY (A) (Kindly refer detail SCOPE OF SUPPLY attached as Volume III for Indicative Description of Goods/BOM, BOQ)

ALL PRICES IN INR (₹)

S No.	DESCRIPTION OF GOODS	UOM	QTY	UNIT BASIC PRICE INCL FREIGHT(₹)	UNIT GST & CESS AS APPLICABLE (CGST & SGST/UTGST or IGST) (₹)		UNIT LANDED COST(₹)	TOTAL LANDED COST (₹)
			(A)	**(B)**	**(C)**		**(D = B+C)**	**(E = DXA)**
	11 kV Switchboard							
1	Incomer panel (with Line PT)	Nos	2					
2	Adaptor for Incomer Panel	Nos	2					
3	Bus Coupler Panel	Nos	1					
4	Bus Riser Panel with Bus PT	Nos	1					
5	Bus PT Panel	Nos	1					
6	Capacitor Panel	Nos	2					
7	Outgoing Panel	Nos	14					
8	Station Transformer Panel	Nos	2					
9	Earthing Truck for Bus bar Side Earthing	Nos	2					
10	Earthing Truck for Cable Side Earthing	Nos	2					
11	Ethernet Switches at 11 kV Switchgear	Nos	2					
12	Optical Fiber Cable	LOT	1					
13	SCADA Works	LOT	1					
	Cable and Associated Items							
12	Control Cables with proper ferruling and tagging along with glands and lugs	LOT	1					
13	Auxiliary Power Cable with proper ferruling and tagging along with glands and lugs	LOT	1					
14	Complete Earthing	LOT	1					
15	Insulated Floor Coating	LOT	1					
16	Tools and Accessories	LOT	1					
17	Recommended and Mandatory Spares	LOT	1					
GRAND TOTAL LANDED COST								
In words								
Note: All quantities mentioned above are estimated quantities. Actual quantities may vary as per actual site requirement								

BSES Yamuna Power Limited

PRICE FORMAT – E/T/C (B) (Kindly refer detail SCOPE OF WORK attached as Volume III for Indicative Description of Services/BOM, BOQ)

S No.	DESCRIPTION OF SERVICES	UOM	QTY	UNIT BASIC PRICE (₹)	UNIT GST & CESS AS APPLICABLE (CGST & SGST/UTGST or IGST) (₹)		UNIT LANDED COST(₹)	TOTAL LANDED COST (₹)
			(A)	(B)	(C)		(D = B+C)	(E = DXA)
	11 kV Switchboard							
1	Incomer panel (with Line PT)	Nos	2					
2	Adaptor for Incomer Panel	Nos	2					
3	Bus Coupler Panel	Nos	1					
4	Bus Riser Panel with Bus PT	Nos	1					
5	Bus PT Panel	Nos	1					
6	Capacitor Panel	Nos	2					
7	Outgoing Panel	Nos	14					
8	Station Transformer Panel	Nos	2					
9	Earthing Truck for Bus bar Side Earthing	Nos	2					
10	Earthing Truck for Cable Side Earthing	Nos	2					
11	Ethernet Switches at 11 kV Switchgear	Nos	2					
12	Optical Fiber Cable	LOT	1					
13	SCADA Works	LOT	1					
	Cable and Associated Items							
12	Control Cables with proper ferruling and tagging along with glands and lugs	LOT	1					
13	Auxiliary Power Cable with proper ferruling and tagging along with glands and lugs	LOT	1					
14	Complete Earthing	LOT	1					
15	Insulated Floor Coating	LOT	1					
16	Erection, Testing and Commissioning of all items specified in "Free Issue Items"	LOT	1					
17	Disconnection and Reconnection of Power Cables with 11 kV Switchgear	LOT	1					
18	Dismantling of Existing 11 KV Switchgears including Control Cables	LOT	1					
19	Painting of Feeder names (SCADA code, Asset Code, etc)	LOT	1					
20	Training on commissioning, operations and maintenance of 11KV Switchgear	Days	2					
21	Training on application, programming, testing and commissioning of Numerical Relays	Days	2					
GRAND TOTAL LANDED COST								
In words								
Note: All quantities mentioned above are estimated quantities. Actual quantities may vary as per actual site requirement								

BSES Yamuna Power Limited

VOLUME – III

TECHNICAL SPECIFICATIONS
FOR
SUPPLY, ERECTION, TESTING, & COMMISSIONING OF 11KV SWITCHBOARD ALONG WITH ALLIED EQUIPMENTS, ACCESSORIES AND WORKS ON TURNKEY BASIS AT SHASTRI PARK GRID (EAST) IN BYPL, DELHI.

SCOPE FOR SITC OF 11 kV SWITCHBOARD

AT

SHASTRI PARK EAST GRID SUBSTATION

		Revision	0
		Date	29/10/2021
		Pages	Page 1 of 13
Prepared by	Abhishek Harsh	**CES**	Abhishek Harsh 3267d7c3-82b5-46cb-b5a6-867ee7820a34
Reviewed by	Srinivas Gopu	**CES**	5d32525e-ed3a-4f41-b1c7-b8a5e77d1519
	Manoj Vidhyarthi	**P&E**	Manoj Vidyarthi 482e4648-110f-4dbf-9528-b52a523b0db5
Approved by	Gaurav Sharma	**CES**	23dc2de2-95de-4472-99a7-dea873f472b6
	Pramod Kumar	**P&E**	Pramod J Kumar 8bbc64b3-a9d3-4fce-a14e-527ef4e0034f

Table of Content

1 INTENT

a. This document defines the scope for turnkey execution of 11 KV Switchgear at Shastri Park East Grid S/S.

b. This document shall be read in conjunction with all technical documents enclosed in tender. In event of any contradiction between tender documents, the most stringent one shall govern.

2 SITE DETAILS

a. Shastri Park East Grid Substation is situated near Jag Pravesh Chandra Hospital Delhi 110053

b. Latitude and Longitude of the same is 28°40'37.5"N 77°15'30.0"E.

3 BIDDER'S SCOPE

a. Bidder's Scope includes design, engineering, manufacture, shop testing, inspection, packing, dispatch, supply, loading, unloading, storage at site, assembly, erection, complete pre-commissioning checks, testing & commissioning at site, obtaining statutory clearance & certification from Electrical Inspector and handing over of complete substation covered under scope of this document to BSES Yamuna Power Ltd.

b. Any supply/work details not explicitly mentioned in this scope but mandatory for successful commercial operation of the substation shall be deemed to be included in bidder's scope

c. Bidder shall depute its representative at site to assess the condition of existing infrastructure in detail prior to submission of bid.

3.1 DESIGN & ENGINEERING

a. Detailed design and engineering of complete project as per tender requirements shall be in bidder's scope.

b. General guidelines for design are given below.

3.1.1 CODES AND STANDARDS

a. The bidder shall comply with latest Indian/International standard and CEA regulations.

b. Refer respective equipment specification for applicable standards.

3.1.2 SERVICE CONDITIONS

S. No	Head	Particulars
3.1.2.1	Average grade atmosphere	Heavily polluted, Dry
3.1.2.2	Maximum altitude above sea level	1000M
3.1.2.3	Ambient air temperature	Highest 50Deg C,Average 40Deg C
3.1.2.4	Minimum ambient air temperature	0 Deg C
3.1.2.5	Relative Humidity	100%
3.1.2.6	Rainfall	750mm concentrated in four months
3.1.2.7	Seismic Condition	Zone IV
3.1.2.8	Max. Relative Humidity	100%

3.1.3 SYSTEM PARAMETERS

S. No	Head	Parameters		
3.1.3.1	Nominal Voltage kV	66	33	11
3.1.3.2	Rated voltage kV	72.5	36	12
3.1.3.3	Power Frequency (kV rms) with stand voltage	140	70	28
3.1.3.4	Basic Insulation Level KVp	325	170	75
3.1.3.5	Rated Frequency Hz	50±5%	50±5%	50±5%
3.1.3.6	System Neutral Earthing	Solidly Grounded	Solidly Grounded	Solidly Grounded

3.2 SCOPE OF SUPPLY

S No.	Items	Remarks	UOM	Quantity
3.2.1	11 kV Switchboard			
3.2.1.1	Incomer panel (with Line PT)		Nos	2

S No.	Items	Remarks	UOM	Quantity
3.2.1.2	Adaptor for Incomer Panel	For Connection of Incoming Cables	Nos	2
3.2.1.3	Bus Coupler Panel		Nos	1
3.2.1.4	Bus Riser Panel with Bus PT		Nos	1
3.2.1.5	Bus PT Panel		Nos	1
3.2.1.6	Capacitor Panel		Nos	2
3.2.1.7	Outgoing Panel		Nos	14
3.2.1.8	Station Transformer Panel		Nos	2
3.2.1.9	Earthing Truck for Bus bar Side Earthing		Nos	2
3.2.1.10	Earthing Truck for Cable Side Earthing for Panel of Each Size		Nos	2
3.2.2	Ethernet Switches at 11 kV Switchgear		Nos	2
3.2.3	Optical Fiber Cable	For Communication between Relay and Ethernet Switch	LOT	1
3.2.4	SCADA Works	As per Specification	LOT	1
3.2.5	Cable and Associated Items	For Items specified in "Scope of Supply"		
3.2.5.1	Control Cables with proper ferruling and tagging along with glands and lugs		LOT	1
3.2.5.2	Auxiliary Power Cable with proper ferruling and tagging along with glands and lugs		LOT	1
3.2.6	Earthing	(a) Earthing for Items specified in “Scope of Supply” with 50x6 GI flat (b) Two earthing per equipment shall be considered (c) Connection of GI Flat with existing earth mesh shall be in bidder's scope	LOT	1
3.2.7	Insulated Floor Coating	For 11 KV Switchboard Room	LOT	1
3.2.8	Tools and Accessories	For Items specified in "Scope of Supply"	LOT	1
3.2.9	Recommended and Mandatory Spares	As per Specification of Supplied items	LOT	1

3.3 SCOPE OF WORK

Bidder's scope of work is specified below. Refer respective equipment/work specifications for detailed scope of work.

S. No	Items	Remarks	Unit	Quantity
3.3.1	Erection, Testing and Commissioning of all items specified in "Scope of Supply"		LOT	1
3.3.2	Erection, Testing and Commissioning of all items specified in "Free Issue Items"		LOT	1
3.3.3	Disconnection and Reconnection of Power Cables with 11 kV Switchgear	a. Disconnection of All Power Cables b. Reconnection of Incomer, Station Transformer and Capacitor Bank Cable	LOT	1
3.3.4	Dismantling of Existing 11 KV Switchgears including Control Cables		LOT	1
3.3.5	Training on commissioning, operations and maintenance of 11KV Switchgear	One day classroom training at BYPL Training Centre and one day onsite training. Training shall be provided by Domain experts only	Days	2
3.3.6	Training on application, programming, testing and commissioning of Numerical Relays	One day classroom training at BYPL Training Centre and one day onsite training. Training shall be provided by Domain experts only	Days	2
3.3.7	Painting of Feeder names (SCADA code, Asset Code, etc)	It Includes Supply Part	LOT	1

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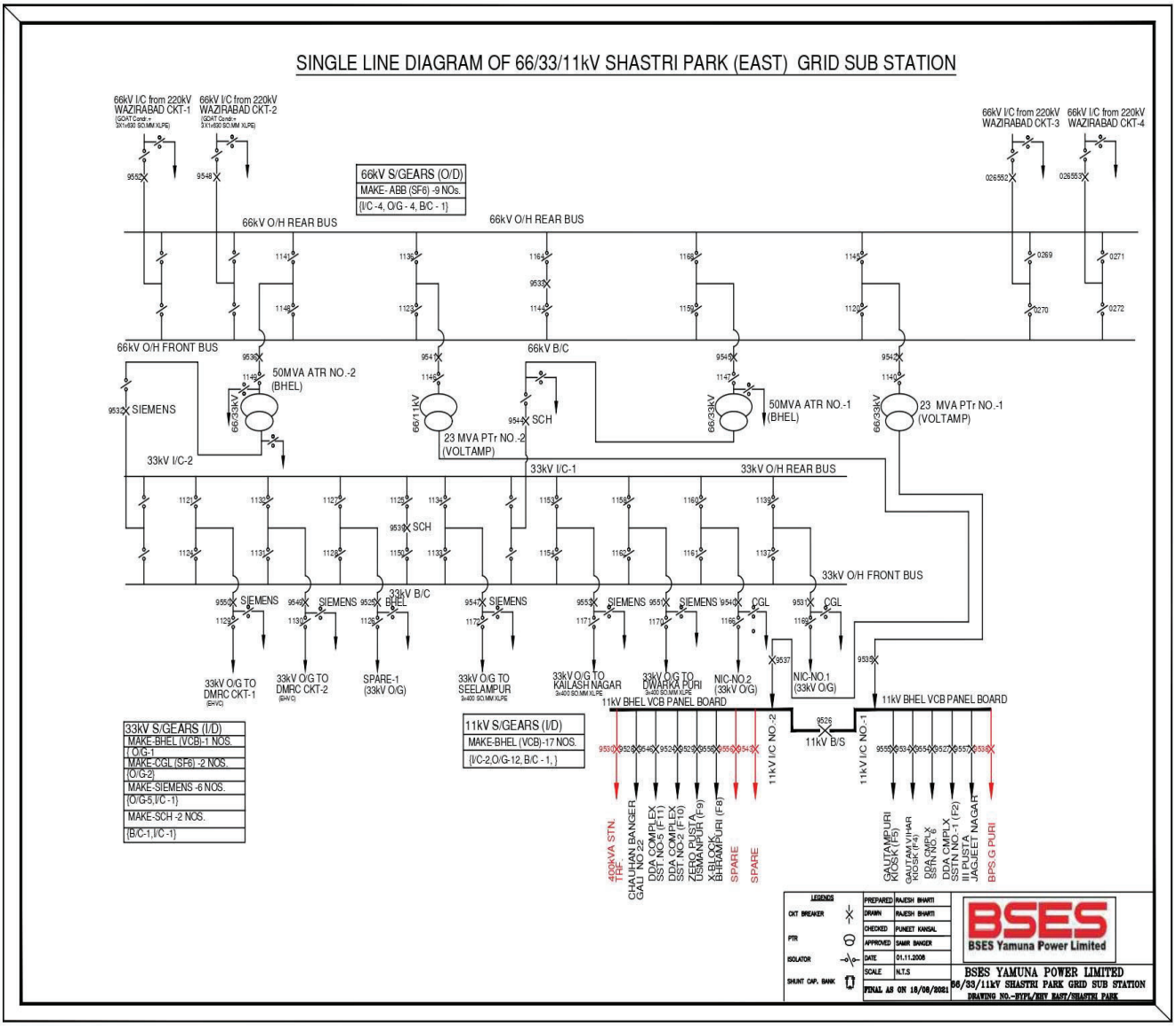
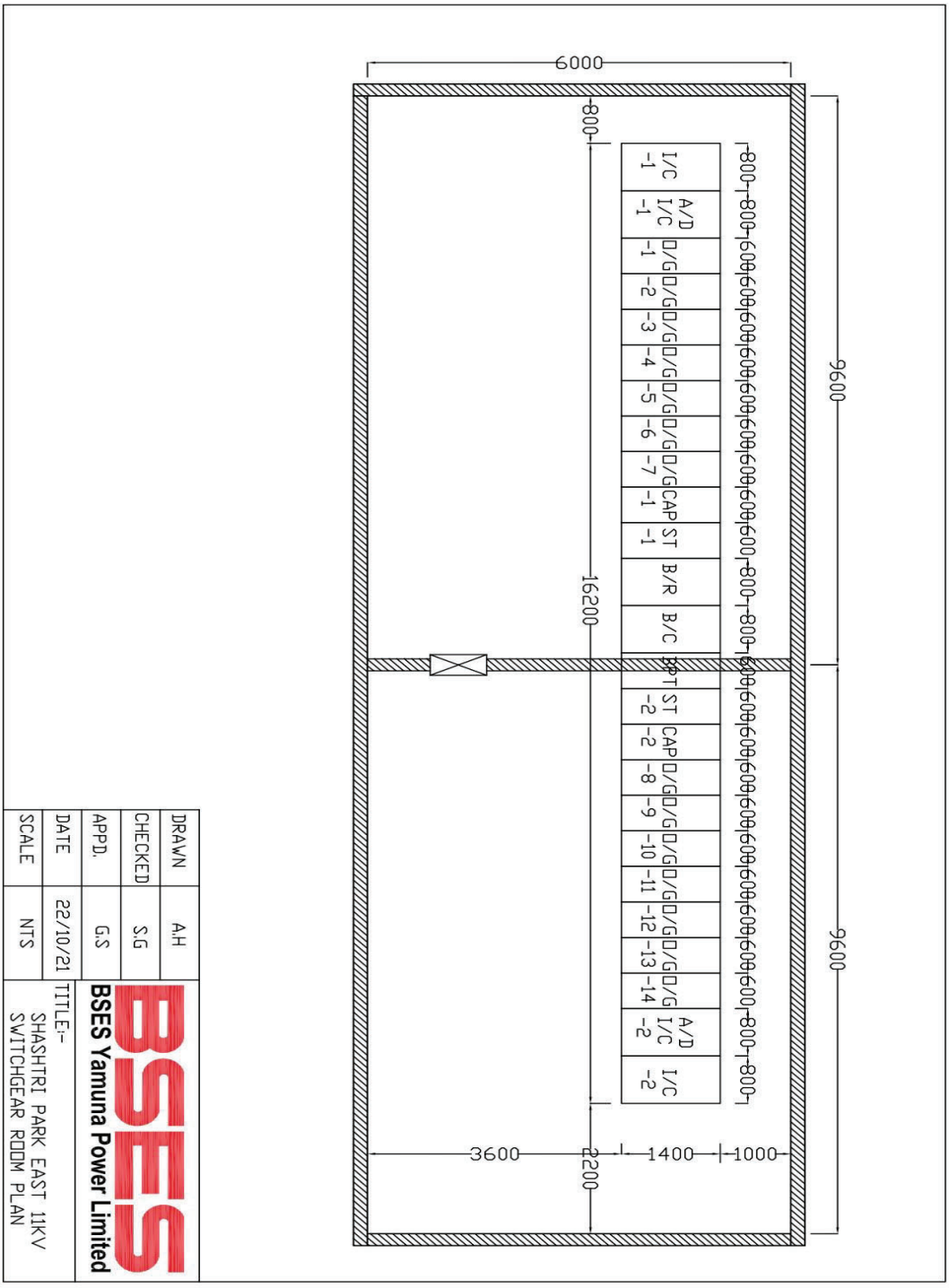
3.4 EXISITING SUBSTATION SLD



3.5 REFERENCE LAYOUT FOR 11 kV SWITCHGEAR



3.6 SCOPE DEMARCATION

S. No	Head	BYPL	Bidder's Scope	Remarks
3.6.1	Testing Equipment	✗	✓	
3.6.2	Lighting Arrangement	✗	✓	
3.6.3	Civil Work with Material	✓	✗	
3.6.4	Disconnection of All 11 kV Power Cables	✗	✓	
3.6.5	Reconnection of 11 kV Outgoing Power Cables	✓	✗	
3.6.6	Reconnection of Incomer, Station Transformer and Capacitor Bank Cable	✗	✓	
3.6.7	Construction Power	✓	✗	
3.6.8	Safety and Security of Manpower(Labor, Engineers, Supervisors etc)	✗	✓	(a) Safety Supervisor/ Officer required at Site. (b) PPE is mandatory.
3.6.9	Various Tools and Tackles related to Job	✗	✓	
3.6.10	Loading, Unloading and Transportation of Material	✗	✓	It includes transportation of dismantled equipment to BYPL store in stacked manner.
3.6.11	Cleanliness around work premises	✗	✓	
3.6.12	Document/Drawing Submission	✗	✓	
3.6.13	Document/Drawing Approval	✓	✗	
3.6.14	Security and Safety of material until handover	✗	✓	
3.6.15	Various Machines e.g. Crane, Hydra, JCB etc to complete the Job	✗	✓	
3.6.16	Maintenance of Equipment Until Handover to Engineer Incharge and EHV O&M	✗	✓	
3.6.17	Electrical Inspector Clearance	✗	✓	Only statutory fees will be borne by BYPL
3.6.18	Permit issuing agency for Works inside BYPL Premises	✓	✗	
3.6.19	Permit requesting Agency	✗	✓	Permit Should be applied to Engineer In charge prior to start of work. Isolation & permit of only one Feeder at a time, shall be given at a time, during final hook up. All necessary preparation works to be made, in order to minimize the Shutdown Time.

S. No	Head	BYPL	Bidder's Scope	Remarks
3.6.20	Temporary office near work premises	✗	✓	After handing over the equipment, contractor has to evacuate the premises within one week otherwise deemed fit action will be taken
3.6.21	Temporary store near work premises	✗	✓	
3.6.22	Aesthetics at work place should be maintained at the time and after the completion of Work	✗	✓	Disposal of Scrap/Debris etc from site and complete cleaning of working area till handover
3.6.23	Any damages done to the existing system, shall be repaired/ rectified/ replaced	✗	✓	
3.6.24	Clearance certificate	✗	✓	Clearance Certificate shall be taken from BYPL Departments (Quality, Safety, Protection, O&M, SCADA, EHV, Civil, etc) before Final Charging of the Systems. Any Site Observations/ Punch points, observed during execution, shall be attended.
3.6.25	Various compliances pertaining to Job	✗	✓	IE rules, CEA Regulation 2010

3.7 DOCUMENTATION

Document/Drawing submission shall be as per the matrix given below:

a. All documents/drawings shall be provided in soft copy only in returnable Pen drives
b. Language of the documents shall be English only.
c. Incomplete submission shall be liable for rejection.
d. Document check sheet compliance shall be the first sheet for each submission stage i.e. Technical bid, Drawing Approval, Pre Dispatch, Pre closure
e. No submission is acceptable without check list compliance.
f. Deficient/ improper document/ drawing submission shall be liable for rejection.
g. Order of documents shall be strictly as per the check list.
h. Any drawing/document not included in the below table but necessary for detailed engineering shall be deemed to be included in bidder's scope.

S. No.	Description	Technical Bid	Drawing Approval	Pre-Dispatch	Pre-Closure
3.7.1	Tender No.	Required			
3.7.2	Communication Details				

S. No.	Description	Technical Bid	Drawing Approval	Pre-Dispatch	Pre-Closure
3.7.2.1	Name of the Bidder	Required			
3.7.2.2	Name of Authorized contact person	Required			
3.7.2.3	Contact No. of Authorized contact person	Required			
3.7.2.4	E-mail id of Authorized contact person	Required			
3.7.3	Document Submission Format				
3.7.3.1	Documents shall be submitted in Box file/spiral binding. Any other format is not acceptable	Required			
3.7.3.2	Index of documents with page numbers for each document	Required			
3.7.3.3	Separator with document description shall be provided before each document	Required			
3.7.4	Qualifying Requirement Compliance				
3.7.4.1	Summary of compliance of qualifying criteria in tabular form along with summary of documentary proof provided	Required			
3.7.4.2	Detailed Documents supporting compliance of qualifying criteria	Required			
3.7.5	Drawings/ Documents as per Technical Specification.				
3.7.5.1	Signed copy of technical specification	Required			
3.7.5.2	Type Test reports of offered model/ type/ rating	Required	Required		
3.7.5.3	Deviation Sheet	Required	Required		
3.7.5.4	Detailed Drawings	Required	Required		
3.7.5.5	Other drawing/ documents mentioned in technical specification	Required	Required		
3.7.5.6	Soft copy of complete technical bid in pen drive	Required			
3.7.5.7	Samples as per technical specification.	Required			
3.7.5.8	Design Calculation		Required		
3.7.5.9	Manufacturer's quality assurance plan		Required		
3.7.5.10	GTP		Required		
3.7.5.11	Inspection Reports			Required	

S. No.	Description	Technical Bid	Drawing Approval	Pre-Dispatch	Pre-Closure
3.7.5.12	As manufacturing Drawings			Required	
3.7.5.13	Operation and Maintenance Manual			Required	
3.7.5.14	As built Drawings				Required
3.7.6	Soft Copy				
3.7.6.1	In Pen drive	Required			
3.7.6.2	Through Mail		Required	Required	Required

4 FREE ISSUE ITEMS

S No.	Items	Remarks	UOM	Quantity
4.1.1	Power Cable			
4.1.1.1	1C X 1000 sqmm cable	From Power Transformer to 11 KV Incomer	LOT	1
4.1.1.2	11kV, 3C x 300 sqmm cable	From 11 KV Panel to 11 kV Capacitor Bank	LOT	1
4.1.1.3	11kV, 3C x 300 sqmm cable	From 11 KV Panel to Station Transformer	LOT	1
4.1.1.4	0.415 kV 4C X 300 sqmm cable	From Station Transformer to ACDB	LOT	1
4.1.2	End Termination Kit			
4.1.2.1	11 kV, 1C X 1000 sqmm	a) For Terminating 11 kV Cables at 11 kv incomer end b) For Terminating 11 kV cables at Transformer end	Set	36
4.1.2.2	11kV, 3C x 300 sqmm cable	For Terminating 11 kV Cables at 11 kV Capacitor Bank end and 11 kV Capacitor Panel end	Set	8
4.1.2.3	11kV, 3C x 150 sqmm cable	For Terminating 11 kV Cables at 11 kV Station Transformer Panel and Station Transformer	Nos	4
4.1.2.4	0.415 kV 4C X 300 sqmm cable	For Terminating 0.415 kV Cables at ACDB and Station Transformer	Nos	8

5 APPROVED MAKE LIST

Following table contains Approved Make List. Although, any make other than specified in table shall be subject to BSES Yamuna Power Limited Approval.

