□न□वदा / Enquiry

भारत हेवी इले□□क□स लिमिटेड
Bharat Heavy Electricals Limited
पारेषण □यापार समूह / Transmission Business Group
साम□ी □बंधन / Materials Management

Project : PGCIL N.E.AGRA HVDC

Enquiry No	Enquiry Dt	Rev No	Rev Dt	PI No	Enquiry Type	Inspection by	Due Dt	Commercial Comments	Technical Comments	Signing Authority
316E118	11-Aug-16	0		342260079	Package	Customer	13-Sep-16	As per Tender Documents	As per Tender Documents	

Document Enclosed

SN	Equipment	Phy Unit	Qty	Unit Exworks	Unit Packing	% ED	% CST	% VAT	% ST	Unit F&I	Plan Dt	Comments
1	MISCELLANEOUS ITEMS SWITCHYARD LABELS	LOT	1									
2	Type -1 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specifcation document	Nos.	0									
3	Type -2 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specifcation document	Nos.	812									
4	Type -3 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specifcation document	Nos.	529									
5	Type -4 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specifcation document	Nos.	2296									
6	Type -5 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specifcation document	Nos.	32									

You are requested to submit your most competitive offer so as to reach us positively by the tender opening date & time. THE TENDERS NOT RECEIVED WITHIN SCHEDULED DATE AND TIME ARE LIKELY TO BE IGNORED. BHEL shall not be responsible for any postal delay.

IN YOUR OWN INTEREST YOU ARE ADVISED TO CAREFULLY READ "THE INSTRUCTIONS TO BIDDERS". INCOMPLETE BIDS AND/OR BIDS NOT COMPLYING WITH TENDER CONDITIONS SHALL BE TREATED AS NON RESPONSIVE AND ARE LIKELY TO BE IGNORED.

In case Tender Documents are not received within 7 days of this E-mail message, intimate BHEL accordingly. If no intimation is received, it will be considered that you have received tender enquiry and delay in submission offer due to late receipt of tender documents will not be entertained.

YOU ARE REQUESTED TO SUBMIT YOUR MOST COMPETITIVE OFFER SO AS TO REACH US POSITIVELY BY 2 PM ON THE TENDER OPENING DATE AND TENDER WILL BE OPENED AT 2:30 PM WITH EFFECT FROM 15-SEP-09.

BHEL RESERVES THE RIGHT TO OPT FOR REVERSE AUCTION FOR OBTAINING BEST PRICES.

OFFERS THROUGH E-MAIL / FAX:

WHOSOEVER DESIRES TO SEND OFFERS ON THEIR OWN RISK (COMPLETE IN ALL RESPECTS) VIA E-MAIL or FAX HAVE TO SEND THE OFFERS TO THE COMMON E-MAIL ADDRESS tenderbox@bhel.in or 0120-6748581 FAX .

THE RECEIVED EMAIL OFFERS WILL BE PRINTED BY PURCHASE COORDINATOR AND PUT THEM INTO COVERS AS PER CONVENTIONAL METHOD FOR TENDER OPENING I.E., TECHNO COMMERCIAL & PRICE OFFER SHALL BE PUT INTO TWO SEPARATE COVERS AND BOTH THE COVERS ARE KEPT IN THIRD COVER DULY SUPER SCRIBING ENQY. NO. AND DUE DATE.

OFFERS SENT TO ANY OTHER E-MAIL ID or FAX NO AND INCOMPLETE OFFERS SHALL NOT BE CONSIDERED FOR EVALUATION PURPOSE.

It is suggested that the bidders are advised to send the files with 'password protection'. procedure for giving a password to a file has been given below:

For saving Excel file with password

Steps to be followed:

1. Click on the FILE option in XP system and Start sign in Vista system then go to SAVE AS option.
2. Select the location to save and Click on the TOOLS box and go to GENERAL OPTION.
3. It will ask for the password, type the password into open or modify box or both as required.
4. Then click on the OK button it will ask for reenter of the password.
5. After reentering the password click on the save box.

For saving Word file with password

Steps to be followed:

1. Click on the FILE option in XP and Start sign in Vista then go to SAVE AS option.
2. Select the location to save and Click on the TOOLS box and go to SECURITY OPTION in XP system and GENERAL OPTION in Vista system.
3. It will ask for the password, type the password into open or modify box or both as required.
4. Then click on the OK button it will ask for reenter of the password.
5. After reentering the password click on the save box.

The venders who has sent offers with password,the passwords are to be forwarded to another email id:supplierinfo@bhelindustry.com

MSME STATUS

"THOSE INDUSTRIES WHO HAVE FILED A MEMORANDUM WITH THE CONCERNED AUTHORITIES AND REGISTERED AS MICRO & SMALL

ENTERPRISE UNDER MICRO, SMALL AND MEDIUM ENTERPRISES DEVELOPMENT ACT 2006, HAVE TO SUBMIT A COPY OF SUCH REGISTRATION CERTIFICATE / MEMORANDUM TO BHEL FOR NECESSARY COMPLIANCES OF THE ABOVE ACT".

Please acknowledge the receipt of tender enquiry and fax back this letter by ticking the appropriate item below.

भारत हैवी इलेक्ट्रिकल्स लिमिटेड के लिए / for BHARAT HEAVY ELECTRICALS LTD

We acknowledge the receipt of tender.

(a) The offer against subject enquiry shall be submitted by the scheduled date and time.

(b) We regret to quote. The item in reference is out of our manufacturing range.

(c) We regret because of our prior commitments.

(d) Any other reason.

To
Dibyendu Ghosh
Sr Manager
BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP
TOWER-A,5th Floor,
Advant Navis IT Business Park,
Plot No-7,Sector-142,Expressway Noida
Noida-201305
Distt. Gautam BudhNagar,U.P

Ph: 0120-6748458
Fax: 0120-6748581

हस्ताक्षर और निविदाकार का सील / Signature and Seal of Tenderer

Enquiry No : 316E118 **Enquiry Dt :** 11-Aug-16

ANNEXURE-1

BHARAT HEAVY ELECTRICALS LIMITED
(TRANSMISSION BUSINESS GROUP)

ENQUIRY NO: 316E118 **DATED: 11/08/16**

1. **For any Technical clarification, please contact:**

   SH. SANJEEV K. SHRIVASTAVA, SR. MGR (TBEM)
   SH. NISHANT SINGH, ENGR. (TBEM)
   BHARAT HEAVY ELECTRICALS LIMITED
   TRANSMISSION BUSINESS GROUP
   TOWER A, 5TH FLOOR, ADVANT NAVIS IT BUSINESS PARK,
   PLOT NO-7, SECTOR-142, EXPRESSWAY NOIDA,
   NOIDA-201305,
   DISTT- GAUTAM BUDH NAGAR, UP, INDIA
   Phone: 0120 – 6748517 / 0120 – 6748515
   E-mail: sanjeev.shrivastava@bhel.in / nishant.singh@bhel.in

2. **For any Commercial clarification, please contact:**

   SH. HIMANSHU KANASKAR, MGR. (TBMM) /
   SH. NAVEEN KUMAR, SR. ENGR. (TBMM)
   BHARAT HEAVY ELECTRICALS LIMITED
   TRANSMISSION BUSINESS GROUP
   TOWER A, 5TH FLOOR, ADVANT NAVIS IT BUSINESS PARK,
   PLOT NO-7, SECTOR-142, EXPRESSWAY NOIDA,
   NOIDA-201305,
   DISTT- GAUTAM BUDH NAGAR, UP, INDIA
   Phone: 0120-6748472 / 0120-6748532
   Email: naveen.kumar@bhel.in / kanaskar@bhel.in

3. **Delivery Requirement:**

   Deliver date is 15/09/16. However, vendors to quote their best delivery time in the Activity Schedule attached with tender documents.

4. **Integrity Pact:** Not Applicable

5. **Project Status :** Domestic

6. Final acceptance of vendor for placement of order is subjected to POWERGRID approval.

7. **Technical Pre-Qualification Requirement:**

   Material should be as technical specification.

Signature of Bidder
Seal

BHARAT HEAVY ELECTRICALS LTD.
(TRANSMISSION BUSINESS GROUP)

GENERAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

This is to be submitted duly signed by bidder in original. Clause-wise deviations and / or additional conditions / clarifications, if any, are to be brought out clearly in "Schedule of Commercial Deviation". Deviations and / or additional conditions / clarifications, if any, mentioned elsewhere in the bid / offer, shall not be considered.

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1.	**INSTRUCTION TO BIDDERS :** 1.1 Sealed bids are invited for the items mentioned in the tender enquiry conforming to the NIT including Technical Specifications. Bids should be typed and free from overwriting and erasures. Corrections or additions / deletions, if any, must be clearly written and attested, otherwise offer may be rejected. 1.2 Bidder must ensure that their bid is submitted / dropped in the tender box on or before **14-00 Hrs.** IST on the due date of opening, unless otherwise specified in the NIT, at the address as follows :- Tender Box, Materials Management, Transmission Business Group, Bharat Heavy Electricals Limited, 5th Floor, Tower-A, Advant Navis IT Business Park, Plot-7, Sector-142, Noida Expressway, Noida, Dist. G. B. Nagar, U. P. – 201305 1.3 In case tender enquiry is floated though the e-procurement system, offer / bid has to be submitted through the e-procurement system **ONLY** as per instructions given in the e-procurement portal (https://bheleps.buyjunction.in). 1.4 The bids shall be opened at 14-30 Hrs. IST on the due date of opening, in the presence of participating bidders who may like to be present, unless otherwise specified in the NIT. Bids received late are liable for rejection. Bidders sending bids by courier or post will have to ensure that it is timely delivered at the above address. 1.5 Bids are to be submitted duly signed with seal in two parts :- a) **Techno-commercial Bid (Part-I**) – To be submitted in 2 sets (original + copy). A copy of Price Bid (Part-II) clearly mentioning all the necessary information as per format **without prices** "Un-Priced Bid" is also to be enclosed in Part-I Bid. b) **Price Bid (Part-II)** – To be submitted only in one set in a separate sealed envelope. This should not contain any Technical and / or Commercial Terms and Conditions. The rates should be quoted both in figures and words. 1.6 The Part-I and Part-II Bids are to be sealed in separate envelopes and

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	marked as "Techno-commercial Bid (Part-I)" and "Price Bid (Part-II)" respectively. Both the envelopes are to be kept in another common envelope and marked as "BID". Each envelope should be sealed and superscribed with tender enquiry no., item / package name, project name and due date of opening. Bidder's name and address shall also be mentioned on each envelope. 1.7 For any technical clarification, please contact official mentioned in the tender enquiry / NIT. 1.8 For any commercial clarification please contact official issuing tender enquiry / NIT. 1.9 Price bid (Part-II) should not contain any additional information / description other than given in "Un-Priced Bid" submitted with "Techno-commercial Bid (Part-I)" except prices, otherwise bid is liable for rejection. 1.10 Price Bid submitted along with the bid shall remain valid up to validity of offer. Any discount / revised offer submitted by the bidder on its own shall be accepted provided it is received before the due date and time of offer submission (i.e. Part-I Bid). The discount shall be applied on pro-rata basis to all items including optional items, if any, unless specified otherwise by the bidder. Discount offered shall be valid for full duration of validity of the offer including extension of validity, if any. Unsolicited Supplementary / Revised Price Bid submitted after the due date and time of offer submission (i.e. Part-I Bid), during validity period of offer, unless asked by BHEL, shall not be considered. Withdrawal of quotation by the bidder, at any stage after its opening, may entail suitable action against such bidder by BHEL. 1.11 The consultants / firm (and any of its affiliates) shall not be eligible to participate against tender enquiry for the related goods or works or services for the same project, if they were engaged by BHEL-TBG for the consultancy services. 1.12 In case any Foreign OEM / Foreign Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer / supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer / supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from the manufacturer / supplier and the agent, bid received from the agent shall be ignored. 1.13 Non-conformities / errors / discrepancies in quoted prices in price bids shall be dealt as follows :- a) If, in the price structure quoted for the required goods / services / works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of BHEL there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly. b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.

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	c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above. d) If there is such discrepancy in an offer as mentioned in (a), (b) & (c) above, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the BHEL, the bid is liable to be ignored. 1.14 In case the scope of the successful bidder / supplier against this tender enquiry includes Erection, Testing and Commissioning (ETC) of the equipment / material at site in addition to Supply, Purchase Order shall be placed for Supply Portion and Contract shall be separately awarded for ETC at Site Portion. General Terms and Conditions for Tender Enquiry / Contract mentioned herein shall be applicable for both Supply & ETC at Site. Additional Terms and Conditions for Tender Enquiry / Contract for Erection, Testing and Commissioning at Site "BHEL/TBG/GTC-ETC/2016" shall be applicable for ETC at Site only which is to be read in conjunction with General Terms and Conditions for Tender Enquiry / Contract mentioned herein. However, any breach of either the Purchase Order or the Contract shall be deemed to be breach of the other. 1.15 Taxes and Duties payable extra as per Clause No. 2.3 in NIT, if not specified/quoted clearly as extra shall be considered as included in Ex-works Price and therefore shall not be reimbursed. Taxes and duties not payable extra as per NIT shall be deemed to be included in Ex-works Price. 1.16 If the rates for taxes and duties in respect of the quoted materials and / or services assumed by the Supplier are less than the tariff prevailing at the time of tendering, Supplier will be responsible for such under quotations. However if the rates assumed are higher than the correct rates prevailing at the time tendering, the difference will be to the credit of BHEL. Note : Representative / official deputed by the bidder to witness tender opening must produce authorization letter for the same.
2.	**PRICES :** 2.1 Unless specifically indicated in the NIT, all prices shall be **FIRM.** No enhancement of rate for whatsoever reasons unless and until asked by BHEL shall be allowed. 2.2 Unless specifically indicated in the NIT, the prices shall be on **INR** basis. 2.3 Unless specifically indicated in the NIT, the prices are to be quoted on FOR (Site / Destination) basis. The break-up of prices shall be as under :- a) **Ex-works Price:** Ex-works price including packing & forwarding charges. b) **Excise duty (ED):** ED as applicable is to be quoted as percentage in both un-priced bid and price bid. c) **Sales Tax (ST):** Central Sales Tax/Value Added Tax shall be reimbursed only

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	if the same is paid by the Seller/Contractor to the respective Govt. authorities on direct sales by the Seller/Contractor to the purchaser meeting all statutory requirements and availing all exemptions/concessions under the respective CST/VAT Acts, If is shown/mentioned as included in quoted Price or mentioned as Not Applicable , it will not be reimbursed by BHEL proposes to make Sale in Transit under section 6(2)(b) of Central Sales Tax Act where good movement is interstate. Form "C" shall be issued and exchanged against Form "E1/E2" based on quarterly transactions. The supplier is required to submit the request for issue of Form "C" within 30 days from the end of the quarter giving statewise invoice details. VAT invoices in format prescribed in the respective State Sales Tax Act have to be submitted in the name of nodal agency specified in NIT/intimated by BHEL. d) **Freight & Insurance:** Freight (inclusive of all applicable taxes and duties) and Transit Insurance (inclusive of all applicable taxes and duties) for door delivery up to destination / site / store are to be quoted individually. e) **Type Test Charges:** If asked in the technical specification, it is to be quoted separately for each test along with applicable taxes and duties. f) **Charges for Supervision of Erection, Testing & Commissioning (ETC) at Site:** If asked in the technical specification / NIT, it is to be quoted separately along with applicable taxes and duties. g) **Charges for Testing & Commissioning at Site:** If asked in the technical specification / NIT, it is to be quoted separately along with applicable taxes and duties. h) **Charges for Erection, Testing & Commissioning at Site:** If asked in the technical specification / NIT, it is to be quoted separately along with applicable taxes and duties. i) **Training Charges:** If asked in the technical specification / NIT, it is to be quoted separately along with applicable taxes and duties. j) **Service Tax:** Service Tax if applicable is to be quoted as percentage in both un-priced bid and price bid. 2.4 Entry Tax / Octroi: Any Entry Tax / Octroi, if applicable at destination / destination state, shall be paid extra on proof of such payment. Supplier has to get confirmation from BHEL before despatch of material for any exemption, if applicable. Note : i) Unless otherwise specified in the NIT, the purchase order shall be placed on Ex-works basis for Indian bidders. ii) Prices quoted by Indian bidders shall be in Indian Rupees only. iii) In case Supervision of Erection, Testing & Commissioning (ETC) at Site or Testing & Commissioning at Site or Erection, Testing & Commissioning at Site is also in scope of the bidder along with supply, bidder has to ensure that prices quoted for such services also are in line with special terms & conditions of the NIT, if any.

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	iv) Unless otherwise specified in the NIT, Unloading at Site / Destination shall not be in the scope of the supplier.
3.	**TERMS OF PAYMENT :** 3.1 For Supply only or Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier or Supply where Testing & Commissioning at Site is in scope of the supplier a) 95% of Ex-works value along with 100% taxes & duties, Freight & Insurance within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : • LR / GR duly endorsed by BHEL Site Official. • Material Receipt Certificate issued by BHEL Site Official. • Excise invoice (where ED reimbursement is required or ED exemption is applicable) • Packing List (Case-wise) • Copy of Transit Insurance Certificate from underwriters. • Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management • Guarantee Certificate • Copy of Performance Bank Guarantee (PBG) • Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order. b) 5% of Ex-works value within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : • Form “E1/E2” against Form “C”, if applicable • Certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site if it is in the scope of the supplier or Certificate of successful completion of Testing & Commissioning at Site if it is in the scope of the supplier. • Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.2 For Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier a) 90% of Ex-works value along with 100% taxes & duties, Freight & Insurance within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : • LR / GR duly endorsed by BHEL Site Official. • Material Receipt Certificate issued by BHEL Site Official. • Excise invoice (where ED reimbursement is required or ED exemption is applicable) • Packing List (Case-wise) • Copy of Transit Insurance Certificate from underwriters. • Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management • Guarantee Certificate • Copy of Performance Bank Guarantee (PBG)

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	• Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order b) 10% of Ex-works value within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : • Form "E1/E2" against Form "C", if applicable • Certificate of successful completion of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management • Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.3 For Type Test Charges 100% payment along with taxes and duties within 60 days from the date of receipt of complete invoice along with copy of Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management in 3 sets (original + 2 copies) on completion of delivery (at site, if F&I is in scope of supplier) of main supplies (excluding spares) for which Type Tests are applicable. List of main supplies (excluding spares) for which Type Tests are applicable shall be certified by BHEL Engineering Management. 3.4 For Charges for Supervision of Erection, Testing & Commissioning at Site 100% payment along with taxes and duties within 60 days from the date of receipt of complete invoice along with certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies). 3.5 For Charges for Testing & Commissioning at Site 100% payment along with taxes and duties within 60 days from the date of receipt of complete invoice along with certificate of successful completion of Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies). 3.6 For Training Charges 100% payment along with taxes and duties within 60 days from the date of receipt of complete invoice along with certificate of completion of training issued by BHEL Engineering Management in 3 sets (original + 2 copies). Note : i) Supplier has to submit invoice(s) as per PO or approved billing break-up of prices (if applicable as per NIT). ii) In case of supplies for overseas project, Material Receipt Certificate issued by BHEL Authorized Representative shall also be acceptable. iii) In case of Transit Insurance under Open Insurance Policy, Intimation /

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	Declaration of Transit Insurance as per terms of the relevant Open Insurance Policy along with copy of Open Insurance Policy from underwriters shall also be acceptable. iv) Supplier has to ensure commencement of transit insurance from the date not later than LR / GR date. v) In case VAT is applicable, supplier has to submit Tax Invoice(s) irrespective of any VAT benefit / input credit available to BHEL. vi) In case of interstate sale-in-transit against Form "C", supplier to ensure submission of Form "E1/E2" to BHEL timely to meet statutory requirements irrespective of the related payment terms. vii) Supplier has to submit proof of Service Tax deposited / paid to authority with copy of PAN Card for payment of Service Tax and TDS shall be applicable as per statutory requirements. viii) MSMED Act, 2006 and the rules made thereunder as amended from time to time shall be applicable for release of payment to suppliers qualified & registered as Micro & Small Enterprises based on documents mentioned in the NIT for MSME. ix) Supplier has to submit PBG & Guarantee Certificate as per BHEL format. x) In case any shortages and / or damages in supplies, an amount calculated based on comments against Material Receipt Certificate issued by the BHEL Site Official shall be withheld from the supply payment against 3.1(a) or 3.2(a) above to be deemed fit by BHEL subject to a minimum of 10% of the total ex-works value of the invoice corresponding to the LR / GR against which any shortages and / or damages are reported. The withheld amount shall be released after the shortages and / or damages in supplies are supplied / replenished against Certification by BHEL Site Official. xi) Additional documents required for payment for services are as follows : (a) Copy of Service Tax Registration Certificate (b) Copies of challans for deposit of service tax alongwith certificate by the supplier / contractor that tax charged under the invoice has been remitted by the supplier / contractor to tax authorities
4.	**INTEREST LIABILITY :** In case of any delay in payment due to any reason, BHEL shall not pay any interest on delayed payment. Also, no interest shall be payable by BHEL on the bank guarantee / deposit amount or balance payment or any other money which may become due owing to difference or misunderstanding or any dispute before any quasi judicial authority between BHEL and the Supplier / Contractor.
5.	**GUARANTEE :** The equipment / material supplied and services rendered (if applicable) shall be guaranteed to be free from all defects and faults in design & engineering, material, workmanship & manufacture and in full conformity with the Purchase Order / Contract, Technical Specifications & approved drawings / data sheets, if any, for 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is earlier. Wherever Erection, Testing & Commissioning at Site are also in the scope of the Supplier, the guarantee period shall be 18 months from the date of last delivery or

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	12 months from the date of commissioning, whichever is later. The defective equipment / material / component shall be replaced free of cost at site. Freight & Insurance during transit shall also be in the scope of the supplier / contractor. Any expenditure for dismantling and re-erection of the replaced equipment / material / component shall be to supplier's / contractor's account. All replacements during the guarantee period shall be delivered at site promptly and satisfactorily within a period not more than 45 days from the date of reporting the defect / rejection etc. In the event of the supplier / contractor failing to replace the defective equipment / material / component within the time period mentioned above, BHEL may proceed to undertake the replacement of such defective equipment / material / component at the risk and cost of the supplier / contractor without prejudice to any other rights under the contract and recover the same from PBG / other dues of this Purchase Order / Contract or any other Purchase Order / Contract executed by the supplier / contractor. Note : i) In case of Illumination System, items viz. Lamps, Tubes, Ballast, Starters, Capacitors & Fuses will not be under Guarantee after commissioning. ii) In addition to the above guarantee period, Extended Guarantee / Warranty, if any, shall be as per NIT / Technical Specifications. iii) In case offer of agent of Foreign OEM / Foreign Principal is considered, as per Clause No. 1.12 above, Guarantee as mentioned above has to be provided by the Foreign OEM / Foreign Principal also.
6.	**LATENT DEFECT :** Liability for latent defects shall be for defects inherently lying within material or arising out of design deficiency which does not manifest itself during guarantee period but later and shall be limited to five years from the expiry of the guarantee period.
7.	**PERFORMANCE BANK GUARANTEE (PBG) :** Supplier shall arrange to submit Performance BG / Deposit on a non-judicial stamp paper of appropriate value along with first invoice or within 60 days from placement of Purchase Order (PO) whichever is earlier, in line with one of the applicable options as follows :- Option "A" A single rolling PBG for Rs. 50 Lakhs initially valid for 18 months with claim period of 3 months extra over and above 18 months for all the Purchase Orders being executed for Transmission Business Group, BHEL. However, validity of the PBG shall be extended till 18 months from the date of last delivery with 3 months claim period extra over and above 18 months. Single Rolling PBG option shall not be applicable in case Ex-works value of the PO at the time of placement of PO exceeds Rs. One Crore. Option "B" PBG for 10% of the total Ex-works PO value, valid for 18 months from the date of last delivery with claim period of 3 months extra over and above 18 months. Ex-works PO value at the time of placement of PO shall be considered for calculation of the PBG amount.

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	Option "C" In case the total Ex-works PO value at the time of placement of PO does not exceed Rs. Ten Lakhs, interest free Deposit of 10% of the total Ex-works PO value at the time of placement of PO in form of Demand Draft favouring "Bharat Heavy Electricals Limited" and payable at New Delhi / Delhi / Noida shall also be acceptable to BHEL in lieu of PBG, which shall be released after expiry of 21 months from the date of last delivery after deduction, if any, within 60 days from receipt of invoice in 3 sets (original + 2 copies) to be submitted by the supplier. Note : i) The Bank Guarantee shall be from any bank as per Annexure for List of Banks (32 Nos.). The original PBG should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida. ii) Extension of validity of the PBG in original, as per above clause, should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida at least 45 days before expiry of validity of the PBG. iii) Unless otherwise specified in the NIT, deviation taken for non-submission of PBG / Deposit, as applicable, shall not be accepted. iv) Supplier has to confirm one of the applicable options for submission of PBG / Deposit before placement of PO. v) In case of non–submission PBG / Deposit, as applicable, BHEL reserve the right for Risk Purchase as per terms of the NIT and impose Suspension of Business Dealings with the Supplier / Contractor. vi) BHEL reserve the right to encash the Bank Guarantee and forfeit the amount in the event of any default, failure or neglect on part of the Supplier in fulfilment of performance of the Purchase Order. vii) Value of the Bank Guarantee (at the time of submission) shall remain unchanged for any subsequent variations in Purchase Order value up to ± 20%. Beyond this variation of ± 20%, the Supplier shall arrange to enhance or may reduce the value of the Bank Guarantee accordingly for the total variation promptly.
8.	**SUBMISSION OF DRAWINGS / DOCUMENTS FOR APPROVAL :** Supplier shall submit the master document list within 7 days from date of Purchase Order / Contract, unless otherwise specified in the NIT, with planned dates for submission which shall be in line with activity schedule as per Purchase Order / Contract and shall be finalized with BHEL Engineering Management. Date of first submission of drawings / documents shall be certified by BHEL Engineering Management after the receipt of applicable drawings / documents (e.g. project specific cover sheet, GTP, OGA drawings, schemes, type test reports etc.) by BHEL. During detailed engineering stage, necessary hard copies of the engineering drawings / documents shall also be submitted by the supplier as per the Purchase Order / Contract requirement. The supplier shall also submit the packing drawings as per technical specifications. In case item(s) offered require any interface details of other item (not in the scope of supplier & required for operating the equipment), the supplier has to submit interfaces schedule along with submission of engineering drawings / documents. It shall be responsibility of the supplier to get the details of the interfaced item from BHEL before manufacturing to avoid any mismatch at site.
9.	**FINAL DOCUMENTATION :** Final documentation as called in the technical / contract specification is to be submitted within 3 months from the date of first delivery of respective equipment / item material. In case of default, the Performance BG is liable for encashment.
10.	**INSPECTION :** BHEL / customer / third party shall inspect equipment / material before despatch.

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	Stage inspection during manufacturing may also be carried out. Material to be despatched only after getting Material Despatch Clearance Certificate (MDCC) / MICC issued by BHEL. Supplier shall send inspection call on prescribed format / web site only, with an advance notice of 15 days. Supplier to ensure submission of all routine / acceptance test reports, inspection reports and all other documents related to inspection, immediately to BHEL. BHEL representative is authorised to carry out audits along with Third Party Inspection Agency at vendor's / supplier's works before clearing the items for despatch.
11.	**DESPATCH DOCUMENTS :** Despatch documents to be immediately sent to BHEL on despatch are as follows :- • Copy of Invoice • Copy of LR / GR in case of Indian suppliers or BL / AWB in case of foreign suppliers • Copy of Packing List (Case-wise) • Copy of Transit Insurance Certificate from underwriters • Copy of Guarantee Certificate
12.	**DELIVERY PERIOD :** Delivery / Completion requirement shall be mentioned in the NIT. Bidder to specify best delivery / completion period possible in weeks from the date of LOI / PO as per activity schedule for consideration by BHEL. Time required for type test, if applicable, is to be separately indicated. Note : LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) contracts shall be considered as delivery date.
13.	**LIQUIDATED DAMAGES FOR DELAYED DELIVERY** In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the total Purchase Order value for supply (incl. taxes, duties, freight & insurance as applicable) per week of delay or part thereof subject to a maximum of 10% of the total Purchase Order value for supply (incl. taxes, duties, freight & insurance as applicable) shall be deducted as Liquidated Damages (LD). However, in case of staggered (lot-wise) contractual delivery schedule, LD shall be 0.5% of the total Purchase Order value for supply (incl. taxes, duties, freight & insurance as applicable) of delayed lot per week of delay or part thereof subject to maximum of 10% of the total ex-works Purchase Order value. Note : i) In case of any amendment / revision, the LD shall be linked to the amended / revised Purchase Order / Contract value and delivery / completion time / schedule, if applicable. ii) LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) contracts shall be treated as the date of dispatch for levying LD as above. iii) However, for indigenous supply, if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 30 days, where distance from place of despatch as per LR / GR is upto 1000 Kms or if time period between date of receipt of

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	material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 45 days, where distance from place of despatch as per LR / GR is more than 1000 Kms, such excess period shall also be considered for LD purpose. iv) If, as per supplier, delay is not attributable to the supplier, delay analysis with documentary evidence may be submitted by the supplier at the earliest but not later than six months from the end of the financial year in which the payment is withheld. Based on the above details / documents submitted by the supplier, BHEL shall take final decision and if considered appropriate by BHEL, withheld amount (full or part as the case may be) shall be released, otherwise, full or balance withheld amount shall be treated as deduction of Liquidated Damages (LD) towards delayed delivery.
14.	**VALIDITY OF OFFER :** The offer shall be valid for 120 days from the due date of opening of tender (i.e. techno-commercial bid unless otherwise specified in the NIT). Prices of Spares, wherever they optional items, shall be valid till two years from the date of placement of PO.
15.	**ACCEPTANCE / REJECTION OF TENDER :** BHEL reserve the right to reject in full or part, any or all tender without assigning any reason thereof. BHEL also reserve right to vary the quantities as mentioned in the NIT. Acceptance of offer is subject to vendor approval by customer before opening of price bid. BHEL shall not be bound by any power of attorney granted by tenderer or by changes in composition of the firm made subsequent to award of order / contract. BHEL may however recognize such power of attorney and changes after obtaining proper legal advice, cost of which will be chargeable to the seller / contractor concerned. If the tenderer deliberately gives wrong information, BHEL reserves the right to reject such an offer at any stage or cancel the order / contract, if awarded, and forfeit the security deposit and bank guarantee.
16.	**DEVIATION :** The bids having deviation(s) w.r.t. tender are liable for rejection. However, BHEL, at its discretion, may load the prices for evaluation of offer with prior intimation to bidder.
17.	**TENDER EVALUATION :** Comparative statement shall be prepared based on overall quantity basis unless otherwise indicated in the tender enquiry / NIT. Evaluation of offers shall be done on the basis of total cost to BHEL which shall include applicable taxes & duties, freight & insurance and other services etc. (if applicable). VAT benefit / input credit available to BHEL shall be deducted from prices quoted for calculation of total cost to BHEL, in case specified in the NIT. In case all bidders are foreign & Port of Entry is same for all the bidders, evaluation of offers shall be done on CIF (Port of Entry) basis. Otherwise, evaluation of offers shall be done on the basis of delivered cost at site / destination to BHEL. However, in case of foreign bidders, marine freight & insurance are to be quoted separately & the purchase order shall be placed on FOB basis with an option for delivery on CIF / CFR basis, if required, later. In case of foreign bidders, Exchange Rate (TT selling rate of State Bank of India) as on date of tender opening (Part-I Bid in case of two part bid) shall be considered. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken for tender evaluation.
18.	**LOADING CRITERIA :** List of permissible deviations & loading criteria thereof are as follows :-

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	a) Payment Terms Base rate of SBI (as applicable on the date of bid opening / techno-commercial bid opening in case of two part bids) + 6% shall be considered for loading for the period of relaxation sought by bidder(s) against terms of payment in the NIT. b) Liquidated Damages (LD) for Delayed Delivery Loading on LD clause shall be to the extent to which it is not agreed to by the bidder (at offered value). c) In case of foreign bidders, if the quoted prices is on CIF basis only, it shall be loaded to arrive at total FOR (Site / Destination) price, as applicable, by factors as follows :- i) Port handling / clearing charges : @ 1% of CIF value to arrive at Customs Assessable Value. ii) Custom Duty (including CVD & SAD) as per NIT prevailing on date of price bid opening. iii) Inland Freight & Transit Insurance : @ 5% of CIF value where distance between site / destination and Port of Discharge is upto 1000 Kms or @ 7% of CIF value where distance between site / destination and Port of Discharge is more than 1000 Kms. Note : Additional deviations (if considered acceptable by BHEL) & the loading criteria shall be communicated to all the qualified bidders before price bid opening.
19.	**ARBITRATION :** In the event of any dispute emanating from and relating to this contract, the matter shall be referred to the sole arbitration of the person appointed by the competent authority of BHEL. Subject to aforesaid, the provisions of "The Arbitration and Conciliation Act, 1996" and the rules made thereunder as amended from time to time in India shall apply to the arbitration proceedings. The venue of arbitration shall be in New Delhi. Further there shall be no claim for any pre-reference or pendente-lite interest on the claims and any claim for such interest made shall be void. However, in case of contract with Public Sector Enterprise / Undertaking (PSE/PSU) or Govt. Dept., the extant guidelines of Govt. of India shall be followed.
20.	**LEGAL SETTLEMENT :** Indian Courts at New Delhi / Delhi shall have exclusive jurisdiction to decide the dispute, if any, arising out of or in respect of the contract(s) to which these conditions are applicable. Contract, including all matters connected with contract, shall be governed by the Indian Law, both substantive and procedural, for the time being in force including modification thereto.
21.	**SUB-CONTRACTING :** In case further subcontracting of BHEL Purchase Order / Contract or part thereof is envisaged by supplier, the same can be done after written permission is obtained from BHEL. However it shall not absolve the Supplier / Contractor of the responsibility of fulfilling BHEL Purchase Order / Contract requirements. In case of subcontracting of Purchase Order / Contract awarded by BHEL or part thereof without such permission, BHEL reserve the right to cancel the Purchase Order / Contract and source such material / component / equipment / system from any other agency at the risk and cost of the Supplier / Contractor. If Supplier / Contractor is an individual or proprietary concern and the individual or the proprietor dies or the partnership is dissolved or substantially affected, then unless BHEL is satisfied that legal representative of individual Supplier / Contractor or proprietor of proprietary concern and surviving partners of partnership firm are

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	capable of carrying out and completing the Purchase Order / Contract, BHEL shall be entitled to cancel the Purchase Order / Contract as to its incomplete portion and without being in any way liable to payment of any compensation to legal representative of Supplier / Contractor and / or to surviving partners of Supplier's / Contractor's firm on account of cancellation of the Purchase Order / Contract. Decision of BHEL that legal representatives of deceased Supplier / Contractor or surviving partners of the Supplier's / Contractor's firm cannot carry out and complete the Purchase Order / Contract shall be final and binding on the parties hereto. Terms and Conditions shall not get affected in case of de-merger / amalgamation / taking-over / re-constitution etc.
22.	**RISK PURCHASE :** In case the Supplier / Contractor fails to supply or fails to comply with terms & conditions of the Purchase Order / Contract or delivers equipment / material not of the contracted quality or fails to adhere to the contract specifications or fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery / completion period to justify that supplies shall be inordinately delayed beyond contractual delivery / completion period, BHEL reserve the right to cancel the Purchase Order / Contract either in whole or in part thereof without compensation to Supplier / Contractor and if BHEL so desires, may procure such equipment / material / items not delivered or others of similar description where equipment / material / items exactly complying with particulars are not readily procurable in the opinion of BHEL which is final and in such manner as deemed appropriate, at the risk and cost of the Supplier / Contractor and the Supplier / Contractor shall be liable to BHEL for any excess cost to BHEL. However, the Supplier / Contractor shall continue execution of the Purchase Order / Contract to the extent not cancelled under the provisions of this clause. Recovery amount on account of purchases made by BHEL at the risk and cost of Supplier / Contractor shall be the difference of total value of new Purchase Order (PO) value and total value of old Purchase Order for applicable items, where the total value of new PO is more than total value of old PO for applicable items, plus additional 15% of the total ex-works value of new PO as overheads. The Supplier / Contractor shall on no account be entitled to any gain on such risk & cost purchase. In case the purchase order (PO) value of the new PO is less than the PO value of the old PO, 15% of the total ex-works value of the new PO shall be recovered as overheads and the difference between the PO value of the old PO and the new PO shall not be considered for calculation of the recovery amount.
23.	**ADJUSTMENT OF RECOVERY :** Any amount payable by the Supplier / Contractor under any of the condition of this contract shall be liable to be adjusted against any amount payable to the Supplier / Contractor under any other Purchase Order / Contract awarded to him by any BHEL unit. This is without prejudice to any other action, as may be deemed fit, by BHEL.
24.	**FORCE MAJEURE CONDITION :** If by reason of war, civil commotion, act of god, Government restrictions, strike, lockout which are not in control of Supplier / Contractor the deliveries / services are delayed, Supplier / Contractor shall not be held responsible. If at any time during the continuance of the Purchase Order / Contract, the performance in whole or in part by either party of any obligations under the Purchase Order / Contract is prevented or delayed by reason of any war hostilities, acts of the public enemy, restrictions by Govt. of India, civil commotion, sabotage, fires, floods, explosion, epidemics, quarantine restrictions, strike, lock-outs or acts of God (hereinafter referred to as "event"), which are not in control of Supplier / Contractor

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	or BHEL, then provided notice of the happening of such event is given by either party to the other within fifteen (15) days from the date of occurrence thereof, neither party shall by reason of such event be entitled to terminate the Purchase Order / Contract nor shall have any claim for damages against each other in respect of such non-performance and delay in performance. Performance under the Purchase Order / Contract shall be resumed immediately after such event has come to an end or ceased to exist and decision of BHEL as to whether the deliveries have to be resumed or not shall be final, conclusive and binding on the parties hereto. In the event of the parties hereto not able to agree that a force majeure event has occurred, the parties shall submit the disputes for resolution pursuant to the provisions hereunder, provided that the burden of proof as to whether a force majeure event has occurred shall be upon the party claiming such an event. Notwithstanding above provisions, BHEL shall reserve the right to cancel the Purchase Order / Contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of delivery and other schedules.
25.	**MANUFACTURING QUALITY PLAN (MQP) :** Supplier to submit approved MQP in line with requirement of BHEL/customer.
26.	**SUPPLIER PERFORMANCE MONITORING AND RATING SYSTEM :** BHEL reserve the right for evaluation of Supplier Performance Rating as per Supplier Performance Monitoring and Rating System of BHEL for necessary action. Details are available at BHEL Website www.bhel.com for reference.
27.	**DEALING WITH BANNED SUPPLIERS / CONTRACTORS IN BHEL :** Offers of the bidders, who are on the banned list, as also the offers of the bidders who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website www.bhel.com for reference.
28.	**ORDER OF PRECEDENCE :** The order of precedence shall be as follows :- a) Special Terms & Conditions (STC) for Tender Enquiry / Contract, if any b) General Terms & Conditions (GTC) for Tender Enquiry / Contract & Additional General Terms & Conditions (GTC) for Tender Enquiry / Contract for Erection Testing & Commissioning (ETC) at Site, if applicable Provisions in (a) above shall prevail over (b). In case of conflict, between Technical Specifications and STC / GTC, bidder to seek necessary clarifications from BHEL concerned official as specified in NIT.
29.	**PACKING :** Packing shall be in conformity with specifications and shall be such as to ensure prevention of damages, corrosion, deterioration, shortages, pilferage and loss in transit or storage. In case of shipment by sea or air, the packing shall be sea-worthy or air-worthy respectively and of international standards. Different types of spares i.e. start-up / commissioning spares and initial spares (mandatory spares and recommended O&M spares) are to be packed separately. Packing List shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate :- a) Case / Packing size (as applicable). b) Gross weight and net weight of each package. c) Detailed contents of the package with quantity of each item separately. Project, Item / Package Description, BHEL's PO No. with date & Case / Packing Mark should also be clearly mentioned on the Case / Packing and Packing List for identification. Also, Packing List must be duly signed & should include respective Invoice No. & LR No. Note :

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	Foreign suppliers to furnish details to arrange inland transportation by BHEL, if applicable, as follows :- i) No. of Packages ii) Size with Weight (Gross & Net) of each Package iii) No. of Containers with type & size required for inland transportation iv) Type of Cargo (Break Bulk / LCL / FCL) v) Customs Tariff No.
30.	**COLOUR CODING :** Aluminium stickers are required to be attached to large components but plastic sheet tags should be tied with small components, giving details like purchase order, description of the component, quantity etc. Tags should be of the colour as follows :- a) Main equipment : Yellow or White tag b) Start-up / Commissioning spares : Blue tag c) Mandatory spares : Pink or Red tag d) Recommended / O&M spares : Green tag
31.	**MICRO, SMALL & MEDIUM ENTERPRISES (MSME) :** MSMED Act 2006 as amended from time to time & extant regulations of Govt. of India for MSME will be applicable. Micro & Small Enterprises (MSE) can avail the intended benefits only if they submit along with the offer / bid, attested copies of either Acknowledgement of Entrepreneur Memorandum Part-II (EM-II certificate) having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (As per BHEL format where deemed validity of EM-II certificate of five years have expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of opening (for Techno-commercial Bid : Part-I in case of two part bid). Non-submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or arrested (in original) by a Gazetted officer. Copy of Udyog Aadhaar Memorandum with Acknowledgement of Ministry of Micro, Small & Medium Enterprises should also be furnished.
32.	**BUSINESS ETHICS / SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS / CONTRACTORS :** If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution, indulges in malpractices cheating, bribery, fraud or other misconduct or formation of cartel so as to influence the bidding process or influences the price or fails to perform or is in default without any reasonable cause etc or performs any act considered objectionable as per extant guidelines, action may be taken against such bidders/supplier/contractor as per extant "Guidelines for Suspension of Business Dealings with Suppliers/Contractors". Abridged version of same is available at BHEL website (www.bhel.com) on "Supplier Registration" Page.
33.	**REVERSE AUCTION :** BHEL reserve the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder or price bid submitted by the bidder through e-procurement system. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA. In case BHEL decides to go for Reverse Auction, only those bidders who have given their unconditional acceptance to participate in RA will be allowed to participate in

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	the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit "online sealed bid in the Reverse Auction. Non-submission of "online sealed bid by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue. General Terms and Conditions of RA are available at Annexure. Business Rules for RA shall be sent to the bidders before conducting RA. Abridged Version of "Common Guidelines for Conducting Reverse Auction" may also be seen at BHEL website (www.bhel.com) on "Supplier Registration" Page & "Tender Notifications" Page.
34.	**INTEGRITY PACT :** Bidders shall have to enter into Integrity Pact with BHEL, duly signed with seal in original, if specified in NIT / RFQ failing which bidder's offer shall be liable for rejection.
35.	**TERMINATION OF CONTRACT :** BHEL shall have the right to cancel the Purchase Order / Contract without any financial implication to BHEL if vendor approval by end user / customer is withdrawn or in case of Suspension of Business Dealings with the Suppliers / Contractors by BHEL. BHEL shall have the right to cancel Purchase Order / Contract, wholly or in part, in case they are obliged to do so on account of any decline, diminution, curtailment or stoppage of their business and in that event, the Supplier's / Contractor' compensation claim shall be settled mutually. In case of cancellation of Purchase Order / Contract for main supply, all other associated Purchase Orders / Contracts like those for Mandatory Spares / Recommended Spares / Erection, Testing & Commissioning (ETC) / Supervision of ETC, if any, would also get cancelled.
36.	**SHELF LIFE :** Supplier has to inform the list of the items / sub-items which have limited shelf life like consumables or those required for the first fill and shall indicate the corresponding shelf life period in the offer. Such items / sub-items shall be manufactured / despatched only after getting formal clearance from BHEL.
37.	**LIMITATION OF LIABILITY :** Notwithstanding any other provisions, except in cases of wilful misconduct and / or criminal negligence / acts, a) Neither the Supplier / Contractor nor BHEL shall be liable to the other, whether in Purchase Order / Contract, tort, or otherwise, for any consequential loss or damage, loss of use, loss of production or loss of profits or interest costs, provided however that this exclusion shall not apply to any obligation of the Supplier / Contractor to pay Liquidated Damages to the BHEL and b) Notwithstanding any other provisions incorporated elsewhere in the contract, the aggregate liability of the Contractor in respect of this contract, whether under the Contract, in tort or otherwise, shall not exceed total Contract Price, provided however that this limitation shall not apply to any obligation of the Vendor to indemnify BHEL with respect to Patent Infringement or Intellectual Property Rights.
38.	**SHORTAGES / DAMAGES :** a) Against Supply only or Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site or Supply where Testing & Commissioning at Site is in scope of the supplier :

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	Any shortages and / or damages in supplies shall be supplied / replenished free of cost by the supplier as early as possible but not later than 30 days from the date of intimation by BHEL to the supplier. b) Against Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier : Any shortages and / or damages in supplies and during handling / storage, erection, testing and commissioning at site shall be supplied / replenished free of cost by the Supplier / Contractor, as early as possible, to meet the contractual completion time / schedule. Note : There shall not be any extension in the contractual delivery time / schedule due to any shortages and / or damages in supplies.
39.	**VARIATION OF CONTRACT VALUE / QUANTITY VARIATION :** BHEL shall have the right to variation in quantities of items within ± 30% of the total Purchase Order / Contract value at the time of placement of PO or award of Contract on overall basis for all amendments together within two years from the date of original Purchase Order / Contract or completion of execution of the Purchase Order / Contract whichever is earlier but quantities of individual items may vary to any extent or may get deleted unless otherwise specified in the technical specifications. No compensation is payable due to variation in the quantities and the Supplier / Contractor shall be bound to accept the same the contracted prices / rates without any escalation. However, if the Purchase Order / Contract is on "Lumpsum" basis, no variation of Purchase Order / Contract value shall be admissible to the Supplier / Contractor within the scope of Purchase Order / Contract, as long as the inputs remain unchanged.
40.	**STATUTORY VARIATION :** Statutory Variations in Excise Duty on self-manufactured items, Service Tax on services directly rendered by Supplier / Contractor and Sales Tax / Central Sales Tax / Value Added Tax only on the rates prevailing at the time of delivery / completion w.r.t. rates on the date of offer will be to the account of the BHEL if quoted separately in the prices. No other variations such as on customs duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the BHEL. Notwithstanding anything above, where the actual completion of the supply / services occurs beyond the period stipulated in the Purchase Order / Contract or any extension thereof, variations referred to above, will be limited to the rates prevailing on the dates of such agreed completion periods only. For variations after the agreed completion periods, the Supplier / Contractor alone shall bear the impact for the upward revisions and for downward revisions BHEL shall be given the benefit of reduction in taxes / duties. This will be without prejudice to the levy of liquidated damages for delay in delivery / completion. If new tax is introduced by Central/State Govt/Municipality becomes directly applicable on items specified in Bill of Quantities/Purchase Order/Contract and new tax is neither in substitution nor in abolition of any of present taxes but is altogether a new tax, full reimbursements shall be made provided it becomes applicable on items specified in Bill of Quantities. However, any additional tax implication due to delay in delivery, beyond the Contractual Delivery, attributable to supplier shall be borne by supplier.
41.	**MODE OF PAYMENT :** Payment shall be made directly to the Supplier / Contractor by BHEL through NEFT / RTGS.
42.	**CONFIDENTIALITY :** Supplier / Contractor shall, at all times, undertake to maintain complete

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	confidentiality of all data, information, software, drawings & documents etc. belonging to BHEL and also of systems, procedures, reports, input documents, manuals, results and any other BHEL documents discussed and / or finalized during the course of execution of Purchase Order / Contract.
43.	**INDEMNIFICATION :** The Supplier / Contractor shall indemnify and keep indemnified and hold harmless BHEL and its employees and officers from and against any and all claims, suits, actions or administrative proceedings, demands, losses, damages, costs and expenses and any other claim of whatsoever nature in respect of the death or injury of any person or loss of or damage to any property arising during the course and out of the execution of the Purchase Order / Contract.
44.	**TITLE OF GOODS :** a) Ownership of the equipment / material procured in India, shall be transferred to BHEL upon loading on to the mode of transport to be used for transportation of the said equipment / material from the works to the site / destination and upon endorsement of the dispatch documents in favour of BHEL. b) Ownership of the equipment / material to be imported into the country where the site is located, if not procured in India, shall be transferred to BHEL upon loading on the mode of transport to be used for transportation of the equipment / material from the country of origin to that country / destination and upon endorsement of despatch document in favour of BHEL. c) Notwithstanding the transfer of ownership of the equipment / material, the responsibility for care and safe custody thereof together with the risk of loss or damage thereto for whatsoever reason shall remain with the Supplier.
45.	**COMPLIANCE OF STATUTORY REQUIREMENTS :** The vendor shall comply with all State and Central Laws / Acts, Statutory Rules, Regulations etc., as may be enacted by the Government during the tenure of the Purchase Order / Contract and having in force and applicable to the Purchase Order / Contract and nothing shall be done by the Supplier / Contractor in contravention of any Law / Act and / or Rules / Regulations, thereunder or any amendment thereof. The Supplier / Contractor shall pay all taxes, fees, licence charges / deposits, duties, tolls, royalty, commissions or other charges which may be levied on account of any of his operations connected with the Purchase Order / Contract. In case BHEL is constrained to make any of such payments, BHEL shall recover the same from the Supplier / Contractor either from moneys due to him or otherwise as deemed fit.
46.	**ACCEPTANCE OF ORDER :** Supplier should acknowledge and accept the Letter of Award / Purchase Order issued by BHEL within 7 days of the issue of Letter of Award / Purchase Order. In case of any discrepancy / typographical error in issue of Purchase Order / Contract, the agreed terms & conditions, scope of work, rates / prices for placement of PO / award of contract shall be applicable and BHEL reserves the right to issue amendment(s) to PO / Contract for correction of discrepancies / typographical errors in the PO / Contract at a later date.
47.	**FRAUD PREVENTION POLICY :** The Bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

Signature of Bidder (Authorized Signatory) with Date & Seal

Ref. BHEL/TBG/GTC/2016

Annexure for List of Banks (32 Nos.)

Sr. No.	Name of Bank
1	Allahabad Bank
2	Andhra Bank
3	Bank of Baroda
4	Canara Bank
5	Corporation Bank
6	Central Bank
7	Indian Bank
8	Indian Overseas Bank
9	Oriental Bank of Commerce
10	Punjab National Bank
11	Punjab & Sindh Bank
12	State Bank of India
13	State Bank of Hyderabad
14	Syndicate Bank
15	State Bank of Travancore
16	UCO Bank
17	Union Bank of India
18	United Bank of India
19	Vijaya Bank
20	IDBI
21	CITI Bank N. A.
22	Deutsche Bank AG
23	The Hongkong and Shanghai Banking Corporation Limited
24	Standard Chartered Bank
25	J P Morgan
26	Axis Bank
27	The Federal Bank Limited
28	HDFC
29	Kotak Mahindra Bank
30	ICICI
31	Indusind Bank
32	Yes Bank

PRICE SCHEDULE

(BIDDER TO STRICTLY ENSURE SUBMITTING THE PRICE BIDS IN THIS FORMAT)

Enquiry No : 316E118 Dated : 11/08/16

Project : PGCIL N.E. AGRA HVDC

Item : SWITCHYARD LABELS

SL. NO.	DESCRIPTION OF ITEM	UNIT	QUANTITY	UNIT PRICE EX. WORKS (Rs.)	TOTAL EX. WORKS (Rs.)	UNIT FREIGHT & INSURANCE UP TO SITE (Rs.)	TOTAL FREIGHT & INSURANCE UP TO SITE (Rs.)	ED @ ....% OF COL 6 (Rs.)	CST/VAT @...% OF COL 6 + 9 (Rs.)	F.O.R. DESTINATION PRICE (Rs.) COL (6+8+9+10)
1	2	3	4	5	6	7	8	9	10	11
1	Type-1 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specification document	Nos.	0							
2	Type-2 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specification document	Nos.	812							
3	Type-3 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specification document	Nos.	529							
4	Type-4 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specification document	Nos.	2296							
5	Type-5 labels as per drawing no. 1JNL 100368 - 265 attached with the technical specification document	Nos.	32							
	TOTAL FOR DESTINATION PRICE									
	TOTAL COST TO BHEL									

NOTE: 1. VENDOR TO INDICATE APPLICABLE LOCAL TAX/VAT WITHOUT AS ANY CONCESSIONAL FORMS FOR TRANSACTION WITHIN THE STATE.LOCAL TAX/VAT_____

2. PLEASE NOTE THAT UNPRICED COPY OF PRICE BID (i.e. WITH ALL PRICE BLANKED) SHALL BE FURNISHED ALONGWITH TECHO-COMMERCIAL BID.

3 . Sales Tax: Sales Tax / VAT / CST (against C-form) to be quoted as percentage in un-price & price-bid

4. Excise duty: To be quoted as percentage in un-price & price-bid.

5. THE PRICES MUST BE QUOTED IN THE PRESCRIBED UNIT ONLY.

6 . F&I Charges quoted by bidders shall be inclusive of taxes and duties (if applicable).

SIGNATURE AND SEAL OF TENDERER

TRANSMISSION BUSSINESS GROUP
MATERIAL MANGEMENT
BHEL TBG NOIDA

ACTIVITY SCHEDULE

Please submit this format duly filled in along with offer. Time indicated will be used for calculating contractual delivery period.

ENQUIRY NO: 316E118 **Dated: 11/08/16**
PROJECT: PGCIL N.E. AGRA HVDC
ITEM: SWITCHYARD LABELS
VENDOR…… **OFFER REF……**

SL. NO.	ACTIVITY	ACTIVITY TIME IN WEEKS	REMARKS IF ANY
1.	Receipt of P.O		
2.	P.O Acceptance	ONE WEEK	Vendor must Submit PO acceptance within one week
3.	Submission of documents necessary for getting manufacturing clearance like Drawings, date sheet etc.		Documents complete in all respect are to be Submitted. Delay in approval on account of incomplete / inadequate information shall be the responsibility of supplier
4.	Review and Approval of documents and issue of manufacturing clearance	BHEL ACTIVITY **(2 weeks)**	Vendor must reply all queries expeditiously.
5.	Manufacturing Time		Manufacturing time be indicated considering all constrains & must include time required for internal inspections etc.
6	Raise inspection call	-VE 2 WEEKS TO SL NO 5	Call for inspection must be raised at least two weeks in advance in the prescribed format. Non availability of offered material for inspection to the inspector will be viewed very seriously & may result in financial implications. The date of inspection must be with in the period indicated in 5 above.
7	Inspection	BHEL **(1 week)**	
8	Issue of MICC, MDCC & other documents like EDEC, Road permits etc	BHEL **(1 week)**	Vendor must indicate requirement well in advance.
9	Dispatch	ONE WEEK	Vendor must ensure to dispatch with in one Week of receiving all documents required

Total time in vendor's scope.

1. Please mention constraints if any. For multiple lot delivery activity landmark for each lot should be mentioned. Multiple inspection calls for one lot are to be avoided & delay on this account shall be vendor's responsibility. Vendors to quote their Best Delivery Plan.
2. Inspection call should be given in the prescribed format only. Inspection calls not in the prescribed format shall not be entertained.
3. Qty. to be offered for Inspection should be in accordance within Delivery- schedule - lot BHEL reserves the right not to entertain multiple inspection calls for a Delivery- lot and delay on this account shall be the responsibility of Supplier.
4. Bidders to mention the period in weeks in the Activity Schedule Format ensuring scheduled delivery preferably within three months from the date of placement of Purchase Order.

SIGNATURE AND SEAL OF COMPANY

ENQUIRY NO: 316E118 DATED: 11/08/16

SCHEDULE OF COMMERCIAL DEVIATION

The following are the deviations / variations exception from the General Terms and Conditions:-

SL. NO.	CLAUSE NO. OF GENERAL TERMS & CONDITIONS	STATEMENT OF DEVIATION

Incase, this schedule is not submitted, it will be presumed that the equipment / material to be supplied under this contract is deemed to be in compliance with the General terms and Conditions.

If there is NIL deviation, even then the format to be filled as NIL DEVIATION.

NOTE: Continuation sheets of like size and format may be used as per the Bidder's requirement and shall be annexed to this schedule.

Place ……..

Date ……..

Signature of the authorized representative of

Bidder's Name ……

Designation ……..

Company seal …….

ENQUIRY NO: 316E118 DATED: 11/08/16

SCHEDULE OF TECHNICAL DEVIATION

The following are the deviations / variations exception from the Technical Specifications:-

SL. NO.	CLAUSE NO. OF TECHNICAL SPECIFICATIONS	STATEMENT OF DEVIATION

Incase, this schedule is not submitted, it will be presumed that the equipment / material to be supplied under this contract is deemed to be in compliance with the Technical Specifications.

If there is NIL deviation, even then the format to be filled as NIL DEVIATION.

NOTE: Continuation sheets of like size and format may be used as per the Bidder's requirement and shall be annexed to this schedule.

Place ……..

Date ……..

Signature of the authorized representative of

Bidder's Name ……

Designation ……..

Company seal …….

Terms & Conditions of Reverse Auction

Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.

2. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit 'online sealed bid' in the Reverse Auction. Non-submission of 'online sealed bid' by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.

3. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.

4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.

5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.

6. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.

7. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.

8. Reverse auction will be conducted on scheduled date & time.

9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.

10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.

11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL's standard practice.

12. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the 'Business Rules of Reverse Auction', which will be communicated before the Reverse Auction.

13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action *as per extant BHEL guidelines*, shall be initiated by BHEL and the results of the RA scrapped/ aborted.

14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.

15. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

Annexure - I

Certificate by Chartered Accountant on letter head

This is to Certify that M/S ....., (hereinafter referred to as 'company') having its registered office at ..... is registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part–II) ..... dtd:....., Category: ..... (Micro/Small)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year ..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5, 2006 :
   Rs.....Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:
   Rs.....Lacs

(Strike off whichever is not applicable)

The above investment of Rs.....Lacs is within permissible limit of Rs.....Lacs for .....Micro / Small **(Strike off which is not applicable)** Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/ Small) **(Strike off which is not applicable)** and the date of graduation of such enterprise from its original category is ..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESSS GROUP
MATERIAL RECEIPT CERTIFICATE

a) Site:
b) LR No. with date:
c) Vehicle no.:
d) Date of receipt of material at site:
e) Material details (as mentioned below):

S.no.	Item Description	Type of Packages	Unit (MT/KM/ NO.)	Qty as per packing list	Qty Received	Remarks

Other Remarks:

Signature with date: _____

Name & Designation: _____
(With Seal)

Important Remarks:

1. LR endorsement Format-

"LR no./ Date: _____ Endorsed in favour of (Customer Name) and the transporter is instructed to deliver the goods to (Site name)".

For Example-

LR no. / Date: 22126/ dt. 30/04/15

Endorsed in favour of TANTRANSCO and the transporter is instructed to deliver the goods to TANTRANSCO, Anikadavu substation.

(Sign and stamp with name & designation)

2. LR will only be endorsed as per the given Format and strictly not be receipted.

3. Material receiving will only be given through the MRC (Format attached).

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड

(भारत सरकार का उद्यम)

POWER GRID CORPORATION OF INDIA LIMITED

(A Government of India Enterprise)

पावरग्रिड

केन्द्रीय कार्यालय : "सौदामिनी" प्लॉट सं. 2, सैक्टर-29, गुडगाँव-122 001, हरियाणा
फोन : 2571700 - 719, फैक्स : 2571760, 2571761 तार 'नेटग्रिड'
Corporate Office : "Saudamini" Plot No. 2, Sector-29, Gurgaon-122 001. Haryana
Tel. : 2571700 - 719, Fax : 2571760, 2571761 Gram : 'NATGRID'

संदर्भ संख्या/Ref. Number

C/ENGG/HVDC/NER-NR/500/3630 Date:26.02.2015

ABB AB
HVDC
SE-771 80 Ludvika
Sweden

Kind Attn.: Mr. Goran Isacsson, Project Manager
Ms. Renuka Gera (GM) TBG, BHEL New-Delhi

Subject: ±800 KV, 6000 MW HVDC Multi Terminal NER/ER – NR/WR Interconnector - I – Label List for Main Circuit Equipment for AGR (BHEL)

NOA No.: C-61901R-S056-8/NOA-I/3659, C-61901R-S056-8/NOA-II/3660, C-61901R-S056-8/NOA-III/3661, C-61901R-S056-8/N OA-IV/3662 C-61901R-S056-8/NOA-V/3663 all dated 21st March 2011

Dear Sir,

In reference to your letter/document TM-NEA1-15800 dated 19.02.15. We are here in conveying comments/ approval on the drawings/ documents listed in attached sheet. For approval/ comments code of each drawing/ documents, please refer the category indicated in remarks column.