S. No	Equipment	MAKE
5.1.1	11 kV Switchgear	ABB/Siemens/Schneider/CGL
5.1.2	Control cable	Universal/KEI/GEMSCAB/Polycab/ Cords Cable
5.1.3	Numerical relays	Siemens (Siprotec series) and Schneider / Alstom (Micom Series)
5.1.4	Ethernet Switch	Ruggedcom,/Hirschman
5.1.5	Floor coating	3M/Demech/Stanvac

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TECHNICAL SPECIFICATION

FOR

HT INDOOR SWITCHGEAR (33 & 11KV)

Revision		6
Date		25.03.2021
Pages		Page **1** of **61**
Prepared by	Abhishek Harsh	3267d7c3-82b5-46cb-b5a6-867ee7820a34
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INDEX

1 RECORD OF REVISION

S. No	Item/ Clause No	Change/ Addition	Reason of Change/Addition	Revision
1.1	12.2	Earthing Bus Position Freezed	For Clarity Purpose	R6
1.2	18.1.5	Conformal Coating on Relays	To protect relays against moisture, dust, chemicals, and temperature extremes.	R6
1.3	18.1.6	LC Type Ports for SCADA Interface	For Standardization Purpose	R6
1.4	18.7.1, 18.12.1	ST Type Ports for Line Differential Relay Communication	For Standardization Purpose	R6
1.5	18.14.1	TC-2 Healthy Status Added	For Ease of Operation	R6
1.6	18.17.1	Flush Mounting of Lock Out Relay	For Ease of Maintenance and Operation	R6
1.7	19	Synch Check Philosophy	For Ease of Operation	R6
1.8	20.1.18	Placement of Ethernet Switch Freezed	For Clarity Purpose	R6
1.9	5.12	Limited Nut Bolt in Switchgear	For ease of Maintenance and Operation	R5
1.10	7.8	Flaps for Internal Arc Protection	Flaps shall not have any pores/ opening during normal operation as opening causes operation and maintenance issues	R5
1.11	13.2.5	Signal list of MFM specified	For clarity	R5
1.12	18.2.1	Insertion of Trip circuit supervision in Numerical relay	For obviating auxiliary relay of trip circuit supervision and hence saving space	R5
1.13	18.7.1	Line Differential protection compatibility with Optical fiber	For clarity	R5
1.14	18.12.1	Line Differential protection compatibility with Optical fiber	For clarity	R5
1.15	18.17.4	Contact Multiplication relay for breaker opening and breaker closing	To safeguard relay in case of fault in tripping and closing coil	R5
1.16	20	Ethernet switches & Fiber Optics	Communication on IEC 61850	R5

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S. No	Item/ Clause No	Change/ Addition	Reason of Change/Addition	Revision
1.17	5.19	Space for APFC Relay	APFC shall be supplied by Auto Switched Capacitor Bank Supplier but cutout for the same has to be provided by 11kV Switchgear Panel Vendor	R4
1.18	13.2	Multifunction Meter	Ammeter has been removed and Multifunction Meter has been included for SCADA integration of all parameters	R4
1.19	17.8	Spare Terminal Block in Capacitor Bank Panel	For APFC Control cables	R4
1.20	18.1.6	SCADA interface port requirement revised	For integration with SCADA on IEC 61850 based on site requirement	R4
1.21	18.6.1	Neutral Unbalance protection by RVT	As Auto Switched Capacitor banks are used, Only one RVT is enough in comparison with three NCTs	R4
1.22	23.1.3	Panel Rating plate requirement revised	All CT, PT and breaker details included in Panel Rating plate for ready reference.	R4
1.23	27	Drawing and Data Submission	To streamline drawing/document submission	R4

2 SCOPE OF SUPPLY

a. This specification covers the design, manufacture, testing, supply, erection & commissioning of 33kV and 11kV, Air Insulated, metal-enclosed and factory assembled switchgear.

b. This specification shall be used in conjunction with all specifications, switchgear data sheets, single line diagrams, and other drawings attached to the specification / purchase requisition.

3 CODES & STANDARDS

Materials, equipment and methods used in the manufacture of switchboards shall conform to the latest edition of following

3.1	Indian Electricity Rules 1956	Latest edition
3.2	Indian Electricity act 1910	Latest edition
3.3	Switchgear and control gear	IEC : 60694, IEC: 60298, IEC : 62271-200, IEC : 60529, IS: 3427, IS: 12729, IS: 12063, IS: 13947, IS: 9046
3.4	Circuit breaker	IEC 62271 - 100, IS 13118, IS 2516
3.5	Isolators & earthing switches	IEC 62271 - 102

DocUUID : 17b81629-6792-43e6-8f6f-1574802d02f6

3.6	Current transformers	IS:2705, IEC:60185
3.7	Voltage transformer	IS:3156, IEC:60186,
3.8	Indicating Instruments	IS:1248
3.9	Energy meters	IS 13010
3.10	Relays	IS:8686, IS:3231, IS:3842
3.11	Control switches and push buttons	IS 6875
3.12	HV fuses	IS 9385
3.13	Arrangement of Switchgear bus bars, main connections and auxiliary wiring	IS:375
3.14	Code of practice for phosphating iron & steel	IS 6005
3.15	Colours for ready mixed paints	IS 5
3.16	Code of practice for installation and maintenance of switchgear	IS 3072

4 SERVICE CONDITION

4.1	Max Ambient Temperature	50 deg C
4.2	Max Daily average ambient temp	40 deg C
4.3	Min Ambient Temp	0 deg C
4.4	Maximum Humidity	95%
4.5	Minimum Humidity	10%
4.6	Maximum annual rainfall	750 mm
4.7	Average no of rainy days per annum	60
4.8	Rainy months	June to Oct
4.9	Altitude above MSL	300 M
4.10	Seismic Zone	IV

5 PANEL CONSTRUCTION

5.1	Enclosure Type	Free standing, Indoor, Fully compartmentalised, Metal clad, Vermin proof
5.2	Enclosure degree of protection	IP 4X for high voltage compartment IP 5X for low voltage compartment

5.3	Enclosure material	Pre-Galvanized CRCA steel
5.3.1	Load bearing members	2.5 mm thick
5.3.2	Doors and covers	2.0 mm thick
5.3.3	Gland plate	3.0 mm MS for multicore and 5. 0 mm Aluminium for single core cables. All gland plates should be detachable type with gasket
5.4	Dimension of Panel	Maximum 2700mm, Operating height maximum 1600mm. In case of Extension of Existing make panels, vendor shall match the dimension of existing panel.
5.5	Extensibility	On either side
5.6	Separate Compartments for	Bus bar, Circuit Breaker, HV incoming cable, HV outgoing cable, PT, LV instruments & relays
5.7	Transparent inspection window	For cable compartment at height of cable termination.
5.8	Bus end cable box	For direct cable feeder from bus
5.9	Rear Doors	Rear doors shall not be interlocked i.e. all door opening shall be independent to each other.
5.10	Breaker compartment door	Separate, with lockable handle (Design with breaker trolley as the front cover is not acceptable). Door of one panel should not cause hindrance for opening of adjacent panel.
5.11	Inter compartmental connections	
5.11.1	Breaker to bus bar compartment	Through seal-off bushings
5.11.2	Breaker to cable compartment	Through seal-off bushings
5.12	Nut Bolt	Shall be as less as possible for ease of opening of compartments
5.13	Pressure relief devices	To be provided for each HV compartment
5.14	Bus support insulator	Non-hygroscopic, track-resistant, high strength, Epoxy insulators (Calculation for validating dynamic force withstand capability to be submitted during detailed engineering)

5.15	Fixing arrangement	Doors - Concealed hinged, door greater than 500mm shall have minimum three sets of hinges Covers - SS bolts Gasket - Neoprene
5.16	Required HV cable termination height in the cable compartment	650 mm for 11 KV. 1000mm for 33 KV
5.17	Panel Base Frame	Steel Base frame as per manufacturer's standard.
5.18	Handle	Removable bolted covers with handle for cable chamber and busbar chamber. Panel no./identification to be provided on cable box cover also.
5.19	APFC	a. Controlling of Capacitor Banks' switching shall be done by APFC. Although APFC shall not be in bidder's scope, Space for cut out shall be provided in the Capacitor panel. Space requirement-150X150 mm^2 b. Wiring of Bus PT , Incomer CT and Capacitor CT upto spare terminal for APFC shall also be provided in Capacitor Panel
5.20	Technical particulars	As per Annexure –C

6 CIRCUIT BREAKER

6.1	Type	Truck or cassette type
6.2	Mounting	On withdrawable truck or carriage, with locking facility in service position.
6.3	Switching duty	c. Transformer (oil filled and dry type) d. Motor (of small and large ratings – DOL starting with starting current 6 to 8 times the full load current & with a maximum of 3 starts per hour) e. Underground cable with length up to 10 km
6.4	Interrupting medium	Vacuum

6.5	Contact	Tulip contact shall be provided without any gap between contacts
6.6	Breaker operation	Three separate identical single pole units operated through the common shaft
6.7	Operating Mechanism	Re-strike free, Trip free, with electrical anti-pumping feature
6.7.1	Type	Motor wound, spring charged, stored energy type with manual charging facility
6.7.2	Operation on supply failure	One O-C-O operation possible after failure of power supply to the spring charging motor
6.8	Breaker indications & push buttons	
6.8.1	ON/ OFF / Emergency trip push button	a. Manual / mechanical. b. Emergency Off push button should be provided with a protective flap. c. Mechanical ON shall have padlocking facility.
6.8.2	Mechanical ON – OFF indication	On breaker trolley front
6.8.3	Operation counter	On breaker trolley front
6.8.4	Test-service position indicator	On breaker trolley front
6.8.5	Mechanism charge / discharge indicator	On breaker trolley front
6.9	Breaker positions	Service, Test and Isolated
6.10	Inter changeability	Possible, only with breaker of same rating
6.11	Breaker Control	On panel front only
6.12	Handle	Breaker shall be provided with handles for easy handling, rack in–out operation and manual spring charging as applicable.
6.13	Pin Sequence and Configuration of Pin of Adaptor Plug	(a) Pin sequence and No of Pins of Adaptor plug shall be same in Outgoing and Capacitor Panel (b) Pin sequence and No of Pins of Adaptor plug shall be same in Incoming and Bus Coupler Panel
6.14	Technical particulars	As per Annexure-C

7 FUNCTIONAL REQUIREMENTS

7.1	Interlocks	
7.1.1	Breaker compartment door opening	Opening of door and rack out to test/isolated position should be possible with breaker in OFF position only.
7.1.2	Breaker compartment door closing	Should be possible even when breaker is in isolated position
7.1.3	Racking mechanism safety interlock	Mechanical type
7.1.4	Racking in or out of breaker inhibited	When the breaker is closed
7.1.5	Racking in the circuit breaker inhibited	Unless the control plug is fully engaged
7.1.6	Disconnection of the control plug inhibited	As long as the breaker is in service position
7.1.7	Opening of cable compartment cover of Incomer Panels inhibited	As long as cable end is alive
7.2	Safety Devices	
7.2.1	Exposure to live parts	In case the breaker panel door is required to be opened during a contingency, the personnel should not be exposed to any live part. Suitable shrouds/barriers/insulating sleeves should be provided.
7.2.2	Breaker handing	In case the breaker is mounted on a carriage which does not naturally roll out on the floor, a trolley for handling the breaker is to be provided.
7.3	Operation of breaker	In either service or test position
7.3.1	Closing from local	Only when local/remote selector switch is in local position
7.3.2	Closing from remote	Only when local/remote selector switch is in remote position

7.3.3	Tripping from local	Only when local/remote selector switch is in local position
7.3.4	Tripping from remote	Only when local/remote selector switch is in remote position
7.3.5	Tripping from protective relays	Irrespective of position of local/remote switch
7.3.6	Testing of breaker	In test or isolated position keeping control plug connected
7.4	Safety shutters.	
7.4.1	Automatic safety shutter for female primary disconnects	To fully cover contacts when breaker is withdrawn to test. Independent operating mechanism for bus bar & cable side shutters, separately pad-lockable in closed position.
7.4.2	Label for identification	For Bus side and cable side shutters
7.4.3	Warning label on shutters of incoming and other connections	Clearly visible label "Isolate elsewhere before earthing" be provided
7.5	Breaker electrical operation features	
7.5.1	Trip circuit supervision	To be given for breaker close & open condition
7.5.2	Trip circuit supervision relay contact	For indication, alarm & to inhibit closing of breaker
7.5.3	Emergency trip push button contact	Wired directly to trip coil (wired to Master trip relay if second trip coil provided)
7.5.4	Emergency trip push button contact	Wired to inhibit closing of breaker
7.5.5	Master trip relay contact (if given)	Wired to inhibit closing of breaker
7.5.6	Tripping or opening of breaker through relay but not routed through Lockout (Example- SCADA Opening, Undervoltage, Overvoltage)	Wired to Contact multiplication Relay and then from CMR to tripping of breaker
7.5.7	Closing of breaker through relay	Wired to Contact multiplication Relay and then from CMR to closing of breaker

7.6	DC control supply bus in all panels	Fed by two DC incoming sources in Bus coupler panel with auto changeover facility
7.7	PT supply bus in all panels	Fed normally by bus PT with automatic changeover facility to incomer line PT
7.8	Flaps for Internal Arc Protection	Flaps shall not have any pores/ opening during normal operation

8 SURGE SUPPRESSOR

8.1	Provision	To be provided in all panels except bus coupler and BPT.
8.2	Type	Gapless, metal oxide type
8.3	Technical particulars	As per Annexure -C

9 CURRENT TRANSFORMER

9.1	Type	Shall be cast resin type with insulation class of E or better.
9.2	Rating and technical particulars	As per Annexure – C (Technical particulars) and Annexure – F (SLDs)
9.3	CBCT	If specified, bidder shall clearly mention his proposal for mounting the same.

10 POTENTIAL TRANSFORMER

10.1	Type	Shall be cast resin type with insulation class of E or better.
10.2	Rating and technical particulars	As per Annexure – C (Technical particulars) and Annexure – F (SLDs)
10.3	Mounting	It shall be mounted on a withdrawable carriage. Mounting of PT on the breaker truck is not acceptable. Mounting of PT on the panel top is also not acceptable. Primary PT fuse shall be easily accessible.
10.4	Neutral	The HV neutral connection to earth shall be easily accessible for disconnection during HV test.

11 FEEDER AND BUS EARTHING

11.1	Earthing arrangement	Through separate earthing truck for bus & feeder
11.2	Short time withstand capacity of earthing truck	Equal to rating of breaker. Refer technical parameters.
11.3	Operation from front	Mechanically operated by separate switch.
11.4	Interlocks and Alarm	To prevent inadvertent closing on live circuit, with padlocking arrangement to lock truck in close or open position.

12 EQUIPMENT EARTHING

12.1	Material of earthing bus	Aluminium
12.2	Earthing Bus Position	It shall run through whole switchgear passing nearer to Power Cable Position
12.3	Earth bus joints	All bolted joints in the bus should be made by connection of two bolts.
12.4	Rating	Sized for rated short circuit current for 3 seconds
12.5	Enclosure & non -current carrying part of the switchboard / components	Effectively bonded to the earth bus.
12.6	Hinged doors	Earthed through flexible copper braid
12.7	Circuit breaker frame /carriage	Earthed before the main circuit breaker contacts/ control circuit contacts are plugged in the associated stationary contacts
12.8	Metallic cases of relays, instruments and other LT panel mounted equipment	Connected to the earth bus by independent copper wires of size not less than 2.5 sq. mm with green colour insulation. For this purpose LT compartment should have a clear designated earth bus to which earth connections from all components are to be connected.
12.9	CT and PT neutral	Earthed at one place at the terminal blocks through links.

13 METERS

13.1	Mounting	Flush mounted
13.2	Multifunction Meter	
13.2.1	SCADA Interfacing	RS485 rear port suitable for integration on Modbus Protocol
13.2.2	Size	96x96 mm^2
13.2.3	Panels where to be provided	All panels except Bus PT Panel
13.2.4	Accuracy Class	1
13.2.5	Signal List	R-Ph Current, Y-Ph Current, B-Ph Current, Neutral Current, R-Y Ph Voltage, Y-B Ph Voltage, B-R Ph Voltage, Active Power, Active Energy, Reactive Power, Power Factor, Max Demand, Phase angle 1, Phase angle 2, Phase angle 3, THD Mean Current, THD Mean Voltage
13.2.6	Data Type	MFI
13.2.7	Compatibility with RTU	ABB 560
13.2.8	Programmability	CT secondary shall be programmable i.e for both 1 A and 5 A
13.2.9	Auxiliary Supply	a. 48 – 240VDC and AC i.e universal type. b. Although in Scheme, MFM must be wired up with DC only
13.3	Voltmeter	Digital type with programmable ratio
13.3.1	Size	96x96 mm^2
13.3.2	Panels where to be provided	Incomer and bus PT panel
13.3.3	Voltmeter switch	Inbuilt in meter
13.3.4	Accuracy Class	1.0
13.4	Energy meter provision	Energy meter is not in supplier's scope. Only space and CT/PT wiring is to be provided in all panels except bus coupler and bus PT. Space for Energy meter shall be 200(w) X 350(h) mm^2

14 INDICATION, ALARMS & ANNUNCIATION

14.1	Indications	Flush mounted, High intensity, clustered LED type
14.1.1	Breaker ON	Red
14.1.2	Breaker Off	Green
14.1.3	Spring Charged	Blue
14.1.4	DC control supply fail	Amber

14.1.5	AC control supply fail	Amber
14.1.6	Auto trip	Amber
14.1.7	Test Position	White
14.1.8	Service Position	White
14.1.9	Heater circuit healthy	Yellow (Indication with integrated push button for checking)
14.1.10	Trip circuit healthy	White
14.1.11	PT supply as applicable	R,Y B
14.2	Annunciator (For 33kV Panels only)	
14.2.1	Type	Static type alongwith alarm. Annunciations shall be repetitive type and shall be capable of registering the fleeting signal. Fascia test facility should also be provided.
14.2.2	Note	LED type indications may not be provided for alarm signals provided on annunciator.
14.2.3	Mounting	Flush mounted
14.2.4	Fascia	12 window
14.2.5	Signals to provided on Fascia	Window 1 – Main Protection Operated (Distance /Differential) Window 2 – Backup O/C & E/F Protection Operated Window 3 – LBB operated Window 4 – CB Autotrip Window 5 – Trip Circuit Unhealthy Window 6 – DC Fail Window 7 – AC Fail Window 8 – VT Fuse Fail Window 9 – Protection Relay Faulty
14.2.6	Push Buttons	For test, accept and reset
14.2.7	Potential Free Contacts	To be provided for event logger

14.3	Alarm scheme with isolation switch	a. For DC fail, TC fail and CB auto trip in 11kV panels b. For all signals wired to annunciator in 33kV panels

Sequence of operation of the annunciator shall be as follows-

S No.	Alarm Condition	Fault Contact	Visual Annunciation	Audible Annunciation
a.	Normal	Open	Off	Off
b.	Abnormal	Close	Flashing	On
c.	Accept	Close	Steady on	Off
d.	Return to normal	Open	Steady On	Off
e.	Reset	Open	Off	Off
f.	Reset before return to normal	Close	Flashing	On

15 SELECTOR SWITCHES & PUSH BUTTONS

15.1	Selector switches	Flush mounted on LV compartment door, with shrouded terminals
15.1.1	TNC switch with pistol grip	Lockable, spring return to normal position
15.1.2	Local / SCADA selector switch	2 pole
15.1.3	Rotary ON/OFF switches	For heater / illumination circuit
15.1.4	Rating	16 A
15.2	Push Button	Flush mounted on LV compartment door, with shrouded terminals
15.2.1	Emergency trip push button	Red color with stay put
15.2.2	Accept push buttons	Black color – Trip alarm / DC fail alarm
15.2.3	Reset push buttons	Yellow color – Trip alarm / DC fail alarm
15.2.4	Rating	10 A

16 INTERNAL WIRING

16.1	Internal wiring	1100 V grade, PVC insulated (FRLS) stranded flexible copper wire.
16.2	Size	2.5 sq mm for CT circuit, 1.5 sq mm for PT & control circuits

16.3	Colour code	
16.3.1	CT & PT	R Ph – Red Y Ph – Yellow B Ph – Blue Neutral – Black
16.3.2	Others	DC– grey, AC-black, Earth – green
16.4	Ferrules	At both ends of wire
16.5	Ferrule type	Interlocked type (one additional red colour ferrule for all wires in trip circuit)
16.6	Lugs	Tinned copper, pre-insulated, ring type, fork type and pin type as applicable. CT circuits should use ring type lugs only.
16.7	Spare contacts	Spare contacts of relays and contactors etc. should be wired upto the terminal block.
16.8	Wiring enclosure	Plastic channels, Inter panel wiring through PVC sleeves
16.9	Interpanel wiring	Wires with ferrule to be terminated in the adjacent shipping section should be supplied with one end terminated and the other end bunched and coiled.
16.10	Auxiliary supply	Auxiliary bus wiring for AC and DC supplies, voltage transformer circuits, annunciation circuits and other common services shall be provided on the same set of terminals in all the panels with proper segregation.

17 TERMINAL BLOCKS

17.1	Rating and Type	1100 V grade, moulded piece, stud type screw driver operated terminals complete with insulated barriers, washers, nuts and lock nuts.
17.2	Segregation	TBs shall be segregated.

17.3	Suitability	Terminal Block shall be Stud Type Screw Driver Operated suitable for 6sqmm control cable. Disconnecting facility shall be provided in CT and PT terminal. Shorting and Earthing facility shall be provided in CT
17.4	Marking and covers	White fibre markings strip with clear plastic, slip-on / clip-on terminal covers to be provided.
17.5	Disconnecting Facility	To be provided in CT and PT terminals
17.6	Shorting & Earthing Facility	To be provided in CT Terminals
17.7	Spare Terminals	20% in each TB row
17.8	Spare Terminal Block in Capacitor Bank Panel	Separate Terminal Block with 50 number terminals required (20 Numbers Disconnecting and 30 Number Non Disconnecting type)
17.9	TB shrouds & separators	Moulded non- inflammable plastic material
17.10	Clearance between 2 sets of TB	100 mm min
17.11	Clearance with cable gland plate	250 mm min
17.12	Clearance between AC / DC set of TB	100 mm min
17.13	Test terminal blocks	Screw driver operated stud type for metering circuit

18 RELAYS

18.1	Protection Relays – General Features	
18.1.1	Technology and Functionality	Numerical , microprocessor based with provision for multifunction protection, control, metering and monitoring
18.1.2	Mounting	Flush Mounting, IP5X
18.1.3	Architecture	Hardware and software architecture shall be modular and disconnectable to adapt the protection and control unit to the required level of complexity as per the application.