In case of any modification other than those desired by us are carried out, the same shall be highlighted clearly in the Drawing / Document with full justification thereof and resubmitted for approval.

Approval/ comments conveyed herein neither relieves the Contractor of his contractual obligation and his responsibilities for correctness of dimensions, material of constructions, weight, quantities, design details, assemble fits, performance particulars and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limits the Purchaser's right under the Contract..

Thanking you,

Yours faithfully

(B. B. Mukherjee)
DGM (Engg-HVDC)

C/ENGG/HVDC/NER-NR/500/ 8630 Date: 26.02.2015

Sl No	Document No./ Drawing No.	Document Title	Category of Approval	Remarks
1	AG-LABEL-ACDCY-00 Rev. 00	Label List of Main Circuit Equipment – Valve Hall, DC Hall, AC and DC Yard for AGR (BHEL)	IV	

CATEGORIES: -

I Approved.
II Approved with comments.
III Returned for correction.
IV For Information.

ABB AB
HVDC

±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I

Document Transmittal

ABB AB
Dept. PSDC/DCOC - NEA800
SE-771 80 Ludvika

Doc No: TM-NEA1-15800
Date: 2015-02-19
Reg./ Class No: NEA-D
Dealt with by: Pranita Singh

To: POWERGRID (NEA800) - Engineering
Attn: Mr. Madan Mohan Goswami
Copy to: Mr. Oommen Chandy, Mr. Bhoj Paul, Mr. Göran Isacsson, Mrs. Renuka Gera & Mr. Abhay Kumar

Document No & Rev	Document Description	Document Type	Station	Action	Before	Class No X	Class No Y
AG-LABEL-ACDCY-00 Rev. 00	Lable list of Main Circuit Equipment -Valve Hall, DC Hall, AC and DC Yard for AGR (BHEL)	LIST	Agra	Approval	2015-03-05	DD	362

Best regards,
Pamela Isacsson
Document Control Manager

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name: ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name: AGRA	Deate: 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
MAIN CIRCUIT EQUIPMENT : AC YARD						
1	**400kV/220kV ICT BAY(=W1.W1)**					
	Isolator	=W1.W1.Q11.Q11	3	1	4	4
	Earth Switch	=W1.W1.Q11.Q21	3	1	4	4
	Isolator	=W1.W1.Q13.Q11	3	1	4	4
	Earth Switch	=W1.W1.Q13.Q21	3	1	4	4
	Circuit Breaker	=W1.W1.Q2	1	1	2	4
	Current Transformer	=W1.W1.T4	1	1	2	4
	Isolator	=W1.W1.Q14.Q11	3	1	4	4
	Earth Switch	=W1.W1.Q14.Q21	3	1	4	4
	Isolator	=W1.W1.Q15.Q11	3	1	4	4
	Earth Switch	=W1.W1.Q15.Q21	3	1	4	4
	Current Transformer	=W1.W1.T3	1	1	2	4
	Circuit Breaker	=W1.W1.Q3	1	1	2	4
	Isolator	=W1.W1.Q16.Q11	3	1	4	4
	Earth Switch	=W1.W1.Q16.Q21	3	1	4	4
	Isolator	=W1.W1.Q18R.Q11	1	1	2	4
	Earth Switch	=W1.W1.Q18R.Q21	1	1	2	4
	Isolator	=W1.W1.Q18Y.Q11	1	1	2	4
	Earth Switch	=W1.W1.Q18Y.Q21	1	1	2	4
	Isolator	=W1.W1.Q18B.Q11	1	1	2	4
	Earth Switch	=W1.W1.Q18B.Q21	1	1	2	4
	Isolator	=W1.W1.Q19R.Q11	1	1	2	4
	Isolator	=W1.W1.Q19Y.Q11	1	1	2	4
	Isolator	=W1.W1.Q19B.Q11	1	1	2	4
	Earth Switch	=W1.W1.Q19B.Q21	1	1	2	4
2	**BUS SECTIONALIZER 1-1A (=W1.WC.A)**					
	Isolator	=W1.WC.A.Q12.Q11	3	1	4	4
	Earth Switch	=W1.WC.A.Q12.Q21	3	1	4	4
	Current Transformer	=W1.WC.A.T6	1	1	2	4
	Circuit Breaker	=W1.WC.A.Q2	1	1	2	4
	Current Transformer	=W1.WC.A.T8	1	1	2	4
	Isolator	=W1.WC.A.Q14.Q11	3	1	4	4
	Earth Switch	=W1.WC.A.Q14.Q21	3	1	4	4
3	**BUS SECTIONALIZER 2-2A (=W1.WC.A)**					
	Isolator	=W1.WC.A.Q11.Q11	3	1	4	4
	Earth Switch	=W1.WC.A.Q11.Q21	3	1	4	4
	Current Transformer	=W1.WC.A.T5	1	1	2	4
	Circuit Breaker	=W1.WC.A.Q1	1	1	2	4
	Current Transformer	=W1.WC.A.T7	1	1	2	4
	Isolator	=W1.WC.A.Q13.Q11	3	1	4	4
	Earth Switch	=W1.WC.A.Q13.Q21	3	1	4	4
4	**FILTER-1 BAY(=W1.W10)**					
	Isolator	=W1.W10.Q11.Q11	3	1	4	4
	Earth Switch	=W1.W10.Q11.Q21	3	1	4	4
	Circuit Breaker	=W1.W10.Q1	1	1	2	4
	Current Transformer	=W1.W10.T1	1	1	2	4
	Isolator	=W1.W10.Q12.Q11	3	1	4	4
	Earth Switch	=W1.W10.Q12.Q21	3	1	4	4
	Isolator	=W1.W10.Q13.Q11	3	1	4	4
	Earth Switch	=W1.W10.Q13.Q21	3	1	4	4
	Circuit Breaker	=W1.W10.Q2	1	1	2	4
	Current Transformer	=W1.W10.T4	1	1	2	4
	Isolator	=W1.W10.Q16.Q11	3	1	4	4
	Earth Switch	=W1.W10.Q16.Q21	3	1	4	4
5	**FILTER-3 & FILTER-4 TIE (=W1.W12)**					
	Isolator	=W1.W12.Q11.Q11	3	1	4	4
	Earth Switch	=W1.W12.Q11.Q21	3	1	4	4
	Circuit Breaker	=W1.W12.Q1	1	1	2	4
	Current Transformer	=W1.W12.T1	1	1	2	4
	Isolator	=W1.W12.Q12.Q11	3	1	4	4
	Earth Switch	=W1.W12.Q12.Q21	3	1	4	4
	Isolator	=W1.W12.Q13.Q11	3	1	4	4

Cat IV

POWER GRID CORPORATION OF INDIA LTD.
±800kV, 6000MW HVDC Multi Terminal
NER / ER - NR / WR Interconnector
Approved in Category : IV

Checked by	Verified by	Reviewed by
26/5/15		

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Date : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	Earth Switch	=W1.W12.Q13.Q21	3	1	4	4
	Current Transformer	=W1.W12.T2	1	1	2	4
	Circuit Breaker	=W1.W12.Q2	1	1	2	4
	Current Transformer	=W1.W12.T4	1	1	2	4
	Isolator	=W1.W12.Q14.Q11	3	1	4	4
	Earth Switch	=W1.W12.Q14.Q21	3	1	4	4
	Isolator	=W1.W12.Q15.Q11	3	1	4	4
	Earth Switch	=W1.W12.Q15.Q21	3	1	4	4
	Current Transformer	=W1.W12.T3	1	1	2	4
	Circuit Breaker	=W1.W12.Q3	1	1	2	4
	Isolator	=W1.W12.Q16.Q11	3	1	4	4
	Earth Switch	=W1.W12.Q16.Q21	3	1	4	4
6	**800KV CONVERTER POLE-4 (=W1.W14)**					
	Isolator	=W1.W14.Q11.Q11	3	1	4	4
	Earth Switch	=W1.W14.Q11.Q21	3	1	4	4
	Circuit Breaker	=W1.W14.Q1	1	1	2	4
	Current Transformer	=W1.W14.T1	1	1	2	4
	Isolator	=W1.W14.Q12.Q11	3	1	4	4
	Earth Switch	=W1.W14.Q12.Q21	3	1	4	4
	Isolator	=W1.W14.Q13.Q11	3	1	4	4
	Earth Switch	=W1.W14.Q13.Q21	3	1	4	4
	Current Transformer	=W1.W14.T2	1	1	2	4
	Circuit Breaker	=W1.W14.Q2	1	1	2	4
	Isolator	=W1.W14.Q14.Q11	3	1	4	4
	Earth Switch	=W1.W14.Q14.Q21	3	1	4	4
7	**800KV CONVERTER POLE-2 (=W1.W16)**					
	Isolator	=W1.W16.Q13.Q11	3	1	4	4
	Earth Switch	=W1.W16.Q13.Q21	3	1	4	4
	Circuit Breaker	=W1.W16.Q2	1	1	2	4
	Current Transformer	=W1.W16.T4	1	1	2	4
	Isolator	=W1.W16.Q14.Q11	3	1	4	4
	Earth Switch	=W1.W16.Q14.Q21	3	1	4	4
	Isolator	=W1.W16.Q15.Q11	3	1	4	4
	Earth Switch	=W1.W16.Q15.Q21	3	1	4	4
	Current Transformer	=W1.W16.T3	1	1	2	4
	Circuit Breaker	=W1.W16.Q3	1	1	2	4
	Isolator	=W1.W16.Q16.Q11	3	1	4	4
	Earth Switch	=W1.W16.Q16.Q21	3	1	4	4
8	**BUS SECTIONALIZER 1A-1B (=W1.WC.B)**					
	CVT	=W1.WC.B.T2	1	1	2	4
	Isolator	=W1.WC.B.Q12.Q11	3	1	4	4
	Earth Switch	=W1.WC.B.Q12.Q21	3	1	4	4
	Earth Switch	=W1.WC.B.Q12.Q22	3	1	4	4
	Current Transformer	=W1.WC.B.T6	1	1	2	4
	Circuit Breaker	=W1.WC.B.Q2	1	1	2	4
	Current Transformer	=W1.WC.B.T8	1	1	2	4
	Isolator	=W1.WC.B.Q14.Q11	3	1	4	4
	Earth Switch	=W1.WC.B.Q14.Q21	3	1	4	4
	Earth Switch	=W1.WC.B.Q14.Q22	3	1	4	4
	CVT	=W1.WC.B.T4	1	1	2	4
9	**BUS SECTIONALIZER 2A-2B (=W1.WC.B)**					
	CVT	=W1.WC.B.T1	1	1	2	4
	Isolator	=W1.WC.B.Q11.Q11	3	1	4	4
	Earth Switch	=W1.WC.B.Q11.Q21	3	1	4	4
	Earth Switch	=W1.WC.B.Q11.Q22	3	1	4	4
	Current Transformer	=W1.WC.B.T5	1	1	2	4
	Circuit Breaker	=W1.WC.B.Q1	1	1	2	4
	Current Transformer	=W1.WC.B.T7	1	1	2	4
	Isolator	=W1.WC.B.Q13.Q11	3	1	4	4
	Earth Switch	=W1.WC.B.Q13.Q21	3	1	4	4
	Earth Switch	=W1.WC.B.Q13.Q22	3	1	4	4
	CVT	=W1.WC.B.T3	1	1	2	4
10	**800KV CONVERTER POLE-1 (=W1.W18)**					
	Isolator	=W1.W18.Q11.Q11	3	1	4	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Deate : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	Earth Switch	=W1.W18.Q11.Q21	3	1	4	4
	Circuit Breaker	=W1.W18.Q1	1	1	2	4
	Current Transformer	=W1.W18.T1	1	1	2	4
	Isolator	=W1.W18.Q12.Q11	3	1	4	4
	Earth Switch	=W1.W18.Q12.Q21	3	1	4	4
	Isolator	=W1.W18.Q13.Q11	3	1	4	4
	Earth Switch	=W1.W18.Q13.Q21	3	1	4	4
	Current Transformer	=W1.W18.T2	1	1	2	4
	Circuit Breaker	=W1.W18.Q2	1	1	2	4
	Isolator	=W1.W18.Q14.Q11	3	1	4	4
	Earth Switch	=W1.W18.Q14.Q21	3	1	4	4
11	**800KV CONVERTER POLE-3 (=W1.W20)**					
	Isolator	=W1.W20.Q11.Q11	3	1	4	4
	Earth Switch	=W1.W20.Q11.Q21	3	1	4	4
	Circuit Breaker	=W1.W20.Q1	1	1	2	4
	Current Transformer	=W1.W20.T1	1	1	2	4
	Isolator	=W1.W20.Q12.Q11	3	1	4	4
	Earth Switch	=W1.W20.Q12.Q21	3	1	4	4
	Isolator	=W1.W20.Q13.Q11	3	1	4	4
	Earth Switch	=W1.W20.Q13.Q21	3	1	4	4
	Current Transformer	=W1.W20.T2	1	1	2	4
	Circuit Breaker	=W1.W20.Q2	1	1	2	4
	Isolator	=W1.W20.Q14.Q11	3	1	4	4
	Earth Switch	=W1.W20.Q14.Q21	3	1	4	4
12	**FILTER-2 & FILTER-5 TIE(=W1.W22)**					
	Isolator	=W1.W22.Q11.Q11	3	1	4	4
	Earth Switch	=W1.W22.Q11.Q21	3	1	4	4
	Circuit Breaker	=W1.W22.Q1	1	1	2	4
	Current Transformer	=W1.W22.T1	1	1	2	4
	Isolator	=W1.W22.Q12.Q11	3	1	4	4
	Earth Switch	=W1.W22.Q12.Q21	3	1	4	4
	Isolator	=W1.W22.Q13.Q11	3	1	4	4
	Earth Switch	=W1.W22.Q13.Q21	3	1	4	4
	Current Transformer	=W1.W22.T2	1	1	2	4
	Circuit Breaker	=W1.W22.Q2	1	1	2	4
	Current Transformer	=W1.W22.T4	1	1	2	4
	Isolator	=W1.W22.Q14.Q11	3	1	4	4
	Earth Switch	=W1.W22.Q14.Q21	3	1	4	4
	Isolator	=W1.W22.Q15.Q11	3	1	4	4
	Earth Switch	=W1.W22.Q15.Q21	3	1	4	4
	Current Transformer	=W1.W22.T3	1	1	2	4
	Circuit Breaker	=W1.W22.Q3	1	1	2	4
	Isolator	=W1.W22.Q16.Q11	3	1	4	4
	Earth Switch	=W1.W22.Q16.Q21	3	1	4	4
13	**SIKAR-1 & SIKAR-2 NEW TIE(=W1.W24)**					
	Isolator	=W1.W24.Q11.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q11.Q21	3	1	4	4
	Circuit Breaker	=W1.W24.Q1	1	1	2	4
	Current Transformer	=W1.W24.T1	1	1	2	4
	Isolator	=W1.W24.Q12.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q12.Q21	3	1	4	4
	Isolator	=W1.W24.Q13.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q13.Q21	3	1	4	4
	Current Transformer	=W1.W24.T2	1	1	2	4
	Circuit Breaker	=W1.W24.Q2	1	1	2	4
	Current Transformer	=W1.W24.T4	1	1	2	4
	Isolator	=W1.W24.Q14.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q14.Q21	3	1	4	4
	Isolator	=W1.W24.Q15.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q15.Q21	3	1	4	4
	Current Transformer	=W1.W24.T3	1	1	2	4
	Circuit Breaker	=W1.W24.Q3	1	1	2	4
	Isolator	=W1.W24.Q16.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q16.Q21	3	1	4	

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Deata : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	SIKAR-1 LINE & 50MVAr REACTOR					
	Isolator	=W1.W24.Q18.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q18.Q21	3	1	4	4
	Wave Trap	=W1.W24.L2	3	1	4	3
	CVT	=W1.W24.T6	1	1	2	4
	LA	=W1.W24.F2	3	1	4	3
	Isolator	=W1.W24.Q31.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q31.Q21	3	1	4	4
	Circuit Breaker	=W1.W24.Q5	1	1	2	4
	LA	=W1.W24.F5	3	1	4	3
	Reactor	=W1.W24.L5	1	1	2	4
	LA	=W1.W24.F6	3	1	4	3
	Reactor	=W1.W24.L6	1	1	2	4
	SIKAR-2 LINE & 50MVAr REACTOR					
	Isolator	=W1.W24.Q17.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q17.Q21	3	1	4	4
	Wave Trap	=W1.W24.L1	3	1	4	3
	CVT	=W1.W24.T5	1	1	2	4
	LA	=W1.W24.F1	3	1	4	3
	Isolator	=W1.W24.Q19.Q11	3	1	4	4
	Earth Switch	=W1.W24.Q19.Q21	3	1	4	4
	Circuit Breaker	=W1.W24.Q4	1	1	2	4
	LA	=W1.W24.F3	3	1	4	3
	Reactor	=W1.W24.L3	1	1	2	4
	LA	=W1.W24.F4	3	1	4	3
	Reactor	=W1.W24.L4	1	1	2	4
14	**400kV/220kV/33kV ICT CHANGR OVER (=W2.W3)**					
	LA	=W2.W3.F1R	1	1	2	3
	LA	=W2.W3.F1Y	1	1	2	3
	LA	=W2.W3.F1B	1	1	2	3
	LA	=W2.W3.F1S	1	1	2	3
	Isolator	=W2.W3.Q11R	1	1	2	4
	Isolator	=W2.W3.Q11Y	1	1	2	4
	Isolator	=W2.W3.Q11B	1	1	2	4
	Isolator	=W2.W3.Q11S	1	1	2	4
	ICT	=W2.W3.T1R	1	1	2	4
	ICT	=W2.W3.T1Y	1	1	2	4
	ICT	=W2.W3.T1B	1	1	2	4
	ICT	=W2.W3.T1S	1	1	2	4
	LA	=W2.W3.F2R	1	1	2	3
	LA	=W2.W3.F2Y	1	1	2	3
	LA	=W2.W3.F2B	1	1	2	3
	LA	=W2.W3.F2S	1	1	2	3
	Isolator	=W2.W3.Q12R.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q12R.Q21	1	1	2	4
	Isolator	=W2.W3.Q12Y.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q12Y.Q21	1	1	2	4
	Isolator	=W2.W3.Q12B.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q12B.Q21	1	1	2	4
	Isolator	=W2.W3.Q13R	1	1	2	4
	Isolator	=W2.W3.Q13Y	1	1	2	4
	Isolator	=W2.W3.Q13B	1	1	2	4
	Isolator	=W2.W3.Q14R.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q14R.Q21	1	1	2	4
	Isolator	=W2.W3.Q14Y.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q14Y.Q21	1	1	2	4
	Isolator	=W2.W3.Q14B.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q14B.Q21	1	1	2	4
	Isolator	=W2.W3.Q15R	1	1	2	4
	Isolator	=W2.W3.Q15Y	1	1	2	4
	Isolator	=W2.W3.Q15B.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q15B.Q21	1	1	2	4
	Isolator	=W2.W3.Q12S.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q12S.Q21	1	1	2	4
	Isolator	=W2.W3.Q13S.Q11	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Date : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	Earth Switch	=W2.W3.Q13S.Q21	1	1	2	4
	Isolator	=W2.W3.Q14S.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q14S.Q21	1	1	2	4
	Isolator	=W2.W3.Q15S.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q15S.Q21	1	1	2	4
	Isolator	=W2.W3.Q16S	1	1	2	4
	Isolator	=W2.W3.Q17S	1	1	2	4
	LA	=W2.W3.F3R	1	1	2	3
	LA	=W2.W3.F3Y	1	1	2	3
	LA	=W2.W3.F3B	1	1	2	3
	CT	=W2.W3.T2	1	1	2	4
	Isolator	=W2.W3.Q11.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q11.Q21	1	1	2	4
	Isolator	=W2.W3.Q12	1	1	2	4
	Circuit Breaker	=W2.W3.Q1	1	1	2	4
	Isolator	=W2.W3.Q13.Q11	1	1	2	4
	Earth Switch	=W2.W3.Q13.Q21	1	1	2	4
	Earth Switch	=W2.W3.Q13.Q22	1	1	2	4
	Isolator	=W2.W3.Q14	1	1	2	4
	CVT	=W2.T1	1	1	2	4
	CVT	=W2.T2	1	1	2	4
15	**220KV TRANSFER BAY(=W2.W5)**					
	Isolator	=W2.W5.Q11.Q11	1	1	2	4
	Earth Switch	=W2.W5.Q11.Q21	1	1	2	4
	Isolator	=W2.W5.Q12	1	1	2	4
	Circuit Breaker	=W2.W5.Q1	1	1	2	4
	CT	=W2.W5.T2	1	1	2	4
	Isolator	=W2.W5.Q13.Q11	1	1	2	4
	Earth Switch	=W2.W5.Q13.Q21	1	1	2	4
	Earth Switch	=W2.W5.Q13.Q22	1	1	2	4
16	**220KV BUS COUPLER(=W2.W4)**					
	Isolator	=W2.W4.Q11.Q11	1	1	2	4
	Earth Switch	=W2.W4.Q11.Q21	1	1	2	4
	Earth Switch	=W2.W4.Q11.Q22	1	1	2	4
	Circuit Breaker	=W2.W4.Q1	1	1	2	4
	CT	=W2.W4.T2	1	1	2	4
	Isolator	=W2.W4.Q12.Q11	1	1	2	4
	Earth Switch	=W2.W4.Q12.Q21	1	1	2	4
	Earth Switch	=W2.W4.Q12.Q22	1	1	2	4
17	**220KV LINE-1(=W2.W2)**					
	Isolator	=W2.W2.Q11.Q11	1	1	2	4
	Earth Switch	=W2.W2.Q11.Q21	1	1	2	4
	Isolator	=W2.W2.Q12	1	1	2	4
	Circuit Breaker	=W2.W2.Q1	1	1	2	4
	Isolator	=W2.W2.Q13.Q11	1	1	2	4
	Earth Switch	=W2.W2.Q13.Q21	1	1	2	4
	Earth Switch	=W2.W2.Q13.Q22	1	1	2	4
	Isolator	=W2.W2.Q14	1	1	2	4
	CT	=W2.W2.T2	1	1	2	4
	Wave Trap	=W2.W2.L1	3	1	4	3
	CVT	=W2.W2.T1	1	1	2	4
	LA	=W2.W2.F1	3	1	4	3
18	**220KV LINE-2(=W2.W1)**					
	Isolator	=W2.W1.Q11.Q11	1	1	2	4
	Earth Switch	=W2.W1.Q11.Q21	1	1	2	4
	Isolator	=W2.W1.Q12	1	1	2	4
	Circuit Breaker	=W2.W1.Q1	1	1	2	4
	Isolator	=W2.W1.Q13.Q11	1	1	2	4
	Earth Switch	=W2.W1.Q13.Q21	1	1	2	4
	Earth Switch	=W2.W1.Q13.Q22	1	1	2	4
	Isolator	=W2.W1.Q14	1	1	2	4
	CT	=W2.W1.T2	1	1	2	4
	Wave Trap	=W2.W1.L1	2	1	3	3
	CVT	=W2.W1.T1	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Deate : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	LA	=W2.W1.F1	3	1	4	3
19	**FILTER -1 (=W1.Z1)**					
	LA	=W1.Z1.F1	3	1	4	4
	HP 12					
	Isolator	=W1.Z1.Q11.Q11	3	1	4	4
	Earth Switch	=W1.Z1.Q11.Q21	3	1	4	4
	Earth Switch	=W1.Z1.Q11.Q22	3	1	4	4
	Circuit Breaker	=W1.Z1.Q1	1	1	2	4
	Current Transformer	=W1.Z1.T1	1	1	2	4
	Earth Switch	=W1.Z1.Q21	3	1	4	4
	HV Capacitor	=W1.Z1.Z1.C1	3	1	4	3
	Optical CT	=W1.Z1.Z1.T1	3	1	4	3
	Reactor	=W1.Z1.Z1.L1	3	1	4	4
	Resistor	=W1.Z1.Z1.R1	3	1	4	3
	LA	=W1.Z1.Z1.F1	3	1	4	3
	CT	=W1.Z1.Z1.T2	3	1	4	4
	HP 12B					
	Isolator	=W1.Z1.Q12.Q11	3	1	4	4
	Earth Switch	=W1.Z1.Q12.Q21	3	1	4	4
	Circuit Breaker	=W1.Z1.Q2	1	1	2	4
	Current Transformer	=W1.Z1.T2	1	1	2	4
	Earth Switch	=W1.Z1.Q22	3	1	4	4
	HV Capacitor	=W1.Z1.Z2.C1	3	1	4	3
	Optical CT	=W1.Z1.Z2.T1	3	1	4	3
	Reactor	=W1.Z1.Z2.L1	3	1	4	4
	Resistor	=W1.Z1.Z2.R1	3	1	4	3
	LA	=W1.Z1.Z2.F1	3	1	4	3
	CT	=W1.Z1.Z2.T2	3	1	4	4
	SHUNT CAPACITOR					
	Isolator	=W1.Z1.Q13.Q11	3	1	4	4
	Earth Switch	=W1.Z1.Q13.Q21	3	1	4	4
	Circuit Breaker	=W1.Z1.Q3	1	1	2	4
	Current Transformer	=W1.Z1.T3	1	1	2	4
	Earth Switch	=W1.Z1.Q23	3	1	4	4
	HV Capacitor	=W1.Z1.Z3.C1	3	1	4	3
	Optical CT	=W1.Z1.Z3.T1	3	1	4	3
	Reactor	=W1.Z1.Z3.L1	3	1	4	4
	LA	=W1.Z1.Z3.F1	3	1	4	3
	CT	=W1.Z1.Z3.T2	3	1	4	4
	SHUNT CAPACITOR					
	Isolator	=W1.Z1.Q14.Q11	3	1	4	4
	Earth Switch	=W1.Z1.Q14.Q21	3	1	4	4
	Circuit Breaker	=W1.Z1.Q4	1	1	2	4
	Current Transformer	=W1.Z1.T4	1	1	2	4
	Earth Switch	=W1.Z1.Q24	3	1	4	4
	HV Capacitor	=W1.Z1.Z4.C1	3	1	4	3
	Optical CT	=W1.Z1.Z4.T1	3	1	4	3
	CT	=W1.Z1.Z4.T2	3	1	4	4
20	**FILTER -2 (=W1.Z2)**					
	LA	=W1.Z2.F1	3	1	4	4
	HP 12					
	Isolator	=W1.Z2.Q11.Q11	3	1	4	4
	Earth Switch	=W1.Z2.Q11.Q21	3	1	4	4
	Earth Switch	=W1.Z2.Q11.Q22	3	1	4	4
	Circuit Breaker	=W1.Z2.Q1	1	1	2	4
	Current Transformer	=W1.Z2.T1	1	1	2	4
	Earth Switch	=W1.Z2.Q21	3	1	4	4
	HV Capacitor	=W1.Z2.Z1.C1	3	1	4	3
	Optical CT	=W1.Z2.Z1.T1	3	1	4	3
	Reactor	=W1.Z2.Z1.L1	3	1	4	4
	Resistor	=W1.Z2.Z1.R1	3	1	4	3
	LA	=W1.Z2.Z1.F1	3	1	4	3
	CT	=W1.Z2.Z1.T2	3	1	4	4
	HP 12B					

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Deata : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	Isolator	=W1.Z2.Q12.Q11	3	1	4	4
	Earth Switch	=W1.Z2.Q12.Q21	3	1	4	4
	Circuit Breaker	=W1.Z2.Q2	1	1	2	4
	Current Transformer	=W1.Z2.T2	1	1	2	4
	Earth Switch	=W1.Z2.Q22	3	1	4	4
	HV Capacitor	=W1.Z2.Z2.C1	3	1	4	3
	Optical CT	=W1.Z2.Z2.T1	3	1	4	3
	Reactor	=W1.Z2.Z2.L1	3	1	4	4
	Resistor	=W1.Z2.Z2.R1	3	1	4	3
	LA	=W1.Z2.Z2.F1	3	1	4	3
	CT	=W1.Z2.Z2.T2	3	1	4	4
	HP24/36B					
	Isolator	=W1.Z2.Q13.Q11	3	1	4	4
	Earth Switch	=W1.Z2.Q13.Q21	3	1	4	4
	Circuit Breaker	=W1.Z2.Q3	1	1	2	4
	Current Transformer	=W1.Z2.T3	1	1	2	4
	Earth Switch	=W1.Z2.Q23	3	1	4	4
	HV Capacitor	=W1.Z2.Z3.C1	3	1	4	3
	Optical CT	=W1.Z2.Z3.T1	3	1	4	3
	Reactor	=W1.Z2.Z3.L1	3	1	4	4
	Resistor	=W1.Z2.Z3.R1	3	1	4	3
	LA	=W1.Z2.Z3.F1	3	1	4	3
	Reactor	=W1.Z2.Z3.L2	3	1	4	4
	Resistor	=W1.Z2.Z3.R2	3	1	4	3
	LV Capacitor	=W1.Z2.Z3.C2	3	1	4	3
	LA	=W1.Z2.Z3.F2	3	1	4	3
	CT	=W1.Z2.Z3.T3	3	1	4	4
	CT	=W1.Z2.Z3.T2	3	1	4	4
	SHUNT CAPACITOR					
	Isolator	=W1.Z2.Q14.Q11	3	1	4	4
	Earth Switch	=W1.Z2.Q14.Q21	3	1	4	4
	Circuit Breaker	=W1.Z2.Q4	1	1	2	4
	Current Transformer	=W1.Z2.T4	1	1	2	4
	Earth Switch	=W1.Z2.Q24	3	1	4	4
	HV Capaçitor	=W1.Z2.Z4.C1	3	1	4	3
	Optical CT	=W1.Z2.Z4.T1	3	1	4	3
	Reactor	=W1.Z2.Z4.L1	3	1	4	4
	LA	=W1.Z2.Z4.F1	3	1	4	3
	CT	=W1.Z2.Z4.T2	3	1	4	3
21	**FILTER -3 (=W1.Z3)**					
	LA	=W1.Z3.F1	3	1	4	4
	HP 12					
	Isolator	=W1.Z3.Q11.Q11	3	1	4	4
	Earth Switch	=W1.Z3.Q11.Q21	3	1	4	4
	Earth Switch	=W1.Z3.Q11.Q22	3	1	4	4
	Circuit Breaker	=W1.Z3.Q1	1	1	2	4
	Current Transformer	=W1.Z3.T1	1	1	2	4
	Earth Switch	=W1.Z3.Q21	3	1	4	4
	HV Capacitor	=W1.Z3.Z1.C1	3	1	4	3
	Optical CT	=W1.Z3.Z1.T1	3	1	4	3
	Reactor	=W1.Z3.Z1.L1	3	1	4	4
	Resistor	=W1.Z3.Z1.R1	3	1	4	3
	LA	=W1.Z3.Z1.F1	3	1	4	3
	CT	=W1.Z3.Z1.T2	3	1	4	4
	HP 12B					
	Isolator	=W1.Z3.Q12.Q11	3	1	4	4
	Earth Switch	=W1.Z3.Q12.Q21	3	1	4	4
	Circuit Breaker	=W1.Z3.Q2	1	1	2	4
	Current Transformer	=W1.Z3.T2	1	1	2	4
	Earth Switch	=W1.Z3.Q22	3	1	4	4
	HV Capacitor	=W1.Z3.Z2.C1	3	1	4	3
	Optical CT	=W1.Z3.Z2.T1	3	1	4	3
	Reactor	=W1.Z3.Z2.L1	3	1	4	4
	Resistor	=W1.Z3.Z2.R1	3	1	4	3
	LA	=W1.Z3.Z2.F1	3	1	4	3