18.1.4	Programming and configuration	Relay shall utilize a user friendly setting and operating multi-lingual software in windows environment with menus and icons for fast access to the data required. Programming software and communication cord for offered relays should be included in scope of supply.
18.1.5	Conformal Coating	a. Required on all cards and Components to protect against moisture, dust, chemicals, temperature extremes etc b. Testing shall be as per IEC 60068-2-60
18.1.6	SCADA Interface port	LC type Dual fibre optic port for interfacing with SCADA on IEC 61850 & PRP compatible. Through this port relays shall be connected to Ethernet switches..
18.1.7	Processing Indications	SCADA functions for monitoring shall be executed on SPI (Single Point Input) and DPI (Double Point Input). DPI shall only be used in case of Isolator and Circuit breaker “close” and “open” indication.
18.1.8	Command Processing	Functionality of command processing offered for SCADA interface shall include the processing of single and double commands i.e SCO (Single Command Output) and DCO (Double object command Output). DCO shall only be used in case of Isolator and Circuit Breaker “close” and “open” command.
18.1.9	PC Interface port	Front port (preferably serial) for configuration/data downloads using PC. Cost of licensed software and communication cord, required for programming of offered protection relays shall be included in the cost of switchgear.
18.1.10	User Interface	An alphanumeric key pad and graphical LCD display with backlight indicating measurement values and operating messages. It should be possible to access and change all settings and parameters without the

		use of PC.
18.1.11	SCADA Interface	Relay shall communicate all measured & monitored parameters, analog signals, event record, fault record, DIs , DOs etc to SCADA
18.1.12	Relay Characteristics	Relay shall integrate all necessary protections for different applications in accordance with IS and IEC. Relay shall provide wide setting ranges and choice of all IEC, IEEE and other tripping curves through a minimum of two setting groups.
18.1.13	GOOSE Messaging	Relays shall communicate all status signals, commands and events on GOOSE messaging.
18.1.14	Event and Fault records	Relay shall have the facility of recording of various parameters during event/fault with option to set the duration of record through settable pre fault and post fault time. Relay shall store records for last 10 events and 10 faults (minimum). It should be possible to download records locally to PC and remotely to SCADA.
18.1.15	Self diagnosis	Relay shall be able to detect internal failures. A watchdog relay with changeover contact shall provide information about the failure.
18.1.16	Time synchronization	All relays shall be capable of being synchronized with the system clock using SCADA interface and PC.
18.1.17	Operation Indicators	LEDs with push button for resetting.
18.1.18	Test Facility	Inbuilt with necessary test plugs.
18.2	Protection Relays for 11kV Incomer panel	
18.2.1	Relay 1	3-phase Directional Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics
		Undervoltage and overvoltage protection
		Trip Circuit Supervision

		Sync Check function
		PT supervision (fuse failure monitoring)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.2.2	Relay 2	High Impedance Restricted Earth fault protection.
18.2.3	User Configurable DIs and Dos	Relay-1 & 2 should have a total of 16 Dis and 10 Dos (minimum). Each relay should have atleast 2 Dis and 4 Dos
18.2.4	Note	Combining functions of Relay-1 and Relay-2 in single relay is not acceptable.
18.2.5	SLD	Refer annexure – F1
18.3	Protection Relays for 11kV Bus Section panel	
18.3.1	Relay 1	3-phase Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics
		Sync Check function
		Trip Circuit Supervision
		PT supervision (fuse failure monitoring)
		User Configurable 16 Dis and 8 Dos (minimum)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.3.2	SLD	Refer annexure – F2
18.4	Protection Relays for 11kV Outgoing panel	
18.4.1	Relay 1	3-phase Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics

		Trip Circuit Supervision
		User Configurable 12 Dis and 6 Dos (minimum)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.4.2	SLD	Refer annexure – F3
18.5	Protection Relays for 11kV Station Transformer panel	
18.5.1	Relay 1	3-phase Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics
		Trip Circuit Supervision
		User Configurable 12 DIs and 6 DOs (minimum)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.5.2	SLD	Refer annexure – F4
18.6	Protection Relays for 11kV Capacitor panel	
18.6.1	Relay 1	3-phase Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics
		Undervoltage and Overvoltage protection(From Bus PT)
		Trip Circuit Supervision
		Neutral Unbalance protection(From RVT associated to Cap Bank)
		Timer for on time delay (minimum 600 seconds)
		User Configurable 12 DIs and 6 DOs (minimum)
		Relay shall communicate all measured and

		monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.6.2	SLD	Refer annexure – F5.
18.7	Protection Relays for 33kV Incomer	
18.7.1	Relay 1 (If Distance protection is considered as primary protection)	Distance Protection
		Power swing blocking
	Relay 1 (If Line differential protection is considered as primary protection)	Line differential protection (Dual channel, ST Port Compatible for Single Mode Fibre having wavelength 1310 nm)
		Distance Protection
		Software based CT ratio correction
		Dedicated port for communication with remote end relay through optical fibre. This port should be in addition to PC interface and SCADA interface ports.
	Selection of Relay 1	Selection of Relay-1 (primary protection) will depend on site requirements. Hence bid shall contain prices of Incomer panel - a. With Distance protection as primary protection b. With Line differential protection as primary protection.
18.7.2	Relay 2	Bay control unit having MIMIC with 3-phase Directional Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics.
		Trip Circuit Supervision
		Sync check function
		Circuit Breaker failure protection
		Reverse blocking function
		PT supervision
		Relay shall communicate all measured and

		monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.7.3	User Configurable DIs and Dos	Relay-1 & 2 should have a total of 16 DIs and 12 DOs (minimum). Each relay should have atleast 2 DIs and 6 Dos
18.7.4	Note	Combining functions of Relay-1 and Relay-2 in single relay is not acceptable.
18.7.5	SLD	Refer annexure – F6
18.8	Protection Relays for 33kV Transformer Feeder Panel	
18.8.1	Relay 1	Biased differential protection
		REF protection
		Software based ratio and vector correction feature (without ICT)
		H2 and H5 harmonic restraint
18.8.2	Relay 2	Bay control unit having MIMIC with 3-phase Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics
		Trip Circuit Supervision
		Reverse Blocking function
		Circuit Breaker failure protection
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.8.3	User Configurable DIs and DOs	Relay-1 & 2 should have a total of 16 DIs and 12 DOs (minimum). Each relay should have atleast 2 DIs and 6 DOs.
18.8.4	Note	Combining functions of Relay-1 and Relay-2 in single relay is not acceptable.

18.8.5	SLD	Refer annexure – F7
18.9	Protection Relays for 33kV Buscoupler Panel	
18.9.1	Relay 1	Bay control unit having MIMIC with 3-phase Overcurrent and earthfault protection with IDMT, Definite time and instantaneous characteristics.
		Trip Circuit Supervision
		Sync check function
		Reverse Blocking Function
		Circuit Breaker failure protection
		PT supervision (fuse failure monitoring) for Bus PT-1
		User Configurable 16 DIs and 8 DOs (minimum)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.9.2	Relay 2	PT supervision (fuse failure monitoring) for Bus PT-2
18.9.3	SLD	Refer annexure – F8
18.10	Protection Relays for 33kV Outgoing Panel (For Installation at KCC Consumer Premises)	
18.10.1	Relay 1	Bay control unit having MIMIC with 3-phase Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics
		Trip Circuit Supervision
		Reverse Blocking Function
		Circuit Breaker failure protection
		User Configurable 12 DIs and 6 DOs (minimum)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA

18.10.2	SLD	Refer annexure – F9
18.11	Protection Relays for 33kV Incomer from 66/33kV Autotransformer	
18.11.1	Relay 1	High Impedance Restricted Earth fault protection
18.11.2	Relay 2	Bay control unit having MIMIC with 3-phase Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics
		Trip Circuit Supervision
		Reverse Blocking Function
		Sync check function
		Undervoltage and overvoltage protection
		Circuit Breaker failure protection
		PT supervision (fuse failure monitoring)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.11.3	User Configurable DIs and DOs	Relay-1 & 2 should have a total of 16 DIs and 12 DOs (minimum). Each relay should have atleast 2 DIs and 6 Dos
18.11.4	Note	Combining functions of Relay-1 and Relay-2 in single relay is not acceptable
18.11.5	SLD	Refer annexure – F10
18.12	Protection Relays for 33kV Outgoing from 66/33kV Autotransformer	
18.12.1	Relay 1 (Distance protection is considered as primary protection)	Distance Protection
		Power swing blocking
	Relay 1 (Line differential protection is considered as primary protection)	Line differential protection(Dual channel, ST Port Compatible for Single Mode Fibre having wavelength 1310 nm)
		Distance Protection
		Software based CT ratio correction
		Dedicated port for communication with remote end

		relay through optical fibre. This port should be in addition to PC interface and SCADA interface ports.
	Selection of Relay-1	Selection of primary protection will depend on site requirements. Hence bid shall contain prices of Incomer panel – a. With Distance protection as primary protection b. With Line differential protection as primary protection.
18.12.2	Relay 2	Bay control unit having MIMIC with 3-phase Overcurrent and Earthfault protection with IDMT, Definite time and instantaneous characteristics.
		PT Supervision
		Trip Circuit Supervision
		Reverse Blocking Function
		Circuit Breaker failure protection
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.12.3	User Configurable DIs and DOs	Relay-1 & 2 should have a total of 16 DIs and 12 DOs (minimum). Each relay should have atleast 2 DIs and 6 Dos
18.12.4	Note	Combining functions of Relay-1 and Relay-2 in single relay is not acceptable.
18.12.5	SLD	Refer annexure – F11
18.13	Protection Relays for 33kV Buscoupler for Switchboard of 66/33kV Autotransformer	
18.13.1	Relay 1	Bay control unit having MIMIC with 3-phase Overcurrent and earthfault protection with IDMT, Definite time and instantaneous characteristics.
		Trip Circuit Supervision

		Sync check function
		Circuit Breaker failure protection
		PT supervision (fuse failure monitoring) for Bus PT-1
		User Configurable 16 DIs and 8 DOs (minimum)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
18.13.2	Relay 2	PT supervision (fuse failure monitoring) for Bus PT-2
18.13.3	SLD	Refer annexure – F12
18.14	Protection Relays – SCADA Interfacing	
18.14.1	Configuration and wiring of DIs in Protection Relays (All panels) for routing status signals to SCADA	DI-1 – TC-1 Healthy DI-2 – TC-2 Healthy DI-3 – CB Autotrip (contact from lockout relay) DI-4 – CB Open DI-5 – CB Close DI-6 – CB in service DI-7 – CB in test DI-8 – Spring Charged DI-9 – L/R switch Remote DI-10 – AC fail DI-11 – Adjacent Panel DC Fail/DC MCB Trip DI-12 – Adjacent Panel Protection Relay fail DI-13 – PT MCB trip (metering and protection, for incomer and capacitor panel only) Sequence of DIs should be strictly as mentioned above. Change in sequence of DIs will not be acceptable.
18.14.2	Configuration and wiring of DOs in Protection relays (all panels) for execution of SCADA commands through	DO-1 – CB Open DO-2 – CB close DO-3-Electrical Reset Sequence of DOs should be strictly as mentioned

	SCADA interface port (refer clause 16.1.5).	above. Change in sequence of DOs will not be acceptable.
18.14.3	Looping of numerical relays	All relays in the switchboard have to be looped to form a common bus for interfacing with SCADA.
18.14.4	Spare DIs and DOs	Should be wired upto terminal block for future use.
18.15	Transformer Monitoring cum AVR Relay	
18.15.1	Features	As per annexure –B
18.15.2	Requirement	To be provided in 33KV Transformer panel only
18.16	Auxiliary Relays – General Features	
18.16.1	Relays for auxiliary, supervision, trip and timer relays	Static or electromechanical type.
18.16.2	Reset mechanism for auxiliary relays	Self reset contacts except for lock-out relays.
18.16.3	Reset mechanism for lockout relays	Electrical reset type for 11kV outgoing panels only. Hand reset type for all other panels.
18.16.4	Operation indicators	With hand-reset operation indicators (flags) or LEDs with pushbuttons for resetting.
18.17	Auxiliary relays – Requirement	
18.17.1	Anti pumping (94), lockout (86),	a. For each breaker b. Lock Out Relay mounting shall be flush type on front side of Panel
18.17.2	PT selection relays	To be provided in bus coupler panel for selection between Bus PT and Line PT of respective sections.
18.17.3	Switchgear with two incomer & bus coupler	Lockout relay (86) contact of each incoming breakers to be wired in series in closing circuit of other incoming breakers & bus coupler.
18.17.4	Contact Multiplication Relay for Tripping and closing of Breaker	a. One for Tripping and one for closing with each breaker b. Current Rating shall be 30 percent more than closing and tripping coil current rating c. Shall be of closed type i.e. direct unauthorised access shall not be provided.
18.17.5	Auxiliary Relays, contact multiplication relays etc.	To effect interlocks and to exchange signals of status & control

18.17.6	Transformer trouble relays (For 33kV Transformer feeder panel only)	Auxiliary relays with indicating flags (contactors will not be accepted) should be provided for the following trip and alarm commands – a. Buchholz trip b. OSR trip c. PRV trip d. SPR trip e. WTI Trip f. OTI Trip g. Buchholz Alarm h. Low oil level alarm i. OTI Alarm j. WTI Alarm.
18.18	General Requirements for all relays/contactors	Auxiliary supply will be 50/220VDC based on requirement. All relays/contactors shall be suitable for continuous operation at 15% overvoltage.

19 SYNCH CHECK PHILOSOPHY

19.1	Dead Bus – Live Line	a. Application - Required for Charging of Bus from Line Supply b. Logic - Sync check relay installed on line panel will check the line and bus voltage and derive that the line is live and bus is in dead condition i.e bus has to be charged by the line breaker. Hence Sync check relay will allow the line breaker to close in this condition.
19.2	Dead Line – Live Bus	a. Application - Required for Charging of Line from Bus Supply b. Logic - Sync check relay installed on line panel will check line and bus voltage and derive that the line is dead and bus is in live condition i.e line has to charged from bus. Hence Sync check relay will allow the line breaker to close in this condition.
19.3	Live Bus – Live Line	a. Application - Required for paralleling of bus and line supply b. Logic - Sync check relay installed on line panel will compare magnitude and phase sequence of line and bus voltages. If the

		variations are within the range set in the relay, sync check relay will allow the closing of line breaker.
19.4	Live Bus – Dead Bus	a. Application – Required for charging of dead bus through another live bus. b. Logic – Sync check relay installed on bus coupler/bus section panel will check voltage of both buses and derive that one bus is dead and other bus is live i.e dead bus is being charged from live bus. Hence Sync check relay will allow the bus coupler/bus section breaker to close in this condition.
19.5	Live Bus – Live Bus	a. Application – Required for paralleling of two buses/bus sections. b. Logic – Sync check relay installed on bus coupler/bus section panel will compare the magnitude and phase sequence of voltage of both buses (or bus sections). If the variations are within the range set in the relay, sync check relay will allow the bus coupler/bus section breaker to close.

20 ETHERNET SWITCHES & FIBRE OPTICS

20.1	Ethernet Switch	
20.1.1	Numbers	Two at each site
20.1.2	FO Port	16 Nos
20.1.3	RJ 45 Port	4 Nos
20.1.4	Communication Protocol	IEC 61850
20.1.5	Network Protocol	PRP
20.1.6	Downlink Rate	100 MBPS
20.1.7	Uplink Rate	1 GBPS
20.1.8	Coating	Conformal
20.1.9	Power Supply Voltage	220 / 50 VDC as per site condition
20.1.10	Grade	Industrial
20.1.11	Certification required	KEMA,CE & FCC for IEC 61850 compliance
20.1.12	Operating Temperature	
20.1.13	Mounting	In Switchgear Panel
20.1.14	Blinking LED Indicators	On each RJ45 ports
20.1.15	Separate Maintenance/console Part	Required
20.1.16	Latency	Less than or equal to 10 ms

20.1.17	Fibre Optic Compatibility	Multimode, 1310 nm
20.1.18	Placement	Din Rail Arrangement Inside Switchgear
20.2	Fibre Optics (Patch Cord) and Ethernet cable	
20.2.1	Connection	From Relays, Meters to Ethernet Switch
20.2.2	Mode of Fibre Optics	Multimode
20.2.3	Wavelength	1310 nm
20.2.4	Ethernet Cable Type	CAT VI
20.2.5	Associated Connectors and Accessories	Required

21 SPACE HEATERS

21.1	Type	Thermostat controlled with switch for isolation
21.2	Location	In Breaker & HV cable compartment, mounted on an insulator. Heater position in cable compartment should be easily accessible after cable termination. Heater position in breaker chamber shall be accessible with breaker racked-in.

22 SOCKETS, SWITCHES ,ILLUMINATION LAMPS & MCBs

22.1	Illumination lamp with switch	For LV & cable chamber
22.2	Universal type (5/15 A) Socket with Switch	In LV chamber
22.3	MCBs	a. MCBs of Proper rating may be provided. b. Although Main MCB shall be directly wired up to Trip Circuit, No other MCB shall be provided in between c. Rating of MCB shall be 300% of full load current of relevant circuit

23 NAMEPLATES AND MARKING

23.1	Nameplates	To be provided as per the following description
23.1.1	Equipment Nameplates	a. All equipment mounted on front side as well as equipment mounted inside the panels shall be provided with individual name plates with equipment designation engraved. b. All front mounted equipment shall be also provided at the rear with individual name plates engraved with tag numbers corresponding to the one shown in the panel internal wiring to facilitate easy tracing of the wiring.
23.1.2	Feeder Nameplates	a. Large and bold name plate carrying the feeder identification/ numbers shall be provided on the top of each panel on front as well as rear side. On rear side, nameplate should be provided on frame. b. Rear bottom of each panel shall have a nameplate clearly indicating the following: Customer Name – BSES Delhi; PO No. & date; Drawing Reference No. etc.
23.1.3	Rating Plate	Following details are to be provided on Panel rating plate: a. Customer Name – BSES Yamuna Power Limited b. PO No. & Date – c. Complete CT Rating plate details d. Complete PT Rating plate details e. Complete CB Rating Plate details f. Date of Manufacturing- g. Warranty Period- h. Customer care No- i. Control Voltage-
23.1.4	Material	Non-rusting metal or 3 ply lamicoid. Nameplates shall be black with white engraving lettering. Stickers are

DocUUID : 17b81629-6792-43e6-8f6f-1574802d02f6

		not allowed.
23.1.5	Fixing	All nameplates/rating plates shall be riveted to the panels at all four corners. Bolting/screwing is not acceptable.
23.2	Markings	Each switch shall bear clear inscription identifying its function. Similar inscription shall also be provided on each device whose function is not otherwise identified. If any switch or device does not bear this inscription separate nameplate giving its function shall be provided for it. Switch shall also have clear inscription for each position indicating e.g. Trip-Neutral close, ON-OFF etc.

24 SURFACE TREATMENT & PAINTING

24.1	Surface Treatment	Sand blasting or by seven tank process.
24.2	Paint type	Powder coated. Pure polyester base grade-A structure finish.
24.3	Paint shade	RAL 7032 for external & internal surface
24.4	Paint thickness	Minimum 50 microns

25 APPROVED MAKES OF COMPONENTS

25.1	Numerical Relays	R series of ABB, Siprotec series of Siemens, Micom series of Schneider/Alstom. Numerical relays used in complete switchboard should be of same make. Use of two different makes of relays in a switchboard is not acceptable.
25.2	Transformer monitoring cum AVR relay	A-eberle/Easun-MR
25.3	Electromechanical Relays	Alstom/Schneider/Siemens/ABB/ER
25.4	Miniature Relays	ABB/Jyoti/Omran
25.5	Contactors	ABB/Siemens/Telemechanique

DocUUID : 17b81629-6792-43e6-8f6f-1574802d02f6

25.6	Instrument transformers	ECS/ Pragati/ Gemini/Schneider/CGL/Kappa/Narayan power tech
25.7	MCBs	Siemens/Schneider/Legrand/ABB
25.8	Control switches	Switron/Kaycee
25.9	Test terminal blocks	IMP/Schneider/Alstom
25.10	Terminal blocks	Elmex/Connectwell
25.11	Indicating lamps	Siemens/ Teknic/ Binay
25.12	Surge Suppressors	Oblum/Tyco
25.13	Meters	Rishabh(Rish delta Energy)/Conzerv
25.14	Ethernet Switch	Ruggedcom/Hirschman

26 INSPECTION , TESTING & QUALITY ASSURANCE

26.1	Type Tests	The product must be of type tested as per applicable Indian standards / IEC
26.1.1	Type test report validity period	Last five years from date of bid submission. Bidder with type test report more than 5 years old needs to re-conduct the tests without any commercial implication to BSES
26.1.2	Pressure relief device operation	Test certificate for panel to be submitted
26.2	Acceptance & Routine tests	As per the specification and relevant standards. Charges for these tests shall be deemed to be included in the equipment price. In addition to these tests, following tests have to be carried out as acceptance tests -
26.2.1	Primary injection test	To be carried out on panels selected for testing
26.2.2	Temperature rise test	One panel per Purchase order (PO with minimum 10 panels) without any commercial implication to BSES. In-house testing is acceptable.
26.2.3	Paint Thickness/ Peel off	To be carried out on panels selected for testing

26.3	Inspection	The purchaser/owner reserves the right to witness all the acceptance/routine tests during inspection.
26.4	Notice to purchaser for conducting type tests	At least three weeks in advance
26.5	Quality Assurance	
26.5.1	Vendor quality plan	To be submitted for purchaser approval
26.5.2	Inspection points	To be mutually identified & agreed in quality plan

27 PACKING

27.1	Packing Protection	Against corrosion, dampness, heavy rains, breakage and vibration. During transportation/ transit and storage, panels may be subjected to outdoor conditions. Hence, packing of each panel shall be weatherproof.
27.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification
27.3	Details of Packing Identification Label on each packing case	a. Individual serial number b. Purchaser's name c. PO number (along with SAP item code, if any) & date d. Equipment Tag no. (if any) e. Destination f. Project Details g. Manufacturer / Supplier's name h. Address of Manufacturer / Supplier / it's agent i. Description and Quantity j. Country of origin k. Month & year of Manufacturing l. Case measurements m. Gross and net weights in kilograms n. All necessary slinging and stacking instructions

28 SHIPPING

28.1	Shipping	The bidder shall ascertain at an early date and definitely before the commencement of manufacture, any transport limitations such as weights, dimensions, road culverts, Overhead lines, free access etc. from the Manufacturing plant to the project site. Bidder shall furnish the confirmation that the proposed Packages can be safely transported, as normal or oversize packages, up to the site. Any modifications required in the infrastructure and cost thereof in this connection shall be brought to the notice of the Purchaser.
		The seller shall be responsible for all transit damage due to improper packing.

29 HANDLING AND STORAGE

29.1	Handling and Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet / manual needs to be furnished before commencement of supply.

30 DEVIATION

30.1	Deviation	Deviations from this Specification shall be provided in excel sheet with tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification.

31 ACCESSORIES & TOOLS

31.1	Type and Quantity	Bidder to indicate
31.2	Special tools & tackles required for erection, testing, commissioning and maintenance of the switchboard	The cost of these items shall be indicated separately in the bid as optional.
31.3	Suitable handling truck / trolley for lifting and moving the circuit breaker	To be supplied. (Two trolleys for each type/rating of breaker)

32 DRAWINGS & DATA SUBMISSION MATRIX

Drawing submission shall be as per the matrix given below. All documents/ drawing shall be provided on A3/A4 sheet (based on legibility) in box file with separators for each section. PDF shall also be provided of all documents via USB. Deviation sheet and GTP shall be provided in excel sheet .Language of the documents shall be English only. Deficient/ improper document/ drawing submission shall be liable for rejection.

S. No	Head	Bid	Drawing Approval	Pre Dispatch	Pre Closure
32.1	Contact Person Name, Email ID and Mobile Number	Required			
32.2	Consolidated Deviation Sheet	Required	Required		
32.3	GTP	Required	Required		
32.4	Relevant Type Test as per IS/IEC	Required			
32.5	Power Cable and control cable Philosophy and Schedule		Required		
32.6	Manufacturer's quality assurance plan and certification for quality standards		Required		
32.7	Sizing Calculation of Associated Equipment		Required		

32.8	Recommended Spares Apart from spares stated in Spec(for five years of operation)		Required		
32.9	11 kV / 33 kV Switchgear drawing				
32.9.1	General Arrangement	Required	Required		
32.9.2	Sectional Layout		Required		
32.9.3	Door Layout		Required		
32.9.4	LV Box Internal Layout		Required		
32.9.5	SLD	Required	Required		
32.9.6	Schematic Circuit diagram and Scheme of Each type of Panel		Required		
32.9.7	Communication Architecture		Required		
32.9.8	Bus Bar Arrangement		Required		
32.9.9	QAP		Required		
32.9.10	Panel wise BOQ		Required		
32.9.11	Logic Operation Diagram		Required		
32.9.12	Plan		Required		
32.9.13	Synch Logic Diagram		Required		
32.9.14	Foundation Diagram		Required		
32.9.15	DI sheet		Required		
32.9.16	DO Sheet		Required		
32.9.17	TB Details		Required		
32.9.18	Make of all Component as per specification		Required		
32.10	Drawing of Substation Room		Required		
32.11	Ventilation detail requirement of GIS Room		Required		
32.12	Installation, erection and commissioning manual for switchgear		Required		
32.13	Inspection Reports			Required	

DocUUID : 17b81629-6792-43e6-8f6f-1574802d02f6

32.14	As manufacturing Drawings			Required	
32.15	Operation and Maintenance Manual			Required	Required
32.16	Trouble shooting manual			Required	Required
32.17	As built Drawings				Required
32.18	Test Report				Required
32.19	Weekly progress report				Required

ANNEXURE – A - SCOPE OF SUPPLY

Scope of supply should include the following –

1.1 Design, manufacture, assembly, testing at manufacturer's works, properly packed for transport, supply and FOR delivery at site of following 11kV / 33kV Switchgears as per enclosed specification and single line diagram.

1.2 Base channel frame of the switchgears with hardware.

1.3 Two trolleys for breaker of each size are to be provided per switchboard.

1.4 Programming software and communication cord for numerical relays.

1.5 Unit price of 33kV Incomer with Distance relay as primary protection and 33kV Incomer with Line differential relay as primary protection should be mentioned separately in the bid. Primary protection to be used in Incomer panel will be finalized based on site requirement.

1.6 Unit price of Bus PT should be indicated separately in the bid to enable addition/deletion based on site requirement.

1.7 Bidder should indicate price of one set of special tools and tackles (if any) required for maintenance of switchgear and its components.