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name: ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name: AGRA	Deate: 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	CT	=W1.Z3.Z2.T2	3	1	4	4
	HP24/36B					
	Isolator	=W1.Z3.Q13.Q11	3	1	4	4
	Earth Switch	=W1.Z3.Q13.Q21	3	1	4	4
	Circuit Breaker	=W1.Z3.Q3	1	1	2	4
	Current Transformer	=W1.Z3.T3	1	1	2	4
	Earth Switch	=W1.Z3.Q23	3	1	4	4
	HV Capacitor	=W1.Z3.Z3.C1	3	1	4	3
	Optical CT	=W1.Z3.Z3.T1	3	1	4	3
	Reactor	=W1.Z3.Z3.L1	3	1	4	4
	Resistor	=W1.Z3.Z3.R1	3	1	4	3
	LA	=W1.Z3.Z3.F1	3	1	4	3
	Reactor	=W1.Z3.Z3.L2	3	1	4	4
	Resistor	=W1.Z3.Z3.R2	3	1	4	3
	LV Capacitor	=W1.Z3.Z3.C2	3	1	4	3
	LA	=W1.Z3.Z3.F2	3	1	4	3
	CT	=W1.Z3.Z3.T3	3	1	4	4
	CT	=W1.Z3.Z3.T2	3	1	4	4
	SHUNT CAPACITOR					
	Isolator	=W1.Z3.Q14.Q11	3	1	4	4
	Earth Switch	=W1.Z3.Q14.Q21	3	1	4	4
	Circuit Breaker	=W1.Z3.Q4	1	1	2	4
	Current Transformer	=W1.Z3.T4	1	1	2	4
	Earth Switch	=W1.Z3.Q24	3	1	4	4
	HV Capacitor	=W1.Z3.Z4.C1	3	1	4	3
	Optical CT	=W1.Z3.Z4.T1	3	1	4	3
	Reactor	=W1.Z3.Z4.L1	3	1	4	4
	LA	=W1.Z3.Z4.F1	3	1	4	3
	CT	=W1.Z3.Z4.T2	3	1	4	4
22	**FILTER -4 (=W1.Z4)**					
	LA	=W1.Z4.F1	3	1	4	4
	HP 3					
	Isolator	=W1.Z4.Q11.Q11	3	1	4	4
	Earth Switch	=W1.Z4.Q11.Q21	3	1	4	4
	Earth Switch	=W1.Z4.Q11.Q22	3	1	4	4
	Circuit Breaker	=W1.Z4.Q1	1	1	2	4
	Current Transformer	=W1.Z4.T1	1	1	2	4
	Earth Switch	=W1.Z4.Q21	3	1	4	4
	HV Capacitor	=W1.Z4.Z1.C1	3	1	4	3
	Optical CT	=W1.Z4.Z1.T1	3	1	4	3
	Reactor	=W1.Z4.Z1.L1	3	1	4	4
	Resistor	=W1.Z4.Z1.R1	3	1	4	3
	LA	=W1.Z4.Z1.F1	3	1	4	3
	LV Capacitor	=W1.Z4.Z1.C2	3	1	4	3
	CT	=W1.Z4.Z1.T5	3	1	4	4
	CT	=W1.Z4.Z1.T2	3	1	4	4
	CT	=W1.Z4.Z1.T3	3	1	4	4
	CT	=W1.Z4.Z1.T4	3	1	4	4
	HP 12B					
	Isolator	=W1.Z4.Q12.Q11	3	1	4	4
	Earth Switch	=W1.Z4.Q12.Q21	3	1	4	4
	Circuit Breaker	=W1.Z4.Q2	1	1	2	4
	Current Transformer	=W1.Z4.T2	1	1	2	4
	Earth Switch	=W1.Z4.Q22	3	1	4	4
	HV Capacitor	=W1.Z4.Z2.C1	3	1	4	3
	Optical CT	=W1.Z4.Z2.T1	3	1	4	3
	Reactor	=W1.Z4.Z2.L1	3	1	4	4
	Resistor	=W1.Z4.Z2.R1	3	1	4	3
	LA	=W1.Z4.Z2.F1	3	1	4	3
	CT	=W1.Z4.Z2.T2	3	1	4	4
	HP24/36					
	Isolator	=W1.Z4.Q13.Q11	3	1	4	4
	Earth Switch	=W1.Z4.Q13.Q21	3	1	4	4
	Circuit Breaker	=W1.Z4.Q3	1	1	2	4
	Current Transformer	=W1.Z4.T3	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name: ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name: AGRA	Deate: 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	Earth Switch	=W1.Z4.Q23	3	1	4	4
	HV Capacitor	=W1.Z4.Z3.C1	3	1	4	3
	Optical CT	=W1.Z4.Z3.T1	3	1	4	3
	Reactor	=W1.Z4.Z3.L1	3	1	4	4
	Resistor	=W1.Z4.Z3.R1	3	1	4	3
	LA	=W1.Z4.Z3.F1	3	1	4	3
	Reactor	=W1.Z4.Z3.L2	3	1	4	4
	Resistor	=W1.Z4.Z3.R2	3	1	4	3
	LV Capacitor	=W1.Z4.Z3.C2	3	1	4	3
	LA	=W1.Z4.Z3.F2	3	1	4	3
	CT	=W1.Z4.Z3.T3	3	1	4	4
	CT	=W1.Z4.Z3.T2	3	1	4	4
	SHUNT CAPACITOR					
	Isolator	=W1.Z4.Q14.Q11	3	1	4	4
	Earth Switch	=W1.Z4.Q14.Q21	3	1	4	4
	Circuit Breaker	=W1.Z4.Q4	1	1	2	4
	Current Transformer	=W1.Z4.T4	1	1	2	4
	Earth Switch	=W1.Z4.Q24	3	1	4	4
	HV Capacitor	=W1.Z4.Z4.C1	3	1	4	3
	Optical CT	=W1.Z4.Z4.T1	3	1	4	3
	Reactor	=W1.Z4.Z4.L1	3	1	4	4
	LA	=W1.Z4.Z4.F1	3	1	4	3
	CT	=W1.Z4.Z4.T2	3	1	4	4
23	**FILTER -5 (=W1.Z5)**					
	LA	=W1.Z5.F1	3	1	4	4
	HP 3					
	Isolator	=W1.Z5.Q11.Q11	3	1	4	4
	Earth Switch	=W1.Z5.Q11.Q21	3	1	4	4
	Earth Switch	=W1.Z5.Q11.Q22	3	1	4	4
	Circuit Breaker	=W1.Z5.Q1	1	1	2	4
	Current Transformer	=W1.Z5.T1	1	1	2	4
	Earth Switch	=W1.Z5.Q21	3	1	4	4
	HV Capacitor	=W1.Z5.Z1.C1	3	1	4	3
	Optical CT	=W1.Z5.Z1.T1	3	1	4	3
	Reactor	=W1.Z5.Z1.L1	3	1	4	4
	Resistor	=W1.Z5.Z1.R1	3	1	4	3
	LA	=W1.Z5.Z1.F1	3	1	4	3
	LV Capacitor	=W1.Z5.Z1.C2	3	1	4	3
	CT	=W1.Z5.Z1.T5	3	1	4	4
	CT	=W1.Z5.Z1.T2	3	1	4	4
	CT	=W1.Z5.Z1.T3	3	1	4	4
	CT	=W1.Z5.Z1.T4	3	1	4	4
	HP 12B					
	Isolator	=W1.Z5.Q12.Q11	3	1	4	4
	Earth Switch	=W1.Z5.Q12.Q21	3	1	4	4
	Circuit Breaker	=W1.Z5.Q2	1	1	2	4
	Current Transformer	=W1.Z5.T2	1	1	2	4
	Earth Switch	=W1.Z5.Q22	3	1	4	4
	HV Capacitor	=W1.Z5.Z2.C1	3	1	4	3
	Optical CT	=W1.Z5.Z2.T1	3	1	4	3
	Reactor	=W1.Z5.Z2.L1	3	1	4	4
	Resistor	=W1.Z5.Z2.R1	3	1	4	3
	LA	=W1.Z5.Z2.F1	3	1	4	3
	CT	=W1.Z5.Z2.T2	3	1	4	4
	HP24/36					
	Isolator	=W1.Z5.Q13.Q11	3	1	4	4
	Earth Switch	=W1.Z5.Q13.Q21	3	1	4	4
	Circuit Breaker	=W1.Z5.Q3	1	1	2	4
	Current Transformer	=W1.Z5.T3	1	1	2	4
	Earth Switch	=W1.Z5.Q23	3	1	4	4
	HV Capacitor	=W1.Z5.Z3.C1	3	1	4	3
	Optical CT	=W1.Z5.Z3.T1	3	1	4	3
	Reactor	=W1.Z5.Z3.L1	3	1	4	4
	Resistor	=W1.Z5.Z3.R1	3	1	4	3
	LA	=W1.Z5.Z3.F1	3	1	4	3

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Date : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	Reactor	=W1.Z5.Z3.L2	3	1	4	4
	Resistor	=W1.Z5.Z3.R2	3	1	4	3
	LV Capacitor	=W1.Z5.Z3.C2	3	1	4	3
	LA	=W1.Z5.Z3.F2	3	1	4	3
	CT	=W1.Z5.Z3.T3	3	1	4	4
	CT	=W1.Z5.Z3.T2	3	1	4	4
	SHUNT CAPACITOR					
	Isolator	=W1.Z5.Q14.Q11	3	1	4	4
	Earth Switch	=W1.Z5.Q14.Q21	3	1	4	4
	Circuit Breaker	=W1.Z5.Q4	1	1	2	4
	Current Transformer	=W1.Z5.T4	1	1	2	4
	Earth Switch	=W1.Z5.Q24	3	1	4	4
	HV Capacitor	=W1.Z5.Z4.C1	3	1	4	3
	Optical CT	=W1.Z5.Z4.T1	3	1	4	3
	Reactor	=W1.Z5.Z4.L1	3	1	4	4
	LA	=W1.Z5.Z4.F1	3	1	4	3
	CT	=W1.Z5.Z4.T2	3	1	4	3
24	**CONVERTER TRANSFORMER POLE-1 (=P1.WT)**					
	Isolator	=P1.WT.Q11.Q11	3	1	4	4
	Earth Switch	=P1.WT.Q11.Q21	3	1	4	4
	CVT	=P1.WT.T7	1	1	2	4
	Reactor	=P1.WT.L1	1	1	2	4
	Reactor	=P1.WT.L2	1	1	2	4
	Capacitor	=P1.WT.C1	3	1	4	3
	Filter Tuning Unit	=P1.WT.Z1	1	1	2	3
	LA	=P1.WT.F1	3	1	4	3
	LA	=P1.WT.F2	3	1	4	3
	LA	=P1.WT.F3	3	1	4	3
	LA	=P1.WT.F4	3	1	4	3
	CT	=P1.WT.T8	3	1	4	4
	Converter Transformer Y-Y	=P1.WT.T1	1	1	2	4
	Converter Transformer Y-Y	=P1.WT.T2	1	1	2	4
	Converter Transformer Y-Y	=P1.WT.T3	1	1	2	4
	Converter Transformer Y-D	=P1.WT.T4	1	1	2	4
	Converter Transformer Y-D	=P1.WT.T5	1	1	2	4
	Converter Transformer Y-D	=P1.WT.T6	1	1	2	4
25	**CONVERTER TRANSFORMER POLE-2 (=P2.WT)**					
	Isolator	=P2.WT.Q11.Q11	3	1	4	4
	Earth Switch	=P2.WT.Q11.Q21	3	1	4	4
	CVT	=P2.WT.T7	1	1	2	4
	Reactor	=P2.WT.L1	1	1	2	4
	Reactor	=P2.WT.L2	1	1	2	4
	Capacitor	=P2.WT.C1	3	1	4	3
	Filter Tuning Unit	=P2.WT.Z1	1	1	2	3
	LA	=P2.WT.F1	3	1	4	3
	LA	=P2.WT.F2	3	1	4	3
	LA	=P2.WT.F3	3	1	4	3
	LA	=P2.WT.F4	3	1	4	3
	CT	=P2.WT.T8	3	1	4	4
	Converter Transformer Y-Y	=P2.WT.T1	1	1	2	4
	Converter Transformer Y-Y	=P2.WT.T2	1	1	2	4
	Converter Transformer Y-Y	=P2.WT.T3	1	1	2	4
	Converter Transformer Y-D	=P2.WT.T4	1	1	2	4
	Converter Transformer Y-D	=P2.WT.T5	1	1	2	4
	Converter Transformer Y-D	=P2.WT.T6	1	1	2	4
26	**CONVERTER TRANSFORMER POLE-3 (=P3.WT)**					
	Isolator	=P3.WT.Q11.Q11	3	1	4	4
	Earth Switch	=P3.WT.Q11.Q21	3	1	4	4
	CVT	=P3.WT.T7	1	1	2	4
	Reactor	=P3.WT.L1	1	1	2	4
	Reactor	=P3.WT.L2	1	1	2	4
	Capacitor	=P3.WT.C1	3	1	4	3
	Filter Tuning Unit	=P3.WT.Z1	1	1	2	3
	LA	=P3.WT.F1	3	1	4	3
	LA	=P3.WT.F2	3	1	4	3

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Deate : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	LA	=P3.WT.F3	3	1	4	3
	LA	=P3.WT.F4	3	1	4	3
	CT	=P3.WT.T8	3	1	4	4
	Converter Transformer Y-Y	=P3.WT.T1	1	1	2	4
	Converter Transformer Y-Y	=P3.WT.T2	1	1	2	4
	Converter Transformer Y-Y	=P3.WT.T3	1	1	2	4
	Converter Transformer Y-D	=P3.WT.T4	1	1	2	4
	Converter Transformer Y-D	=P3.WT.T5	1	1	2	4
	Converter Transformer Y-D	=P3.WT.T6	1	1	2	4
27	**CONVERTER TRANSFORMER POLE-4 (=P4.WT)**					
	Isolator	=P4.WT.Q11.Q11	3	1	4	4
	Earth Switch	=P4.WT.Q11.Q21	3	1	4	4
	CVT	=P4.WT.T7	1	1	2	4
	Reactor	=P4.WT.L1	1	1	2	4
	Reactor	=P4.WT.L2	1	1	2	4
	Capacitor	=P4.WT.C1	3	1	4	3
	Filter Tuning Unit	=P4.WT.Z1	1	1	2	3
	LA	=P4.WT.F1	3	1	4	3
	LA	=P4.WT.F2	3	1	4	3
	LA	=P4.WT.F3	3	1	4	3
	LA	=P4.WT.F4	3	1	4	3
	CT	=P4.WT.T8	3	1	4	4
	Converter Transformer Y-Y	=P4.WT.T1	1	1	2	4
	Converter Transformer Y-Y	=P4.WT.T2	1	1	2	4
	Converter Transformer Y-Y	=P4.WT.T3	1	1	2	4
	Converter Transformer Y-D	=P4.WT.T4	1	1	2	4
	Converter Transformer Y-D	=P4.WT.T5	1	1	2	4
	Converter Transformer Y-D	=P4.WT.T6	1	1	2	4
28	**33KV SWITCHYARD-1 (765/400/33KV ICT)**					
	Isolator	=T1-89	1	1	2	4
	Potential Transformer	=T1-PT	1	1	2	4
	Circuit Breaker	=T1-52	1	1	2	4
	CT	=T1-CT	1	1	2	4
	Isolator	=301-89	1	1	2	4
	Circuit Breaker	=301-52	1	1	2	4
	CT	=301-CT	1	1	2	4
	LA	=301-SA	1	1	2	3
	Isolator	=303-89	1	1	2	4
	Circuit Breaker	=303-52	1	1	2	4
	CT	=303-CT	1	1	2	4
	LA	=303-SA	1	1	2	3
	LT Transformer	=S3.AL.P1.TA	1	1	2	4
	LT Transformer	=S3.AL.P1.TB	1	1	2	4
	LT Transformer	=S3.AL.P3.TA	1	1	2	4
	LT Transformer	=S3.AL.P3.TB	1	1	2	4
29	**33KV SWITCHYARD-2 (400/220/33KV ICT)**					
	Isolator	=T2-89	1	1	2	4
	Potential Transformer	=T2-PT	1	1	2	4
	Circuit Breaker	=T2-52	1	1	2	4
	CT	=T2-CT	1	1	2	4
	Isolator	=302-89	1	1	2	4
	Circuit Breaker	=302-52	1	1	2	4
	CT	=302-CT	1	1	2	4
	LA	=302-SA	1	1	2	3
	Isolator	=304-89	1	1	2	4
	Circuit Breaker	=304-52	1	1	2	4
	CT	=304-CT	1	1	2	4
	LA	=304-SA	1	1	2	3
	LT Transformer	=S3.AL.P2.TA	1	1	2	3
	LT Transformer	=S3.AL.P2.TB	1	1	2	3
	LT Transformer	=S3.AL.P4.TA	1	1	2	3
	LT Transformer	=S3.AL.P4.TB	1	1	2	3
30	**VALVE HALL POLE-4(=P4.U)**					
	Valve hall earthing switch, Delta (1 ph)	=P4.U.Q21	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Date : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	Valve hall earthing switch, Star (1 ph)	=P4.U.Q22	1	1	2	4
	Valve hall earthing switch, pole bus	=P4.U.Q23	1	1	2	4
	Pole Bus Wall bushing (indoor-indoor)	=P4.U.X1	1	1	2	4
	Neutral bus arrester (indoor) (CBN)	=P4.U.F3	1	1	2	4
	Valve hall arrester CT	=P4.U.T4	1	1	2	4
	Valve hall earthing switch, neutral bus	=P4.U.Q24	1	1	2	4
	Valve hall neutral bus transducer	=P4.U.T1	1	1	2	4
	Valve hall neutral bus transducer	=P4.U.T2	1	1	2	4
	Wall bushing (Neutral)	=P4.U.X2	1	1	2	4
31	**DC HALL POLE-4**					
	Smoothing Reactor (Pole)	=P4.WP.L1	1	1	2	4
	Smoothing Reactor Arrester (Pole)	=P4.WP.F1	1	1	2	4
	Smoothing Reactor (Pole)	=P4.WP.L2	1	1	2	4
	Smoothing Reactor Arrester (Pole)	=P4.WP.F4	1	1	2	4
	DC Pole Arrester	=P4.WP.F2	1	1	2	4
	DC PLC/RI Capacitor (Pole)	=P4.WP.C1	1	1	2	4
	DC Pole Capacitor CT with LFL Trigger Unit	=P4.WP.T1	1	1	2	4
	DC Pole Bus Volatge Divider	=P4.WP.T2	1	1	2	4
	DC Isolator,Pole	=P4.WP.Q11.Q11	1	1	2	4
	DC Earth Switch,Pole	=P4.WP.Q11.Q21	1	1	2	4
	DC Isolator,MR	=WB4.Q13	1	1	2	4
	DC Pole High Speed Switch	=WB4.Q1	1	1	2	4
	OCT(COCT),Pole Bus	=WB4.T3	1	1	2	4
	DC Isolator,Line	=WB4.Q12	1	1	2	4
	DC Line Arrester	=WB4.F3	1	1	2	4
	Pole Bus Wall Bushing	=WB4.X1	1	1	2	4
	DC Isolator for DC Filter	=P4.Z1.Q11.Q11	1	1	2	4
	DC Earth Switch for DC Filter	=P4.Z1.Q11.Q21	1	1	2	4
	HP 2/6 DC Filter Capacitor	=P4.Z1.Z1.C1	1	1	2	4
	HP 12/24 DC Filter Capacitor	=P4.Z1.Z2.C1	1	1	2	4
	ST/RI DC Filter Capacitor	=P4.Z1.Z3.C1	1	1	2	4
	ST/RI DC Filter Arrester	=P4.Z1.Z3.F1	1	1	2	4
	ST/RI DC Filter Reactor	=P4.Z1.Z3.L1	1	1	2	4
	ST/RI DC;Filter Capacitor	=P4.Z1.Z3.C2	1	1	2	4
	ST/RI DC Filter CT	=P4.Z1.Z3.T1	1	1	2	4
	Neutral Bus Wall Bushing	=P4.WN.X1	1	1	2	4
	HP 2/6 DC Filter Wall Bushing	=P4.Z1.Z1.X1	1	1	2	4
	HP 12/24 DC Filter Wall Bushing	=P4.Z1.Z2.X1	1	1	2	4
32	**DC FILTER AREA POLE-4(=P4.Z1)**					
	DC Isolator, DC Filter	=P4.Z1.Q12.Q11	1	1	2	4
	DC Earth Switch, DC Filter	=P4.Z1.Q12.Q21	1	1	2	4
	HP 2/6					
	HP 2/6 DC Filter HV Arrester to GND	=P4.Z1.Z1.F1	1	1	2	4
	HP 2/6 DC Filter HV Reactor	=P4.Z1.Z1.L1	1	1	2	4
	HP 2/6 DC Filter LV Reactor	=P4.Z1.Z1.L2	1	1	2	4
	HP 2/6 DC Filter Resistor	=P4.Z1.Z1.R1	1	1	2	4
	HP 2/6 DC Filter LV Capacitor	=P4.Z1.Z1.C2	1	1	2	4
	HP 2/6 DC Filter LV Arrester	=P4.Z1.Z1.F2	1	1	2	4
	HP 2/6 DC Filter CT, T1	=P4.Z1.Z1.T1	1	1	2	4
	HP 2/6 DC Filter CT, T2	=P4.Z1.Z1.T2	1	1	2	4
	HP 12/24					
	HP 12/24 DC Filter HV Arrester to GND	=P4.Z1.Z2.F1	1	1	2	4
	HP 12/24 DC Filter HV Arrester	=P4.Z1.Z2.F3	1	1	2	4
	HP 12/24 DC Filter HV Reactor	=P4.Z1.Z2.L1	1	1	2	4
	HP 12/24 DC Filter LV Reactor	=P4.Z1.Z2.L2	1	1	2	4
	HP 12/24 DC Filter HV Resistor	=P4.Z1.Z2.R1	1	1	2	4
	HP 12/24 DC Filter LV Resistor	=P4.Z1.Z2.R2	1	1	2	4
	HP 12/24 DC Filter LV Capacitor	=P4.Z1.Z2.C2	1	1	2	4
	HP 12/24 DC Filter LV Arrester	=P4.Z1.Z2.F2	1	1	2	4
	HP 12/24 DC Filter CT, T1	=P4.Z1.Z2.T1	1	1	2	4
	HP 12/24 DC Filter CT, T2	=P4.Z1.Z2.T2	1	1	2	4
33	**DC NEUTRAL AREA POLE-4(=P4.WN)**					
	Smoothing Reactor (Neutral)	=P4.WN.L1	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
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S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	Blocking Filter Reactor	=P4.WN.L3	1	1	2	4
	Fundamental Frequency Blocking Filter Resistor	=P4.WN.R1	1	1	2	4
	Blocking Filter Capacitor	=P4.WN.C2	1	1	2	4
	Blocking Filter Arrester	=P4.WN.F2	1	1	2	4
	Neutral Bus Capacitor	=P4.WN.C1	1	1	2	4
	Neutral Bus Capacitor CT	=P4.WN.T1	1	1	2	4
	Neutral Bus Voltage Divider	=P4.WN.T2	1	1	2	4
	Neutral Bus Arrester	=P4.WN.F1	1	1	2	4
	DC Neutral Earth Switch	=P4.WN.Q21	1	1	2	4
	NBS	=P4.WN.Q1	1	1	2	4
	DC OCT, Neutral	=P4.WN.T3	1	1	2	4
34	**VALVE HALL POLE-2(=P2.U)**					
	Valve hall earthing switch, Delta (1 ph)	=P2.U.Q21	1	1	2	4
	Valve hall earthing switch, Star (1 ph)	=P2.U.Q22	1	1	2	4
	Valve hall earthing switch, pole bus	=P2.U.Q23	1	1	2	4
	Pole Bus Wall bushing (indoor-indoor)	=P2.U.X1	1	1	2	4
	Neutral bus arrester (indoor) (CBN)	=P2.U.F3	1	1	2	4
	Valve hall arrester CT	=P2.U.T4	1	1	2	4
	Valve hall earthing switch, neutral bus	=P2.U.Q24	1	1	2	4
	Valve hall neutral bus transducer	=P2.U.T1	1	1	2	4
	Valve hall neutral bus transducer	=P2.U.T2	1	1	2	4
	Wall bushing (Neutral)	=P2.U.X2	1	1	2	4
35	**DC HALL POLE-2**					
	Smoothing Reactor (Pole)	=P2.WP.L1	1	1	2	4
	Smoothing Reactor Arrester (Pole)	=P2.WP.F1	1	1	2	4
	Smoothing Reactor (Pole)	=P2.WP.L2	1	1	2	4
	Smoothing Reactor Arrester (Pole)	=P2.WP.F4	1	1	2	4
	DC Pole Arrester	=P2.WP.F2	1	1	2	4
	DC PLC/RI Capacitor (Pole)	=P2.WP.C1	1	1	2	4
	DC Pole Capacitor CT with LFL Trigger Unit	=P2.WP.T1	1	1	2	4
	DC Pole Bus Volatge Divider	=P2.WP.T2	1	1	2	4
	DC Isolator,Pole	=P2.WP.Q11.Q11	1	1	2	4
	DC Earth Switch,Pole	=P2.WP.Q11.Q21	1	1	2	4
	DC Isolator,MR	=WB2.Q13	1	1	2	4
	DC Pole High Speed Switch	=WB2.Q1	1	1	2	4
	OCT(COCT),Pole Bus	=WB2.T3	1	1	2	4
	DC Isolator,Line	=WB2.Q12.Q11	1	1	2	4
	DC Earth Switch,Line	=WB2.Q12.Q21	1	1	2	4
	DC Line Arrester	=WB2.F3	1	1	2	4
	Pole Bus Wall Bushing	=WB2.X1	1	1	2	4
	DC Isolator for DC Filter	=P2.Z1.Q11.Q11	1	1	2	4
	DC Earth Switch for DC Filter	=P2.Z1.Q11.Q21	1	1	2	4
	HP 2/6 DC Filter Capacitor	=P2.Z1.Z1.C1	1	1	2	4
	HP 12/24 DC Filter Capacitor	=P2.Z1.Z2.C1	1	1	2	4
	ST/RI DC Filter Capacitor	=P2.Z1.Z3.C1	1	1	2	4
	ST/RI DC Filter Arrester	=P2.Z1.Z3.F1	1	1	2	4
	ST/RI DC Filter Reactor	=P2.Z1.Z3.L1	1	1	2	4
	ST/RI DC Filter Capacitor	=P2.Z1.Z3.C2	1	1	2	4
	ST/RI DC Filter CT	=P2.Z1.Z3.T1	1	1	2	4
	Neutral Bus Wall Bushing	=P2.WN.X1	1	1	2	4
	HP 2/6 DC Filter Wall Bushing	=P2.Z1.Z1.X1	1	1	2	4
	HP 12/24 DC Filter Wall Bushing	=P2.Z1.Z2.X1	1	1	2	4
36	**DC FILTER AREA POLE-2(=P2.Z1)**					
	DC Isolator, DC Filter	=P2.Z1.Q12.Q11	1	1	2	4
	DC Earth Switch, DC Filter	=P2.Z1.Q12.Q21	1	1	2	4
	HP 2/6					
	HP 2/6 DC Filter HV Arrester to GND	=P2.Z1.Z1.F1	1	1	2	4
	HP 2/6 DC Filter HV Reactor	=P2.Z1.Z1.L1	1	1	2	4
	HP 2/6 DC Filter LV Reactor	=P2.Z1.Z1.L2	1	1	2	4
	HP 2/6 DC Filter Resistor	=P2.Z1.Z1.R1	1	1	2	4
	HP 2/6 DC Filter LV Capacitor	=P2.Z1.Z1.C2	1	1	2	4
	HP 2/6 DC Filter LV Arrester	=P2.Z1.Z1.F2	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Date : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	HP 2/6 DC Filter CT, T1	=P2.Z1.Z1.T1	1	1	2	4
	HP 2/6 DC Filter CT, T2	=P2.Z1.Z1.T2	1	1	2	4
	HP 12/24					
	HP 12/24 DC Filter HV Arrester to GND	=P2.Z1.Z2.F1	1	1	2	4
	HP 12/24 DC Filter HV Arrester	=P2.Z1.Z2.F3	1	1	2	4
	HP 12/24 DC Filter HV Reactor	=P2.Z1.Z2.L1	1	1	2	4
	HP 12/24 DC Filter LV Reactor	=P2.Z1.Z2.L2	1	1	2	4
	HP 12/24 DC Filter HV Resistor	=P2.Z1.Z2.R1	1	1	2	4
	HP 12/24 DC Filter LV Resistor	=P2.Z1.Z2.R2	1	1	2	4
	HP 12/24 DC Filter LV Capacitor	=P2.Z1.Z2.C2	1	1	2	4
	HP 12/24 DC Filter LV Arrester	=P2.Z1.Z2.F2	1	1	2	4
	HP 12/24 DC Filter CT, T1	=P2.Z1.Z2.T1	1	1	2	4
	HP 12/24 DC Filter CT, T2	=P2.Z1.Z2.T2	1	1	2	4
37	**DC NEUTRAL AREA POLE-2 (=P2.WN)**					
	Smoothing Reactor (Neutral)	=P2.WN.L1	1	1	2	4
	Blocking Filter Reactor	=P2.WN.L3	1	1	2	4
	Fundamental Frequency Blocking Filter Resistor	=P2.WN.R1	1	1	2	4
	Blocking Filter Capacitor	=P2.WN.C2	1	1	2	4
	Blocking Filter Arrester	=P2.WN.F2	1	1	2	4
	Neutral Bus Capacitor	=P2.WN.C1	1	1	2	4
	Neutral Bus Capacitor CT	=P2.WN.T1	1	1	2	4
	Neutral Bus Voltage Divider	=P2.WN.T2	1	1	2	4
	Neutral Bus Arrester	=P2.WN.F1	1	1	2	4
	DC Neutral Earth Switch	=P2.WN.Q21	1	1	2	4
	NBS	=P2.WN.Q1	1	1	2	4
	DC OCT, Neutral	=P2.WN.T3	1	1	2	4
38	**VALVE HALL POLE-1(=P1.U)**					
	Valve hall earthing switch, Delta (1 ph)	=P1.U.Q21	1	1	2	4
	Valve hall earthing switch, Star (1 ph)	=P1.U.Q22	1	1	2	4
	Valve hall earthing switch, pole bus	=P1.U.Q23	1	1	2	4
	Pole Bus Wall bushing (indoor-indoor)	=P1.U.X1	1	1	2	4
	Neutral bus arrester (indoor) (CBN)	=P1.U.F3	1	1	2	4
	Valve hall arrester CT	=P1.U.T4	1	1	2	4
	Valve hall earthing switch, neutral bus	=P1.U.Q24	1	1	2	4
	Valve hall neutral bus transducer	=P1.U.T1	1	1	2	4
	Valve hall neutral bus transducer	=P1.U.T2	1	1	2	4
	Wall bushing (Neutral)	=P1.U.X2	1	1	2	4
39	**DC HALL POLE-1**					
	Smoothing Reactor (Pole)	=P1.WP.L1	1	1	2	4
	Smoothing Reactor Arrester (Pole)	=P1.WP.F1	1	1	2	4
	Smoothing Reactor (Pole)	=P1.WP.L2	1	1	2	4
	Smoothing Reactor Arrester (Pole)	=P1.WP.F4	1	1	2	4
	DC Pole Arrester	=P1.WP.F2	1	1	2	4
	DC PLC/RI Capacitor (Pole)	=P1.WP.C1	1	1	2	4
	DC Pole Capacitor CT with LFL Trigger Unit	=P1.WP.T1	1	1	2	4
	DC Pole Bus Volatge Divider	=P1.WP.T2	1	1	2	4
	DC Isolator,Pole	=P1.WP.Q11.Q11	1	1	2	4
	DC Earth Switch,Pole	=P1.WP.Q11.Q21	1	1	2	4
	DC Isolator,MR	=WB1.Q13	1	1	2	4
	DC Pole High Speed Switch	=WB1.Q1	1	1	2	4
	OCT(COCT),Pole Bus	=WB1.T3	1	1	2	4
	DC Isolator,Line	=WB1.Q12.Q11	1	1	2	4
	DC Earth Switch,Line	=WB1.Q12.Q11	1	1	2	4
	DC Line Arrester	=WB1.F3	1	1	2	4
	Pole Bus Wall Bushing	=WB1.X1	1	1	2	4
	DC Isolator for DC Filter	=P1.Z1.Q11.Q11	1	1	2	4
	DC Earth Switch for DC Filter	=P1.Z1.Q11.Q21	1	1	2	4
	HP 2/6 DC Filter Capacitor	=P1.Z1.Z1.C1	1	1	2	4
	HP 12/24 DC Filter Capacitor	=P1.Z1.Z2.C1	1	1	2	4
	ST/RI DC Filter Capacitor	=P1.Z1.Z3.C1	1	1	2	4
	ST/RI DC Filter Arrester	=P1.Z1.Z3.F1	1	1	2	4
	ST/RI DC Filter Reactor	=P1.Z1.Z3.L1	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Date : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	ST/RI DC Filter Capacitor	=P1.Z1.Z3.C2	1	1	2	4
	ST/RI DC Filter CT	=P1.Z1.Z3.T1	1	1	2	4
	Neutral Bus Wall Bushing	=P1.WN.X1	1	1	2	4
	HP 2/6 DC Filter Wall Bushing	=P1.Z1.Z1.X1	1	1	2	4
	HP 12/24 DC Filter Wall Bushing	=P1.Z1.Z2.X1	1	1	2	4
40	**DC FILTER AREA POLE-1(=P1.Z1)**					
	DC Isolator, DC Filter	=P1.Z1.Q12.Q11	1	1	2	4
	DC Earth Switch, DC Filter	=P1.Z1.Q12.Q21	1	1	2	4
	HP 2/6					
	HP 2/6 DC Filter HV Arrester to GND	=P1.Z1.Z1.F1	1	1	2	4
	HP 2/6 DC Filter HV Reactor	=P1.Z1.Z1.L1	1	1	2	4
	HP 2/6 DC Filter LV Reactor	=P1.Z1.Z1.L2	1	1	2	4
	HP 2/6 DC Filter Resistor	=P1.Z1.Z1.R1	1	1	2	4
	HP 2/6 DC Filter LV Capacitor	=P1.Z1.Z1.C2	1	1	2	4
	HP 2/6 DC Filter LV Arrester	=P1.Z1.Z1.F2	1	1	2	4
	HP 2/6 DC Filter CT, T1	=P1.Z1.Z1.T1	1	1	2	4
	HP 2/6 DC Filter CT, T2	=P1.Z1.Z1.T2	1	1	2	4
	HP 12/24					
	HP 12/24 DC Filter HV Arrester to GND	=P1.Z1.Z2.F1	1	1	2	4
	HP 12/24 DC Filter HV Arrester	=P1.Z1.Z2.F3	1	1	2	4
	HP 12/24 DC Filter HV Reactor	=P1.Z1.Z2.L1	1	1	2	4
	HP 12/24 DC Filter LV Reactor	=P1.Z1.Z2.L2	1	1	2	4
	HP 12/24 DC Filter HV Resistor	=P1.Z1.Z2.R1	1	1	2	4
	HP 12/24 DC Filter LV Resistor	=P1.Z1.Z2.R2	1	1	2	4
	HP 12/24 DC Filter LV Capacitor	=P1.Z1.Z2.C2	1	1	2	4
	HP 12/24 DC Filter LV Arrester	=P1.Z1.Z2.F2	1	1	2	4
	HP 12/24 DC Filter CT, T1	=P1.Z1.Z2.T1	1	1	2	4
	HP 12/24 DC Filter CT, T2	=P1.Z1.Z2.T2	1	1	2	4
41	**DC NEUTRAL AREA POLE-1(=P1.WN)**					
	Smoothing Reactor (Neutral)	=P1.WN.L1	1	1	2	4
	Blocking Filter Reactor	=P1.WN.L3	1	1	2	4
	Fundamental Frequency Blocking Filter Resistor	=P1.WN.R1	1	1	2	4
	Blocking Filter Capacitor	=P1.WN.C2	1	1	2	4
	Blocking Filter Arrester	=P1.WN.F2	1	1	2	4
	Neutral Bus Capacitor	=P1.WN.C1	1	1	2	4
	Neutral Bus Capacitor CT	=P1.WN.T1	1	1	2	4
	Neutral Bus Voltage Divider	=P1.WN.T2	1	1	2	4
	Neutral Bus Arrester	=P1.WN.F1	1	1	2	4
	DC Neutral Earth Switch	=P1.WN.Q21	1	1	2	4
	NBS	=P1.WN.Q1	1	1	2	4
	DC OCT, Neutral	=P1.WN.T3	1	1	2	4
42	**VALVE HALL POLE-3(=P3.U)**					
	Valve hall earthing switch, Delta (1 ph)	=P3.U.Q21	1	1	2	4
	Valve hall earthing switch, Star (1 ph)	=P3.U.Q22	1	1	2	4
	Valve hall earthing switch, pole bus	=P3.U.Q23	1	1	2	4
	Pole Bus Wall bushing (indoor-indoor)	=P3.U.X1	1	1	2	4
	Neutral bus arrester (indoor) (CBN)	=P3.U.F3	1	1	2	4
	Valve hall arrester CT	=P3.U.T4	1	1	2	4
	Valve hall earthing switch, neutral bus	=P3.U.Q24	1	1	2	4
	Valve hall neutral bus transducer	=P3.U.T1	1	1	2	4
	Valve hall neutral bus transducer	=P3.U.T2	1	1	2	4
	Wall bushing (Neutral)	=P3.U.X2	1	1	2	4
43	**DC HALL POLE-3**					
	Smoothing Reactor (Pole)	=P3.WP.L1	1	1	2	4
	Smoothing Reactor Arrester (Pole)	=P3.WP.F1	1	1	2	4
	Smoothing Reactor (Pole)	=P3.WP.L2	1	1	2	4
	Smoothing Reactor Arrester (Pole)	=P3.WP.F4	1	1	2	4
	DC Pole Arrester	=P3.WP.F2	1	1	2	4
	DC PLC/RI Capacitor (Pole)	=P3.WP.C1	1	1	2	4
	DC Pole Capacitor CT with LFL Trigger Unit	=P3.WP.T1	1	1	2	4
	DC Pole Bus Volatge Divider	=P3.WP.T2	1	1	2	4
	DC Isolator,Pole	=P3.WP.Q11.Q11	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-ACDCY-00 Rev 00
	Station name : AGRA	Dasta : 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	DC Earth Switch,Pole	=P3.WP.Q11.Q21	1	1	2	4
	DC Isolator,MR	=WB3.Q13	1	1	2	4
	DC Pole High Speed Switch	=WB3.Q1	1	1	2	4
	OCT(COCT),Pole Bus	=WB3.T3	1	1	2	4
	DC Isolator,Line	=WB3.Q12	1	1	2	4
	DC Line Arrester	=WB3.F3	1	1	2	4
	Pole Bus Wall Bushing	=WB3.X1	1	1	2	4
	DC Isolator for DC Filter	=P3.Z1.Q11.Q11	1	1	2	4
	DC Earth Switch for DC Filter	=P3.Z1.Q11.Q21	1	1	2	4
	HP 2/6 DC Filter Capacitor	=P3.Z1.Z1.C1	1	1	2	4
	HP 12/24 DC Filter Capacitor	=P3.Z1.Z2.C1	1	1	2	4
	ST/RI DC Filter Capacitor	=P3.Z1.Z3.C1	1	1	2	4
	ST/RI DC Filter Arrester	=P3.Z1.Z3.F1	1	1	2	4
	ST/RI DC Filter Reactor	=P3.Z1.Z3.L1	1	1	2	4
	ST/RI DC Filter Capacitor	=P3.Z1.Z3.C2	1	1	2	4
	ST/RI DC Filter CT	=P3.Z1.Z3.T1	1	1	2	4
	Neutral Bus Wall Bushing	=P3.WN.X1	1	1	2	4
	HP 2/6 DC Filter Wall Bushing	=P3.Z1.Z1.X1	1	1	2	4
	HP 12/24 DC Filter Wall Bushing	=P3.Z1.Z2.X1	1	1	2	4
44	**DC FILTER AREA POLE-3(=P3.Z1)**					
	DC Isolator, DC Filter	=P3.Z1.Q12.Q11	1	1	2	4
	DC Earth Switch, DC Filter	=P3.Z1.Q12.Q21	1	1	2	4
	HP 2/6					
	HP 2/6 DC Filter HV Arrester to GND	=P3.Z1.Z1.F1	1	1	2	4
	HP 2/6 DC Filter HV Reactor	=P3.Z1.Z1.L1	1	1	2	4
	HP 2/6 DC Filter LV Reactor	=P3.Z1.Z1.L2	1	1	2	4
	HP 2/6 DC Filter Resistor	=P3.Z1.Z1.R1	1	1	2	4
	HP 2/6 DC Filter LV Capacitor	=P3.Z1.Z1.C2	1	1	2	4
	HP 2/6 DC Filter LV Arrester	=P3.Z1.Z1.F2	1	1	2	4
	HP 2/6 DC Filter CT, T1	=P3.Z1.Z1.T1	1	1	2	4
	HP 2/6 DC Filter CT, T2	=P3.Z1.Z1.T2	1	1	2	4
	HP 12/24					
	HP 12/24 DC Filter HV Arrester to GND	=P3.Z1.Z2.F1	1	1	2	4
	HP 12/24 DC Filter HV Arrester	=P3.Z1.Z2.F3	1	1	2	4
	HP 12/24 DC Filter HV Reactor	=P3.Z1.Z2.L1	1	1	2	4
	HP 12/24 DC Filter LV Reactor	=P3.Z1.Z2.L2	1	1	2	4
	HP 12/24 DC Filter HV Resistor	=P3.Z1.Z2.R1	1	1	2	4
	HP 12/24 DC Filter LV Resistor	=P3.Z1.Z2.R2	1	1	2	4
	HP 12/24 DC Filter LV Capacitor	=P3.Z1.Z2.C2	1	1	2	4
	HP 12/24 DC Filter LV Arrester	=P3.Z1.Z2.F2	1	1	2	4
	HP 12/24 DC Filter CT, T1	=P3.Z1.Z2.T1	1	1	2	4
	HP 12/24 DC Filter CT, T2	=P3.Z1.Z2.T2	1	1	2	4
45	**DC NEUTRAL AREA POLE-3 (=P3.WN)**					
	Smoothing Reactor (Neutral)	=P3.WN.L1	1	1	2	4
	Blocking Filter Reactor	=P3.WN.L3	1	1	2	4
	Fundamental Frequency Blocking Filter Resistor	=P3.WN.R1	1	1	2	4
	Blocking Filter Capacitor	=P3.WN.C2	1	1	2	4
	Blocking Filter Arrester	=P3.WN.F2	1	1	2	4
	Neutral Bus Capacitor	=P3.WN.C1	1	1	2	4
	Neutral Bus Capacitor CT	=P3.WN.T1	1	1	2	4
	Neutral Bus Voltage Divider	=P3.WN.T2	1	1	2	4
	Neutral Bus Arrester	=P3.WN.F1	1	1	2	4
	DC Neutral Earth Switch	=P3.WN.Q21	1	1	2	4
	NBS	=P3.WN.Q1	1	1	2	4
	DC OCT, Neutral	=P3.WN.T3	1	1	2	4
46	**DC BIPOLE-1 AREA (=WN1)**					
	Metallic Return Bus Arrester(EM)	=WN1.F1	1	1	2	4
	DC OCT	=WN1.T1	1	1	2	4
	DC Isolator	=WN1.Q31.Q11	1	1	2	4
	DC Earth Switch	=WN1.Q31.Q21	1	1	2	4
	NBGS	=WN1.Q1	1	1	2	4
	DC OCT	=WN1.T5	1	1	2	4
	DC Isolator	=WN1.Q14	1	1	2	4

Label List of Main Circuit Equipement - Valve Hall, DC Hall, AC and DC Yard

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	Station name: AGRA	Deate: 12/02/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
	DC Isolator	=WN1.Q11	1	1	2	4
	DC Isolator	=WN1.Q13.Q11	1	1	2	4
	DC Earth Switch	=WN1.Q13.Q21	1	1	2	4
	DC Isolator	=WN1.Q12.Q11	1	1	2	4
	DC Earth Switch	=WN1.Q12.Q21	1	1	2	4
	DC OCT	=WN1.T6	1	1	2	4
	DC Isolator	=WN1.Q16.Q11	1	1	2	4
	DC Earth Switch	=WN1.Q16.Q21	1	1	2	4
	DC Isolator	=WN1.Q17.Q11	1	1	2	4
	DC Earth Switch	=WN1.Q17.Q21	1	1	2	4
	DC Earth Switch	=WN1.Q17.Q22	1	1	2	4
	ELIS Blocking Filter Capacitor	=WN1.C1	1	1	2	4
	ELIS Blocking Filter Reactor	=WN1.L1	1	1	2	4
	ELIS Injection Circuit Capacitor	=WN1.C2	1	1	2	4
	ELIS Injection Circuit Reactor	=WN1.L2	1	1	2	4
	Electrode Supervision Aux System	=WN1.EL1	1	1	2	4
	Electrode line Arrester	=WN1.F2	1	1	2	4
	Electrode line Arrester CT	=WN1.T4	1	1	2	4
	Anode Electrode line CT	=WN1.T2	1	1	2	4
	Cathode Electrode line CT	=WN1.T3	1	1	2	4
47	**DC BIPOLE-2 AREA (=WN2)**					
	Metallic Return Bus Arrester(EM)	=WN2.F1	1	1	2	4
	DC OCT	=WN2.T1	1	1	2	4
	DC Isolator	=WN2.Q31.Q11	1	1	2	4
	DC Earth Switch	=WN2.Q31.Q21	1	1	2	4
	NBGS	=WN2.Q1	1	1	2	4
	DC OCT	=WN2.T5	1	1	2	4
	DC Isolator	=WN2.Q14	1	1	2	4
	DC Isolator	=WN2.Q11	1	1	2	4
	DC Isolator	=WN2.Q13.Q11	1	1	2	4
	DC Earth Switch	=WN2.Q13.Q21	1	1	2	4
	DC Isolator	=WN2.Q12.Q11	1	1	2	4
	DC Earth Switch	=WN2.Q12.Q21	1	1	2	4
	DC OCT	=WN2.T6	1	1	2	4
	DC Isolator	=WN2.Q16	1	1	2	4
	DC Isolator	=WN2.Q17.Q11	1	1	2	4
	DC Earth Switch	=WN2.Q17.Q21	1	1	2	4
	DC Earth Switch	=WN2.Q17.Q22	1	1	2	4
	ELIS Blocking Filter Capacitor	=WN2.C1	1	1	2	4
	ELIS Blocking Filter Reactor	=WN2.L1	1	1	2	4
	ELIS Injection Circuit Capacitor	=WN2.C2	1	1	2	4
	ELIS Injection Circuit Reactor	=WN2.L2	1	1	2	4
	Electrode Supervision Aux System	=WN2.EL1	1	1	2	4
	Electrode line Arrester	=WN2.F2	1	1	2	4
	Electrode line Arrester CT	=WN2.T4	1	1	2	4
	Anode Electrode line CT	=WN2.T2	1	1	2	4
	Cathode Electrode line CT	=WN2.T3	1	1	2	4
	POLE-1	POLE-1	4	1	5	5
	POLE-2	POLE-2	4	1	5	5
	POLE-3	POLE-3	4	1	5	5
	POLE-4	POLE-4	4	1	5	5
	DC HALL-1	DC HALL-1	2	1	3	5
	DC HALL-2	DC HALL-2	2	1	3	5
	DC HALL-3	DC HALL-3	2	1	3	5
	DC HALL-4	DC HALL-4	2	1	3	5

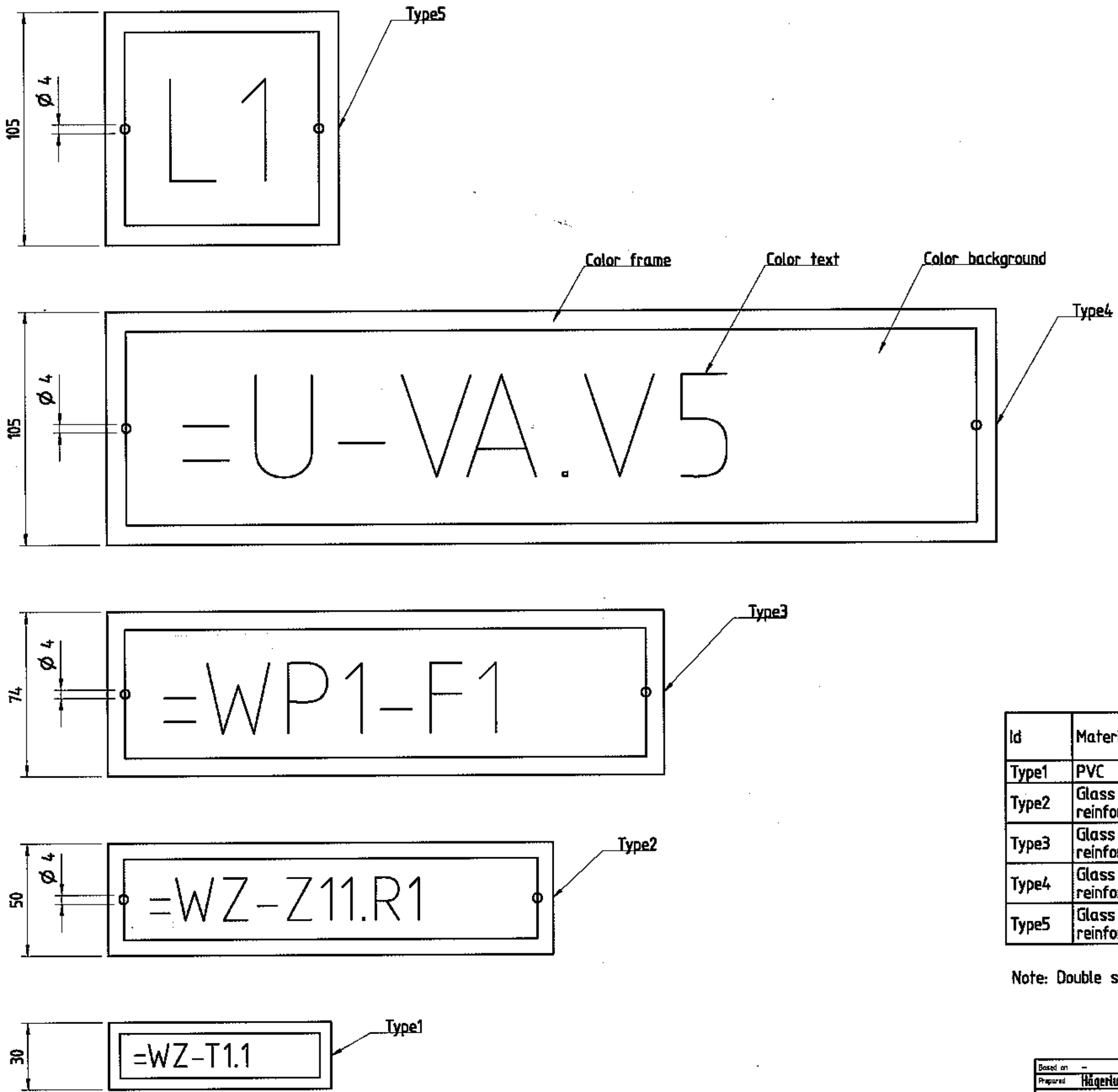
Note:

1. In Circuit Breaker, label will be installed on the Central Marshalling Box.

2. In CT & CVT, label will be installed on the Common Junction Box.

3. In Isolators and LA's, label will be fixed on the motor drive box of each phase.

4. 1JNL100368-265 document shall be refered for label size, text and color details.



Id	Material	Color background	Color frame	Color text
Type1	PVC	White	Black	Black
Type2	Glass fibre reinforced plastic	White	Black	Black
Type3	Glass fibre reinforced plastic	White	Black	Black
Type4	Glass fibre reinforced plastic	White	Black	Black
Type5	Glass fibre reinforced plastic	Yellow	Black	Black

Note: Double sided adhesive tape on backside

Based on	-
Prepared	Hägerlund, Emil 2013-09-10
Approved	
Doc. kind	
Title	Switchyard labels
Project name	BASE DESIGN
	-
Status	Issued
Item designation	-
Resp dept	PSDC/DCTPM
Rev ind	00
Language	-
Document number	1JNL100368-265
Sheet/of	1 / 1

Rev	Revision	Prepared	Approved	Date
00		Hägerlund, Emil	Hedenbo, Magnuz	2013-10-18

ABB ABB AB - HVDC

(A2)

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

पावरग्रिड

केन्द्रीय कार्यालय : "सौदामिनी" प्लॉट सं. 2, सैक्टर-29, गुडगाँव-122 001, हरियाणा
फोन : 2571700 - 719, फैक्स : 2571760, 2571761 तार 'नेटग्रिड'
Corporate Office : "Saudamini" Plot No. 2, Sector-29, Gurgaon-122 001, Haryana
Tel. : 2571700 - 719, Fax : 2571760, 2571761 Gram : 'NATGRID'

संदर्भ संख्या/Ref. Number
C/ENGG/HVDC/NER-NR/258/5938

Date: 23.06.2015

ABB AB
HVDC
SE-771 80 Ludvika--
Sweden

Kind Attn.: Mr Goran Isacsson, Project Manager

Subject: ±800 KV, 6000 MW HVDC Multi Terminal NER/ER – NR/WR Interconnector - I

NOA No.: C-61901R-S056-8/NOA-I/3659, C-61901R-S056-8/NOA-II/3660, C-61901R-S056-8/NOA-III/3661, C-61901R-S056-8/NOA-IV/3662 C-61901R-S056-8/NOA-V/3663 all dated 21st March 2011

Dear Sir,

In reference to your letter no **TM-NEA1-15935 (Label list-AUX.-AGR) dtd. 24.04.15,** We are herein conveying comments/ approval on the drawings/ documents listed in attached sheet. For approval/ comments code of each drawing/ documents, please refer the category indicated in remarks column.

In case of any modification other than those desired by us are carried out, the same shall be highlighted clearly in the Drawing/ Document with full justification thereof and resubmitted for approval.

Approval/ comments conveyed herein neither relieves the Contractor of his contractual obligation and his responsibilities for correctness of dimensions, material of constructions, weight, quantities, design details, assemble fits, performance particulars and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limits the Purchaser's right under the Contract.

Thanking you,

Yours faithfully

(B B Mukherjee)
DGM (Engg-HVDC)

पंजीकृत कार्यालय : बी-9, कुतब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110016 दूरभाष : 26560121 फैक्स : 011-26560039 तार 'नेटग्रिड'
Registered Office : B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110016 Tel. : 26560121 Fax : 011-26560039 Gram : 'NATGRID'

C/ENGG/HVDC/NER-NR/258/ S 938 Date: 23.06.2015

Sl. No.	Document No./ Drawing No.	Document Title	Category of Approval	Remarks/ comments
1.	AG-LABEL-AUX-POW Rev 0	Label list-Auxiliary power equipments-AGR	IV	

CATEGORIES: -

I Approved.
II Approved with comments.
III Returned for correction.
IV For Information

Generally in Order/Not in order – For Type-test reports

ABB AB
HVDC

ABB AB, Project Office
Plot No. 58, Sector – 44
Gurgaon – 122001
Haryana, India

±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I

Document Transmittal

Transmittal No: TM-NEA1-15935
Issue Date: 2015-04-24
Managed by: Ansari, Imtiaj

To : POWERGRID (NEA800) - Engineering
Attn: Mr. Madan Mohan Goswami
CC : Mr. Oommen Chandy, Mr. Bhoj Paul, Mr. Göran Isacsson, Mrs. Renuka Gera & Mr. Abhay Kumar

All enclosed documents have been uploaded in NEA800 eRoom.