1.8 Bidder should indicate price of each spare as per Annexure E.

1.9 All relevant drawings, data and instruction manuals.

ANNEXURE – B – TRANSFORMER MONITORING CUM AVR RELAY

1	General features	
1.1	Technology and Functionality	Microprocessor based with provision for multifunction control and monitoring.
1.2	Mounting	Flush Mounting
1.3	Architecture	Hardware and software architecture shall be modular and disconnectable to adapt the control unit to the required level of complexity as per the application.
1.4	Programming and configuration	AVR shall utilize a user friendly setting and operating multilingual software in windows environment with menus and icons for fast access to the data required.
1.5	User Machine Interface	UMI with an alphanumeric key pad and graphical LCD display with backlight indicating measurement values and operating messages. Capability to access and change all settings and parameters.
1.6	PC Interface port	Front port (preferably serial) for configuration using PC. Cost of licensed software and communication cord, required for programming of offered protection relays using PC, shall be mentioned separately in the bid.
1.7	SCADA Interface port	LC Type Dual fibre optic port for interfacing with SCADA on IEC 61850 & PRP compatible. Through these ports relays shall be connected to Ethernet switches.
1.8	Self diagnosis	Shall be able to detect internal failures. A watchdog relay with changeover contact shall provide information about the failure.
1.9	Cable Termination	Termination of cable shall be at rear side.
1.10	Auxiliary supply	220VDC or 48VDC
2	Inputs and Outputs	
2.1	CT Input	1/5A selectable through programming
2.2	PT Input	110VAC
2.3	Binary Inputs	Sixteen programmable binary inputs should be provided

2.4	Analog Inputs (4-20mA)	One input to be provided
2.5	PT-100 direct input	Two inputs to be provided
2.6	Direct Resistance Input	For tap position indication (18 steps)
2.7	Binary Outputs	Ten programmable binary outputs should be provided
3	Control	
3.1	Control Tasks	Ability to implement control functions through programmable logics
3.2	Voltage setting	Programmable Voltage set point
3.3	Voltage Regulation	Raise/Lower tap position to maintain the preset value of voltage.
3.4	Voltage Regulation modes	Automatic and Manual
3.5	Operation Modes	Local and Remote
3.6	Fan and Pump control	To be provided
3.7	Transformer Paralleling	Capability to parallel transformers whose AVRs are interconnected via a communication network.
4	SCADA Interfacing	
4.1	Configuration of DIs for routing alarm/trip signals to SCADA.	DI-1 – Buchholz trip DI-2 – OSR Trip DI-3 – PRV trip DI-4 – SPR trip DI-5 – OTI trip DI-6 – WTI trip DI-7 – Buchholz alarm DI-8 – Oil Level low alarm (MOG alarm) DI-9 – WTI alarm DI-10 – OTI alarm DI-11 – Tap changer trouble/stuck/out of step DI-12 – Tap changer motor supply fail DI-13 – Tap changer in local control All signals from DI-1 to DI-10 are to be wired up from transformer trouble auxiliary relays.
4.2	Configuration of DOs for	DO-1 – Tap raise

	executing commands from SCADA through interface port/CRP	DO-2 – Tap lower DO-3 – Fan group 1 control DO-4 – Fan group 2 control
4.3	Spare DIs and DOs	To be wired upto the terminal block.
5	Measurement, Event Recording and Monitoring	
5.1	Measured Quantities (optional)	Voltage, Current, Active Power, Reactive Power, Apparent Power, Power factor, frequency
5.2	Event Recording	Facility for recording parameters during various events such as tap change, change in binary input status etc.
5.3	Monitoring	Capability to monitor important transformer parameters such as Oil temperature, Winding Temperature etc and give indication/alarm when the value of a particular parameter exceeds the preset value.

ANNEXURE – C - TECHNICAL PARTICULARS

1.0	SWITCHGEAR		
1.1	Type	Metal clad, air insulated with VCB type circuit breaker	
1.2	Service	Indoor	
1.3	Mounting	Free standing, floor mounted	
1.4	System Voltage	11 KV	33kV
1.5	Voltage variation	+/- 10%	
1.6	Frequency	50 Hz +/- 5%	
1.7	Phase	3	
1.8	Rated voltage	12 KV	36 kV
1.9	Rated current	As per SLDs given in Annexure-F	
1.10	Short time rating for 3 sec.	25kA	25kA
1.11	Internal arc classification and rating		
1.11.1	Classification	IAC – A - FLR	IAC – A - FLR
1.11.2	Rating	25kA for 1 second	25kA for 1 second.
1.12	Insulation level (PF rms / Impulse peak)	28 kV / 75 kV	70 kV/ 170 kV
1.13	System ground	Effectively earthed	Effectively earthed
1.14	Enclosure degree of protection	IP – 4X for high voltage compartment and IP – 5X for metering and protection compartment	
1.15	Bus bar - Main	Rating as per SLDs given in annexure - F, Short time rating as per clause 1.10.	
1.15.1	Material	Tinned Electrolytic copper	
1.15.2	Bus bar sleeve	Sleeved with shrouds on joints. Tape on joints is not acceptable.	
1.15.3	Bus identification	Colour coded	
1.15.4	Temperature rise	40 deg. C for conventional joints. 55 deg. C for silver plated joints	
1.16	Auxiliary bus bar	Electrolytic grade tinned copper	

1.17	Auxiliary DC Supply	220 V DC / 48 V DC	
1.18	Auxiliary AC supply	240 V AC 50 Hz	
1.19	Hardware	Stainless steel.	
1.20	Earth bus	Aluminium	
1.21	Bus duct entry	From top (where ever applicable)	
1.22	Power cable entry	From bottom and rear	
1.23	Control cable entry	From bottom and front (i.e breaker compartment)	
2.0	CIRCUIT BREAKER		
2.1	Voltage class, insulation level, short time rating	As specified for switchgear	
2.2	Rated current	As per SLDs given in annexure - F. Use of two breakers in parallel to meet the required current rating shall not be acceptable.	
2.3	Duty cycle	O – 0.3 sec – CO - 3min - CO	
2.4	Short circuit rating		
2.4.1	A.C sym. breaking current	25kA	25kA
2.4.2	Short circuit making current	62.5kA	62.5kA
2.5	Operation time		
2.5.1	Break time	Not more than 4 cycles	
2.5.2	Make time	Not more than 5 cycles	
2.6	Range of Auxiliary Voltage		
2.6.1	Closing	85% - 110%	
2.6.2	Tripping	70% - 110%	
2.6.3	Spring Charging	85% - 110%	
2.7	No. of spare aux. Contacts of Breaker, for Owner's use.	Minimum 6 NO + 6 NC	
2.8	No. of spare contacts of Service and Test position limit switch	2 NO	

3.0	CURRENT TRANSFORMERS		
3.1	Voltage class, insulation level and short time rating	As specified for switchgear	
3.2	Type	Cast resin, window / bar primary type	
3.3	Class of insulation	Class E or better	
3.4	Ratio	As per SLDs given in annexure - F	
3.5	Number of secondaries	As per SLDs given in annexure - F	
3.6	Accuracy class		
3.6.1	Protection core	5P20	
3.6.2	Protection (Diff. / REF)	PS	
3.6.3	Metering	0.2s	
3.6.4	Core balance CT	PS	
3.7	Burden (VA)	Adequate for the protection & instruments offered	
3.8	Excitation current of PS Class CTs	30 mA at Vk/4	
3.8	Knee Point Voltage of PS Class CTs (Vk)	>= 40 (Rct + 4)	
3.9	Primary operating current sensitivity of CBCTs	5A	
4.0	VOLTAGE TRANSFORMERS		
4.1	Type	Cast resin, draw out type, single phase units	
4.2	Rated Voltage		
4.2.1	Primary	11000/sq.rt.3	33000/sq.rt.3
4.2.2	Secondary	110V/sq.rt.3	
4.3	No. of phases	3	
4.4	No. of secondary windings	2	
4.5	Method of connection	Star/Star	
4.6	Rated voltage factor	1.2 continuous, 1.9 for 30 seconds	
4.7	Class of insulation	Class E or better	

4.8	Accuracy class		
4.8.1	Protection	3P	
4.8.2	Metering	0.2	
4.9	Primary and secondary fuses	HRC current limiting type, Primary fuse replacement shall be possible with VT in withdrawn position	
5.0	HV FUSES		
5.1	Voltage class	12kV	36kV
5.2	Rupturing capacity	50kA	
5.3	Rated current	As per application	
6.0	SURGE ARRESTORS	For 11kV switchgear	For 33kV switchgear
6.1	Rated Voltage	9kV	30kV
6.2	Maximum continuous operating voltage (MCOV)	7.65kV	25kV
6.3	Discharge current	10kA	10kA
6.4	Discharge class	3	3

Note - The auxiliary DC voltage shall be checked on a case to case basis by Purchaser

ANNEXURE – D - GUARANTEED TECHNICAL PARTICULARS (DATA BY BIDDER)

Vendor must submit clause wise compliance in Excel sheet against specification at the time of drawing approval clearly highlighting the deviations from specification against each clause.
:

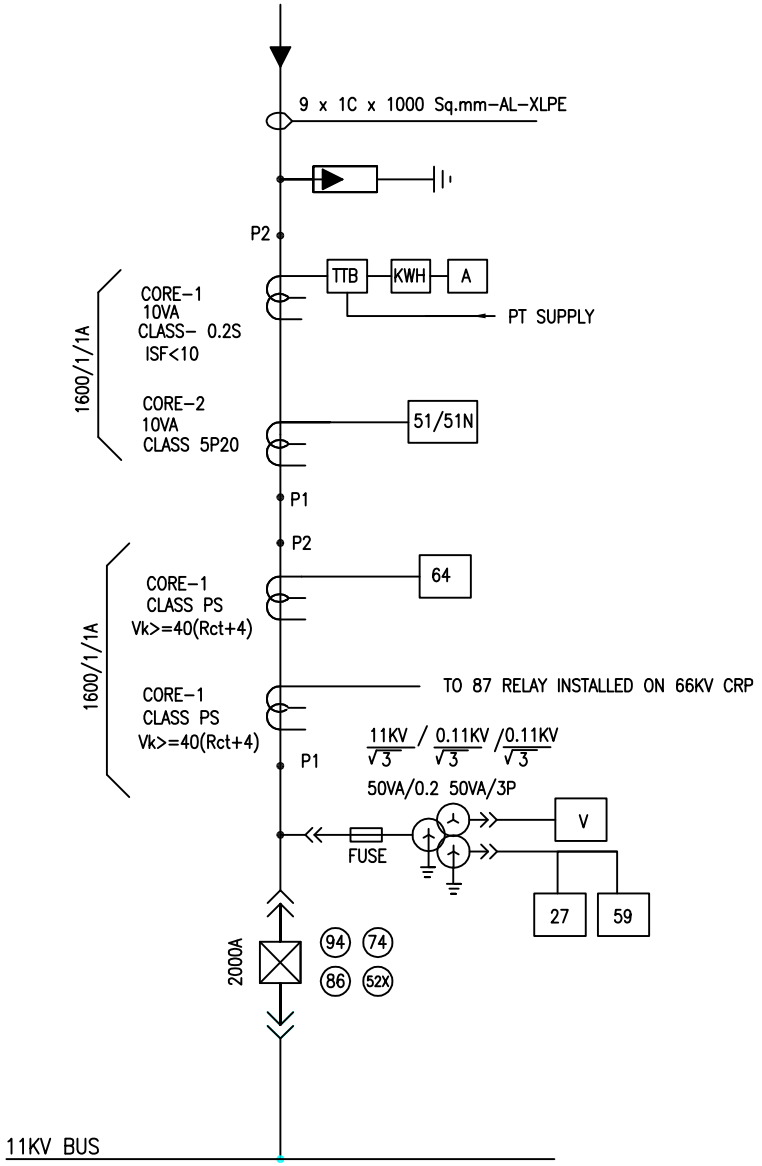
ANNEXURE – E – SPARES REQUIREMENT

Unit rate of all below mentioned spares have to be provided in the bid.

S No.	Description	Qty
1	Line voltage transformer	3 (1 set)
2	Bus voltage transformer	3 (1 set)
3	Current transformer of each ratio	3 (1 set)
4	Trip Coil	4
5	Closing Coil	4
6	CB Spring charging motor	2
7	Auxiliary switch	2 sets (2 Nos. each type)
8	Bursting disc / pressure relief plate complete	2
9	Numerical relay of each type	1 nos. (each type)
10	Ethernet Switch	1 No (Each Site)
11	Optical Fibre	20% of Supplied Items
12	CAT VI Ethernet cable for Communication	20% of Supplied Items
13	Vacuum Interrupter Bottle	1 set (3 nos.) of each rating
14	Breaker contacts for busbar	1 set (3 nos.) of each rating
15	Breaker testing cable with plug suitable for breaker on one side and plug suitable for the panel on the other side	3 meter(each type)
16	SCADA Spare	20% of Supplied Items

ANNEXURE – F – SLDs

ANNEXURE–F1



25 KA for 3 secs, 2000A at 50 degree celsius

LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:–

1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS

DRAWN	R.K/A.H
CHECKED	S.G
APPD.	G.S
DATE	25.03.21
SCALE	NTS

TITLE:–

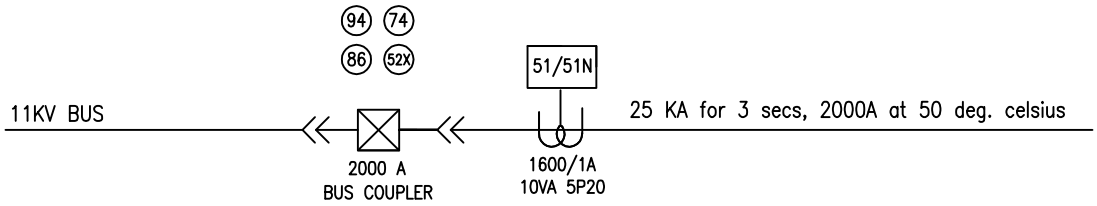
STANDARD SLD FOR 11KV INCOMER

BSES Yamuna Power Limited

SPECIFICATION NO. SP–HTSWG–01–R6

SLD–SWG–11KV–01

ANNEXURE–F2



LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:–

1. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS

DRAWN	R.K/A.H
CHECKED	S.G
APPD.	G.S
DATE	25.03.21
SCALE	NTS

TITLE:–

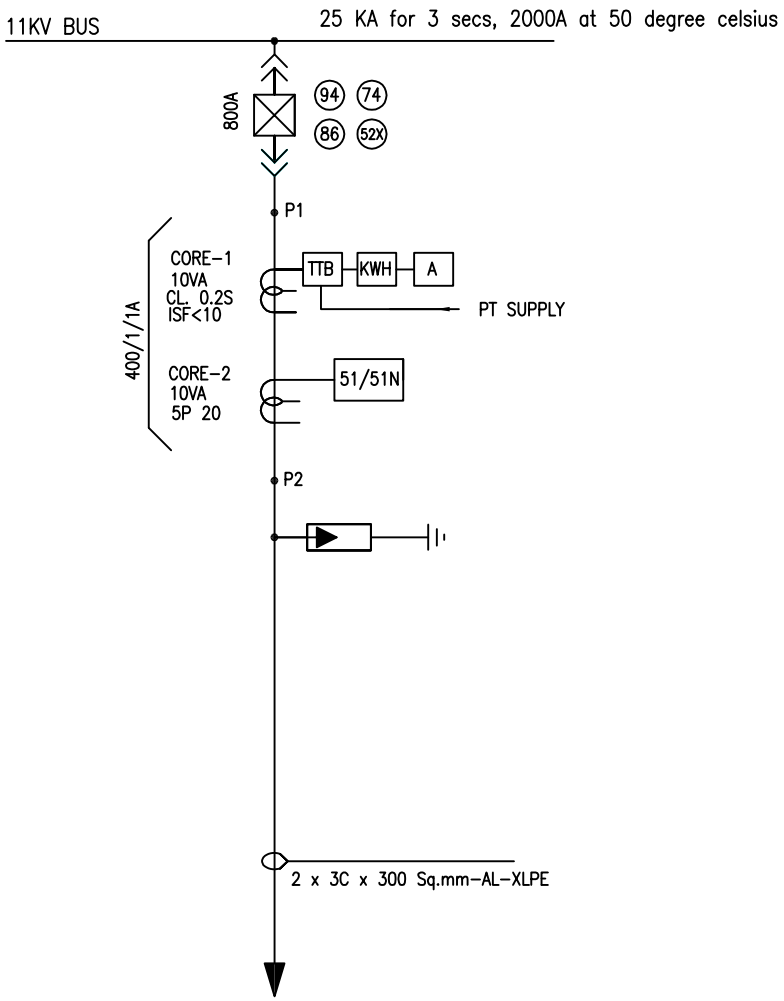
STANDARD SLD FOR 11KV BUS SECTION

BSES Yamuna Power Limited

SPECIFICATION NO. SP–HTSWG–01–R6

SLD–SWG–11KV–02

ANNEXURE–F3



LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:–

1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS

DRAWN	R.K/A.H
CHECKED	S.G
APPD.	G.S
DATE	25.03.21
SCALE	NTS

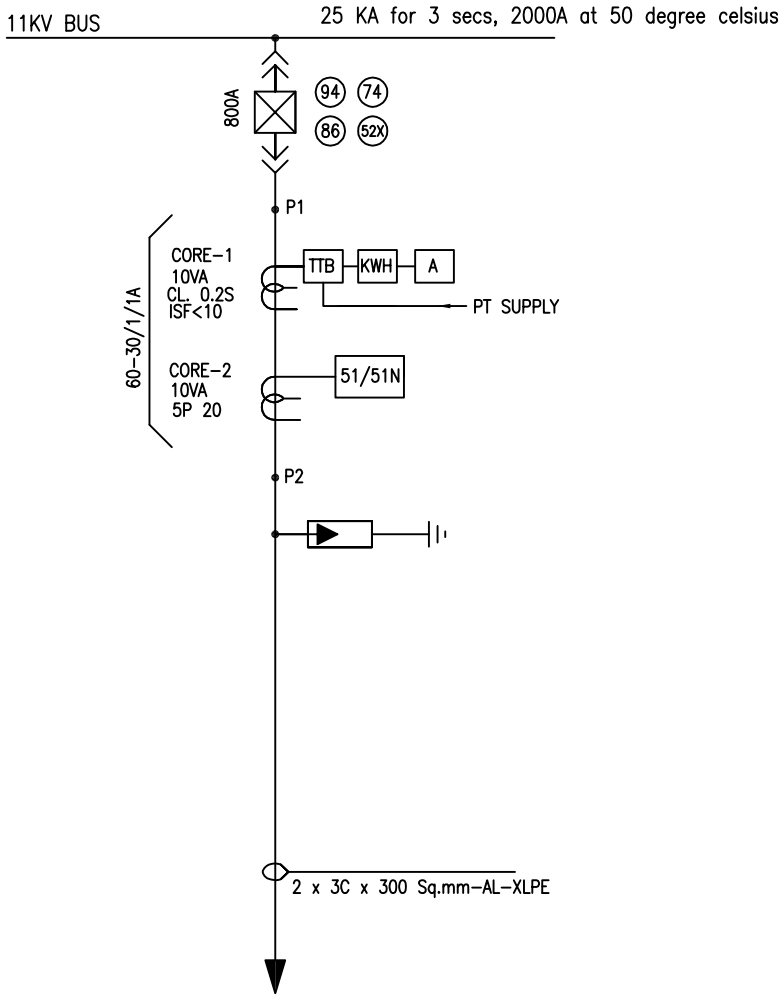
TITLE:–
STANDARD SLD FOR 11KV OUTGOING FEEDER

BSES Yamuna Power Limited

SPECIFICATION NO. SP–HTSWG–01–R6

SLD–SWG–11KV–03

ANNEXURE–F4



LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:–

1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS

DRAWN	R.K/A.H
CHECKED	S.G
APPD.	G.S
DATE	25.03.21
SCALE	NTS

TITLE:–

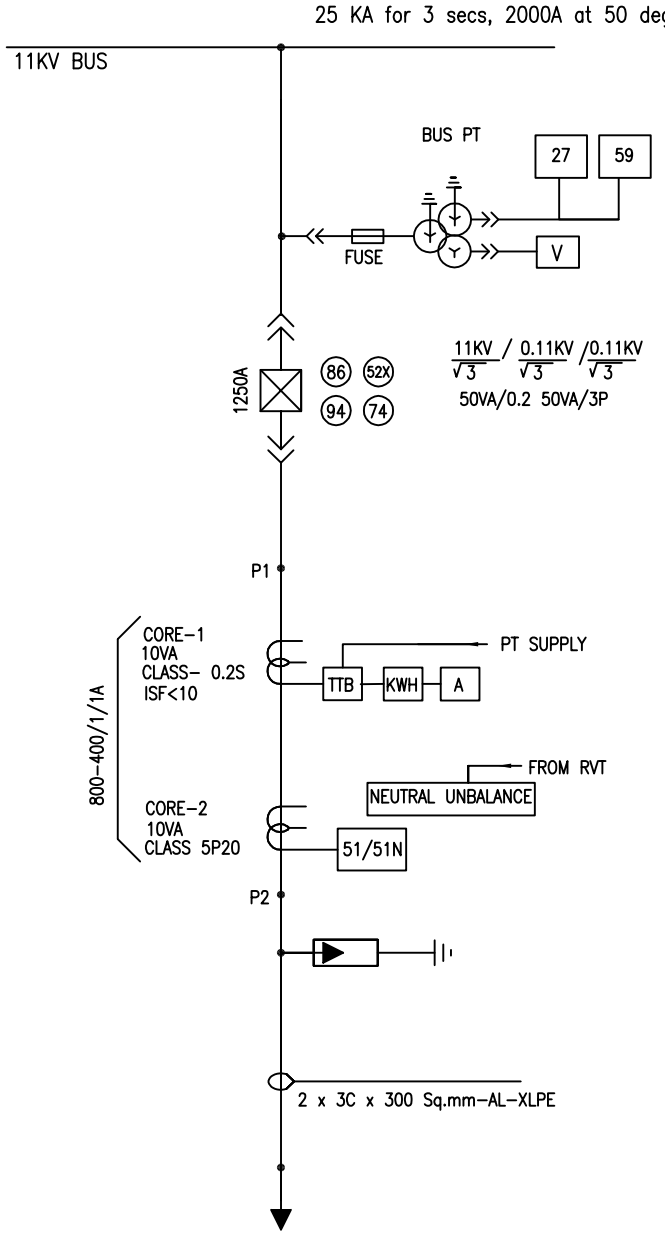
STANDARD SLD FOR 11KV STATION TRANSFORMER FEEDER

BSES Yamuna Power Limited

SPECIFICATION NO. SP–HTSWG–01–R6

SLD–SWG–11KV–04

ANNEXURE–F5



LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

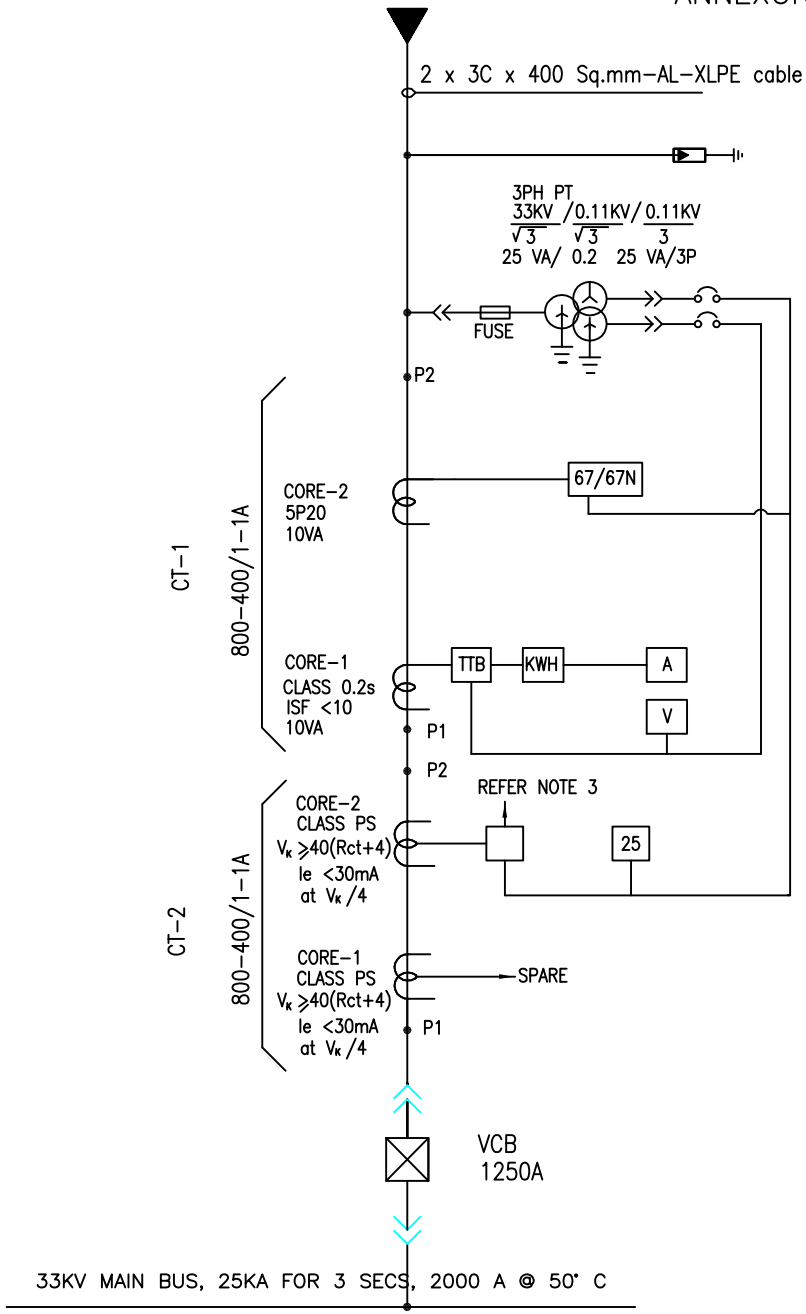
SYMBOL	DESCRIPTION
KWH	ENERGY METER
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:–

1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS
3. ONE BPT TO BE CONSIDERED FOR EACH CAPACITOR PANEL

DRAWN	R.K/A.H	TITLE:– STANDARD SLD FOR 11KV CAPACITOR FEEDER	BSES Yamuna Power Limited
CHECKED	S.G		
APPD.	G.S		SPECIFICATION NO. SP–HTSWG–01–R6
DATE	25.03.21		
SCALE	NTS		SLD–SWG–11KV–05

ANNEXURE–F6



LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:
1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS
3. LINE DIFFERENTIAL OR DISTANCE RELAY. REFER CLAUSE 16.7.1 OF SPECIFICATION

DRAWN	R.K/A.H
CHECKED	S.G
APPD.	G.S
DATE	25.03.2021
SCALE	NTS

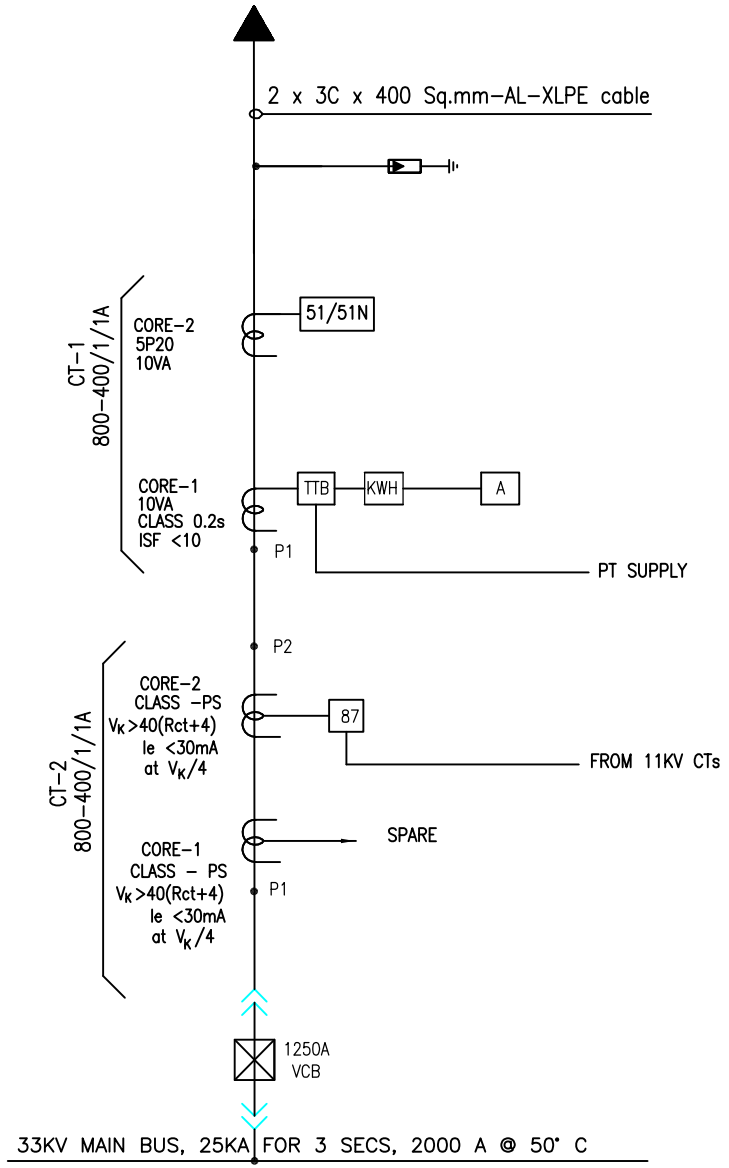
TITLE
TYPICAL SLD FOR 33KV INCOMER

BSES Yamuna Power Limited

SPECIFICATION NO. SP-HTSWG-01-R6

SLD-SWG-33KV-01

ANNEXURE–F7



LEGEND

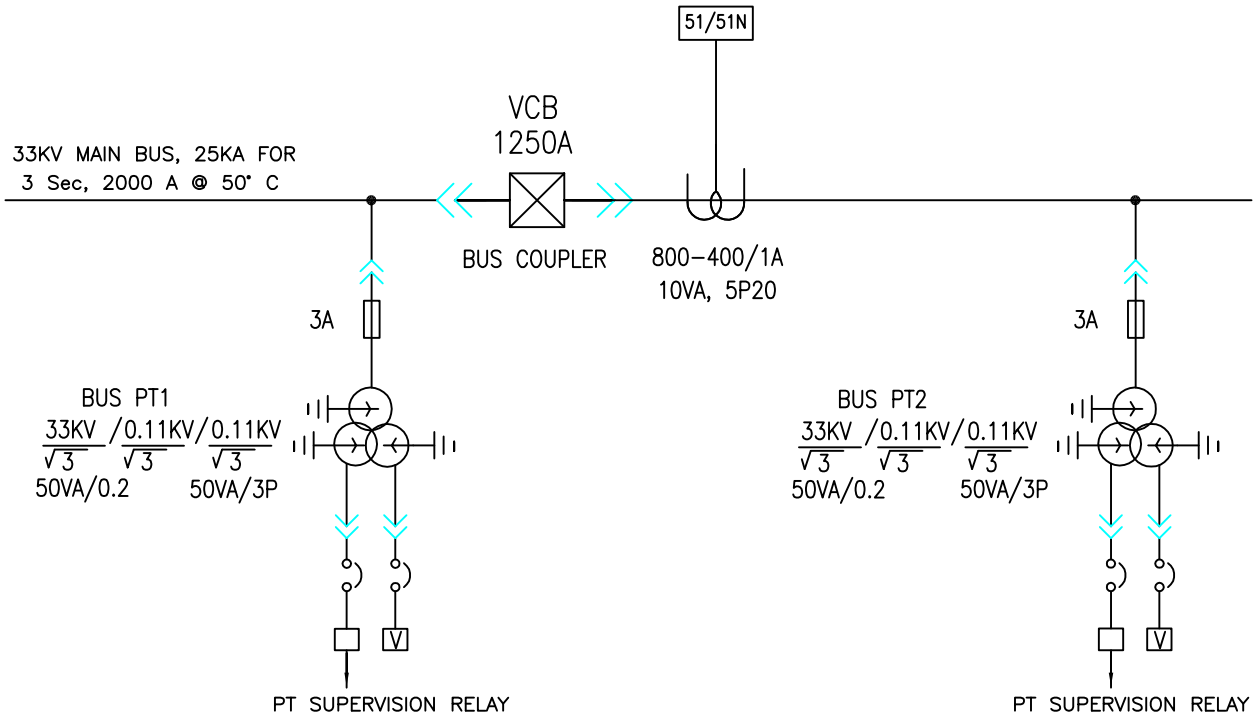
SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:
1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS

DRAWN	R.K/A.H	TITLE	BSES Yamuna Power Limited
CHECKED	S.G	TYPICAL SLD FOR 33/11KV TRANSFORMER FEEDER	SPECIFICATION NO. SP-HTSWG-01-R6
APPD.	G.S		
DATE	25.03.2021		SLD-SWG-33KV-02
SCALE	NTS		

ANNEXURE–F8



LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

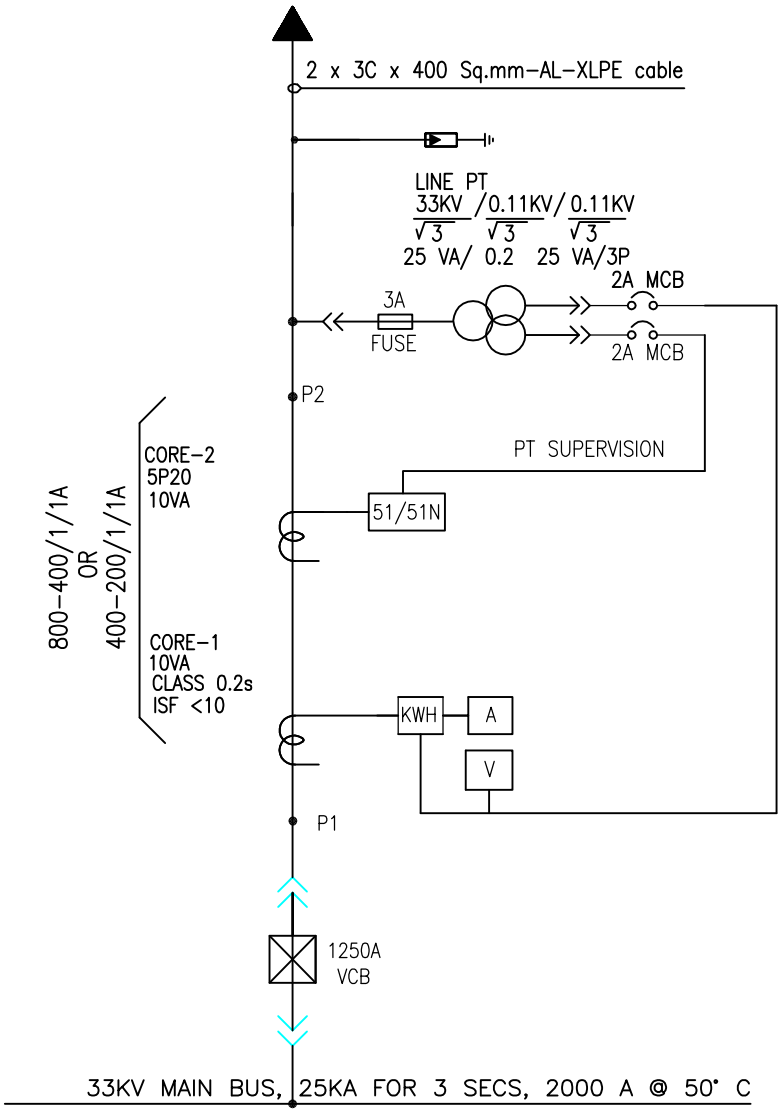
SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:–

1. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS

DRAWN	R.K/A.H	TITLE	BSES Yamuna Power Limited
CHECKED	S.G	TYPICAL SLD FOR 33KV BUS COUPLER CUM BUS PT	SPECIFICATION NO. SP-HTSWG-01-R6
APPD.	G.S		
DATE	25.03.2021		SLD-SWG-33KV-03
SCALE	NTS		

ANNEXURE–F9



LEGEND

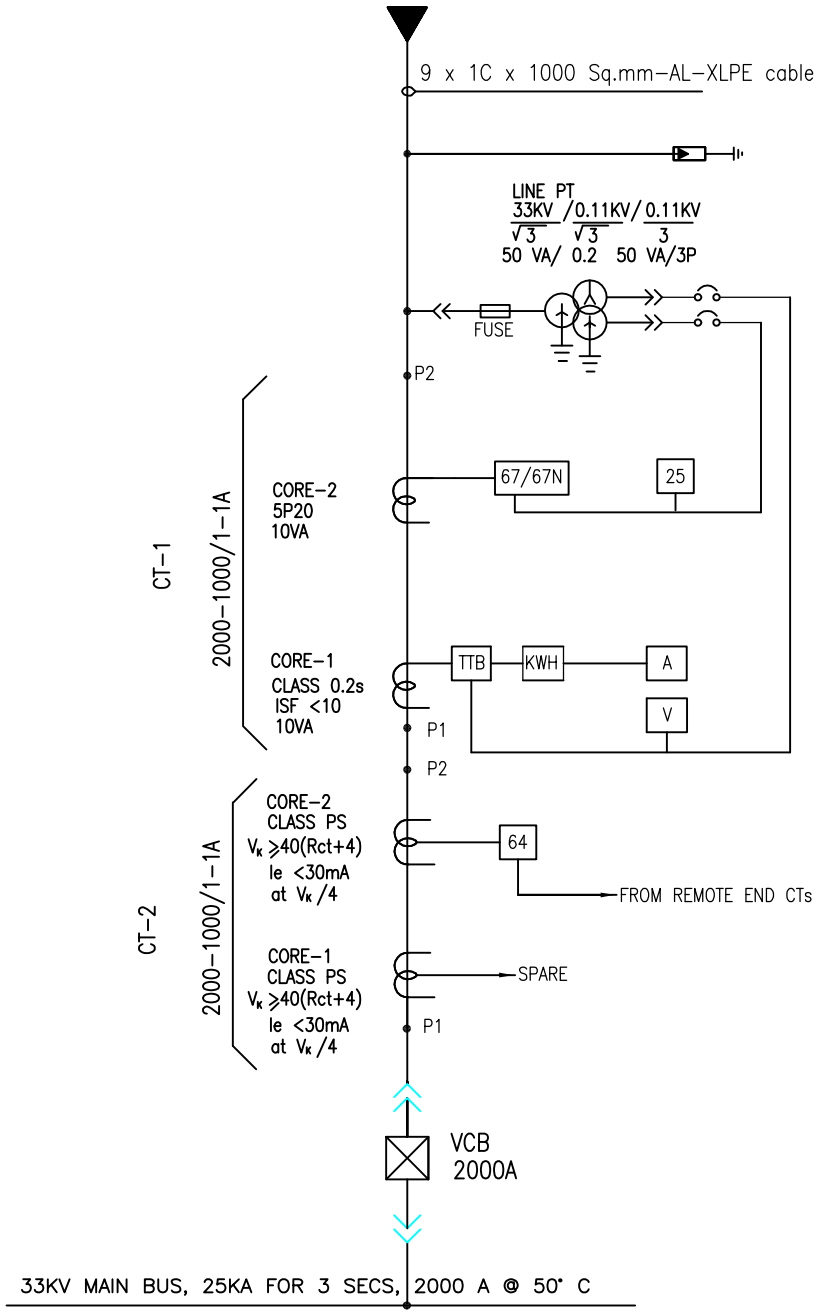
SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:
1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS
3. TTB NOT REQUIRED IN THIS PANEL

DRAWN	R.K/A.H	TITLE	BSES Yamuna Power Limited
CHECKED	S.G	TYPICAL SLD FOR 33 KV OUTGOING FEEDER (FOR INSTALLATION AT KCC CONSUMERS PREMISES)	SPECIFICATION NO. SP-HTSWG-01-R6
APPD.	G.S		
DATE	25.03.2021		SLD-SWG-33KV-04
SCALE	NTS		

ANNEXURE–F10



LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:
1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS

DRAWN	R.K/A.H
CHECKED	S.G
APPD.	G.S
DATE	25.03.2021
SCALE	NTS

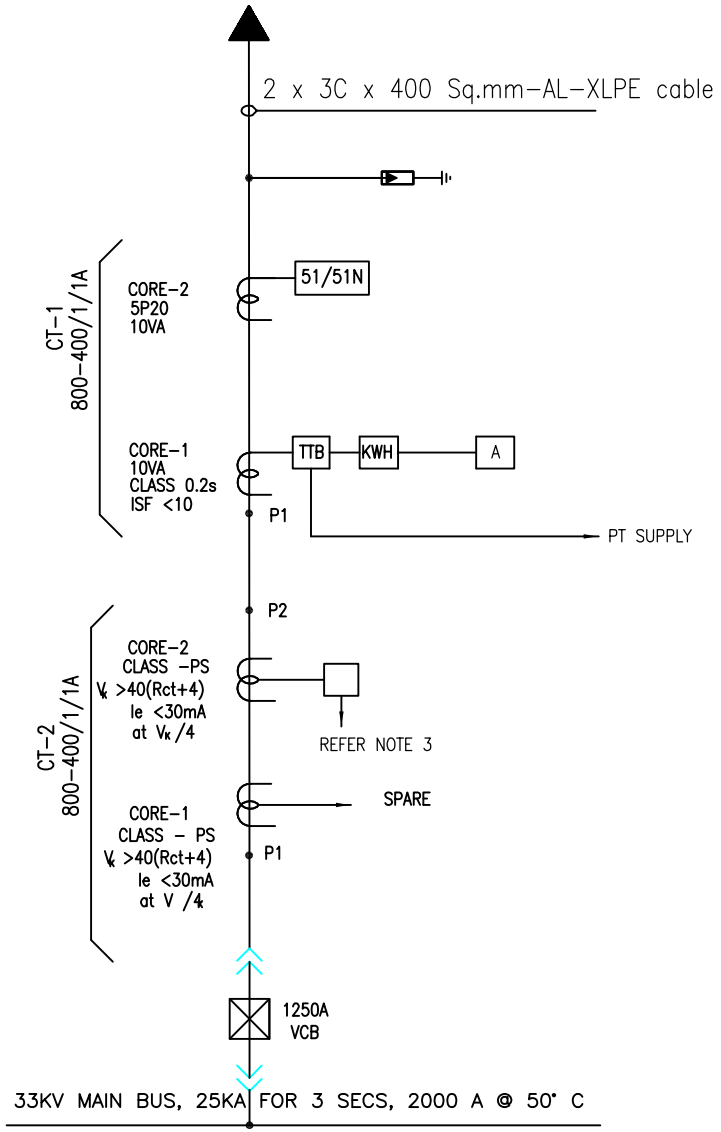
TITLE
TYPICAL SLD FOR 33KV INCOMER FROM 66/33KV AUTO TRANSFORMER

BSES Yamuna Power Limited

SPECIFICATION NO. SP-HTSWG-01-R6

SLD-SWG-33KV-05

ANNEXURE–F11



LEGEND

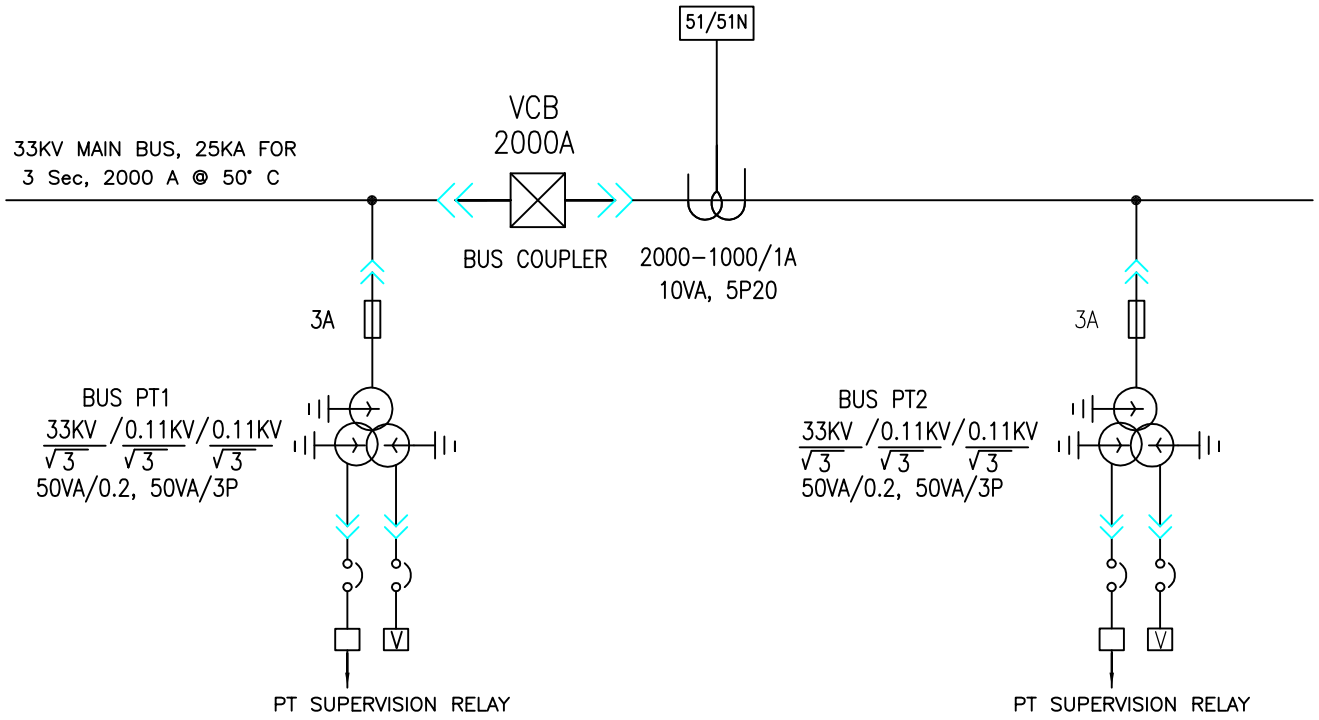
SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:
1. KWH METER NOT IN SUPPLIER'S SCOPE
2. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS
3. LINE DIFFERENTIAL OR DISTANCE RELAY. REFER CLAUSE 16.12.1 OF SPECIFICATION

DRAWN	R.K/A.H	TITLE: TYPICAL SLD FOR 33KV OUTGOING FROM 66/33KV AUTO TRANSFORMER	BSES Yamuna Power Limited
CHECKED	S.G		SPECIFICATION NO. SP-HTSWG-01-R6
APPD.	G.S		
DATE	25.03.2021		SLD-SWG-33KV-06
SCALE	NTS		

ANNEXURE–F12



LEGEND

SYMBOL	DESCRIPTION
	11KV SF6/VACUUM CKT. BKR. DRAWOUT TYPE
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	SURGE ARRESTOR
	FUSE
52X	BREAKER AUX CONTACT MULTIPLIER
74	TRIP CIRCUIT SUPERVISION RELAY
94	ANTI PUMPING RELAY
86	HIGH SPEED TRIP RELAY
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
KWH	ENERGY METER
46	NEGATIVE PHASE SEQUENCE PROTECTION
25	SYNC CHECK
51/51N	O/C & E/F RELAY
27	UNDER VOLTAGE RELAY
87	DIFFERENTIAL RELAY
21	DISTANCE RELAY
59	OVER VOLTAGE RELAY
64	REF RELAY
67/67N	DIRECTIONAL O/C & E/F RELAY
TTB	TEST TERMINAL BLOCK

NOTE:–

1. REFER CLAUSE 16 OF SPECIFICATION FOR DETAILED FUNCTIONAL REQUIREMENTS OF PROTECTION RELAYS

DRAWN	R.K/A.H	TITLE	BSES Yamuna Power Limited
CHECKED	S.G	TYPICAL SLD FOR BUS COUPLER CUM BUS PT PANEL FOR 33KV SWITCH BOARD OF 66/33KV AUTO TRANSFORMER	SPECIFICATION NO. SP-HTSWG-01-R6
APPD.	G.S		
DATE	25.03.2021		SLD-SWG-33KV-07
SCALE	NTS		

TECHNICAL SPECIFICATION

FOR

SCADA NETWORK & INTEGRATION

PREPARED BY	APPROVED BY	REV	01
		DATE	26th Oct 2021
RK	AV	PAGE	1 OF 15

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BSES Yamuna Power Limited
A Joint Venture with Govt. of NCT of Delhi

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BSES Yamuna Power Ltd.
A Joint Venture with Govt. of NCT of Delhi

INDEX

1.0 SCOPE

A. This specification is intended to cover the supply, erection, testing and commissioning of SCADA Network and Integration associated hardware/software (like protocol converters), cables, accessories and other material required for interfacing of all electrical equipments with existing ABB RTU560 for efficient and trouble free operation.

A.1. ABB RTU panel is multi processor CMU05/CMR02 based having required nos. of co processor and main processor and having redundant power supply. Main processor is having Ethernet ports and serial ports. Ethernet port of main processor is connected to LAN Switch (to be provided by BSES) for communication with Master Control Centre on IEC 104 Protocol.

A.2. The co processors are having Ethernet ports which are responsible to communicate to all numerical relays and Digital RTCC on IEC 61850 protocol.

A.3. The co processors are having serial ports which are responsible to communicate to all multifunction meters (MFMs) and battery charger on Modbus protocol through RS485 network.

A.4. The main processors and co processors are having the licenses of IEC61850, MODBUS RTU MASTER & PLC, Archive, HMI, IEC 103 and IEC 104.

B. The devices i.e. Numerical relays, digital RTCC, MFMs, battery charger etc. on serial and LAN should have redundant media and redundant co processor connectivity.

C. This specification shall be used in conjunction with all specifications, data sheets, single line diagrams, and other drawings attached to the specification / purchase requisition.