Note:

Documents of TM-NEA1-15935

Doc No	Revision	Document Description	Document Type	Station	Action	Before	Class No X	Class No Y
AG-LABEL-AUX-POW	00	Label List of Auxiliary Power Equipment for AGR (BHEL)	List	Agra	Approval	2015-05-09	DD	362

Best Regards
Pamela Isacsson
Document Control Manager

Label List of Auxiliary Power Equipment

BHEL	Project name: ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-AUX-POW Rev 00	
	Station name: AGRA	Date: 16/04/2015	

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
1	**Medium Voltage Switchgear**					
		=S3.AL.MVS1	1	1	2	2
		=S3.AL.MVS2	1	1	2	2
		=S3.AL.MVS3	1	1	2	2
		=S3.AL.MVS4	1	1	2	2
2	**Low Voltage Switchgear**					
		=S3.AL.P1.LVS	1	1	2	2
		=S3.AL.P2.LVS	1	1	2	2
		=S3.AL.P3.LVS	1	1	2	2
		=S3.AL.P4.LVS	1	1	2	2
3	**415V AC Auxiliary Distribution**					
		=S3.AL.P1.ACDB1	1	1	2	2
		=S3.AL.P1.ACDB2	1	1	2	2
		=S3.AL.P1.ACDB3	1	1	2	2
		=S3.AL.P1.ACDB4	1	1	2	2
		=S3.AL.P2.ACDB1	1	1	2	2
		=S3.AL.P2.ACDB2	1	1	2	2
		=S3.AL.P2.ACDB3	1	1	2	2
		=S3.AL.P2.ACDB4	1	1	2	2
		=S3.AL.P3.ACDB1	1	1	2	2
		=S3.AL.P3.ACDB2	1	1	2	2
		=S3.AL.P3.ACDB3	1	1	2	2
		=S3.AL.P3.ACDB4	1	1	2	2
		=S3.AL.P4.ACDB1	1	1	2	2
		=S3.AL.P4.ACDB2	1	1	2	2
		=S3.AL.P4.ACDB3	1	1	2	2
		=S3.AL.P4.ACDB4	1	1	2	2
4	**415V AC Outdoor Junction Box**					
		=S3.AL1.P1.LVS.OJB	1	1	2	4
		=S3.AL1.P2.LVS.OJB	1	1	2	4
		=S3.AL1.P3.LVS.OJB	1	1	2	4
		=S3.AL1.P4.LVS.OJB	1	1	2	4
		=S3.AL1.P1.CNG.OJB	1	1	2	4
		=S3.AL1.P2.CNG.OJB	1	1	2	4
		=S3.AL1.P3.CNG.OJB	1	1	2	4
		=S3.AL1.P4.CNG.OJB	1	1	2	4
5	**48V DC System**					
		=S3.AL.48VDC.CHGR1	1	1	2	2
		=S3.AL.48VDC.CHGR2	1	1	2	2
		=S3.AL.48VDC.CHGR3	1	1	2	2
		=S3.AL.48VDC.EA1	1	1	2	2
		=S3.AL.48VDC.EB1	1	1	2	2
6	**220V DC System - Pole-1**					
		=S3.AL.P1.220VDC.CHGR1	1	1	2	2
		=S3.AL.P1.220VDC.CHGR2	1	1	2	2
		=S3.AL.P1.220VDC.CHGR3	1	1	2	2
		=S3.AL.P1.220VDC.DB1.EA1	1	1	2	2
		=S3.AL.P1.220VDC.DB1.EB1	1	1	2	2
		=S3.AL.P1.220VDC.DB1.EC1	1	1	2	2
		=S3.AL.P1.220VDC.DB1.EC2	1	1	2	2
7	**220V DC System - Pole-2**					
		=S3.AL.P2.220VDC.CHGR1	1	1	2	2
		=S3.AL.P2.220VDC.CHGR2	1	1	2	2
		=S3.AL.P2.220VDC.CHGR3	1	1	2	2
		=S3.AL.P2.220VDC.DB1.EA1	1	1	2	2
		=S3.AL.P2.220VDC.DB1.EB1	1	1	2	2
		=S3.AL.P2.220VDC.DB1.EC1	1	1	2	2
		=S3.AL.P2.220VDC.DB1.EC2	1	1	2	2
8	**220V DC System - Pole-3**					
		=S3.AL.P3.220VDC.CHGR1	1	1	2	2

Cl. IV

पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिo
POWER GRID CORPORATION OF INDIA LTD.
± 800kV 6000MW HVDC Multi Terminal
NER / ER - NR / WR Interconnector I
Approved in Category: I II III IV
Checked by | Verified by | Reviewed by
Signature:
Date: 23/6/15

Label List of Auxiliary Power Equipment

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-AUX-POW Rev 00	
	Station name : AGRA	Date : 16/04/2015	

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
		=S3.AL.P3.220VDC.CHGR2	1	1	2	2
		=S3.AL.P3.220VDC.CHGR3	1	1	2	2
		=S3.AL.P3.220VDC.DB1.EA1	1	1	2	2
		=S3.AL.P3.220VDC.DB1.EB1	1	1	2	2
		=S3.AL.P3.220VDC.DB1.EC1	1	1	2	2
		=S3.AL.P3.220VDC.DB1.EC2	1	1	2	2
9	**220V DC System - Pole-4**					
		=S3.AL.P4.220VDC.CHGR1	1	1	2	2
		=S3.AL.P4.220VDC.CHGR2	1	1	2	2
		=S3.AL.P4.220VDC.CHGR3	1	1	2	2
		=S3.AL.P4.220VDC.DB1.EA1	1	1	2	2
		=S3.AL.P4.220VDC.DB1.EB1	1	1	2	2
		=S3.AL.P4.220VDC.DB1.EC1	1	1	2	2
		=S3.AL.P4.220VDC.DB1.EC2	1	1	2	2
10	**220V DC System - Bipole & Filter**					
		=S3.AL.220VDC.DB1.EA1	1	1	2	2
		=S3.AL.220VDC.DB1.EB1	1	1	2	2
		=S3.AL.220VDC.DB1.EC1	1	1	2	2
		=S3.AL.220VDC.DB1.EC2	1	1	2	2
		=S3.AL.220VDC.DB2.EA1	1	1	2	2
		=S3.AL.220VDC.DB2.EB1	1	1	2	2
		=S3.AL.220VDC.DB2.EC1	1	1	2	2
		=S3.AL.220VDC.DB2.EC2	1	1	2	2
		=S3.AL.220VDC.DB3.EA1	1	1	2	2
		=S3.AL.220VDC.DB3.EB1	1	1	2	2
		=S3.AL.220VDC.DB3.EC1	1	1	2	2
		=S3.AL.220VDC.DB4.EA1	1	1	2	2
		=S3.AL.220VDC.DB4.EB1	1	1	2	2
		=S3.AL.220VDC.DB4.EC1	1	1	2	2
		=S3.AL.220VDC.DB5.EA1	1	1	2	2
		=S3.AL.220VDC.DB5.EB1	1	1	2	2
		=S3.AL.220VDC.DB5.EC1	1	1	2	2
		=S3.AL.220VDC.DB6.EA1	1	1	2	2
		=S3.AL.220VDC.DB6.EB1	1	1	2	2
		=S3.AL.220VDC.DB6.EC1	1	1	2	2
		=S3.AL.220VDC.DB7.EA1	1	1	2	2
		=S3.AL.220VDC.DB7.EB1	1	1	2	2
		=S3.AL.220VDC.DB7.EC1	1	1	2	2
11	**220V DC Auxiliary Distribution**					
		=S3.AL.P1.220VDC.DB2.EA1	1	1	2	2
		=S3.AL.P1.220VDC.DB2.EB1	1	1	2	2
		=S3.AL.P1.220VDC.DB3.EA1	1	1	2	2
		=S3.AL.P1.220VDC.DB3.EB1	1	1	2	2
		=S3.AL.P1.220VDC.DB4.EA1	1	1	2	2
		=S3.AL.P1.220VDC.DB4.EB1	1	1	2	2
		=S3.AL.P1.220VDC.DB5.EA1	1	1	2	2
		=S3.AL.P1.220VDC.DB5.EB1	1	1	2	2
		=S3.AL.P1.220VDC.DB6.EA1	1	1	2	2
		=S3.AL.P1.220VDC.DB6.EB1	1	1	2	2
		=S3.AL.P2.220VDC.DB2.EA1	1	1	2	2
		=S3.AL.P2.220VDC.DB2.EB1	1	1	2	2
		=S3.AL.P2.220VDC.DB3.EA1	1	1	2	2
		=S3.AL.P2.220VDC.DB3.EB1	1	1	2	2
		=S3.AL.P2.220VDC.DB4.EA1	1	1	2	2
		=S3.AL.P2.220VDC.DB4.EB1	1	1	2	2
		=S3.AL.P2.220VDC.DB5.EA1	1	1	2	2
		=S3.AL.P2.220VDC.DB5.EB1	1	1	2	2
		=S3.AL.P2.220VDC.DB6.EA1	1	1	2	2
		=S3.AL.P2.220VDC.DB6.EB1	1	1	2	2
		=S3.AL.P3.220VDC.DB2.EA1	1	1	2	2
		=S3.AL.P3.220VDC.DB2.EB1	1	1	2	2
		=S3.AL.P3.220VDC.DB3.EA1	1	1	2	2
		=S3.AL.P3.220VDC.DB3.EB1	1	1	2	2
		=S3.AL.P3.220VDC.DB4.EA1	1	1	2	2
		=S3.AL.P3.220VDC.DB4.EB1	1	1	2	2

Label List of Auxiliary Power Equipment

Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-AUX-POW Rev 00
Station name : AGRA	Date : 16/04/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
		=S3.AL.P3.220VDC.DB5.EA1	1	1	2	2
		=S3.AL.P3.220VDC.DB5.EB1	1	1	2	2
		=S3.AL.P3.220VDC.DB6.EA1	1	1	2	2
		=S3.AL.P3.220VDC.DB6.EB1	1	1	2	2
		=S3.AL.P4.220VDC.DB2.EA1	1	1	2	2
		=S3.AL.P4.220VDC.DB2.EB1	1	1	2	2
		=S3.AL.P4.220VDC.DB3.EA1	1	1	2	2
		=S3.AL.P4.220VDC.DB3.EB1	1	1	2	2
		=S3.AL.P4.220VDC.DB4.EA1	1	1	2	2
		=S3.AL.P4.220VDC.DB4.EB1	1	1	2	2
		=S3.AL.P4.220VDC.DB5.EA1	1	1	2	2
		=S3.AL.P4.220VDC.DB5.EB1	1	1	2	2
		=S3.AL.P4.220VDC.DB6.EA1	1	1	2	2
		=S3.AL.P4.220VDC.DB6.EB1	1	1	2	2
12	**Station Battery**					
		=S3.AL.48VDC.BATT1	1	1	2	2
		=S3.AL.48VDC.BATT2	1	1	2	2
		=S3.AL.P1.220VDC.BATT1	1	1	2	2
		=S3.AL.P1.220VDC.BATT2	1	1	2	2
		=S3.AL.P2.220VDC.BATT1	1	1	2	2
		=S3.AL.P2.220VDC.BATT2	1	1	2	2
		=S3.AL.P3.220VDC.BATT1	1	1	2	2
		=S3.AL.P3.220VDC.BATT2	1	1	2	2
		=S3.AL.P4.220VDC.BATT1	1	1	2	2
		=S3.AL.P4.220VDC.BATT2	1	1	2	2
13	**Valve Cooling MCC**					
		=S3.AL.P1.U.E.MCC	1	1	2	2
		=S3.AL.P2.U.E.MCC	1	1	2	2
		=S3.AL.P3.U.E.MCC	1	1	2	2
		=S3.AL.P4.U.E.MCC	1	1	2	2
14	**Station UPS**					
		=S3.AL.UPS1	1	1	2	2
		=S3.AL.UPS2	1	1	2	2
		=S3.AL.UPS.ACDB	1	1	2	2
		=S3.AL.UPS.BATT.1	1	1	2	2
		=S3.AL.UPS.BATT.2	1	1	2	2
15	**SUX PANEL**					
		=S3.AL.P1.SUX1	1	1	2	2
		=S3.AL.P2.SUX2	1	1	2	2
		=S3.AL.P3.SUX3	1	1	2	2
		=S3.AL.P4.SUX4	1	1	2	2
16	**Marshalling Kiosk**					
		=S3.W1.W1.MK29	1	1	2	2
		=S3.W1.W1.MK30	1	1	2	2
		=S3.W1.W1.MK31	1	1	2	2
		=S3.W1.W1.MK32	1	1	2	2
		=S3.W1.WC.A.MK5	1	1	2	2
		=S3.W1.WC.A.MK4	1	1	2	2
		=S3.W1.W10.MK2	1	1	2	2
		=S3.W1.W10.MK3	1	1	2	2
		=S3.W1.W12.MK8	1	1	2	2
		=S3.W1.W12.MK9	1	1	2	2
		=S3.W1.W14.MK10	1	1	2	2
		=S3.W1.W14.MK12	1	1	2	2
		=S3.W1.W16.MK11	1	1	2	2
		=S3.W1.W16.MK13	1	1	2	2
		=S3.W1.WC.B.MK15	1	1	2	2
		=S3.W1.WC.B.MK14	1	1	2	2
		=S3.W1.W18.MK16	1	1	2	2
		=S3.W1.W18.MK17	1	1	2	2
		=S3.W1.W20.MK18	1	1	2	2
		=S3.W1.W20.MK19	1	1	2	2
		=S3.W1.W22.MK20	1	1	2	2

Label List of Auxiliary Power Equipment

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-AUX-POW Rev 00	
	Station name : AGRA	Date : 16/04/2015	

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
		=S3.W1.W22.MK21	1	1	2	2
		=S3.W2.W1.MK28	1	1	2	2
		=S3.W2.W2.MK27	1	1	2	2
		=S3.W2.W3.MK26	1	1	2	2
		=S3.W2.W4.MK25	1	1	2	2
		=S3.W2.W5.MK24	1	1	2	2
		=S3.W1.Z1.MK1	1	1	2	2
		=S3.W1.Z1.MK35	1	1	2	2
		=S3.W1.Z2.MK22	1	1	2	2
		=S3.W1.Z2.MK38	1	1	2	2
		=S3.W1.Z3.MK6	1	1	2	2
		=S3.W1.Z3.MK36	1	1	2	2
		=S3.W1.Z4.MK7	1	1	2	2
		=S3.W1.Z4.MK37	1	1	2	2
		=S3.W1.Z5.MK23	1	1	2	2
		=S3.W1.Z5.MK39	1	1	2	2
		=S3.33KV.MK33	1	1	2	2
		=S3.33KV.MK34	1	1	2	2
		=P1.Z1.MK	1	1	2	2
		=P2.Z2.MK	1	1	2	2
		=P3.Z1.MK	1	1	2	2
		=P4.Z1.MK	1	1	2	2
17	**Junction Box**					
		=S3.W1.W1.T3.JB	1	1	2	2
		=S3.W1.W1.T4.JB	1	1	2	2
		=S3.W1.WC.A.T5.JB	1	1	2	2
		=S3.W1.WC.A.T6.JB	1	1	2	2
		=S3.W1.WC.A.T7.JB	1	1	2	2
		=S3.W1.WC.A.T8.JB	1	1	2	2
		=S3.W1.W14.T1.JB	1	1	2	2
		=S3.W1.W14.T2.JB	1	1	2	2
		=S3.W1.W16.T3.JB	1	1	2	2
		=S3.W1.W16.T4.JB	1	1	2	2
		=S3.W1.W18.T1.JB	1	1	2	2
		=S3.W1.W18.T2.JB	1	1	2	2
		=S3.W1.WC.B.T5.JB	1	1	2	2
		=S3.W1.WC.B.T6.JB	1	1	2	2
		=S3.W1.WC.B.T7.JB	1	1	2	2
		=S3.W1.WC.B.T8.JB	1	1	2	2
		=S3.W1.W20.T3.JB	1	1	2	2
		=S3.W1.W20.T4.JB	1	1	2	2
		=S3.W2.W1.T2.JB	1	1	2	2
		=S3.W2.W2.T2.JB	1	1	2	2
		=S3.W2.W3.T2.JB	1	1	2	2
		=S3.W2.W4.T2.JB	1	1	2	2
		=S3.W2.W5.T2.JB	1	1	2	2
		=S3.33KV.T1.CT.JB	1	1	2	2
		=S3.33KV.301CT.JB	1	1	2	2
		=S3.33KV.303CT.JB	1	1	2	2
		=S3.33KV.T2CT.JB	1	1	2	2
		=S3.33KV.302CT.JB	1	1	2	2
		=S3.33KV.304CT.JB	1	1	2	2
		=S3.W1.Z1.T1.JB	1	1	2	2
		=S3.W1.Z1.T2.JB	1	1	2	2
		=S3.W1.Z1.T3.JB	1	1	2	2
		=S3.W1.Z1.T4.JB	1	1	2	2
		=S3.W1.Z2.T1.JB	1	1	2	2
		=S3.W1.Z2.T2.JB	1	1	2	2
		=S3.W1.Z2.T3.JB	1	1	2	2
		=S3.W1.Z2.T4.JB	1	1	2	2
		=S3.W1.Z3.T1.JB	1	1	2	2
		=S3.W1.Z3.T2.JB	1	1	2	2
		=S3.W1.Z3.T3.JB	1	1	2	2
		=S3.W1.Z3.T4.JB	1	1	2	2
		=S3.W1.Z4.T1.JB	1	1	2	2
		=S3.W1.Z4.T2.JB	1	1	2	2
		=S3.W1.Z4.T3.JB	1	1	2	2

Label List of Auxiliary Power Equipment

	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-AUX-POW Rev 00	
	Station name : AGRA	Date : 16/04/2015	

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
		=S3.W1.Z4.T4.JB	1	1	2	2
		=S3.W1.Z5.T1.JB	1	1	2	2
		=S3.W1.Z5.T2.JB	1	1	2	2
		=S3.W1.Z5.T3.JB	1	1	2	2
		=S3.W1.Z5.T4.JB	1	1	2	2
		=S3.P1.WT.T8.JB	1	1	2	2
		=S3.P2.WT.T8.JB	1	1	2	2
		=S3.P3.WT.T8.JB	1	1	2	2
		=S3.P4.WT.T8.JB	1	1	2	2
		=S3.W2.W1.T1.JB	1	1	2	2
		=S3.W2.W2.T1.JB	1	1	2	2
		=S3.W2.T1.JB	1	1	2	2
		=S3.W2.T2.JB	1	1	2	2
		=S3.W1.WC.B.T1.JB	1	1	2	2
		=S3.W1.WC.B.T2.JB	1	1	2	2
		=S3.W1.WC.B.T3.JB	1	1	2	2
		=S3.W1.WC.B.T4.JB	1	1	2	2
		=S3.33KV.T1VT.JB	1	1	2	2
		=S3.33KV.T2VT.JB	1	1	2	2
		=S3.W1.W10.T4.JB	1	1	2	2
		=S3.W1.W10.T1.JB	1	1	2	2
		=S3.W1.W12.T1.JB	1	1	2	2
		=S3.W1.W12.T2.JB	1	1	2	2
		=S3.W1.W12.T3.JB	1	1	2	2
		=S3.W1.W12.T4.JB	1	1	2	2
		=S3.W1.W22.T1.JB	1	1	2	2
		=S3.W1.W22.T2.JB	1	1	2	2
		=S3.W1.W22.T3.JB	1	1	2	2
		=S3.W1.W22.T4.JB	1	1	2	2
		=S3.P1.WT.T7.JB	1	1	2	2
		=S3.P2.WT.T7.JB	1	1	2	2
		=S3.P3.WT.T7.JB	1	1	2	2
		=S3.P4.WT.T7.JB	1	1	2	2
18	**CNG**					
		=S3.AL.P1.CNG.ALT	1	1	2	2
		=S3.AL.P2.CNG.ALT	1	1	2	2
		=S3.AL.P3.CNG.ALT	1	1	2	2
		=S3.AL.P4.CNG.ALT	1	1	2	2
		=S3.AL.P1.CNG.GCP	1	1	2	2
		=S3.AL.P2.CNG.GCP	1	1	2	2
		=S3.AL.P3.CNG.GCP	1	1	2	2
		=S3.AL.P4.CNG.GCP	1	1	2	2
		=S3.AL.P1.CNG.DB	1	1	2	2
		=S3.AL.P2.CNG.DB	1	1	2	2
		=S3.AL.P3.CNG.DB	1	1	2	2
		=S3.AL.P4.CNG.DB	1	1	2	2
		=S3.AL.P1.CNG.BATT1	1	1	2	2
		=S3.AL.P1.CNG.BATT2	1	1	2	2
		=S3.AL.P2.CNG.BATT1	1	1	2	2
		=S3.AL.P2.CNG.BATT2	1	1	2	2
		=S3.AL.P3.CNG.BATT1	1	1	2	2
		=S3.AL.P3.CNG.BATT2	1	1	2	2
		=S3.AL.P4.CNG.BATT1	1	1	2	2
		=S3.AL.P4.CNG.BATT2	1	1	2	2
19	**Air Conditioning**					
		=S3.AL1.MSB.AC.MCC.1	1	1	2	2
		=S3.AL1.MSB.AC.MCC.2	1	1	2	2
		=S3.AL1.ASB1.AC.MCC	1	1	2	2
		=S3.AL1.ASB2.AC.MCC	1	1	2	2
		=S3.AL1.OA.AC.MCC	1	1	2	2
20	**Ventilation System**					
		=S3.AL.P1.VH.VENT.MCC	1	1	2	2
		=S3.AL.P1.VH.VENT.MCC.HTR.PDB	1	1	2	2
		=S3.AL.P2.VH.VENT.MCC	1	1	2	2
		=S3.AL.P2.VH.VENT.MCC.HTR.PDB	1	1	2	2

Label List of Auxiliary Power Equipment

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	Station name : AGRA	Date : 16/04/2015	

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
		=S3.AL.P3.VH.VENT.MCC	1	1	2	2
		=S3.AL.P3.VH.VENT.MCC.HTR.PDB	1	1	2	2
		=S3.AL.P4.VH.VENT.MCC	1	1	2	2
		=S3.AL.P4.VH.VENT.MCC.HTR.PDB	1	1	2	2
		=S3.AL.P1.DCH.VENT.MCC.M	1	1	2	2
		=S3.AL.P1.DCH.VENT.MCC.S	1	1	2	2
		=S3.AL.P1.DCH.VENT.MCC.HTR.PDB	1	1	2	2
		=S3.AL.P2.DCH.VENT.MCC.M	1	1	2	2
		=S3.AL.P2.DCH.VENT.MCC.S	1	1	2	2
		=S3.AL.P2.DCH.VENT.MCC.HTR.PDB	1	1	2	2
		=S3.AL.P3.DCH.VENT.MCC.M	1	1	2	2
		=S3.AL.P3.DCH.VENT.MCC.S	1	1	2	2
		=S3.AL.P3.DCH.VENT.MCC.HTR.PDB	1	1	2	2
		=S3.AL.P4.DCH.VENT.MCC.M	1	1	2	2
		=S3.AL.P4.DCH.VENT.MCC.S	1	1	2	2
		=S3.AL.P4.DCH.VENT.MCC.HTR.PDB	1	1	2	2
21	**Fire Fighting System**					
		=S3.AL1.FF.MCC	1	1	2	2
		=S3.AL1.FF.EM.MCC	1	1	2	2
22	**Illumination System**					
		=S3.AL1.OD.MLDB.1	1	1	2	4
		=S3.AL1.OD.MLDB.2	1	1	2	4
		=S3.AL1.OD.ELDB.1	1	1	2	4
		=S3.AL1.OD.ELDB.2	1	1	2	4
		=S3.AL1.IND.MLDB.1	1	1	2	2
		=S3.AL1.IND.MLDB.2	1	1	2	2
		=S3.AL1.IND.MLDB.3	1	1	2	2
		=S3.AL1.IND.MLDB.4	1	1	2	2
		=S3.AL2.DCLP.MSB	1	1	2	2
		=S3.AL2.DCLP.ASB1	1	1	2	2
		=S3.AL2.DCLP.ASB2	1	1	2	2
		=S3.AL2.DCLP.LVS1	1	1	2	2
		=S3.AL2.DCLP.LVS2	1	1	2	2
		=S3.AL2.DCLP.VH.1	1	1	2	2
		=S3.AL2.DCLP.VH.2	1	1	2	2
		=S3.AL2.DCLP.VH.3	1	1	2	2
		=S3.AL2.DCLP.VH.4	1	1	2	2
		=S3.AL2.DCLP.DCH.1	1	1	2	2
		=S3.AL2.DCLP.DCH.2	1	1	2	2
		=S3MIS.AUX.LTG.LP1	1	1	2	2
		=S3MIS.AUX.LTG.LP2	1	1	2	2
		=S3MIS.AUX.LTG.LP3	1	1	2	2
		=S3MIS.AUX.LTG.LP4	1	1	2	2
		=S3MIS.AUX.LTG.LP5	1	1	2	2
		=S3MIS.AUX.LTG.LP6	1	1	2	2
		=S3MIS.AUX.LTG.LP7	1	1	2	2
		=S3MIS.AUX.LTG.LP8	1	1	2	2
		=S3MIS.AUX.LTG.LP9	1	1	2	2
		=S3MIS.AUX.LTG.LP10	1	1	2	2
		=S3MIS.AUX.LTG.LP11	1	1	2	2
		=S3MIS.AUX.LTG.LP12	1	1	2	2
		=S3MIS.AUX.LTG.LP13	1	1	2	2
		=S3MIS.AUX.LTG.LP14	1	1	2	2
		=S3MIS.AUX.LTG.LP15	1	1	2	2
		=S3MIS.AUX.LTG.LP16	1	1	2	2
		=S3MIS.AUX.LTG.LP17	1	1	2	2
		=S3MIS.AUX.LTG.LP18	1	1	2	2
		=S3MIS.AUX.LTG.LP19	1	1	2	2
		=S3MIS.AUX.LTG.LP20	1	1	2	2
		=S3MIS.AUX.LTG.LP21	1	1	2	2
		=S3MIS.AUX.LTG.LP22	1	1	2	2
		=S3MIS.AUX.LTG.LP23	1	1	2	2
		=S3MIS.AUX.LTG.LP24	1	1	2	2
		=S3MIS.AUX.LTG.ISLP1	1	1	2	2
		=S3MIS.AUX.LTG.ISLP2	1	1	2	2

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	Project name : ±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I	Document Number: AG-LABEL-AUX-POW Rev 00
	Station name : AGRA	Date : 16/04/2015

S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
		=S3MIS.AUX.LTG.ISLP3	1	1	2	2
		=S3MIS.AUX.LTG.ISLP4	1	1	2	2
		=S3MIS.AUX.LTG.ISLP5	1	1	2	2
		=S3MIS.AUX.LTG.ISLP6	1	1	2	2
		=S3MIS.AUX.LTG.ISLP7	1	1	2	2
		=S3MIS.AUX.LTG.ISLP8	1	1	2	2
		=S3MIS.AUX.LTG.ISLP9	1	1	2	2
		=S3MIS.AUX.LTG.ELP1	1	1	2	2
		=S3MIS.AUX.LTG.ELP2	1	1	2	2
		=S3MIS.AUX.LTG.ELP3	1	1	2	2
		=S3MIS.AUX.LTG.ELP4	1	1	2	2
		=S3MIS.AUX.LTG.ELP5	1	1	2	2
		=S3MIS.AUX.LTG.OLP1	1	1	2	4
		=S3MIS.AUX.LTG.OLP2	1	1	2	4
		=S3MIS.AUX.LTG.OLP3	1	1	2	4
		=S3MIS.AUX.LTG.OLP4	1	1	2	4
		=S3MIS.AUX.LTG.OLP5	1	1	2	4
		=S3MIS.AUX.LTG.OLP6	1	1	2	4
		=S3MIS.AUX.LTG.OLP7	1	1	2	4
		=S3MIS.AUX.LTG.OLP8	1	1	2	4
		=S3MIS.AUX.LTG.OLP9	1	1	2	4
		=S3MIS.AUX.LTG.OLP10	1	1	2	4
		=S3MIS.AUX.LTG.OLP11	1	1	2	4
		=S3MIS.AUX.LTG.OLP12	1	1	2	4
		=S3MIS.AUX.LTG.OLP13	1	1	2	4
		=S3MIS.AUX.LTG.OSLP1	1	1	2	4
		=S3MIS.AUX.LTG.OSLP2	1	1	2	4
		=S3MIS.AUX.LTG.OSLP3	1	1	2	4
		=S3MIS.AUX.LTG.OSLP4	1	1	2	4
		=S3MIS.AUX.LTG.OSLP5	1	1	2	4
		=S3MIS.AUX.LTG.OSLP6	1	1	2	4
		=S3MIS.AUX.LTG.OSLP7	1	1	2	4
		=S3MIS.AUX.LTG.OSLP8	1	1	2	4
		=S3MIS.AUX.LTG.OSLP9	1	1	2	4
		=S3MIS.AUX.LTG.OSLP10	1	1	2	4
		=S3MIS.AUX.LTG.OSLP11	1	1	2	4
		=S3MIS.AUX.LTG.OSLP12	1	1	2	4
		=S3MIS.AUX.LTG.OSLP13	1	1	2	4
		=S3MIS.AUX.LTG.OSLP14	1	1	2	4
		=S3MIS.AUX.LTG.OSLP15	1	1	2	4
		=S3MIS.AUX.LTG.OSLP16	1	1	2	4
		=S3MIS.AUX.LTG.OSLP17	1	1	2	4
		=S3MIS.AUX.LTG.OSLP18	1	1	2	4
		=S3MIS.AUX.LTG.OSLP19	1	1	2	4
		=S3MIS.AUX.LTG.OSLP20	1	1	2	4
		=S3MIS.AUX.LTG.OSLP21	1	1	2	4
		=S3MIS.AUX.LTG.OSLP22	1	1	2	4
		=S3MIS.AUX.LTG.OSLP23	1	1	2	4
		=S3MIS.AUX.LTG.OSLP24	1	1	2	4
		=S3MIS.AUX.LTG.OSLP25	1	1	2	4
		=S3MIS.AUX.LTG.OSLP26	1	1	2	4
		=S3MIS.AUX.LTG.OSLP27	1	1	2	4
		=S3MIS.AUX.LTG.OSLP28	1	1	2	4
		=S3MIS.AUX.LTG.OSLP29	1	1	2	4
		=S3MIS.AUX.LTG.STLP1	1	1	2	4
		=S3MIS.AUX.LTG.STLP2	1	1	2	4
23	**Miscellaneous**					
		=S3.AL1.WS.EM.MCC	1	1	2	2
		=S3.AL1.PA.SYS.MCC	1	1	2	2
		=S3.AL1.BLDGSKT.LVS1	1	1	2	2
		=S3.AL1.BLDGSKT.LVS2	1	1	2	2
		=S3.AL1.BLDGSKT.LVS3	1	1	2	2
		=S3.AL1.BLDGSKT.LVS4	1	1	2	2
		=S3.AL1.BLDGSKT.MVS1	1	1	2	2
		=S3.AL1.BLDGSKT.MVS2	1	1	2	2
		=S3.AL1.BLDGSKT.MVS3	1	1	2	2

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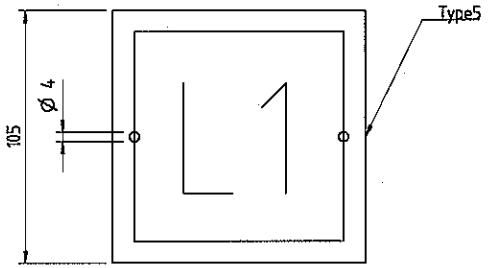
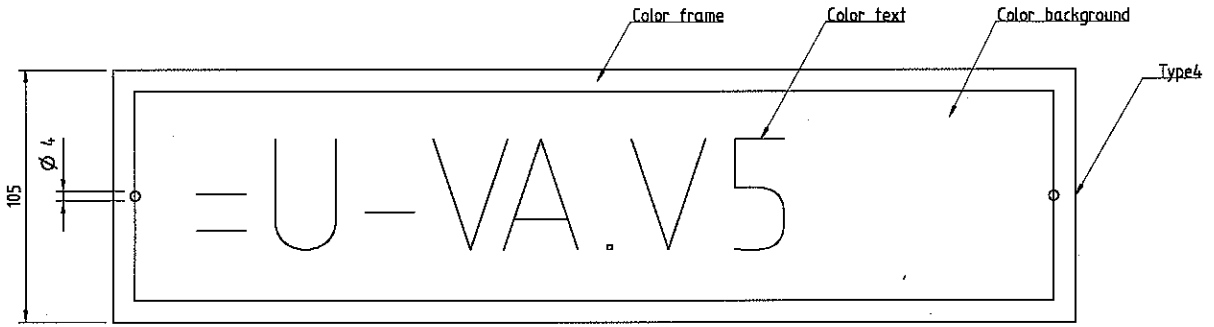
S.No	Description	Item Designation	Quantity	Spare	Total Qty(Nos.)	Type
		=S3.AL1.BLDG5KT.MVS4	1	1	2	2
		=S3.AL1.P1.WT.TSP	1	1	2	2
		=S3.AL1.P2.WT.TSP	1	1	2	2
		=S3.AL1.P3.WT.TSP	1	1	2	2
		=S3.AL1.P4.WT.TSP	1	1	2	2
		=S3.AL1.P1.WT.OFT.RP.1	1	1	2	2
		=S3.AL1.P1.WT.OFT.RP.2	1	1	2	2
		=S3.AL1.P2.WT.OFT.RP.1	1	1	2	2
		=S3.AL1.P2.WT.OFT.RP.2	1	1	2	2
		=S3.AL1.P3.WT.OFT.RP.1	1	1	2	2
		=S3.AL1.P3.WT.OFT.RP.2	1	1	2	2
		=S3.AL1.P4.WT.OFT.RP.1	1	1	2	2
		=S3.AL1.P4.WT.OFT.RP.2	1	1	2	2
		=S3.AL1.ICT.R	1	1	2	2
		=S3.AL1.ICT.Y	1	1	2	2
		=S3.AL1.ICT.B	1	1	2	2
		=S3.AL1.ICT.SP	1	1	2	2
		=S3.AL1.AC1.FRB-1	1	1	2	2
		=S3.AL1.AC1.FRB-2	1	1	2	2
		=S3.AL1.AC1.FRB-3	1	1	2	2
		=S3.AL1.AC1.FRB-4	1	1	2	2
		=S3.AL1.AC1.FRB-5	1	1	2	2
		=S3.AL1.AC2.FRB-1	1	1	2	2
		=S3.AL1.AC2.FRB-2	1	1	2	2
		=S3.AL1.AC2.FRB-3	1	1	2	2
		=S3.AL1.AC2.FRB-4	1	1	2	2
		=S3.AL1.AC2.FRB-5	1	1	2	2
		=S3.AL.UPS.BMS	1	1	2	2
		=S3.AL.UPS.VPS.1	1	1	2	2
		=S3.AL.UPS.VPS.2	1	1	2	2
		=S3.AL.UPS.CCTV	1	1	2	2
		=S3.AL.UPS.CFL	1	1	2	2
		=S3.AL.UPS.VC.SYS	1	1	2	2
		=S3.AL.UPS.FOX.SYS	1	1	2	2

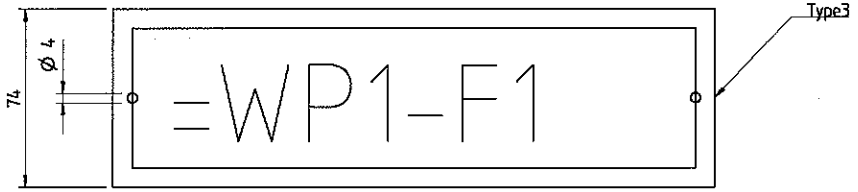
Note:

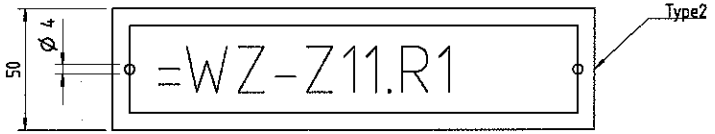
1. For all panels, label will be installed on the upper most right hand corner.