2.0 SCADA NETWORK

2.1	INFRASTRUCTURE	i. All numerical relays & transformer monitoring units shall be connected to RTU in parallel redundancy protocol (PRP). ii. The communication shall be made in 1+1 mode, including the links between numerical relays & TMUs to switch and up to RTU, such that failure of one set of communication shall not affect the normal operation of system. However it shall be alarmed in RTU. iii. Data exchange is to be realized on dual star Bus topology using IEC 61850 protocol with a redundant managed switched on Ethernet communication infrastructure. iv. MFMs shall be connected to RTU through RS485 network with SPD so loop shall be prepared in daisy chain fashion. v. Devices connected to single loop shall not be more than 10 IEDs.

		vi. Network architecture shall be approved by BYPL SCADA team.
2.2	SCOPE OF WORK	i. Laying and termination of cat 6 cables from CRP switch to RTU Switch shall be done in suitable size of PVC Pipe. ii. Laying and termination of RS 485 cables shall be done in PVC Pipe of minimum 2 inch. iii. Laying and termination of FO patch cord from IEDs to CRP LAN Switch through suitable size PVC conduit.
2.3	SCOPE OF SUPPLY	i. All the hardware required to extend the relay signals to the RTU shall be supplied along with the switchboards. ii. Aux supply of these hardware devices shall be same as grid control voltage having wide range (-20% to +20%). iii. All communication hardware or protocol converters required for compatibility with existing RTU system shall be in bidder's scope.
2.3.1	Ethernet switches	The IEC 61850 compliant Managed Ethernet switch shall meet the demand of power system automation systems (IEC 61850-3, IEEE 1613 compliance). i. Ethernet switch shall be layer 2 industrial grade. ii. Ethernet switch shall be modular with SFP for copper and fiber port. iii. Ethernet switch port shall be approve by engineering in charge of SCADA. iv. Ethernet switch shall be 19" rack mounted. v. Ethernet switch shall operate at grid supply voltage with range +20% to -20% VDC. vi. Operating Temperature: -40°C to +85°C. vii. All port shall be user configurable with minimum configuration of 100Mbps. viii. Communication type: Fiber Optics media and ST/LC Connector compatible with IEDs supplied with CRP, As Per Site and Ethernet copper CAT6 OR above cable. Further approval at the time of final engineering approval. ix. LED indicators on all ports shall be blinking with data transfer. x. The switch should have a diagnostic/ error/ warning LED.

		xi. It should support remote user setting configuration. xii. It should own separate maintenance/ console port. xiii. Latency shall be not more than 10ms. xiv. Should be KEMA, CE and FCC Certified. xv. Switch should be extendable for future expansion. xvi. Minimum 20% spares of utilized hardware and accessories to be provided by the supplier/ BA. xvii. On-site warranty for the switch must be 5 years. The warranty certificate is required to be submitted by the supplier/ BA to BYPL at the time of SAT. xviii. Shall be suitably mounted in CRP/switchgear panel. xix. Ethernet Switch shall have required nos. of ports (having RJ45 Ports / FO Ports).Minimum 20% spare ports shall be provided. Final approval at the time of detail engineering. xx. Power Supply of EFS shall be Dual redundant with pluggable terminal block. xxi. Shall have Environmental conditions compliance as per • IEC60068-2-1 COLD TEMPERATURE • IEC60068-2-2 DRY HEAT • IEC60068-2-30 HUMIDITY • IEC60068-21-1 VIBRATION • IEC60068-21-2 SHOCK xxii. Shall have Features: • Management through Web-based, Telnet, CLI • SNMP supported • Remote Monitoring • Diagnostics with logging and alarms • Console ports xxiii. Shall have Product conformity • acc. to IEEE 802.3-10BaseT Yes • acc. to IEEE 802.3u-100BaseTX Yes • acc. to IEEE 802.3u-100BaseFX Yes • acc. to IEEE 802.3ab-1000BaseT Yes • acc.toIEEE802.3ad-Link Aggregation Yes • acc. to IEEE 802.3x-Flow Control Yes • acc. to IEEE 802.1d-MAC Bridges Yes • acc. to IEEE 802.1d-STP Yes

		• acc. to IEEE 802.1p-class of serviceYes • acc. to IEEE 802.1Q-VLAN tagging Yes • acc. to IEEE 802.1Q-2005 (formerly IEEE 802.1s) MSTP Yes • acc. to IEEE 802.1w-RRS Yes • acc. to IEEE 802.1x-port based Network Access Control xxiv. Shall have Mode Store and Forward xxv. Shall have Protection class IP4X,Conformal Coating,IPV6 xxvi. Shall have Authorized Repair center of original Ethernet switch manufacture in India. xxvii. Shall have Uplink Rate 1 GBPS and Downlink Rate 100 MBPS BYPL approved Makes Make 1 Ruggedcom 2 Hirschmann The specified makes are to be strictly adhered to and no change will be considered hereto.
2.3.2	Interface between Numerical Relay and switch	LC/ ST multimode duplex fibre optic patch cords connecting the numerical relay to switch shall be supplied by the bidder.. Make- Preston or equivalent
2.3.3	Interface between RTU and Ethernet switch	CAT 6 STP Cable shall be in bidder scope. Make- D-link, Belden or equivalent
2.3.4	Interface between MFM and RTU	RS485 Belden class cable shall be provided by bidder. Make- Belden or equivalent
2.3.5	Communication hardware	All hardware like LAN Switch, FO cables, protocol converters required for interfacing IEDs like protection relays, multifunction meters, transformer monitoring relays, battery charger controllers etc. to RTU should be included in scope of supply.

3.0 SCADA INTEGRATION

3.1	INFRASTRUCTURE	Numerical relays should be IEC 61850 compatible having dual fibre PRP optic ports. Through these ports relays shall be connected to CRP switches that further extended to existing RTU system through CAT6 LAN cable.
3.2	SCOPE OF WORK	i. Configuration of IEDs (primary, backup) and multifunction meters for SCADA signals as per Annexure 1: Signals related with 11KV panels and Annexure 2: Signals Related with MFM to communication the same in existing RTU 560A Co Processor CMU05/CMR02. ii. For communication configuration and troubleshooting of Relays and MFM, required software, ICD file (IED configuration description file), SCD file (substation configuration description file), communication cables and documents to be handed over to team SCADA BYPL. iii. Providing protocol mapping/node details for signals listed in Annexure 1: Signals related with 11KV panels and Annexure 2: Signals Related with MFM and communication configuration details for RTU configuration. iv. Simulation of all configured signals (Annexure 1: Signals related with 11KV panels and Annexure 2: Signals Related with MFM) over LAN on IEC 61850 and over RS 485 on modbus on separate terminal with same configuration settings. v. Testing & commissioning of Numerical relays, and Multifunction meters for all related signals upto RTU. vi. Testing of Indications, Command, Interlocks as per scheme, Relay soft interlock testing from Relay HMI as well as simulation of SCADA command through configured output of Relay. vii. Downloading of Disturbance records and uploading/downloading of configuration file to and from IEDs facility from remote through switches at pre decided IPs shall be provided. viii. Demonstration of operational compatibility with SCADA. ix. Point to Point testing all signals to BYPL SCADA at MCC and BCC.

3.3	SCOPE OF SUPPLY	
3.3.1	Configuration Software and Tools	All software and configuration tools required for configuration of SCADA Network should be included in scope of supply.

4.0 SPARES

4.1		i. Bidder shall submit list of recommended spares for BSES BYPL SCADA approval. ii. Recommended minimum 20% spares of supplied SCADA accessories for SCADA interface to be supplied by bidder. Price for spares shall be included in CRP package. All spares shall be tested in our premises

5.0 DOCUMENTATION

5.1	Documents for approval	i. The bidder shall ensure that all necessary drawings, write-up, information, etc required to fully describe the equipment are to be submitted for approval. ii. The manual shall clearly indicate in English the installation and connection method. Check up, maintenance and calibration method shall also be provided in the manuals.

6.0 TRAINING

5.1	Training at site	Training to BYPL SCADA's engineers at site by domain expert (two day training- one day in classroom and one day on site) with hands on.

7.0 DEVIATIONS

6.1	Deviation	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification. No deviation will be acceptable post order.

Annexure 1 (Signal List- 11kV)

A. 11kV Outgoing feeders- IEC 61850 Protocol

S.No.	Signal List	DI/ AI soft through N.Relay/ BCU	DO soft through N.Relay/ BCU	Signal Type
1.	Breaker ON	✓		DPI
2.	Breaker OFF			SPI
3.	Trip Ckt Healthy	✓		SPI
4.	Spring Charge	✓		SPI
5.	Breaker in Service	✓		SPI
6.	Breaker in Test	✓		SPI
7.	Auto Trip (86) Operated	✓		SPI
8.	Panel DC Fail	✓		SPI
9.	L/R switch in SCADA	✓		SPI
10.	Relay Int Fault	✓		SPI
11.	Over Current Operated	✓		SPI
12.	Earth Fault Operated	✓		SPI
13.	BKR Close COMMAND		✓	DCO
14.	BKR Open COMMAND			
15.	Auto Trip (86) relay reset from Remote		✓	SCO
16.	3Phase R, Y, B- Current & Voltage, Active Power, Reactive Power, Power factor, Max. Demand, Neu. Current	✓		AI/ MV
17.	Fault current and phase indication of faulty phase viz. R, Y, B, Earth, Unbalance (O/C & E/F Relay), Disturbance Records, Fault Graphs for Remote diagnosis purpose	✓		AI

Note: Signals like Panel DC Fail and Relay Int Fault to be taken from adjacent panel

B. 11kV Incomers: IEC 61850 Protocol

S.No.	Signal List	DI/ AI soft through N.Relay/ BCU	DO soft through N.Relay/ BCU	Signal Type
1.	Breaker On	✓		DPI
2.	Breaker OFF			
3.	Trip Ckt Healthy	✓		SPI
4.	Spring Charge	✓		SPI
5.	Breaker in Service	✓		SPI
6.	Breaker in Test	✓		SPI
7.	Auto trp (86) Operated	✓		SPI
8.	VT fuse Blown- Metering	✓		SPI
9.	VT fuse Blown- Protection	✓		SPI
10.	Panel DC Fail	✓		SPI
11.	L/R Switch in SCADA	✓		SPI
12.	Relay Int Fault	✓		SPI
13.	Over Current Operated (All Stages)	✓		SPI
14.	Earth Fault Operated (All Stages)	✓		SPI
15.	Under Voltage Prot. Operated	✓		SPI
16.	Over Voltage Prot. Operated	✓		
17.	REF Operated	✓		SPI
18.	BKR Close COMMAND		✓	DCO
19.	BKR Open COMMAND			
20.	Auto trip (86) relay reset from Remote		✓	SCO
21.	3Phase R, Y, B- Current & Voltage, Active Power, Reactive Power, Power factor, Max. Demand, Neu. Current	✓		AI/ MV
22.	Fault current and phase indication of faulty phase viz. R, Y, B, Earth, Unbalance (O/C & E/F Relay), Disturbance Records, Fault Graphs for Remote diagnosis purpose	✓		AI

Note: Signals like Panel DC Fail and Relay Int Fault to be taken from adjacent panel

C. 11kV Bus Coupler: IEC 61850 Protocol

S.No.	Signal List	DI/ AI soft through N.Relay/ BCU	DO soft through N.Relay/ BCU	Signal Type
1.	Breaker On	✓		DPI
2.	Breaker OFF			
3.	Trip Ckt Healthy	✓		SPI
4.	Spring Charge	✓		SPI
5.	Breaker in Service	✓		SPI
6.	Breaker in Test			SPI
7.	Auto trip (86) Operated	✓		SPI
8.	Panel DC Fail	✓		SPI
9.	L/R Switch in SCADA			SPI
10.	Relay Int. Fault	✓		SPI
11.	PT MCB- Metering operated	✓		SPI
12.	PT MCB- Protection operated	✓		SPI
13.	Over Current Operated	✓		SPI
14.	Earth Fault Operated	✓		SPI
15.	BKR Close COMMAND		✓	DCO
16.	BKR Open COMMAND			
17.	Fault current and phase indication of faulty phase viz. R, Y, B, Earth, Unbalance (O/C & E/F Relay), Disturbance Records, Fault Graphs for Remote diagnosis purpose	✓		AI

Note: Signals like Panel DC Fail and Relay Int Fault to be taken from adjacent panel

D. 11Kv Capacitors: IEC 61850 Protocol

S.No.	Signal List	DI/ AI soft through N.Relay/ BCU	DO soft through N.Relay/ BCU	Signal Type
1.	Breaker On	✓		DPI
2.	Breaker OFF			
3.	Bank ISO ON	✓		DPI
4.	Bank ISO OFF			
5.	Trip Ckt Healthy	✓		SPI
6.	Spring Charge	✓		SPI
7.	Breaker in Service	✓		SPI
8.	Breaker in Test	✓		SPI
9.	Master Trip (86) Operated	✓		SPI
10.	Bus PT fuse Blown-Metering	✓		SPI
11.	Bus PT fuse Blown-Protection	✓		SPI
12.	Panel DC Fail	✓		SPI
13.	L/R Switch in SCADA	✓		SPI
14.	Over Current Operated	✓		SPI
15.	Earth Fault Operated	✓		SPI
16.	Under Volt. Prot. Operated	✓		SPI
17.	Over Volt. Prot. Operated	✓		SPI
18.	Neg. Phase sequence Operated	✓		SPI
19.	Timer Relay operated/ Normal	✓		DPI
20.	Relay Int. Fault	✓		SPI
21.	BKR Close COMMAND		✓	DCO
22.	BKR Open COMMAND			
23.	BANK ISO OPN		✓	DCO
24.	BANK ISO CLS			
25.	Master trip (86) reset from remote		✓	SCO
26.	3phase R, Y, B- Curr & Volt, React. Pow, Neu. Curr	✓		AI/ MV
27.	Fault current and phase indication of faulty phase viz. R, Y, B, Earth, Unbalance (O/C & E/F Relay), Disturbance	✓		AI

	Records, Fault Graphs for Remote diagnosis purpose			

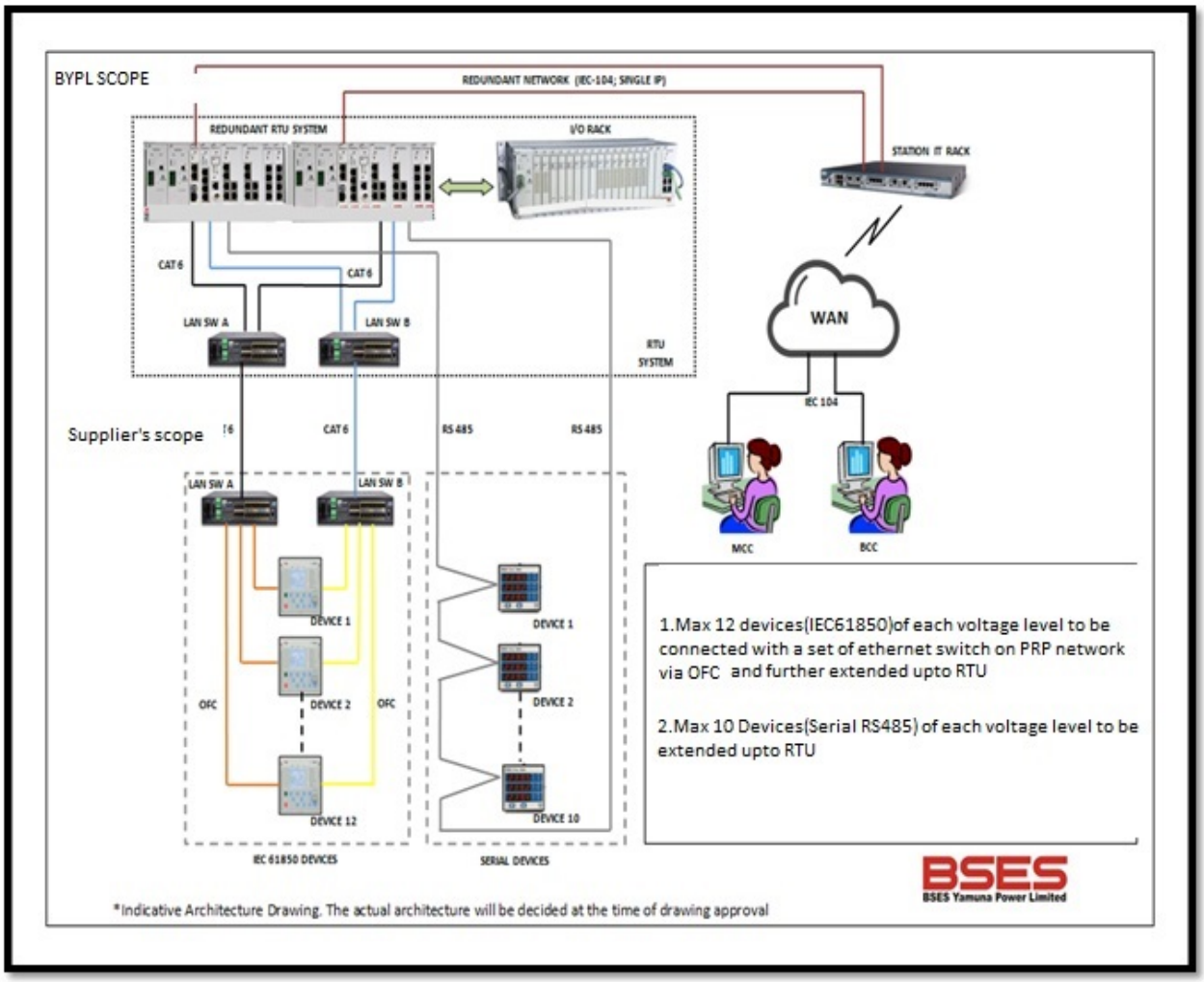
Annexure 2: Signals Related with MFM

Sr. No.	Signal Detail	Type of Signal on Modbus
	Measurement Signals	
1	Active Power	Measured Float
2	Current Bph	Measured Float
3	Current Rph	Measured Float
4	Current Yph	Measured Float
5	Frequency	Measured Float
6	Power Factor	Measured Float
7	Reactive Power	Measured Float
8	Voltage BR	Measured Float
9	Voltage RY	Measured Float
10	Voltage YB	Measured Float
11	Neutral Current	Measured Float
12	THD	Measured Float
13	Max Demand	Measured Float
14	Apparent power	Measured Float

(This is the indicative IO list, however the signal list may vary during the engineering time)

Annexure 4:

SCADA Network Architecture



Annexure 5: (List of Abbreviations)

1. SCADA: Supervisory Control and Data Acquisition
2. RTU: Remote Terminal Unit
3. C&R: Control and Relay
4. MFM: Multi Function Meter
5. BYPL: BSES Yamuna Power Ltd.
6. MCC: Master Control Center
7. BCC: Business Continuity Center
8. IED: Intelligent Electronic Devices
9. IEC: International Electrotechnical Commisssion
10. KEMA: Keuring van Elektrotechnische Materialen te Arnhem
11. CE: Conformité Européene
12. FCC: Federal Communications Commission
13. PRP: Parallel Redundancy Protocol
14. LAN: Local Area Network
15. NIFPS: Nitrogen Injection Fire Protection System
16. APFC: Automatic Power factor Controller
17. HMI: Human Machine Interface
18. PVC: Polyvinyl Chloride
19. OFC: Optical Fiber Cable
20. MV: Measured Value
21. SPD: Surge Protection Device
22. DCO: Double Command Input
23. DPI: Double Point Indication
24. MV: Measured Value
25. SCO: Single Command Input
26. SPI: Single Point Indication

TECHNICAL SPECIFICATION

FOR

FRLS CONTROL CABLE

SPECIFICATION NO. – SP-FRLSCC-184-R0

Prepared by	Reviewed by	Approved by	Rev	Date
Jeena Borana	Gaurav Sharma	Ashwani Aggarwal		
			R0	30.06.2020

INDEX

1.0 SCOPE

The scope of supply includes Design, Manufacture, Testing at manufacturer's works before dispatch, packing, delivery including unloading and stacking at site/store of Control Cable complete with all accessories.

2.0 STANDARDS & CODES

Materials, equipments and methods used in the manufacture of Cable shall conform to the latest edition of following:

S No.	STANDARD	DESCRIPTION
2.1	IS- 1554 Part-1	PVC insulated Cables
2.2	IS- 5831 : 1984	PVC insulation & sheath of electric cables.
2.3	IS- 10810 : 1984	Methods of test for cables.
2.4	IS- 8130 : 1984	Conductors for insulated electric cables and flexible cords.
2.5	IS- 3961 Part 2	Recommended current ratings for PVC insulated and PVC sheathed heavy duty Cables
2.6	IS- 3975 : 1999	Mild steel wires, formed wires and tapes for armouring of cables.
2.7	IS- 10418 : 1982	Drums for Electric Cables
2.8	IEC 60228 Ed.3.0 b	Conductors of insulated cables.
2.9	IEC 60332-3-21 Ed.1.0 b	Tests on electric cables under fire conditions. Part 3-21. Tests on bunched wires or cables.
2.10	IEC 60502-1 Ed. 2.1 b	Power cables with extruded insulation and their accessories for rated voltage from 1kV up to 30kV –Part 1: cables for rated voltages of 1kV and 3kV
2.11	IEC 60811	Common test methods for insulating and sheathing materials of electric cables.
2.12	IEC 60885 Ed.1.0 b	Electric test methods for electric cables.
2.13	IEC 60227	PVC insulated cables of rated voltages up to and including 450/750 V.
2.14	IEC 60028 Ed. 2.0 b	International Standard of Resistance for Copper
2.15	ASTMD 2843	Standard Test Method for density of Smoke from the burning or decomposition of cables
2.16	ASTM 2863	Standard Test Method for measuring of minimum oxygen concentration
2.17	IEC 60754-1	Test on gases evolved during combustion of materials for cables. Part 1 – Determination of the Halogen Acid gas Content

3.0 SERVICE CONDITIONS

Control Cables to be supplied against this specification shall be suitable for satisfactory operation under the following conditions-

3.1	Average grade atmosphere	Heavily polluted, Dry
3.2	Maximum altitude above sea level	1000M
3.3	Relative Humidity	100%
3.4	Ambient air temperature	Highest 50 Deg C Average 40 Deg C Minimum 0 Deg C
3.5	Operating temperature	0 Deg C - 50 Deg C
3.6	Rainfall	750mm concentrated in four months

4.0 DESIGN FEATURES

(Refer Annexure – "A")

S No.	Parameters	Technical Requirements
4.1	Cable construction Features	Size & dimensions of each item mentioned under this clause shall be followed as detailed out in GTP, refer Annexure A
4.2	Conductor	• Stranded, plain copper, circular • Shall be made from high conductivity copper rods
4.3	Insulation	Extruded PVC Insulation Type A as per IS 5831
4.4	Core Identification	Each core shall have different color of insulation
4.5	Inner Sheath	Extruded Inner Sheath of Black PVC type ST-2 as per IS 5831
4.6	Armour	• As per Clause 13.2 of IS 1554 Part-1: Galvanized steel round wire armour. • Minimum area of coverage of armouring shall be not less than 90 %. (refer Annex C of IS 1554-part 1 for % calculation)

S No.	Parameters	Technical Requirements
4.7	Outer Sheath	a) Extruded outer sheath of PVC type ST-2 as per IS 5831 having FRLS properties b) Color : Black c) The Outer Sheath shall be embossed with: • The voltage designation • Type of construction / cable code (for e.g. AYWY) • Manufacturers Name or Trade mark • Number of Cores and nominal cross sectional area of conductors • The drum progressive length of cable at every meter. (By Printing) • Name of buyer i.e. BSES • Month & Year of Manufacturing • P.O. No. and P.O. Date
4.8	FRLS Properties	a) Oxygen Index : Not less than 29% as per ASTM 2863 b) Temperature Index: shall be 21 at a temperature of 250℃. (when tested as per ASTM D 2863) c) Max Acid Gas Generation – Not more than 20% as per IEC -60754-1 d) Light Transmission - Minimum 40% when tested as per ASTMD 2843 (Smoke Density rating shall be max 60%) e) Flammability Test – As per IEC 60332-III, Cat – B, IEC 60332- I, IS- 10810 – Part 53, IS:10810 – Part 61 & 62 (Category A)
4.9	Sealing of cable end	Both ends of the cable shall be sealed with PVC Cap.
4.10	Drum length & tolerance	500 mtr (+/- 5%)
4.11	Overall tolerance in cable length	- 2 %
4.12	Short length of cables	a) Minimum acceptable short length shall be above 100 meters. Manufacturer shall be required to take prior approval from engineering for any short length supply. b) Manufacturer shall not be allowed to put two cable pieces of different short lengths in same cable drum. c) Only 1% of the total ordered quantity.

5.0 QUALITY ASSURANCE PLAN, INSPECTION AND TESTING

S No.	Parameters	Technical Requirements
5.1	Quality Assurance Plan	QAP Shall be submitted by vendor for approval. Inspection and testing of the material shall be carried out accordingly.
5.2	Type test	a) Cables must be of type tested as per relevant IS/IEC/ASTM. Type test conducted either from CPRI/ERDA will be treated as valid. b) Type test reports shall be submitted for the type, size & rating of cable offered along with bid.
5.3	Routine test	Each drum length of cable shall be subjected to the tests as mentioned in IS 1554 part -1
5.4	Acceptance Tests	The sampling & acceptance tests Shall be conducted, as per IS 1554 Part-1 and approved QA plan, for each lot of cable during the inspection of lot at manufacturer's works.
5.5	Inspection	a) The buyer reserves the right to inspect cables at the Seller's works at any time prior dispatch, to verify compliance with the specifications. b) In-process and final inspection call intimation shall be given in 15 days advance to purchaser.
5.6	Test certificates	Test certificates (routine and acceptance) shall be submitted along with the dispatch documents.

6.0 PACKING, SHIPPING, HANDLING & SITE SUPPORT

6.1	Packing	The cable shall be wound on wooden drums (with anti termite treatment and M.S. spindle plate with nut-bolts). Cable should be packed conforming to Indian / international standards. The drum shall be fully enclosed by suitable packing preferably PP sheeting.
6.2	Drum identification label	The following information shall be marked on the drum: a) Drum identification number b) Trade name or trade mark; if any c) Name of manufacturer d) Name of buyer i.e. BYPL e) Cable voltage grade f) Cable code (e.g. YWY) g) Number of cores and cross sectional area h) Purchase order number with SAP item code i) Year and month of manufacturing j) Direction of rotation of drum (an arrow) k) Net weight of cable in drum and gross weight of cable with drum l) Batch no or Lot no. m) Cable length initial reading & end reading shall be marked on drum. Cable starting end shall be taken out from winding to read this drum reading with proper sealing to protect against external damage.
6.3	Shipping	The seller shall give complete shipping information concerning the gross weight, size of each packing.
6.4	Handling & Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet/manual needs to be furnished before commencement of supply.
6.5	Transit damage	The seller shall be responsible for any transit damage due to improper packing.