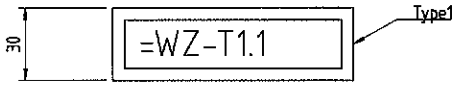
2. 1JNL100368-265 document shall be refered for label size, text and color details.











Id	Material	Color background	Color frame	Color text
Type1	PVC	White	Black	Black
Type2	Glass fibre reinforced plastic	White	Black	Black
Type3	Glass fibre reinforced plastic	White	Black	Black
Type4	Glass fibre reinforced plastic	White	Black	Black
Type5	Glass fibre reinforced plastic	Yellow	Black	Black

Note: Double sided adhesive tape on backside

Rev	Revision	Prepared	Approved	Date
00		Hägerlund, Emil	Hedenbo, Magnuz	2013-10-18

Based on –
Prepared Hägerlund, Emil 2013-09-10
Approved
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–
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Item designation –
Resp dept PSDC/DCTPM
Rev ind 00
Language –
ABB AB - HVDC
Document number 1JNL100368-265
Sheet/of 1 / 1

(A2)

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

DOCUMENT No.	TB-343-316-000	Rev. No.	02		Prepared	Checked	Approved
TYPE OF DOC.	TECHNICAL SPECIFICATION			SIGN			
TITLE	GENERAL TECHNICAL REQUIREMENTS-SECTION 3			NAME	NK	MK/AG	RK
				DATE	06.04.11	07.04.11	07.04.11
				GROUP	TBEM	W.O. No	80014

CUSTOMER	**Powergrid Corporation of India Ltd.**
PROJECT	**±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER – NR/WR INTERCONNECTOR-I PROJECT**
LOA NO.	**C-61901R-S056-8/NOA-II/3660 dated 21.3.2011 for Supplies & C-61901R-S056-8/NOA-IV/3662 dated 21.3.2011 for Services**

Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS
02	20.07.11	NK	MK	AG	
01	11.07.11	NK	MK	AG	

Distribution	To	TBEM	TBMM	TBQM	Supplier
	Copies	1	1	1	4

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GENERAL TECHNICAL REQUIREMENTS-SECTION 3

3 General

The Works covered by the Specification shall be designed, manufactured, built, tested and commissioned in accordance with the Acts, Rules, Laws and Regulations of India. The Equipment(s) shall also conform to the general requirements detailed in the following standards, which shall form an integral part of the Specification, in addition to meeting the specific requirements called for elsewhere in the Specification.

The Supplier shall note that the standards mentioned herein are not mutually exclusive or complete in themselves, but are intended to complement each other, with minimum repetition, to define the requirements of the Specification. In the event of a conflict between requirements of any two clauses of the Specification/ documents or requirements of different codes/ standards specified, the more stringent requirement as per the interpretation of the owner shall apply, unless confirmed otherwise by the owner in writing based on a written request from the Supplier.

In case of conflicting requirements between this document (General Technical Requirements - Section 3) and equipment specification (Section 1 & Section 2), equipment specification shall prevail.

When specific requirements stipulated in the Specification exceed or change those required by the applicable standards, the stipulations of the Specification shall take precedence.

Unless specifically agreed to by the Purchaser prior to Award of Contract, the Work shall be in accordance with the standards indicated and the requirements of the Specification. The Supplier shall be held responsible for any deviation.

In case of conflict between the various standards, the decision of owner shall be binding & final.

3.1 Definitions

The following words and expressions shall have the meanings hereby assigned to them throughout this document

"Biswanath Chariali " means Biswanath Chariali Converter Station

"Alipurduar " means Alipurduar Converter Station

"Agra" means Agra Converter Station

"Employer/Owner" means Power Grid Corporation of India Ltd.

"Purchaser" means Bharat Heavy Electricals Limited

"Supplier/Manufacturer" means the person or persons, firm or company assigned to execute the works as defined by the scope of supply, described here.

"Specification" refers to this document.

3.2 Instructions to Suppliers

The supplier should be approved by Power Grid. If not, it is the responsibility of the vendor to be assessed and approved by Power Grid, before placement of order by BHEL. Any cost involved in vendor assessment/approval must be borne by the vendor himself.

The supplier shall submit the technical requirements, data and information as per the technical data sheets provided in the appropriate clause of bid document.

Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the Specifications unless included in the list of exclusions. Materials and components not specifically stated in the specification but which are necessary for commissioning and satisfactory operation of the switchyard/substation unless specifically excluded shall be deemed to be included in the scope of the specification and shall be supplied without any extra cost. All similar standard components/parts of similar standard equipment provided, shall be inter-changeable with one another.

The Supplier shall offer equipment whose similar equipment for similar applications have been in service for at least two years from the date of first stage bid opening (30-06-2009) and should have been type tested as per relevant standards.

The suppliers who have supplied 400 kV equipment rated for 40 kA earlier to POWERGRID, may supply 50 kA rated equipment subject to fulfilling specified requirements:

The supplier shall supply type tested (including special tests as per tech. specification) equipment and materials. The Employer shall accept the equipment type test reports under the following conditions:

(i) Type test in accordance with the relevant specified standards

(ii) Type tests performed within five (5) years from the date of first stage bid opening (30-06-2009)

(iii) The type tested equipment shall be of the same design, insulation class and rating as per the equipment offered under this contract

In the event that equipment furnished includes important modifications of, or significant departure from, the designs of equipment on which type test report has been furnished or if there is evidence that the equipment does not comply with the requirements of the Specifications, the Supplier shall conduct the type test without any cost implication to the Purchaser. In the price bid, the type test charges shall be included and no separate type test charges shall be indicated by the supplier.

Acceptance of the type test reports shall be at the discretion of the Employer. All type tests

performed after the date of award of the Contract shall be witnessed by the Employer unless authority to proceed with the tests in his absence is received from the Employer in writing.

3.3 Standards

All equipment and materials, unless otherwise specifically required in the Specification, shall conform to latest revisions of the standards listed in the Specification, in force at the time of signing of the contract for this project.

Generally the standards listed in the specification are applicable in accordance with the specific requirements of the technical section covering particular alternating current equipment or materials.

3.4 Site information

Table 3.4 - 1 Table for site information

	Particular	*Biswanath Chariali*	*Alipurduar*	*Agra*
a)	Employer/Owner	*Power Grid Corporation of India Ltd (POWERGRID)*		
b)	Project Title	*±800 kV, 6000 MW HVDC Multi terminal System Package*		
c)	Location	*70 km from Tezpur in Sonitpur district of Assam, Kolkatta port is the nearest port to the site*	*175 Kms. from Siliguri city in the state of West Bengal. Kolkatta port is the nearest port to the site*	*12.6 Km Agra-Shamsabad road PO – Shyamo, Agra*
d)	Nearest Rail Head	*Guwahati*	*Alipurduar junction*	*Agra*
e)	Postal Address	*To follow*	*To follow*	*To follow*
f)	Design ambient temp.	*40°C*	*40°C*	*50°C*
g)	SEISMIC COEFFICIENT	*Zone V Importance factor for the stations is 1.5 as per table no. 6 of IS-1893.*	*Zone IV Importance factor for the stations is 1.5 as per table no. 6 of IS-1893.*	*Zone III Importance factor for the stations is 1.5 as per table no. 6 of IS-1893.*
h)	Site Wind Pressure	*Zone V with basic wind speed of 50 m/s at 10 m height above mean ground level. The risk level coefficient/factor shall be taken as 1.07.*	*Zone IV with basic wind speed of 47 m/s at10 m height above mean ground level. The risk level coefficient/factor shall be taken as 1.07.*	*Zone III with basic wind speed of 44 m/s at 10 m height above mean ground level. The risk level coefficient/factor shall be taken as 1.07.*
i)	Isokeraunic Level	*150 days per year*	*150 days per year*	*50 days per year*
j)	Relative Humidity	*Max. 100%*		
k)	Rain fall Intensity	*In 24 hours: 250mm 80mm/hr (for drainage system Design*	*In 24 hours: 250mm 80mm/hr (for drainage system Design*	*In 24 hours: 200mm, 30mm/hr (for drainage system Design)*

3.5 Site temperatures for design purposes

The Supplier shall assume the temperatures given below for the design of the works at the converter stations.

Table 3.5 - 2 Table for Site temperatures

Description	*Temperature in deg C*		
Site	*Biswanath Chariali*	*Alipurduar*	*Agra*
Maximum dry bulb one hour average	*40*	*40*	*50*
Maximum dry bulb 24 hour average	*40*	*40*	*40*
Annual mean dry bulb temperature	*30*	*30*	*30*
Minimum dry bulb one hour average	*0*	*0*	*0*
Maximum wet bulb one hour average	*33*	*33*	*33*
Dry bulb temperature for low ambient condition	*33*	*33*	*33*
Wet bulb temperature for low ambient condition	*23*	*23*	*23*

3.6 Documentation

All technical description, specifications, literature, correspondence, prints, drawings, instruction manuals, test reports(both factory and site), progress photographs, booklets, schedules and all supplementary data or documents furnished in compliance with the requirements of the Contract, shall become the property of the Purchaser/owner and the costs shall be considered as included in the Contract price.

The Supplier shall be responsible for any time delay, misinterpretation, error and conflict during design, manufacturing, testing and erection of the Works resulting from non-compliance with the requirements of this Specification.

The Purchaser/owner shall have the right to make copies of any documents, data, reports, information etc. supplied by the Supplier in connection with the Works. The Purchaser/ owner shall not impart the information of these documents to any other manufacturer or competitor but he shall be free to use these for preparation of technical papers, reports etc.

The Supplier shall submit consolidated list of all symbols used in any drawing, data and information under three separate headings namely Civil, Mechanical & Electrical. If symbols other than IS or IEC are used, the Supplier shall submit consolidated list of these symbols and their significance under a separate section.

The Supplier is not required to supply detailed drawings whose purpose is manufacture only butin case such information is specifically asked for by the Purchaser/owner during evaluation of Bid, finalization of Contract, design review by Purchaser/owner his appointed Consultant or during execution of the Contract, the Supplier shall comply with the same.

All drawings, documents manual etc. as specified in this section shall have to be provided separately for each station.

All documentation shall be in English language.

Requirements for submission of documents, information and data by the supplier

General

The Supplier shall submit to the Owner/Purchaser all documents in accordance with an approved schedule of submissions and shall submit any further information (in the form of drawings, documents, manuals, literature, reports etc.) when asked by the Owner/Purchaser while commenting/approving any drawings/documents etc. All applicable documents shall be provided for each converter/repeater station separately.

The documents which are subject to the approval of the Owner/Purchaser shall be identified by the Supplier with the stamp "FOR APPROVAL". All other documents shall be submitted to the Owner/Purchaser for information and shall be identified by the Supplier with the stamp "FOR INFORMATION".

The sequence of submission of the documents shall be subject to the approval of the Employer. The sequence of submissions of all documents shall be such that the necessary information is available to enable the Employer to approve or comment the document.

The Supplier shall supply 5 hard copies of all drawings and documents. The final documentation for the project shall be supplied in nine sets of hard copies (three to each site) and nine sets of CDs to the Purchaser.

The entire plant documentation shall include all construction drawings, equipment specifications, design/study reports, O&M documents, factory test reports, etc. All the final/as built drawings shall be submitted in CAD format along with the complete final documentation.

In case a "SUBSEQUENT" revision of any document is made due to any reason whatsoever, a revision of the same, highlighting the changes shall be resubmitted for the Employer's specific approval/ information.

Documents for approval

Approved documents shall be considered as the working documents. However the Specification and connected documents shall prevail over these documents in case a decision is required on interpretation.

Documents for information

The Supplier shall not delay the Works pending the receipt by the supplier of the comments on documents submitted to the Owner/Purchaser for information. However, the Owner/Purchaser shall have the right to comment on all the documents submitted by the Supplier, when, in the opinion of the Owner/Purchaser the document does not comply with the Contract or otherwise. The Supplier shall satisfactorily demonstrate that the information contained in the aforesaid document does meet the requirements of the Contract or revise the document in order that the information shall comply with the requirements of the Contract.

Drawings and data

General

The Supplier shall submit to the Owner/Purchaser all assembly and detail drawings of equipment,

station design, civil work, building, controls, protection, etc., as well as the corresponding computation where necessary in order to establish to the satisfaction of the Owner/Purchaser the Supplier's compliance with the requirements of the Contract.

Drawings, as set forth below shall be submitted to the Owner/Purchaser and shall be completewith all information necessary for complete interpretation of the drawings by the Owner/ Purchaser. All drawings shall show the materials, dimensions, finish, fits, clearances, tolerances, bolting and such other information as is necessary to demonstrate to the Owner/ Purchaser that all items covered by the drawings are in compliance with the requirements of the Contract.

Drawings may consist of several sheets as required in order to provide for the degree of detail required by the Employer, so that he may clearly understand such drawings.

Not later than 90 (ninety) days after completion of successful trial operation of the HVDC station, the Supplier shall supply copies of the last revision of all drawings produced for this project, stamped as "AS BUILT".

The Supplier shall provide separate sets of drawings for each control cubicle. Typical drawings for similar cubicles shall not be accepted. If there are several cubicles per system, then one common bill of material and one system schematic diagram may be provided. Such system schematic diagram shall show the control scheme for the particular system in its entirety and shall be laid out on the minimum number of drawings sheets consistent with clarity and legibility.

The Owner/Purchaser shall not accept typical drawings for control, protection and three-phase schematics, power circuits and single line diagrams. The Supplier shall supply complete set of such drawings for each system, even when drawings are duplicates.

Inspections plans and documentation

The Supplier shall submit in required number copies for the Owner's/Purchaser's approval an inspection plan (quality plan) describing the inspection system indicating the inspections to be carried out and their sequence in the manufacturing stages.

The inspection plan shall be such that it can be related to the manufacturing program. The plan shall also include a description of the inspection methods employed with reference to the Supplier's written inspection procedures.

Separate inspection plans describing the inspection systems for equipment supplied by each sub-Supplier, in the same form as that of the Supplier, shall be submitted for the approval of the Owner/Purchaser.

In addition to the inspection plans referred to above, the Supplier shall submit complete and satisfactory evidence of possessing a working scheme assuring the control of all critical activities pertinent to the assurance of quality, and objective evidence (by means of quality manuals and appropriate forms, etc.) of this capability to employ and maintain quality control to meet the required quality level of the manufacture and construction of the Works.

Supplier's Quality Control Program in the context of this Clause means the implementation of a quality assurance program by means of which full conformance of material and workmanship to best

quality standards can be achieved effectively and economically by the Supplier's control and surveillance of all essential inspection operations, and periodic verification of the results of the manufacture of equipment and the assembly, erection and installation of equipment at the sites.

Required number of copies of all test reports, including those supplied by Sub-Suppliers, and shall be submitted to the Owner/Purchaser for approval. The Supplier shall include in the report all additional data required by the Owner/Purchaser to permit a clear understanding of the reports.

All test reports shall be certified and shall contain the signature of the Inspector as having witnessed the test, unless such witnessing has been specifically waived by the Owner/ Purchaser. A certified test report shall be issued for each test.

Instruction manuals and operating manuals

The Supplier shall provide Instruction & Maintenance Manuals for each part of the Plant and Equipment included in the Works and Operating Manuals for each Station.

The Instruction Manuals and Operating Manuals shall be arranged in an organized library adequately cross referenced to facilitate issuing clauses of the manuals as required by the work i.e. erection instructions shall be required before operating & maintenance instructions.

All Manuals provided by the Supplier shall be fully detailed and specifically prepared for the Works and equipment provided. General manuals not specifically required for the work shall not be acceptable.

The instruction manuals shall at least contain:

a) A general description of all components
b) Storage instructions
c) Erection instructions
d) Pre-commissioning Instruction :
e) Material and part list.
f) Design clearances and settings
g) Complete sets of drawings as finally issued
h) Operating Instructions:
i) Routine and Preventive Maintenance instructions with material requirement for each site
j) Preventive Maintenance Schedule.
k) Replacement instruction for all equipment

The operation manuals shall at least contain:

a) Operator oriented functional descriptions of the equipment.
b) Operator oriented description of the protection and control systems
c) Description of the equipment auxiliary systems
d) Fault finding and diagnostic tools
e) User software interface tools for modification/augmentation etc.

Notes:

The supplier may please note that all resubmissions must incorporate all comments given in the ear-

lier submission by the Owner/Purchaser or adequate justification for not incorporating the same must be submitted failing which the submission of documents is likely to be returned.

If after the commissioning and initial operation of the substation, the instruction manuals require any modifications/ additions/changes, the same shall be incorporated and the updated final instruction manuals shall be submitted by the Supplier to the Owner/Purchaser.

The Supplier shall furnish to the Owner/Purchaser, catalogues of spare parts also.

3.7 Quality assurance requirements

Quality assurance programme

To ensure that the equipment and services under the scope of Contract, whether manufactured or performed at the Supplier's Works or at his Sub-supplier's premises or at the Purchaser's site or at any other place of Work, are in accordance with the specifications, the Supplier shall adopt a suitable quality assurance programme to control such activities at all points, as necessary. Such programme shall be outlined by the Supplier and shall be submitted by the supplier after the award of contract and finally accepted by the owner after discussions prior to commencement of manufacturing.

A quality assurance programme of the supplier shall generally cover the following:

(a) Supplier's organisation structure for the management and implementation of the proposed quality assurance programme;
(b) Design and Documentation control system;
(c) Qualification data of Supplier's key personnel;
(d) The procedure for purchases of materials, parts components and selection of sub-Supplier's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchased etc.
(e) System for shop manufacturing and site erection controls including process controls and fabrication and assembly control;
(f) Control of non-conforming items and system for corrective actions;
(g) Inspection and test procedure both for manufacture and field activities;
(h) Control of calibration and testing of measuring and testing equipment.
(i) System for quality audits;
(j) System for indication and appraisal of inspection status
(k) System for authorising release of manufactured product to the Purchaser
(l) System for maintenance of records;
(m) Furnishing of quality plans (QP)/inspection and test plan (ITP) for manufacturing and field activities detailing out the specific quality control procedure adopted for controlling the quality characteristics relevant to each item of equipment/component.

General requirements - Quality assurance

1. All services, materials, components and equipment covered under this specification shall be engineered, designed, procured, manufactured, erected, commissioned and tested at all the stages, as per a comprehensive Quality Assurance Programme. It is the Supplier's responsibility to draw up and implement agreed programme for system as a whole as well as for individual equipment.

The detailed Quality Plans for manufacturing and field activities shall be drawn up by the Supplier and shall be submitted to the Employer for approval.

The Supplier shall furnish with his bid a list of approved suppliers for the information of the Employer.

2. Engineering and design quality Plan shall detail out the studies, overall detail design documentation and communicating, defining interfaces and controlling changes. To achieve quality, reliability and schedule objectives that project shall be designed so that it meets performance requirements. Manufacturing Quality Plan shall detail out for all the components and equipment, various tests/inspection, to be carried out as per the requirements of this Specification and standards mentioned therein and quality practices and procedures followed by Supplier's Quality Control Organisation, the relevant reference documents and standards, acceptance norms, inspection documents etc., during all stages of materials procurement, manufacture, assembly, and final testing/performance testing.

3. Field Quality Plan shall detail out for all the equipment, the quality practices and procedures etc. to be followed by the Supplier's site Quality Control Organisation, during various stages of site activities from receipt of materials/equipment at site onwards.

4. The Supplier shall also furnish copies of the reference documents/plant standards/ acceptance norms/tests and inspection procedure etc., as referred in Quality Plans along with respective Quality Plan. These Quality Plans and reference documents/standards etc. shall be subject to Employer's approval without which manufacture shall not proceed. In these approved QPs, the Employer shall identify customer inspection points (CIP), test/checks which shall be carried out in presence of the Employer's Engineer or his authorised representative and beyond which the work shall not proceed without consent of Employer or his authorised representative in writing. All deviations to specification, approved quality plans and applicable standards must be documented and referred to the Employer for approval and disposition.

5. No material shall be dispatched from the manufacturer's works before the same is accepted subsequent to pre-dispatch final inspection including verification of records of all previous tests/inspections by Employer's Engineer and / or his authorised representative, and duly authorised for dispatch issuance of Material Inspection Clearance Certificate (MICC). Before making request for issuance of MICC, the Supplier shall ensure that approval of type tests, data sheets, drawing etc. had already been obtained from Employer. All materials used or supplied shall be accompanied by valid materials certificates and tests and inspection reports. These certificates and reports shall indicate the sheet numbers or other such acceptable identification numbers of the material. The material certified shall also have the identification details stamped on it.

6. All welding and brazing shall be carried out as per procedure drawn and qualified in accordance with requirements of ASME section - IX/BS-4870 or other International equivalent standard acceptable to the Employer.

7. All the (sub)-Vendors proposed by the Supplier for procurement of bought out item list of which shall be drawn up by the Supplier and finalised with the Employer shall be subject to the Employer's approval. Quality Plans of the successful vendors shall be discussed, finalised and approved by the Employer and shall form part of the purchase order between the Supplier and the Vendor.

8. The Employer reserves the right to carry out quality audit and qualify surveillance of the systems and procedures of the Supplier's of their sub-Supplier's (sub-vendor's) quality management and control activities. The Supplier shall provide all necessary assistance to enable the Employer carry out such audit and surveillance.

9. As a part of quality assurance of engineering and design, the technical review meetings (TRMs) shall be conducted between the Employer and/or his consultants/representative and the Supplier and/or his subSupplier(s). The duration and cycle of such TRMs shall be as frequent and regular as required to meet the time schedules. The meetings shall be held at either at the Employer's office and/or at the office/manufacturing place of the Supplier/sub-Supplier or at any other place as agreed mutually.

10. The Supplier shall agree upon a schedule of submissions of documents concerning the Quality Assurance Program within two months of the effective date of the Contract. This schedule shall indicate the list of mutually agreed items/equipment for which quality Plans shall be submitted by the Supplier and the last dates for the submissions. It shall be ensured by the Supplier that the submissions are so programmed that all relevant approvals are obtained from the Employer for these documents in a timely manner before the material induction and commencement of the manufacture for any equipment.

11. The documents that shall be submitted by the Supplier to the Employer for review and approval as per the agreed schedule include:

    a) QA Manuals
    b) Quality Plans (Inspection & Test Plans) for all equipment/materials manufactured in the Supplier's works and/or in the sub-Supplier's works
    c) Purchase Specifications for equipment procured from sub- Suppliers.
    d) Supplier's assessment reports of his sub-Suppliers
    e) Field Quality Plans for all activities at site
    f) Reference documents referred to in Quality Plan.
    g) Erection, commissioning, operation and maintenance manuals

12. QA Document Package

The Supplier shall submit the following Quality Assurance Documents to the Employer. These documents shall be as per the approved Quality Plans for the concerned equipment. The documents shall include, but not limited to, the following:

    a) Routine test reports & Acceptance test reports
    b) Type test reports
    c) Quality records etc. corresponding to items identified Quality Plan
    d) Inspection reports for Customer inspection points
    e) Reports on repair/modification carried out to make the item/equipment acceptable.
    f) Non-destructive examination result reports including radiography interpretation reports, wherever applicable.

The above documents are required to be submitted in required number of copies within three weeks after dispatch of equipment.

Inspection and testing

1. In order to verify that all the manufacturing of equipment by the Supplier as well as materials & equipment being procured and provided by the Supplier are in complete conformance with the requirement of theContract, the Employer and/or his duly authorized representative shall have access to the Supplier's premises or works at all reasonable times to inspect and examine the material, equipment and workman ship during its manufacture or installation. In addition to carrying out inspection the Employer and/or his authorized representative/Consultant all carry out quality audit on the Supplier's Quality Assurance System and conduct quality surveillance to check conformance to quality procedure/practice in general. The Supplier shall provide necessary facilities to carry out all the above activities at their works and the works of the sub- Suppliers.

2. The Supplier shall provide a detailed inspection schedule for those inspection stages identified as CIP and shall furnish updated schedules once every two months.

3. The Supplier shall give the Employer/Inspector six(6) weeks written notice, by telex or by letter, of the tentative date any material/equipment shall be ready for witness points, corresponding to Customer inspection points (CIP), when the Employer/Inspector is based in India. Final confirmation shall be given at least 15 days in advance. The Employer/Inspector, unless witnessing of the tests is waived, shall attend such tests, failing which the Supplier may proceed with the test which shall be deemed to have been made in the Inspector's presence. The Supplier shall forthwith forward to the Employer copies of duly certified test reports. Test reports of all tests corresponding to CIP performed in the supply shall be reviewed and approved, subject to satisfactory conduction and successful passing of the test, by the Employer or his authorised representative (even if the witnessing of the test was waived).

4. The Employer or his authorized representative shall, within fifteen (15) days from receipt of such reports, give notice in writing to the Supplier of any objection to any aspect of the test reports or any or all equipment and workmanship which in his opinion is not in conformance with the Contract. The Employer or his authorized representative shall advise his reasons for objections on completion and review of the activity. The Supplier shall give due consideration to such objection(s) and shall either make the modifications that may be necessary to overcome the said objection(s) or shall confirm in writing giving reasons therein that no modifications are necessary to comply with the Contract. However, the Supplier may proceed with the works/dispatch even before the receipt of written objection(s), if any, at his own cost & risk.

5. Whenever the Employer's inspection engineer undertakes the inspection, at a particular stage identified as Customer inspection point (CIP) in the Quality Plan, the acceptance of test reports/test results and the MICC where applicable shall be given immediately after the test if the results, including those for previous points identified as per clause 9.6 are found to be in conformity with the Contract. In case of any deviations, the Employer/Inspector at his discretion may refer the matter to the Employer's main office, together with the manufacturer's comments, who in turn shall communicate his final decision regarding the acceptance or otherwise to the Supplier within fifteen (15) days of the receipt of such test reports/results. In case the presence of the Employer/Inspector is waived, the acceptance of test results and issuance by the Employer of Material Inspection Clearance certificate wherever applicable, shall be given within fifteen (15) days after receipt of test reports/results for the CIP as well as for previous CIP's identified in the approved Quality Plan, provided such test reports/test results are found to be in order. The Em-

ployer/Inspector shall at his discretion and based on the outcome of any inspection and the requirements of the contract, have the right to 'accept', 'accept as noted' or 'reject' any equipment/material. The reasons/comments in case of each ruling shall be communicated to the Supplier in writing.

6. In all cases where the contract provides for tests, whether at the premises of works of the Supplier or of any sub-Supplier, the Supplier, except where otherwise specified, shall provide free of charge such items as labour, materials, electricity, fuel, water, apparatus and instruments as required to fulfil the requirements of the approved Quality Plan.

7. The inspection by Employer/Inspector or waver of the presence of the Employer/Inspector, issue of CIP clearance certificate and issue of Material Inspection clearance certificate (MICC) thereon shall in no way limit the liabilities and responsibilities of the Supplier in respect of the agreed quality plans forming part of the contract. The Employer shall not be found to accept the material/equipment if on further testing it is found to be not in compliance with the requirements of the contract. The Supplier shall include in all orders to his sub-Suppliers, the requirements for any equipment, being supplied by the sub- Supplier for incorporation in his equipment to be subjected to inspection and testing by the Employer or is authorised representative. Copies of such orders or purchase specifications, blanked for prices, shall be forwarded to the Employer.

8. The costs of all tests specified in the Contract together with the same for all tests facilities, test samples and such like shall be to the Supplier's account.

9. The Employer/Inspector shall have complete authority to reject, on behalf of the Employer, any material, equipment or parts thereof considered unsatisfactory and not in accordance with the Contract. Accept, accept as noted or reject materials, equipment or any components thereof shall not relieve the Supplier of any of his obligations under the Supplier, nor impose any liability whatsoever on the Employer.

10. The Employer shall have the right to have Inspectors on the Sites, on a regular basis or from time to time as required at his sole discretion to monitor the quality and the progress of the work. Generally the site inspection shall be as per the approved Field Quality Plans (FQPs) and the Installation & Operation Manual(s). All quality related documents and test results shall be a part of plant documentation.

3.8 Materials and workmanship

Where the specification does not contain references to workmanship, it is understood that the equipment shall be new, of the best quality and in accordance with the purpose for which they are intended.