7.0 DEVIATIONS

7.1	Deviation	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification.

8.0 DOCUMENT SUBMISSION MATRIX

- Document checklist for each stage is given in table below.
- Document check sheet compliance shall be the first sheet for each submission stage i.e. Technical bid, Drawing Approval, Pre Dispatch, Pre closure.
- No submission is acceptable without check list compliance.
- Deficient/ improper document/ drawing submission shall be liable for rejection.
- Order of documents shall be strictly as per the check list.
- Any drawing not included in the below table but necessary for detailed engineering shall be deemed to be included in bidder's scope.

S No.	Description	Technical Bid	Drawing Approval	Pre Dispatch	Pre Closure
8.1	Tender No.	required			
8.2	Communication details				
8.2.1	Name of the Bidder	required			
8.2.2	Name of Authorized contact person	required			
8.2.3	Contact No. of Authorized contact person	required			
8.2.4	E-mail id of Authorized contact person	required			
8.3	Document Submission Format				
8.3.1	Index of documents with page numbers for each document	required			
8.3.2	Separator with document description shall be provided before each document	required			
8.4	Qualifying Requirement Compliance				
8.4.1	Summary of compliance of qualifying criteria in tabular form along with summary of documentary proof provided	required			
8.4.2	Detailed Documents supporting compliance of qualifying criteria	required			

S No.	Description	Technical Bid	Drawing Approval	Pre Dispatch	Pre Closure
8.5	Drawings/ Documents as per Technical Specification				
8.5.1	Signed copy of technical specification	required			
8.5.2	Type Test reports of offered model/ type/ rating	required	required		
8.5.3	Deviation Sheet	required	required		
8.5.4	Detailed Drawings	required	required		
8.5.5	Other drawing/ documents mentioned in technical specification	required	required		
8.5.6	Make of raw Materials				
8.5.7	Design Calculation		required		
8.5.8	Manufacturer's quality assurance plan		required		
8.5.9	GTP		required		
8.5.10	Inspection and routine test reports, carried out in manufacturer's works			required	
8.5.11	Detailed installation & commissioning instructions			required	
8.6	BIS Certificate	required			
8.7	Soft Copy of all the documents mentioned in table				
8.7.1	In Pen drive	required			
8.7.2	Through Mail		required	required	required

Annexure – A: Guaranteed Technical Particulars (Data by Supplier)

(Standard Cable sizes are 6C X 2.5 and 10C X 2.5 mm^2)

For each size separate GTP need to be furnished

***For any size other than standard sizes mentioned, GTP should be as per IS or requirement whichever applicable**

Sr.	Description	Buyer's requirement	Vendor's Data
	Purchase Req. No.	….	
	Guarantee Period: 5 Years	60/66 Months	
1.0	Make	To be specified by vendor	
2.0	Type (AS PER IS 1554 part -1)	YWY	
3.0	Voltage Grade (KV)	1.1	
4.0	Maximum Conductor temperature		
a)	Continuous (° C)	70℃	
b)	Short time (° C)	160℃	
5.0	Conductor		
a)	Size (mm^2)	2.5	
b)	No. of wires in each conductor	As per Manufacturer standard	
c)	Dia. of wires in each conductor before compaction (mm)	As per Manufacturer standard	
d)	Shape of Conductor	As per Clause 4.2.0 of specification	
e)	Diameter over conductor mm	To be specified by vendor	
f)	Maximum Conductor resistance at 20 ° C (Ohm/Km)	As per Table 2 of IS 8130	
6.0	Insulation	As per Table 1 of IS:5831 – 1984	
a)	Nominal thickness (mm)	As per Clause 4.3.0 of specification & Table 2 of IS 1554(Part-1)	
b)	Minimum thickness (mm)		
c)	Core Identification	Color of all the cores shall be different	

Sr.	Description	Buyer's requirement	Vendor's Data
d)	Approx. dia. over Insulation (mm)	To be specified by vendor	
7.0	Inner Sheath	As per Table 2 of IS:5831 – 1984	
a)	Minimum thickness (mm)	As per Table 4 of IS 1554(Part-1)	
b)	Approx. dia. Over sheath (mm)	To be specified by vendor	
8.0	Galvanized Steel Armour	As per IS 1554-part 1	
a)	Number of armour wire	As per Manufacturer Std.	
b)	Nominal dia. of Round Wire	As per Table 5 of IS 1554(Part-1)	
c)	Dia. over armour – approx.	To be specified by vendor	
d)	Lay Ratio	To be specified by vendor	
e)	Confirm minimum 90% coverage (submit calculation)		
9.0	Outer Sheath (FRLS)	As per Table 2 of IS:5831 – 1984	
a)	Thickness (min)	As per Table 7 of IS 1554(Part-1)	
b)	Color	Black	
10.0	Approx. overall dia. (mm)	To be specified by vendor	
11.0	Drum length & tolerance	As per clause 4.10.0 of specification	
12.0	End Cap	Required	
13.0	Drums provide with MS Spindle plate & Nut bolts arrangement	Required	

Sr.	Description	Buyer's requirement	Vendor's Data
14.0	Net Weight of cable (Kg/Km.) – approx.	To be specified by vendor	
15.0	Continuous current rating for standard I.S. condition laid Direct		
a)	In ground 30° C Amps	To be specified by vendor	
b)	In duct 30° C Amps	To be specified by vendor	
c)	In Air 40° C Amps	To be specified by vendor	
16.0	Short circuit current for 1 sec of conductor. (KAmp)	To be specified by vendor	
17.0	Electrical Parameters at Maximum Operating temperature:		
a)	Resistance (Ohm/Km) (AC Resistance)	To be specified by vendor	
b)	Reactance at 50 C/s (Ohm/Km)	To be specified by vendor	
c)	Impedance (Ohm/Km)	To be specified by vendor	
d)	Capacitance (Micro farad / KM)	To be specified by vendor	
18.0	Recommended minimum bending radius	…. x O/D	
19.0	FRLS Properties		
a)	Oxygen Index	To be specified by vendor	
b)	Temperature Index	To be specified by vendor	
c)	Max Acid Gas Generation	To be specified by vendor	
d)	Light Transmission / Smoke Density	To be specified by vendor	

TECHNICAL SPECIFICATION
FOR
LT POWER CABLE
(Single & Multi-Core)
Specification No. : SP-LTPC-63-R1

Rev 01	*Date 19 March 2021*	*No. of Page 40*
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Contents

1.0 SCOPE OF SUPPLY

The specification covers design, manufacture, shop testing, packing and delivery of 1100 Volts grade, Aluminium conductor, and XLPE insulated multi core power cables.

2.0 CODES & STANDARDS

The cables shall be designed, manufactured and tested in Accordance with the following Indian & IEC standards.

2.1	IS- 7098 (Part-1)	Cross linked polyethylene insulated PVC sheathed cables for working voltages upto and including 1100V.
2.2	IS- 6474	Polyethylene insulation & sheath of electric cables.
2.3	IS- 5831	PVC insulation and sheath of electrical cables.
2.4	IS : 10810	Methods of tests for cables.
2.5	IS : 8130	Conductors for insulated electrical cables and flexible cords.
2.6	IS : 3975	Low carbon galvanized steel wires, formed wires and tapes for armouring of cables.
2.7	IS- 4026	Aluminum ingots, billets and wire bars (EC grade)
2.8	IS-5484	EC Grade aluminium rod produced by continuous casting and rolling
2.9	IS : 10418	Specification for drums for electric cables.
2.10	IS : 3961	Recommended current ratings for cables.
2.11	IS:1255	Installation and Maintenance of power cables upto and including 33 kV rating.
2.12	IS:4826	Specification for hot-dipped galvanized coatings on round steel wires
2.13	IS:1717	Metallic Materials – Wire – Simple torsion test
2.14	IEC 60331	Fire resisting characteristics of electric cables.
2.15	IEC 60332 - 3	Tests on electric cables under fire conditions. Part 3: Tests on bunched wires or cables.

2.16	IEC 60502	Extruded solid dielectric insulated power cables for rated voltages from 1kV to 30 kV.
2.17	IEC 60754 - 1	Test on gases evolved during combustion of materials from cables. Part 1: Determination of the amount of halogen acid gas evolved during combustion of polymeric material taken from cables.
2.18	IEC 60811	Common test methods for insulating and sheathing materials of electric cables.
2.19	IEC 60885	Electric test methods for electric cables.
2.20	IEC 60304	Standard colours for insulation for low frequency cables and wires.
2.21	IEC 60227	PVC insulated cables of rated voltages up to and including 450/750 V.
2.22	IEC 1034	Measurement of smoke density of electric cables burning under defined conditions.

3.0 CABLE DESIGN

Cable design shall be in accordance with IS 7098 Part-1

3.1	Conductor	a) Electrolytic Grade Stranded Aluminium Conductor b) Grade: H2 as per IS:8130/1984 c) Class 2 d) Chemical composition as per IS 4026 e) Shape : i) Compacted Circular for sizes up to 16 sqmm and for Single core cables. ii) Sector shaped for sizes above and including 25Sqmm
3.2	Insulation	Extruded XLPE Insulation as per IS:7098 Part-1

3.3	Core Identification	Coloured XLPE insulation as per Cl.10.1 (b) of IS 7098 Part-1
3.4	Inner Sheath	Extruded Inner Sheath of Black PVC type ST-2 IS:5831-1984)
3.5	Armour	a) For 2CX10Sqmm - Galvanized Steel Wire b) For all sizes above 10Sqmm – Galvanized Steel Strip. c) Not required for Single core cables of sizes i.e. 25, 95, 300, 630 & 1000 sq mm d) Minimum area of coverage of armouring shall be 90% e) The breaking load of armour joint shall not be less than 95% of that of armour wire/strip. f) Zero negative tolerance for thickness of armour strip as per IS:3975 g) Zinc rich paint shall be applied on strip/wire and its joint surface. If the armour breaks or the lot finished then they start the new lot and join the two ends for continuation process.

3.6	Outer Sheath	a) Extruded outer sheath of PVC (ST-2) shall be as per IS:5831. b) Colour : Yellow (For Multi core cables) Black (For Single core cables) c) Outer sheath of all the LT cables shall be UV resistant; as these cables are laid in air exposed to sun. Bidder to ensure the same for these requirements supported by required test of any lot of the order d) Shape of the cable over the outer sheath shall be circular, when manufactured /completed. Regular Ovality check shall be carried out at Factory, to detect any abnormality. Manufacturing quality shall be such that cable will retain its circular shape, even after it is laid at site. e) The Outer Sheath shall be embossed with following minimum text: (i) The voltage designation (ii) Type of construction / cable code (iii) Manufacturers Name / Trade mark (iv) Number of Cores and nominal cross sectional area of conductor. (v) Progressive (Sequential) length of cable at every meter, starting from zero for every drum. Colour filled in for the progressive marking, shall be with proper contrast in colouring. (vi) Name of buyer i.e. BYPL (vii) Month & Year of Manufacturing (viii) IS reference, i.e. IS:7098 (ix) P.O No. and Date (x) Font size shall be 5/5mm (xi) ISI mark (xii)Drum Number The embossing shall be progressive, automatic, in line and marking shall be legible and indelible.

3.7	FRLS Properties	Outersheath of the power cable shall have following FRLS Properties **for cable sizes; 2Cx10sqmm, 2Cx25sqmm, 4Cx25sqmm & 4Cx50sqmm Only** a) Oxygen Index : Not less than 29% as per ASTM 2863 b) Temperature Index: shall be 21 at a temperature of 250°C. (when tested as per ASTM D 2863) c) Max Acid Gas Generation – Not more than 20% as per IEC -60754-1 d) Light Transmission - Minimum 40% when tested as per ASTMD 2843 (Smoke Density rating shall be max 60%) e) Flammability Test – As per IEC 60332-III, Cat – B, IEC 60332- I, IS- 10810 – Part 53, IS:10810 – Part 61 & 62 (Category A) f) Anti- termite and rodent property test
3.8	Bending Radius	Bending Radius of cable shall comply to IS:1255.
3.9	Sealing of Cable end	Both ends of the cable shall be sealed by means of non-hygroscopic heat shrinkable HDPE caps.

4.0 CABLE DRUM

4.1	Reference Standard	Cable drums shall comply with IS: 10418.
4.2	Type of Drum	Wooden drums with anti termite treatment. (The drums shall be provided with M.S. spindle plate and nut-bolts arrangement as per IS:10418).
4.3	Drum Length & Tolerance	500 +/ - 5% Mtr
4.4	Overall Tolerance	+/-2 % for the total cable length for the entire order.
4.5	Short Length of Cables	a) Minimum acceptable short length (Maximum is 525 mtr) shall be 1% of the total ordered quantity and no length shall be less than 250Mtrs. Manufacturer shall be required to take prior approval from Engineering for any short length supply. Short length will be accepted in last lot. b) Manufacturer shall not be allowed to put two cable pieces of different short lengths in same

		cable drum.
4.6	Preventive Measure for Cable Drum	a) The surface of the drum and the outer most cable layer shall be covered with water proof layer. b) Ferrous part of wooden drum shall be treated with suitable rust preventive paint/coating to minimize rusting during storage.
4.7	Drum Identification Labels	a) Drum identification number b) Cable voltage grade c) Cable code (eg. A2XFY/A2XWY) d) Number of cores and cross sectional area e) Cable quantity i.e. cable length (Meters) f) Purchase order number, date and SAP item code g) Total weight of cable and drum (kg) h) Manufacturer's and Buyer's name i) Month & year of manufacturing j) Direction of rotation of drum; An arrow and suitable accompanying wording shall be marked on one end of the reel indicating the direction in which it should be rolled. k) Cable length final end-markings (i.e. reading at the inner end and reading at the outer end, just before packing shall be marked on the drum).

5.0 PACKING, SHIPPING, HANDLING & STORAGE

5.1	Packing	The cable shall be wound on wooden drums (with anti termite treatment and M.S. spindle plate with nut-bolts). Cable should be packed conforming to Indian / international standards. The drum shall be fully enclosed by suitable packing preferably PP sheeting.
5.2	Shipping Information	The seller shall give complete shipping information concerning the weight, size of each package.
5.3	Transit Damage	The seller shall be held responsible for all transit damage due to improper packing.
5.4	Cable Drum Handling	The drums shall be with M.S spindle plate (with nut-bolts) of adequate size to suit the spindle rods, normally required for handling the drums, according to expected weight of the cable drums as per IS:10418
5.5	Handling & Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet/manual needs to be furnished before commencement of supply.

6.0 QUALITY ASSURANCE, TESTING & INSPECTION

All the tests shall be carried out in accordance with IEC / IS standards.

6.1	**Quality Assurance Plan**	As per Annexure – E. In event of order Manufacturer has to submit the signed copy of QAP.
6.3	**Routine Test**	a) Measurement of Electrical Resistance b) HV test with power frequency AC voltage

6.4	**Type Test**	a) Cables must be of type tested quality. Cable design not type tested shall not be considered. Type test reports shall be submitted for the same or higher type, size and rating of cable offered along with bid. b) Bidder supplying 1.1 kV cable to BSES for the first time shall have to conduct type test on sample randomly selected from lot in event of order from CPRI/ERDA without any price implication to BSES. c) UV resistance test to be carried out on one sample randomly selected from any one lot to be supplied against Rate Contract. Testing shall be carried out from CPRI/ERDA as per ASTM standard (sample shall meet minimum 80% retention after exposure of 21 days as per ASTM standard). Test reports must have PO number, drum no., photograph details of the inspected item.

6.5	**Acceptance Test** **(Shall be conducted as per IS 7098 Part-1 for each lot of cable)**	a) **For cable sizes upto 50sqmm** – one sample for chemical composition and purity test of aluminium shall be conducted per 100km of ordered quantity and multiple thereof. b) **For cable sizes above 50sqmm** – one sample for chemical composition and purity test of aluminium shall be conducted per 50km of ordered quantity and multiple thereof. c) Chemical composition and purity test of aluminium shall be conducted from the lot offered to BSES on each size involved in the purchase order. Test shall be carried out at NABL accredited third party laboratory without any price implication to BSES. Test reports must have PO number, drum no., photograph details of the inspected item. d) The sample will be selected either during acceptance test or after receipt of cable in BSES stores.
6.6	**Inspection**	a) The buyer reserves the right to inspect cables at the Seller's works at any time prior dispatch, to verify compliance with the specifications. b) In-process and final inspection call intimation shall be given in 15 days advance to purchaser. c) In the event of any discrepancy in the test reports i.e. test reports not acceptable or any type tests (including special /additional tests, if any) not carried out, same shall be carried out without any cost implication to BSES before dispatch of cable.
6.7	**Test Certificates**	Complete test certificates (routine & acceptance tests) need to be submitted along with the delivery of cables.

7.0 DEVIATIONS

7.1	Deviations from specification	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause / GTP and a description of the alternative offer. In absence of such a statement, it will be assumed by the buyer that the seller complies fully with this specification.

8.0 DOCUMENT SUBMISSION MATRIX

Document/Drawing submission shall be as per the matrix given below:

i. All documents/drawings shall be provided in soft copy only in returnable Pen drives
ii. Language of the documents shall be English only.
iii. Incomplete submission shall be liable for rejection.
iv. Document check sheet compliance shall be the first sheet for each submission stage i.e. Technical bid, Drawing Approval, Pre Dispatch.
v. No submission is acceptable without check list compliance.
vi. Deficient/ improper document/ drawing submission shall be liable for rejection.
vii. Order of documents shall be strictly as per the check list.
viii. Any drawing not included in the below table but necessary for detailed engineering shall be deemed to be included in bidder's scope.

S No.	Detail of Document	Bid	Approval	Pre Dispatch
1	Guaranteed Technical Particulars (GTP)	Required	Required	
2	Deviation Sheet, if any	Required	Required	
3	Detailed cross sectional drawing of cable	Required	Required	
4	Dimensional drawing of cable drum	Required	Required	
4	Type test reports of offered type and rating of cable	Required	Required	
5	BIS certificate	Required		
6	Complete cable catalogue	Required		
7	Make of Raw Materials	Required	Required	
8	Cable de-rating factors	Required	Required	
9	Armour coverage calculation		Required	
10	Inspection test reports and Routine Test Certificates carried out in manufacturer's works			Required
12	Test certificates of all raw materials			Required
13	Calibration test reports of instruments			Required

ANNEXURE – A

GUARANTEED TECHNICAL PARTICULARS (Multi-core)

(Standard Cable sizes are 2Cx10, 2Cx25 For each size /rating separate GTP need to be furnished)

S.No.	Description	Buyer's Requirement	Seller's data
1	**Make**	….	
2	**Type (as required by purchaser)**		
A	For 2CX10Sqmm	A2XWY	
B	For Sizes above 10Sqmm	A2XFY	
3	**Voltage Grade (kV)**	1.1	
4	**Maximum Conductor temperature**		
A	Continuous	90°C	
B	Short time	250°C	
5	**Conductor**		
A	Material and Grade	As per Cl.3.1	
B	Make of Al	Ref Annexure D	
C	Size (mm^2)	…… sq mm	
D	Min no. of wires in each conductor (Nos.)	As per Manufacturer Standard	
E	Min Dia. of wires in each conductor before compaction (mm)	As per Manufacturer Standard	
F	Shape of Conductor	As per Cl.3.1 (e)	

S.No.	Description	Buyer's	Seller's data
G	Diameter over conductor (mm)	……	
H	Maximum Conductor resistance at 20 ° C (Ohm/Km)	As per Table 2 of IS 8130	
6	**Insulation**		
A	Insulation Material	As per Cl. 3.2	
B	Nominal thickness (mm)	As per Table 3 of IS 7098 Part-1	
C	Diameter over Insulation (mm) Approx.	……	
D	Make of insulation compound	Ref: Annexure D	
7	**Inner Sheath**		
A	Material and Type	As per Cl. 3.4	
B	Minimum thickness	As per Table 5 of IS 7098 Part-1	
C	Approx. dia. Over sheath (mm)	……	
8	**Galvanized Steel Armour**	As per manufacturer's standard and as per purchaser's site - specific condition	
A	Material		
a)	**For 2CX10Sqmm**	G.I.Wire	
(i)	Wire Dia (mm)	1.4+/-0.040	
(ii)	No. of wires	As per Manufacturer Standard	
b)	**For sizes above 10Sqmm**	G.I.Strip	
(i)	Strip size (Width and Thickness)	4x0.8 (Zero negative tolerance for thickness)	
(ii)	No. of Strips	As per Manufacturer Standard	

S.No.	Description	Buyer's	Seller's data
B	Area covered by Armour	Min 90% and calculations shall be strictly as per Annexure D	
C	Dia. over Armour – Approx.	……	
9	**Outer Sheath**		
A	Material and Type	As per Cl. 3.6	
B	Minimum Thickness	As per Table 8 of IS 7098 Part-1	
C	Colour	Yellow	
D	Embossing Details	As per Cl.3.6 (e)	
10	**Approx. overall dia. (mm)**	……	
11	**Overall order tolerance**	± 2 % for the total cable length for the entire order	
12	**Cable Drum**		
A	Type of Drum	Wooden	
B	Drum Length & tolerance	As per Spec.Cl. 4.3 & 4.4	
C	Marking on Drum	As per Spec.Cl. 4.7	
D	Drums provide with MS Spindle plate & nut-bolts arrangement (as per IS:10418)	Required	
13	**End Cap**	Required	
14	**Weights**	……	
a)	Net Weight of cable (Kg/Km.) – Approx		
b)	Weight of empty drum	Kg	

S.No.	Description	Buyer's	Seller's data
c)	Weight of cable with drum	Kg	
15	**Continuous current rating for standard I.S condition laid direct**		
a)	In ground 30° C	Amps	
b)	In duct 30° C	Amps	
c)	In Air 40° C	Amps	
16	**Short circuit current for 1 sec of Conductor (kAmp)**	……	
17	**Electrical Parameters at Maximum operating temperature:**		
A	AC Resistance	Ohm/Km	
B	Reactance at 50 C/s	Ohm/Km	
C	Impedance	Ohm/Km	
D	Capacitance	Micro farad / Km	
18	**Recommended minimum bending radius**	..... x O/D	
19	**Derating factor for following Ambient temperature in**	Ground / Air	
a)	At 30° C		
b)	At 35° C		
c)	At 40° C		
d)	At 45° C		
e)	At 50° C		
20	**Group factor for following Nos. of cables laid**	Touching / Trefoil	
a)	3 Nos.		

S.No.	Description	Buyer's	Seller's data
b)	4 Nos.		
c)	5 Nos.		
d)	6 Nos.		
21	**Process of Cross linking of Polyethylene**		
22	**Type test**	Is copy of latest valid TTR for respective sizes enclosed? Yes / No	

ANNEXURE – B

GUARANTEED TECHNICAL PARTICULARS (Multi-core)

Standard Cable sizes are 4Cx25, 4Cx50, 4Cx95, 4Cx150, 4Cx300 & 4Cx400sqmm

S.No.	Description	Buyer's Requirement	Seller's data
1	**Make**	….	
2	**Type (as required by purchaser)**		
A	For 4Cx25 to 4Cx400sqmm	A2XFY	
3	**Voltage Grade (kV)**	1.1	
4	**Maximum Conductor temperature**		
A	Continuous	90°C	
B	Short time	250°C	
5	**Conductor**		
A	Material and Grade	As per Cl.3.1	
B	Make of Al	Ref Annexure D	
C	Size (mm^2)	…… sq mm	
D	Min no. of wires in each conductor (Nos.)	As per Manufacturer Standard	
E	Min Dia. of wires in each conductor before compaction (mm)	As per Manufacturer Standard	
F	Shape of Conductor	As per Cl.3.1 (e)	

S.No.	Description	Buyer's	Seller's data
G	Diameter over conductor (mm)	……	
H	Maximum Conductor resistance at 20 ° C (Ohm/Km)	As per Table 2 of IS 8130	
6	**Insulation**		
A	Insulation Material	As per Cl. 3.2	
B	Nominal thickness (mm)	As per Table 3 of IS 7098 Part-1	
C	Diameter over Insulation (mm) Approx.	……	
D	Make of insulation compound	Ref: Annexure D	
7	**Inner Sheath**		
A	Material and Type	As per Cl. 3.4	
B	Minimum thickness	As per Table 5 of IS 7098 Part-1	
C	Approx. dia. Over sheath (mm)	……	
8	**Galvanized Steel Armour**	As per manufacturer's standard and as per purchaser's site - specific condition	
A	Material		
b)	**For sizes above 10Sqmm**	G.I.Strip	
(i)	Strip size (Width and Thickness)	4x0.8 (Zero negative tolerance for thickness)	
(ii)	No. of Strips	As per Manufacturer Standard	
B	Area covered by Armour	Min 90% and calculations shall be strictly as per Annexure D	
C	Dia. over Armour – Approx.	……	

S.No.	Description	Buyer's	Seller's data
9	**Outer Sheath**		
A	Material and Type	As per Cl. 3.6	
B	Minimum Thickness	As per Table 8 of IS 7098 Part-1	
C	Colour	Yellow	
D	Embossing Details	As per Cl.3.6 (e)	
10	**Approx. overall dia. (mm)**	……	
11	**Overall order tolerance**	± 2 % for the total cable length for the entire order	
12	**Cable Drum**		
A	Type of Drum	Wooden	
B	Drum Length & tolerance	As per Spec.Cl. 4.3 & 4.4	
C	Marking on Drum	As per Spec.Cl. 4.7	
D	Drums provide with MS Spindle plate & nut-bolts arrangement (as per IS:10418)	Required	
13	**End Cap**	Required	
14	**Weights**	……	
a)	Net Weight of cable (Kg/Km.) – Approx		
b)	Weight of empty drum	Kg	
c)	Weight of cable with drum	Kg	
15	**Continuous current rating for standard I.S condition laid direct**		
a)	In ground 30° C	Amps	

S.No.	Description	Buyer's	Seller's data
b)	In duct 30° C	Amps	
c)	In Air 40° C	Amps	
16	**Short circuit current for 1 sec of Conductor (kAmp)**	……	
17	**Electrical Parameters at Maximum operating temperature:**		
A	AC Resistance	Ohm/Km	
B	Reactance at 50 C/s	Ohm/Km	
C	Impedance	Ohm/Km	
D	Capacitance	Micro farad / Km	
18	**Recommended minimum bending radius**	..... x O/D	
19	**Derating factor for following Ambient temperature in**	Ground / Air	
a)	At 30° C		
b)	At 35° C		
c)	At 40° C		
d)	At 45° C		
e)	At 50° C		
20	**Group factor for following Nos. of cables laid**	Touching / Trefoil	
a)	3 Nos.		
b)	4 Nos.		
c)	5 Nos.		
d)	6 Nos.		
21	**Process of Cross linking of Polyethylene**		

S.No.	Description	Buyer's	Seller's data
22	**Type test**	Is copy of latest valid TTR for respective sizes enclosed? Yes / No	

ANNEXURE - C

GUARANTEED TECHNICAL PARTICULARS (Single Core)

(Separate GTP needs to be furnished for 1Cx25, 1Cx95, 1Cx300, 1Cx630 & 1Cx1000 sqmm cables)

S.No.	Description	Buyer's Requirement	Seller's data
1	**Make**	.....	
2	**Type**	A2XY (Unarmoured)	
3	**Voltage Grade (kV)**	1.1 kV	
4	**Maximum Conductor temperature**		
A	Continuous	90°C	
B	Short time	250°C	
5	**Conductor**		
A	Material and Grade	As per Cl.2.1.1	
B	Size (mm^2)	25/95/300 / 630 / 1000 sqmm	
C	Min no. of wires in each conductor (Nos.)	As per Manufacturer Standard	
D	Min Dia. of wires in each conductor before compaction (mm)	As per Manufacturer Standard	
E	Shape of conductor	Compacted Circular	
F	Diameter over conductor	.....	
G	Maximum Conductor resistance at 20 ° C (Ohm/Km)	As per Table 2 of IS 8130	
H	Make of Al	Ref Annexure-F	

6	**Insulation**	As per Table 3 of IS 7098 Part-1	
A	Insulation Material	As per Cl. 3.2	
B	Nominal thickness		
(i)	For 1Cx500sqmm	2.2mm	
(ii)	For 1Cx630sqmm	2.4mm	
C	Diameter over Insulation (mm) Approx.	.....	
D	Make of insulation compound	Refer Annexure-F	
7	**Inner Sheath**	Not applicable	
8	**Armour**	Not applicable	
9	**Outer Sheath**		
A	Material and Type	As per Cl. 3.6	
B	Minimum Thickness	As per Table 8 of IS	
C	Colour	Black	
D	Embossing Details	As per Cl.3.6 (e)	
10	**Approx. overall dia. (mm)**	……	
11	**Overall order tolerance**	±2% For the total cable Length for the entire order	
12	**Cable Drum**		
A	Type of Drum	Wooden	
B	Drum Length & tolerance	As per Spec.Cl. 4.3 &	

C	Marking on Drum	As per Spec.Cl. 4.7	
D	Drums provide with MS Spindle plate & nut-bolts arrangement (as per IS:10418)	Required	
13	**End Cap**	Required	
14	**Weights**	….	
a)	Net Weight of cable (Kg/Km.) – Approx		
b)	Weight of empty drum	Kg	
c)	Weight of cable with drum	Kg	
15	**Continuous current rating for standard I.S condition laid direct**		
a)	In ground 30° C	Amps	
b)	In duct 30° C	Amps	
c)	In Air 40° C	Amps	
16	**Short circuit current for 1 sec of Conductor (KAmp)**	……	
17	**Electrical Parameters at Maximum Operating temperature**		
A	AC Resistance	Ohm/Km	
B	Reactance at 50 C/s	Ohm/Km	
C	Impedance	Ohm/Km	
D	Capacitance	Micro farad / Km	
18	**Recommended minimum bending radius**	..... x O/D	
19	**Derating factor for following Ambient temperature in**	Ground / Air	

a)	At 30° C		
b)	At 35° C		
c)	At 40° C		
d)	At 45° C		
e)	At 50° C		
20	**Group factor for following Nos. of Cables laid**	Touching / Trefoil	
a)	3 Nos.		
b)	4 Nos.		
c)	5 Nos.		
d)	6 Nos.		
21	**Process of Cross linking of Polyethylene**		

ANNEXURE - D

List of Sub-Vendors For critical items

S. No.	Description of Material	Sub-Vendors
1	E.C Grade Aluminium Rod	Bharat Aluminium Co. Ltd. (BALCO) Hindustan Aluminium Co. Ltd. (HINDALCO) National Aluminium Co. Ltd. (NALCO)
2	XLPE Compound	KKalpena Industries Ltd. KLJ Polymers and Chemicals Ltd. Dow Chemical, U.S.A Borealis, Sweden Hanwha, Seoul, South Korea

ANNEXURE - E

QUALITY ASSURANCE PLAN FOR XLPE INSULATED 1.1KV LT POWER CABLE											
Sl. No.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REF. DOCUMENT	ACCEPTANCE STANDARDS	FORMAT OF RECORD	AGENCY		REMARKS
									M	B	
1	2	3	4	5	6	7	8	9	10	11	12
A)	**Raw Material**										
1)	Aluminum Rod	a) Make / Type / Grade	Maj.	Vis.	100%	BSES Approved Documents/ Specifications	BSES Approved Documents/ Specifications	Reg./Sheet	P	V	
		b) Tensile strength	Cri.	Physical	1 Sample/lot	IS:5484	IS:5484	Int. Test Records	P	V	
		c) Elongation	Cri.	Physical	----do---	-- do --	-- do --	-- do --	P	V	
		d)Resistivity/Conductivity	Cri.	Elec.	----do---	-- do --	-- do --	-- do --	P	V	On drawn Wire
		e) Diameter	Cri.	Physical	100%	-- do --	-- do --	-- do --	P	V	
		f) Purity	Cri.	Chemical	1 Sample/lot	-- do --	-- do --	-- do --	V	V	Manufacturer's test

											certificate
		g) Surface Finish	Cri.	Vis.	100%	Smooth Surface	Smooth Surface	T.C	P	V	
2)	XLPE Compound	a) Visual checks on packing	Maj.	Vis.	100%	BSES Approved Documents /Specifications	BSES Approved Documents/ Specifications	Reg./Sheet	P	V	
		b) Hot set	Maj.	Physical	1sample/lot	IS:7098-1/88	IS:7098-1/88	-- do --	P	V	
		c) Tensile strength	Maj.	Physical	-- do --	-- do --	-- do --	-- do --	P	V	
		d) Elongation	Maj.	Physical	-- do --	-- do --	-- do --	-- do --	P	V	
		e) Volume resistivity	Maj.	Electrical	-- do --	-- do --	-- do --	-- do --	P	V	
		f) Specific gravity	Maj.	Physical	-- do --	-- do --	-- do --	-- do --	P	V	
3)	Armour Wires / Strips (G.S)	a) Dimension	Maj.	Physical	1sample / lot	IS:3975 & Data Sheet	IS:3975 & Data Sheet	Reg./Sheet	P	V	
		b) T.S & Elongation	Maj.	Physical	-- do --	IS:3975	IS:3975	-- do --	P	V	
		c) Mass & Uniformity of zinc coating	Maj.	Chemical	-- do --	IS:3975 / IS:4826	IS:3975 / IS:4826	-- do --	P	V	

		d) Torsion / winding test	Maj.	Physical	-- do --	IS:3975	IS:3975	-- do --	P	V	
		e) Wrapping test	Maj.	Physical	-- do --	IS:3975	IS:3975	-- do --	P	V	
4)	PVC Compound	a) Make / Type / Grade	Maj.	Physical	100%	BSES Approved Documents/ Specifications	BSES Approved Documents/ Specifications	Reg./Sheet	P	V	
		b) T.S & Elongation	Maj.	Physical	1sample / lot	IS:5831/84	IS:5831/84	-- do --	P	V	
		c) Thermal Stability	Maj.	Physical	-- do --	IS 5831 & IS 10810 (Part-60)	IS 5831 & IS 10810 (Part-60)	-- do --	P	V	
		d) Specific Gravity	Maj.	Chemical	-- do --	IS:5831/84	IS:5831/84	-- do --	P	V	
5)	Wooden Drum	a) Dimension	Maj.	Physical	1sample / lot	IS:10418	IS:10418	Reg./Sheet	P	V	
		b) Anti-termite treatment	Maj.	Chemical	Plant standard	Plant standard	Plant standard	-- do --	P	V	

B)	**Process & Stage Inspection**										
1)	Wire Drawing	a) Diameter	Maj.	Physical	Sample	IS:8130/84	IS:8130/84	Reg./Sheet	P	V	
		b) Surface Finish	Maj.	Vis.	100%	Smooth Surface	Smooth Surface	T.C	P	V	
		c) Tensile Strength	Maj.	Physical	1sample / lot	IS:8130/84	IS:8130/84	Reg./Sheet	P	V	
		d) Elongation test	Maj.	Physical	-- do --	IS:8130/84	IS:8130/84	-- do --	P	V	
		e) Wrapping Test	Maj.	Physical	-- do --	IS:8130/84	IS:8130/84	-- do --	P	V	
2)	Stranding	a) No. / dia of wires	Maj.	Count	At the time of m/c setting	IS:8130/84	IS:8130/84	Reg./Sheet	P	V	
		b) Diameter of conductor	Maj.	Physical	At the time of m/c setting and once in each shift	-- do --	-- do --	-- do --	P	V	
		c) Lay Length	Maj.	Physical	During m/c setting	-- do --	-- do --	-- do --	P	V	
		d) Direction of Lay	Maj.	Physical	One sample/Setting of each size	-- do --	-- do --	-- do --	P	V	

		e) Weight	Maj.	Physical	Each unloaded reel	-- do --	-- do --	-- do --	P	V	
		f) Surface Finish	Maj.	Vis.	100%	No surface defects and free from sharp edges, scratches, grease, oil etc.		T.C	P	V	
		g) Resistance	Cri.	Physical	1 sample from starting & finishing end of each length	IS:8130/84	IS:8130/84	-- do --	P	V	
3)	Insulation	a) Material	Maj.	Physical	During m/c setting	IS:7098-1/88	IS:7098-1/88	Reg./Sheet	P	V	
		b) Thickness	Cri.	Physical	During m/c setting and at standard	-- do --	-- do --	-- do --	P	V	

					length						
		c) Surface Finish	Maj.	Vis.	100%	Surface shall be smooth and free from defects		T.C	P	V	
		d) Spark Testing	Cri.	Electrical	100%	IS:7098-1/88	IS:7098-1/88	Reg./Sheet	P	V	
		e) Colour of Cores	Maj.	Vis.	100%	-- do --	-- do --	-- do --	P	V	
		f) Thermal Stability	Cri.	Chemical	One sample/Setting of each size	-- do --	-- do --	-- do --	P	V	
		g) Core Identification	Maj.	Vis.	10%	-- do --	-- do --	-- do --	P	V	
		h) Hot set test	Maj.	Physical	1sample / lot	-- do --	-- do --	-- do --	P	V	
		i) Diameter	Maj.	Physical	-- do --	-- do --	-- do --	-- do --	P	V	
		j) Resistance	Cri.	Physical	-- do --	-- do --	-- do --	-- do --	P	V	
		k) Curing	Maj.	Vis.	100%	-- do --	-- do --	-- do --	P	V	
4)	Laying up	a) Identification of cores	Maj.	Vis.	During m/c setting	IS:7098-1/88	IS:7098-1/88	Reg./Sheet	P	V	

		b) Direction of lay & core sequence	Maj.	Vis.	-- do --	-- do --	-- do --	-- do --	P	V	
		c) Lay length	Minor	Vis.	-- do --	Once in a shift.	Once in a shift.	-- do --	P	V	
		d) Shape of laid up assembly	Minor	Vis.	-- do --	Reasonable circular	Reasonable circular	-- do --	P	V	
		e) Dia. Over laid up assembly	Maj.	Physical	-- do --	Once in a shift.	Once in a shift.	-- do --	P	V	
5)	Innersheath	a) Material & type	Maj.	Vis.	During m/c setting	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	Reg./Sheet	P	V	
		b) Thickness	Maj.	Physical	During m/s setting & at std. length	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	-- do --	P	V	
		c) Dia. Over sheath	Maj.	Physical	During m/c setting	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	-- do --	P	V	
		d) Surface finish	Minor	Vis.	100%	Surface shall be smooth and free from defects		T.C	P	V	

6)	Armouring	a) Dimension of armour wires/strips	Maj.	Physical	At the time of m/c setting	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	Reg./Sheet	P	V	
		b) No. of wires/strips	Maj.	Count	At the time of m/c setting	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	-- do --	P	V	
		c) Direction of lay	Maj.	Vis.	One sample/Setting of each size	IS:7098-1/88	IS:7098-1/88	-- do --	P	V	
		d) Surface finish	Maj.	Vis.	100%	Surface shall be smooth and free from defects		T.C	P	V	
		e) Lay Length	Minor	Vis.	At the time of m/c setting	IS:7098-1/88	IS:7098-1/88	Reg./Sheet	P	V	
		f) Coverage & quality of armouring	Maj.	Vis.	100%	IS:7098-1/88 and IS:3975	IS:7098-1/88 and IS:3975	-- do --	P	V	

7)	Outer Sheath	a) Material & type	Maj.	Vis.	During m/c setting	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	Reg./Sheet	P	V	
		b) Thickness	Maj.	Physical	During m/s setting & at std. length	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	-- do --	P	V	
		c) Overall diameter	Maj.	Physical	During m/s setting & at std. length	Measurement	Measurement	-- do --	P	V	
		d) Surface finish	Maj.	Vis.	100%	Surface shall be smooth and free from defects		T.C	P	V	
		e) Embossing/Marking quality	Maj.	Vis.	100%	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	Reg./Sheet	P	V	

		f) Colour of sheath	Maj.	Vis.	During m/c setting	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	-- do --	P	V	
		g) Sequential marking	Maj.	Vis.	Full Length	BSES specifications/ IS:7098-1/88	BSES specifications /IS:7098-1/88	-- do --	P	V	
C)	**Final Inspection**										
1)	Routine Tests	a) Conductor Resistance	Maj.	Elec.	100%	IS:7098-1/88	IS:7098-1/88	Test Report	P	V	
		b) High Voltage Test	Maj.	Elec.	100%	IS:7098-1/88	IS:7098-1/88	Test Report	P	V	
2)	Acceptance Tests										

	Acceptance test shall be carried out for each type and size of the cables on the cable drums randomly selected as per sampling plan mentioned in IS:7098 Part-1.										
i)	For Conductor	a) Tensile Test (for Aluminium)	Cri.	Elec.	As per IS:7098-1/88	As per IS:7098-1/88	As per IS:7098-1/88	Test Certificate	P	W	
		b) Wrapping Test (for Aluminium)	Cri.	Elec.	-- do --	-- do --	-- do --	-- do --	P	W	
		c) Resistance Test	Cri.	Elec.	-- do --	-- do --	-- do --	-- do --	P	W	
ii)	For armour wire/formed wire (as applicable)	a) Measurement of Dimensions	Cri.	Measurement	One sample of each offered lot of all offered sizes	As per IS:7098-1/88 and IS:3975	As per IS:7098-1/88 and IS:3975	Test Certificate	P	W	
		b) Tensile Test	Cri.	Physical	-- do --	-- do --	-- do --	-- do --	P	W	
		c) Elongation Test	Cri.	Physical	-- do --	-- do --	-- do --	-- do --	P	W	
		d) Torsion Test (for round wires only)	Cri.	Physical	-- do --	-- do --	-- do --	-- do --	P	W	
		e) Wrapping Test	Cri.	Physical	-- do --	-- do --	-- do --	-- do --	P	W	
		f) Resistance Test	Cri.	Electrical	-- do --	-- do --	-- do --	-- do --	P	W	
		g) Mass of zinc coating	Cri.	Chemical	-- do --	-- do --	-- do --	-- do --	P	W	
		h) Uniformity of zinc coating	Cri.	Chemical	-- do --	-- do --	-- do --	-- do --	P	W	
		I) Adhesion Test	Cri.	Physical	-- do --	-- do --	-- do --	-- do --	P	W	
		j) Freedom from defects	Cri.	Visual	-- do --	-- do --	-- do --	-- do --	P	W	

iii)	For XLPE Insulation and PVC sheath	a) Test for thickness	Cri.	Measurement	One sample of each offered lot of all offered sizes	As per IS:7098-1/88 and IS:1554-1/88	As per IS:7098-1/88 and IS:1554-1/88	Test Report	P	W	
		b) Hot set test (for insulation)	Cri.	Electrical	-- do --	-- do --	-- do --	-- do --	P	W	
		c) Tensile strength and Elongation at break	Cri.	Physical	-- do --	-- do --	-- do --	-- do --	P	W	
		d) Thermal Stability Test (for PVC sheath)	Cri.	Chemical	-- do --	-- do --	-- do --	-- do --	P	W	
iv)	For Completed Cables	a) High Voltage Test	Cri.	Electrical	-- do --	As per IS:7098-1/88 and IS:1554-1/88	As per IS:7098-1/88 and IS:1554-1/88	-- do --	P	W	
		b) Insulation Resistance Test (Volume Resistivitty Method)	Cri.	Electrical	-- do --	-- do --	-- do --	-- do --	P	W	
		c) Flammability Test	Cri.	Electrical	-- do --	As per IEC-332(3) Category (B)/IS:7098-1/88	As per IEC-332(3) Category (B)/IS:7098-1/88	-- do --	P	W	
		d) Surface Finish	Maj.	Physical	One length of each size	Surface shall be smooth and free from defects		T.C	P	W	

		e) Length Measurement (Rewinding)	Maj.	Physical	1 drum per lot	BSES specifications/ IS:7098-1/88	BSES specifications/IS:7098-1/88	-- do --	P	W	
		f) Armour Coverage	Maj.	Physical	-- do --	BSES specifications/ IS:7098-1/88	BSES specifications/IS:7098-1/88	-- do --	P	W	
3)	Type Tests	As per IS:7098-1/88							Review and verification of type test clearance from BSES Engg.		
D	**Packing & Marking**	a) End Sealing	Maj.	Visual	100%	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	———— –	P	—— –	
		b) Stenciling/Marking	Mino r	Visual	100%	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	———— –	P	—— –	
		c) Packing	Maj.	Visual	100%	BSES specifications/ IS:7098-1/88	BSES specifications/ IS:7098-1/88	———— –	P	—— –	

Note:-

1. BSES may witness raw material and in process inspection in addition to routine / acceptance / type test at any time or stage of manufacturing.

2. Checks specified above for Raw material, In process and Final inspection shall be as relevant to the specific cable construction.

Abbreviations used in the above Quality Plan :-

M	Manufacturer	P	Perform
B	BSES	V	Verification
Vis.	Visual	W	Witness
Maj.	Major	T.C	Test Certificates
Cri.	Critical	Reg.	Register
Elec.	Electrical		

TECHNICAL SPECIFICATION

FOR

INSULATING FLOORS IN SWITCHGEAR ROOMS

Specification No. SP-INSFLR-103-R0

DEPARTMENT	PREPARED BY	REVIEWED BY	APPROVED BY	REV	0
CES	Minita	Gaurav Sharma	Ashwani Agarwal	DATE	31/05/2017
	minita			PAGE	Page 1 of 6
SAFETY	Paridhi Bansal	Arun Raj	Umesh Purbey		
	Paridhi				

INDEX TABLE

TECHNICAL SPECIFICATION OF INSULATING FLOORS IN SWITCHGEAR ROOMS

1. SCOPE

This specification covers the basic requirement, the testing and inspection, supply and installation/fixing of insulating paints on floors in front of the switchgear panels at BYPL grid locations.

2. STANDARDS & CODES

2.1.	IS 15652:2006	Specification of Insulating mats for electrical purposes
2.2.	CEA guidelines, 2010	Measures relating to safety and Electric supply

3. SERVICE CONDITIONS

The insulating floor against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

3.1.	Average Grade atmosphere	Heavily polluted, Dry
3.2.	Maximum altitude above sea level	1000 meters
3.3.	Ambient air temperature	Highest 50 deg C Average 40 deg C Minimum 0 deg C
3.4.	Relative Humidity	10 to 100 %

4. GENERAL REQUIREMENTS OF INSULATING PAINTS ON FLOORS

4.1.	**General Properties**	a. The Insulating coating shall be self leveling, solvent free, and have high breakdown voltage,loaded with special insulating additives. b. The material of the insulating floor shall be epoxy resin. c. It shall be resistant to chemicals and oils. d. It shall be tough, wear & weather resistant. e. It shall exhibit high build, high adhesion with smooth and glossy finish and slip resistant. f. It shall be easy to apply/install, clean and repair on floors.
4.2.	Colour of the finished item	The insulating floors shall be light Grey in colour
4.3.	Class of the insulating floor to be used	For 11kV voltage : Class B For 33kV voltage : Class C
4.4.	Thickness of the paint on floor	For 33kV voltage : 3 mm +/- 10% For 11kV : 2.5 mm +/- 10%

4.5.	AC proof voltage	For 33kV : 36kV minimum For 11kV: 22 kV minimum
4.6.	Dielectric strength	For 33kV: 65kV rms For 11kV: 45kV rms

5. TESTING AND INSPECTION

5.1.	Routine and Acceptance tests in the factory	All the routine and acceptance tests shall be performed as per IS 15652. The purchaser reserves the right to witness the tests at the time of inspection.
5.2.	Inspection at site	The purchaser reserves the right to verify the material at the time of applying the insulating floors at site. Following tests shall also be verified at site: 1. Dielectric strength 2. Ac proof voltage 3. Thickness
5.3.	Type Test Reports	All the Type test reports of the material to be used as the insulating floors as per IS 15652 from CPRI/ERDA shall be submitted.

6. INSTALLATION

6.1.	Application of insulating paints	a. The insulating paint shall be applied in accordance with manufacturer's installation procedure. b. The purchaser may witness the painting process.

7. DEVIATIONS

7.1.	Deviations	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification. No deviation will be acceptable post order.

8. DOCUMENTS SUBMISSION

The bidder has to submit the following documents along with bid:-

8.1.	Complete product catalogue, and Manual
8.2.	Type test reports from CPRI/ERDA
8.3.	P.O. copy and Performance Certificates and feedback for similar type of job done in any other power industry (distribution, transmission and generation).
8.4.	Deviation Sheet (if any)
8.5.	Filled copy of GTP (Annexure A)

ANNEXURE A- GENERAL TECHNICAL PARTICULARS OF INSULATING FLOORS

S. No.	Particulars	BYPL Requirements		Bidder's Data	
1	Make	To be Specified			
2	Application	11kV Indoor	33kV Indoor		
3	Ambient temperature range	0 to 50 deg C			
4	Standard reference	IS 15652:2006			
5	Material to be used	Epoxy Resin			
6	Surface finish	Free from harmful physical irregularities			
7	Solids	100% solvent free			
8	Colour & Appearance	Light grey , viscous liquid			
9	Class of Coating	B	C		
10	Mix Ratio				
11	Specific Gravity				
12	Pot life (in hrs)				
13	Touch dry (in hrs)				
14	Tack free (in hrs)				
15	Hard dry (in hrs)				
16	Full cure (in days)				
17	Dimensions				
17.1	Length	According to the site requirements			
17.2	Width	1000mm ± 20mm			
17.3	Thickness	2.5 mm ± 10%	3 mm ± 10%		
18	**Dielectric Properties**				
18.1	Dielectric constant (ASTM D150 - 150kHz)				
18.2	Insulation resistance with water	minimum 10^6 M Ohm with 500V megger			
18.2	Leakage current	Not more than 10µA			
18.3	AC dielectric strength	45kV rms (min)	65kV rms (min)		
18.4	AC proof voltage	22kV	36kV		
19	**Mechanical Properties**				
19.1	Abrasion resistance (ASTM D 4060)				
19.2	Hardness shore D (ASTM D 2240)				
19.3	Scratch hardness (BS 3900E-2)				
19.4	Pull-Off Adhesion (ASTM D 4541)				
19.5	Tensile strength (ASTM D 638)				

20	Temperature resistance				
21	Gloss(ASTM D523)				
22	**Ageing Properties**				
22.1	Tensile strength & elongation at break after subjection mat to ageing	not less than 75% of the corresponding values			
22.2	Durability of coating (in years)				
23	**Thermal Properties**				
23.1	Flame Retardance	Self extinguishing			
23.2	Marking : Each coating shall be marked with	Class, Lot no., Roll no., Manufacturer's name, BYPL as a customer name, BYPL PO no. and date, BIS marking			
24	**Tests**				
24.1	Type test reports to be submitted	Type test reports not older than 5 years from CPRI/ERDA lab			
24.2	QAP for Acceptance and Routine tests	To be submitted			
24.3	Acceptance test	To be carried out during inspection			