In case where the equipment, materials or components are indicated in the specification as "similar" to any special standard, the owner shall decide upon the question of similarity. When required by the specification or when required by the Purchaser & owner the Supplier shall submit for approval, all the information concerning the materials or components to be used in manufacture. Machinery, equipment, materials and components supplied, installed or used without such approval shall run the risk of subsequent rejection, it being understood that the cost as well as the time delay associated with the rejection shall be borne by the Supplier.

The design of the Works shall be such that installation, future expansions, replacements and general maintenance may be undertaken with a minimum of time and expenses. Each component shall be designed to be consistent with its duty and suitable factors of safety shall be used throughout the design.

All joints and fastenings shall be devised, constructed and documented so that the component parts shall be accurately positioned to fulfil their required function. In general, screw threads shall be standard metric threads. The use of other thread forms will only be permitted when prior approval has been obtained from the owner.

Whenever possible, all similar parts of the works shall be made to gauge and shall also be made interchangeable with similar parts. All spare parts shall also be made interchangeable and shall be made of the same materials and workmanship as the corresponding parts of the equipment supplied under the specification. All the equipment of the same type and rating shall be physically and electrically interchangeable.

All materials and equipment shall be installed in strict accordance with the manufacturer's recommendation(s). All factory assembled rotating machinery shall be checked for alignment and adjustments made as necessary. The spare equipment(s) shall be installed at designated locations and tested for healthiness.

The Supplier shall apply oil and grease of the proper specification as is necessary for the installation of the equipment. Lubricants used for installation purposes shall be drained out and the system flushed through where necessary in readiness for applying the lubricant required for operation. The Supplier shall apply all operational lubricants to the equipment installed by him. All insulating oil, lubricating material, grease and other consumables used in the Works/ Equipment shall be purchased in India unless the Supplier has any special requirement for the specific application for a type of oil or grease not available in India. If such is the case he shall declare in the proposal where such oil or grease or other consumables is available. In any case he shall identify equivalent Indian makes and inform the Purchaser & owner of the name of at least two Indian suppliers before handing over of the Works to the Purchaser. All consumables required upto operational acceptance shall be the part of supply scope of the Supplier.

The supplier shall perform all tests and inspection necessary to ensure that the material and workmanship conform to the approved design drawings and that such tests are adequate to demonstrate that the equipment shall comply with the requirements of the Specification & relevant standards.The supplier shall test the component parts at his plant or his Sub- supplier's plant, prior to packaging and shipping, to determine that the performance requirements have been met. All testing shall be in accordance with the Standards related to the piece of work.

3.9 Colour schemes

The Supplier shall propose a colour scheme for the equipment for the approval of the Employer. The decision of the Employer shall be final. However, the finishing colour shall be RAL 7035 for indoor panels and RAL 7032 for outdoor panels. The scheme shall include:

- Finishing colour of Indoor equipment
- Finishing colour of Outdoor equipment
- Finishing colour of various auxiliary system equipment including piping
- Finishing colour of various building items.

- Finishing colour of all cubicles.

All steel structures, plates etc shall be painted with non-corrosive paint on a suitable primer. The galvanised structures in the switchyard shall not be painted. However galvanised structures in other areas may require painting for aesthetic reasons.

3.10 Clamps & connectors

i) All power clamps and connectors shall conform to IS: 5561, and/or IEC standard and shall be made of materials listed below:

a)	For connecting ACSR conductors	Aluminium alloy casting, conforming to designation A6 of IS: 617 and shall be tested for all tests as per IS:617
b)	For connecting equipment terminals made of copper with ACSR conductors	Bimetallic connectors made from aluminium alloy casting, conforming to designation A6 of IS 617 with 2 mm thick Bimetallic liner and shall be tested as per IS: 617.
c)	For connecting G.I. Shield wire	Galvanised mild steel
d).1	Bolts, nuts & Plain washers.	Electro galvanized for sizes below M12, for others hot dip galvanised
d).2	Spring washers for items 'a' to 'c'	Electro-galvanised mild steel suitable for at least service condition-3 as per IS: 1573

ii) Equipment shall be supplied with the necessary terminals and connectors, as required by the ultimate design for the particular installation. The conductor terminations of equipment shall be either expansion, sliding or rigid type. The requirements regarding external corona and RIV as specified for any equipment shall include its terminal fittings and the equipment shall be factory tested with the connectors in position. In case the connector is not available then equivalent connector may be used. If corona rings are required to meet these requirements they shall be considered as part of that equipment and included in the scope of Work.

iii) Where copper to aluminium connections are required, bi-metallic clamps shall be used, which have been properly designed to ensure that any deterioration of the connection is kept to a minimum and restricted to parts which are not current t shall be furnished to the Employer.

iv) Low voltage connectors, grounding connectors and accessories for grounding all equipment as specified are also included in the scope of Work.

v) No current carrying part of any clamp shall be less than 10 mm thick. All ferrous parts shall be hot dip galvanised. Copper alloy liner of minimum 2mm thickness shall be cast integral with aluminium body for Bi-metallic clamps. When copper alloy is not cast integral with aluminium body, a bimetallic washer or strip shall be used to meet the functional requirement.

vi) All casting shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off.

vii) Flexible connectors, braids or laminated straps made for the terminal clamps for bus posts shall be suitable for both expansion or through (fixed/sliding) type connection of IPS Aluminium tube as required. In both the cases the clamp height (top of the mounting pad to centre line of the tube) should be same.

viii) Clamp shall be designed to carry the same current as the conductor and the temperature rise shall be equal or less than that of the conductor at the specified ambient temperature. The rated current for which the clamp/connector is designed with respect to the specified reference ambient temperature, shall also be indelibly marked on each component of the clamp/connector, except on the hardware.

ix) All current carrying parts shall be designed and manufactured to have minimum contact resistance.

x) TESTS

The following is the list of type tests.
a) Temperature rise test (maximum temperature rise allowed is 35deg C over 50 deg C ambient)
b) Short time current test
c) Dry corona and RIV test as per annexure-A
d) Resistance test and tensile test

3.11 Name Plates and Markings

All equipment mounted on front and rear side as well as equipment mounted inside the panels shall be provided with individual nameplates with equipment designation engraved. Also on the top of each panel on front as well as rear side, large and bold nameplates shall be provided for circuit/ feeder designation.

All front mounted equipment shall also be 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.

All relays and other devices shall be clearly marked with manufacturer's name, manufacturer's type, serial number and electrical rating data.

Name Plates shall be made of non-rusting metal or 3-ply lamicoid. Name plates shall be black with white engraving lettering.

All the panels shall be provided with nameplate mounted inside the panel. Stainless steel nameplates shall be installed on all apparatus and on all major equipment components. For indoor cubicles, nameplates made of aluminium shall also be acceptable. Name plates shall be white with black engraved lettering and shall carry all the applicable information specified in the applicable items of the Standards, together with any other relevant information which may be required. For groups of smaller items for which this is not possible e.g. switch bays etc. a common nameplate with the title and special instructions on it shall be provided. No scratching, corrections or changes shall be allowed on nameplates. Main equipments like converter transformer, CBs, Reac-

tor, Filter gates etc shall have nameplates in Hindi also.

All equipment mounted on front and rear sides as well as equipment mounted inside the panels shall be provided with individual name plates with equipment designation engraved. Also on the top of each panel on front as well as rear sides large name plates with bold size lettering shall be provided for circuit / feeder / cubicle / box designation.

All front mounted equipment shall also be provided at the rear with individual name plates engraved with tag numbers corresponding to the one shown in the panel internal wiring to facilitate tracing of the wiring. The nameplates shall be mounted directly by the side of the respective equipment and shall not be hidden by the equipment wiring.

The nameplate inscription and size of nameplates and letters shall be submitted to the Employer for approval.

The nameplates of the apparatus shall include, at least, the information listed below, together with any other relevant information specified in the applicable standards:

a) A concise descriptive title of the equipment

b) Rating and circuit diagram reference numbers

c) Manufacturer's name, trade-mark, model type, serial number d) Instruction book number
e) Year of manufacture

f) Total weight (for capacitor racks indicate weight, for capacitors indicate quantity of liquid)

g) Special instructions, if any, about storage, transportation, handling etc.

Each measuring instrument and meter shall be prominently marked with the quantity measured e.g. kV, A, MW etc. All relays and other devices shall be clearly marked with manufacturer's name, manufacturer's type, serial number and electrical rating data.

Danger plates and plates for phase colours shall be provided as per requirement. The Supplier shall devise a system to designate equipment and sub-systems. The nameplates/ labels displaying these designations shall be installed at appropriate locations. Wherever motion/ flow of fluids are involved, plates/ marks showing direction of motion/ flow shall also be provided.

Each main and auxiliary item of substation is to have permanently attached to it in a conspicuous position a rating plate of non-corrosive material upon which is to be engraved manufacturer's name, year of manufacture, equipment name, type or serial number together with details of the loading conditions under which the item of substation in question has been designed to operate, and such diagram plates as may be required by the Purchaser. The rating plate of each equipment shall be according to IEC requirement.

All such nameplates, instruction plates, rating plates of transformers, reactors, CB, CT, CVT, SA, Isolators, C & R panels and PLCC equipments shall be bilingual with Hindi inscription first followed by English. Alternatively two separate plates one with Hindi and the other with English inscriptions may be provided.

3.12 Provisions for Exposure to Hot and Humid Climate

Outdoor equipment supplied under the specification shall be suitable for service and storage under tropical conditions of high temperature, high humidity, heavy rainfall and environment favourable to the growth of fungi and mildew. The indoor equipments located in non-air conditioned areas shall also be of same type.

3.12.1 Space Heaters

The heaters shall be suitable for continuous operation at 240 V ac supply voltage & shall be connected to the supply through a fuse.

One or more heaters shall be provided, with thermostats or hygrostat, to prevent condensation in any compartment. The heaters shall be suitable to maintain the compartment temperature at approximately10 deg. C, above the outside air temperature to prevent condensation.

Control cubicles installed in air-conditioned area need not be provided with space heaters. These cubicles shall, however, have space heaters in case of storage of cubicles for long duration.

3.12.2 Fungi Static Varnish

Besides the space heaters, special moisture and fungus resistant varnish shall be applied on parts which may be subjected or predisposed to the formation of fungi due to the presence or deposit of nutrient substances. The varnish shall not be applied to any surface of part where the treatment will interfere with the operation or performance of the equipment. Such surfaces or parts shall be protected against the application of the varnish.

3.12.3 Ventilation Opening

In order to ensure adequate ventilation, compartments shall have ventilation openings provided with fine wire mesh of brass or galvanized steel to prevent the entry of insects and to reduce to a minimum the entry of dirt and dust. Outdoor compartment openings shall be provided with shutter type blinds.

3.12.4 Tropicalisation

The service building and bay kiosk shall be air-conditioned whereas the valve halls and indoor DC yard at Agra shall have ventilation system with positive pressure. All equipments shall, however, be suitable for installation in a tropical monsoon area having hot, humid climate and dry & dusty seasons with ambient conditions as specified. All control wiring, equipment and accessories shall be protected against fungus growth, condensation, vermin and other harmful effects due to a tropical environment.

3.13 Painting and finishing of metal surfaces

All sheet steel work shall be phosphated in accordance with the IS:6005 "Code of practice for phos-

phating iron and steel".

Oil, grease, dirt and swarf shall be thoroughly removed by emulsion cleaning.

Rust and scale shall be removed by pickling with dilute acid followed by washing with running water rinsing with a slightly alkaline hot water and drying.

After phosphating, thorough rinsing shall be carried out with clean water followed by final rinsing with dilute dichromate solution and oven drying.

The phosphate coating shall be sealed with application of two coats of ready mixed, stoved type zinc chromate primer. The first coat may be "flash dried" while the second coat shall be stoved.

After application of the primer, two coats of finishing synthetic enamel paint shall be applied, each coat followed by stoving. The second finishing coat shall be applied after inspection of first coat of painting. The exterior colour of paint shall be of a slightly different shade to enable inspection of the painting.

A small quantity of finished paint shall be supplied for minor touching up required at site after installation of the panels.

In case the Supplier proposes to follow his own standard surface finish and protection procedures any other established painting procedures, like electrostatic painting etc., the procedure shall be submitted along with the Bids for Purchaser's review & approval. The Supplier shall use procedures for painting approved by the Employer during detailed Engineering.

3.14 Hot Dip Galvanising

The minimum weight of the zinc coating shall be 615 gm/ sq.m and minimum thickness of coating shall be 85 microns for all items thicker than 6 mm. For items less than 6 mm, requirements of coating thickness shall be as per relevant ASTM. For surfaces, which shall be embedded in concrete, the zinc coating shall be 900-gm/sq.m .

The galvanized surfaces shall consist of a continuous and uniform thick coating of zinc, firmly adhering to the steel. The finished surface shall be clean and smooth and shall be free from defects like discoloured patches, bare spots, unevenness of coating, which is loosely attached to the steel globules, spiky deposits, blistered surfaces, flaking or peeling off, etc. The presence of any of these defects noticed on visual inspection shall render the material liable to rejection.

After galvanizing, no drilling or welding shall be performed on the galvanized parts of the equipment except the nuts may be rethreaded after galvanizing. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization.

The galvanized steel shall be subjected to six one-minute dips in copper sulphate solution as per IS-2633.

Sharp edges with radii less than 2.5 mm shall be able to withstand four immersions of the Standard Preece test. All other coatings shall withstand six immersions.

The following galvanizing tests should be performed as per relevant Indian Standards.

- Coating thickness
- Uniformity of zinc
- Adhesion test
- Mass of zinc coating

3.15 Control cabinets, junction boxes, terminal boxes & marshalling boxes for equipment

All types of boxes, cabinets etc. shall generally conform to & be tested in accordance with IS-5039/IS-8623, IEC-60439, as applicable, and the clauses given below:

1. Enclosure for control cabinets, junction boxes, Marshalling boxes & terminal boxes shall be made of stainless steel or aluminium and shall be dust, water and vermin proof. The box shall be properly braced to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation.

2. The enclosures of the control cabinets, junction boxes, terminal boxes & marshalling boxes located outdoor shall provide a degree of protection of not less than IP 55 as per IS-13947:Part I One control cabinet, junction box, terminal box & marshalling box of each type shall be tested for the same.

3. Cabinets/boxes shall be freestanding floor-mounting type, wall mounting type, or pedestal mounting type as required. Equipments such as telephone exchange, Public address systems etc shall be kept inside cubicles.

4. Cabinets/ boxes shall be provided with double-hinged doors with padlocking arrangements. The distance between two hinges shall be adequate to ensure uniform sealing pressure against atmosphere. The quality of the gasket shall be such that it does not get damaged/cracked during the operation of the equipment.

5. All doors, removable covers and plates shall be gasketed all around with suitably profiled EPDM gaskets. The gasket shall be tested in accordance with approved Quality Plan. Ventilating louvers, if provided, shall have screen and filters. The screen shall be fine wire mesh made of brass.

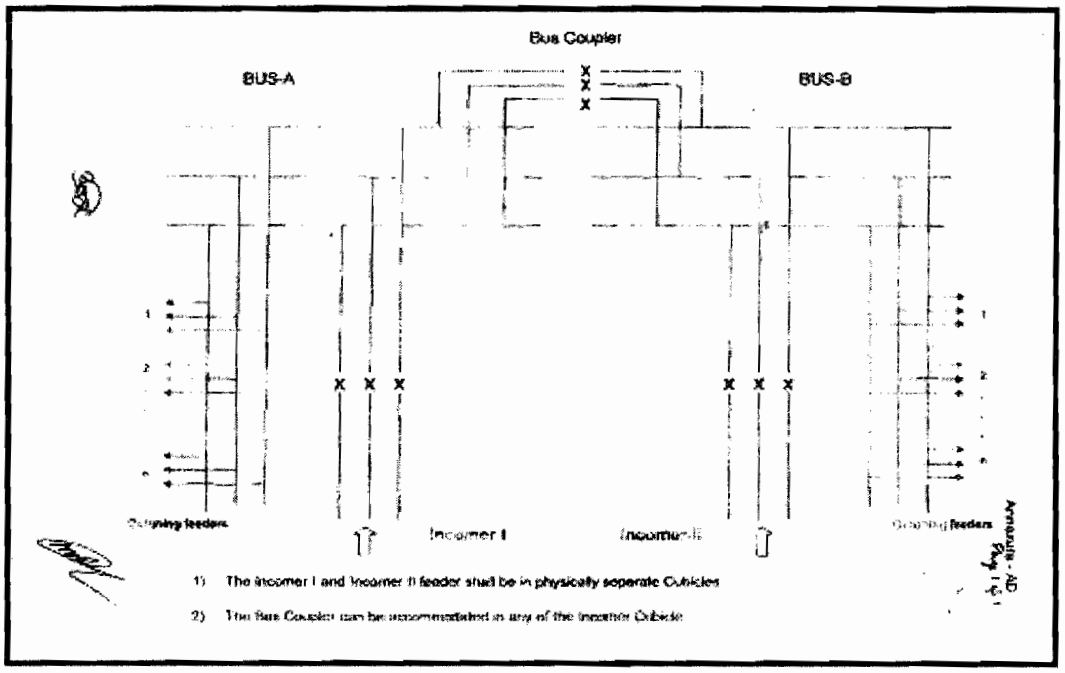
6. All boxes/cabinets shall be designed for the entry of cables from the bottom by means of weatherproof and dust-proof connections. Boxes and cabinets shall be designed with generous clearances to avoid interference between the wiring entering from below and any terminal blocks or accessories mounted within the box or cabinet. A suitable horizontal cable gland plate positioned at least 150 mm above the base of the marshalling kiosk/box shall be provided for this purpose along with the proper blanking plates. Necessary number of cable glands shall be supplied and fitted on this gland plate. The gland shall project at least 25mm above gland plate to prevent entry of moisture in cable crutch. Gland plate shall have provision for some future glands to be provided later, if required. The glands shall be dust proof, screw on & double compression type and made of brass. The gland shall have provision for securing armour of the cable separately and shall be provided with earthing tag. The glands shall conform to BS: 6121 and shall be nickel-plated.

Boxes / cabinets to be located inside a building in a non air- conditioned area may be designed for the entry of cables from the bottom or from the top.

The (415 V) secondary distribution system shall be made up of 415 V power centres serving the different classes of loads either directly or thorough motor control centres. Two separate 415 V power centres, one for each pole shall be provided. The two sections of power control centres (PCC) feeding the duplicated loads, like pumps, fans, heat exchangers, etc. as well as the duplicated supply circuits shall be physically independent, permanently energized and fed by different sections of the 415 V power centres. A tie circuit breaker, shall be provided between the two sections of above PCC feeding the duplicated loads, in order that when one section of PCC is out for maintenance or fault, the other section can supply all the loads.

The motor control centres (MCC) shall be provided in accordance with the relevant Standards. The MCC shall be located near the supplied loads. The incomers of the MCC shall be individually interlocked to prevent paralleling of two different power centre buses. The 240 V loads shall be supplied by 240 V panels located in the MCC or outside the MCC where it is required.

415 V MCCs for valve cooling, pump house, valve hall ventilation system, air-conditioning system etc. shall be arranged as per figure given below:



25% spare feeders, but not less than one of each type and rating shall be provided on 415V switchgears, power centres and motor, control centres as well as on all dc distribution boards

The AC & DC Distribution Boards shall have a fixed type, floor-mounted, free-standing, metal enclosed, with compartmentalised construction. They shall have separate Busbar chamber and cable alleys. All equipment for each feeder (i.e. main switch, HRC fuses, neutral link and cable terminals) shall be housed in a fully enclosed compartment with a separate hinged door,

such that fuse replacement, cable termination/replacement etc. are possible with complete safety, even if the Busbar and adjacent feeders are live. The connections from Busbar to the main switch shall be fully insulated/shrouded, and securely bolted. The partition between the feeder compartment and cable alley shall be non- metallic and shall be of such construction as to allow cable cores with lugs to be easily inserted in the feeder compartment for termination. Cable alley shall have no exposed live parts, and shall have no communication with Busbar chamber. The main switch shall be operated from outside, and shall be interlocked with the compartment door such that the latter can be opened only when the switch is OFF. However, it shall be possible to defeat this interlock and open and close the door with the switch ON. Busbar chamber shall be completely enclosed with metallic partitions. Bolted covers shall be provided for access to horizontal and vertical Busbar and all joints, for repair and maintenance, which shall be feasible without disturbing the feeder compartment. Cable alley door shall preferably be hinged. The main switch shall have the facility of being pad- locked in both ON and OFF positions. The switch handle shall clearly indicate the position of main switch. The Supplier shall furnish suitable plugs to cover the cable openings in the partition between feeder compartment and cable alley, for at least 50% of the total number of feeders. The distribution boards shall have a degree of protection of at least IP52 as per IS-13947:Part I.

All 415V switchgear (circuit breaker boards) shall be of single front type, with fully draw out circuit breakers, which can be drawn out without having to unscrew any connections. The circuit breakers shall be mounted on rollers and guides for smooth movement between SERVICE, TEST and ISOLATED positions and for withdrawal from the Switchboard. Testing of the breaker shall be possible in the TEST position. Unless kept in OFF position it shall not be possible to withdraw the modules from service position or rack them into service position.

All outgoing feeders in distribution boards shall be through MCBs/MCCBs.

Circuit breakers shall be three pole air break horizontal draw out type and shall have inherent fault making and breaking capacities as specified. The circuit breakers which meet specified parameter only after provision of releases or any other devices shall not be acceptable.

All circuit breakers shall be provided at least with 4 NO and 4 NC potentially free auxiliary contacts. These contacts shall be in addition to those required for internal mechanism of the breaker. Separate limit switches each having required number of contacts shall be provided in both 'SERVICE' & 'TEST' position of the breaker.

Control cabinets, junction boxes, Marshalling boxes and terminal boxes shall be made of sheet steel or aluminium enclosure.Sheet steel used shall be at least 2.0-mm thick cold rolled or 2.5 mm hot rolled. In case of aluminium enclosed box the thickness of aluminium shall be such that it provides adequate rigidity and long life as comparable with sheet steel of specified thickness.

7. Earthing

The provision for earthing shall be generally as per requirements given in Clause 3.16.2

8. Tests

a) The Marshalling Kiosks shall be subject to routine tests as per IS: 5039

b) The following routine tests shall also be conducted:

i) Check for wiring

ii) Visual and dimension check

Marshalling kiosk shall be provided with danger plate and a diagram showing the numbering/ connection/ ferruling by pasting the same on the inside of the door.

Marshalling kiosk shall also be provided with incoming MCB and one 15 Amp interlocked switched socket in addition to the MCB required.

3.16 Indoor control cubicles

The control panel, cubicles and desks shall be in accordance with the relevant IEC standards and shall be installed in air-conditioned space. Indoor electronic cubicles shall not generally require fans for cooling in order to operate successfully and correctly at the maximum ambient temperature. However, if it is absolutely necessary to install fans etc. in cubicles for cooling then these shall be driven by the same dc supply as used for control, and necessary redundancy, failure alarm etc. shall be incorporated. Louvers in the doors and side panels shall be permitted, if required.

The control and relay panels shall be suitable for numerical relays of modular type mounted in standard 19 inch racks located on the vertical front panel with rear doors for access or located on the front doors for front access type panels. Panels Cubicles shall be completely metal enclosed and shall be dust, moisture and vermin proof. The enclosure shall provide a degree of protection not less than IP 32 in accordance with IS-13947:Part I for cubicles located in air-conditioned areas. IP 31 may also be acceptable for these areas if the layout is arranged such that there is no possibility at all of any liquid entering the area. However, for ventilation reasons the cubicles may be provided with a ventilation hood at the top with a protection class of IP21.

Panels shall be free standing, floor mounting type and shall comprise structural frames enclosed completely with specially selected smooth finished, cold rolled sheet steel of thickness not less than 2.5 mm for weight bearing members of the cubicles such as base frame, front sheet and door frames, and 1.5 mm for sides, door top and bottom portions. There shall be sufficient reinforcement to provide level surfaces, resistance to vibration and rigidity during transportation and installation. The cubicles shall be provided with lifting lugs.

All doors, removable covers and plates shall be gasketed all around with neoprene gaskets. Ventilation louvers, if provided, shall have screens and filters. The screens shall be made of either brass or GI wire mesh with a graduation of 1 mm or less.

Design, material selection and workmanship shall be such as to result in a neat appearance, inside and outside with no welds rivets or bolt heads apparent from outside, with all exterior surfaces true and smooth. All cubicles located in any room shall be matched in appearance.

The Supplier along with anchor bolts and necessary hardware for mounting the cubicles shall furnish metal sills in the form of metal channels properly drilled. Panels shall have an additional rolled channel plinth at the bottom with a smooth bearing surface. The panels shall be fixed on channels with intervening layers of anti- vibration strips made of shock absorbing material, which shall be

supplied by the Supplier.

Supplier's standard practice for control panels shall be acceptable to the Employer/Purchaser subject to approval during detailed engineering and meeting all functional requirements of the specification.

3.16.1 Mounting

All equipment on and in panels shall be mounted and completely wired to the terminal blocks ready for external connections. The equipment on front of panel shall be mounted flush. No equipment shall be mounted on the doors.

Equipment shall be mounted such that removal and replacement can be accomplished individually without interruption of service to adjacent devices and are readily accessible without use of special tools. Terminal marking on the equipment shall be clearly visible.

The Supplier shall carry out cut out, mounting and wiring of the free issue items supplied by others, which are to be mounted in his panel in accordance with the corresponding equipment manufacturer's drawings. Cut outs if any, provided for future mounting of equipment shall be properly blanked off with blanking plate.

The centre lines of switches, push buttons and indicating lamps shall be not less than 750mm from the bottom of the panel. The centre lines of relays, meters and recorders shall be not less than 450mm from the bottom of the panel

The centre lines of switches, push buttons and indicating lamps shall be matched to give a neat and uniform appearance. Like wise the top lines of all meters, relays and recorders etc. shall be matched.

No equipment shall be mounted on the doors.

At existing station, panels shall be matched with other panels in the control room in respect of dimensions, colour, appearance and arrangement of equipment (centre lines of switches, push buttons and other equipment) on the front of the panel.

3.16.2 Earthing

1) All panels shall be equipped with an earth bus securely fixed. Location of earth bus shall ensure no radiation interference for earth systems under various switching conditions of isolators and breakers. The material and the sizes of the bus bar shall be at least 25 X 6 sq. mm perforated copper with threaded holes at a gap of 50mm with a provision of bolts and nuts for connection with cable armours and mounted equipment etc for effective earthing. When several panels are mounted adjoining each other, the earth bus shall be made continuous and necessary connectors and clamps for this purpose shall be included in the scope of supply of Supplier. Provision shall be made for extending the earth bus bars to future adjoining panels on either side.

2) Provision shall be made on each bus bar of the end panels for connecting Substation earthing grid. Necessary terminal clamps and connectors for this purpose shall be included in the scope

of supply of Supplier.

3) All metallic cases of relays, instruments and other panel mounted equipment including gland plate, shall be connected to the earth bus by copper wires of size not less than 2.5 sq. mm. The colour code of earthing wires shall be green.

4) Looping of earth connections, which would result in loss of earth connection to other devices when the loop is broken, shall not be permitted. Earthing may be done in such a manner that no circulating current shall flow in the panel.

5) VT and CT secondary neutral or common lead shall be earthed at one place only at the terminal blocks where they enter the panel. Such earthing shall be made through links so that earthing may be removed from one group without disturbing continuity of earthing system for other groups.

6) An electrostatic discharge point shall be provided in each panel connected to earth bus via 1 Mega Ohm resistor.

3.16.3 Instruments, meters and recorders

Only digital displays and systems shall be provided. The requirements in this section are applicable to auxiliary systems only. All instruments, meters and recorders shall be enclosed in dust proof, moisture resistant, black finished cases and shall be suitable for tropical use. They shall be calibrated to read directly the primary quantities. They shall be accurately adjusted and calibrated at the factory and shall have means of calibration, checking and adjustment at site.

3.16.4 Miscellaneous

1) The Supplier shall submit all type and routine test certificates to the Employer & Purchaser for approval before dispatching the equipment. Control and relay panels shall also be subjected to the following tests:
   i) Mechanical operation test
   ii) Verification of degree of protection as per IS-13947:Part I
   iii) High voltage test
   iv) Electrical control, Interlock and sequential operation test
   v) Verification of wiring as per approved schematic.

2) Plug Point: 240V, Single phase 50Hz, AC socket with switch suitable to accept 5 Amps and 15 Amps pin round standard Indian plug, shall be provided in the interior of each cubicle with ON-OFF switch.

3) Interior Lighting: Each panel shall be provided with a CFL lighting fixture rated for 240 Volts, single phase, 50 Hz supply for the interior illumination of the panel controlled by the respective panel door switch. Adequate lighting shall also be provided for the corridor in Duplex panels.

4) MCB's: Each panel shall be provided with necessary arrangements for receiving, distributing and isolating of DC and AC supplies for various control, signalling, lighting and space heater circuits. The incoming and sub-circuits shall be separately provided with miniature circuit breakers (MCB).

5) Space Heater: Panels wherever required shall be provided with a space heater rated for 240V single phase, 50 Hz Ac supply for the internal heating of the panel to prevent condensation of moisture. The fittings shall be complete with thermostat and switch fuse /MCB unit.

3.16.5 Terminal blocks and wiring

All internal wiring to be connected to external equipment shall terminate on terminal blocks. Terminal blocks shall be 650 V grade and have 10 Amps. Continuous rating, moulded piece, complete with insulated barriers, stud type terminals, washers, nuts and lock nuts. Markings on the terminal blocks shall correspond to wire number and terminal numbers on the wiring diagrams. All terminal blocks shall have shrouding with transparent unbreakable material.

Disconnecting type terminal blocks for current transformer and voltage transformer secondary leads shall be provided. Also current transformer secondary leads shall be provided with short circuiting and earthing facilities.

Spare terminals for Employer's use for upgrading to 6000 MW shall be provided wherever required. In addition, at least 20% spare terminals shall be provided on each panel and these spare terminals shall be uniformly distributed on all terminal blocks.

The terminal blocks shall be suitable for connecting the conductors of external cable on each side.

Terminal blocks shall be of (at least) 650V grade and have 10 amps continuous rating. These shall be moulded, complete with insulated barriers, stud type terminals, complete with washers, nuts and lock nuts. Screw clamp, overall insulated, insertion type, rail mounted terminals can be used in place of stud terminals with locking type. The terminal blocks shall be of reputed make subject to Employer's acceptance.

Terminal block design shall include a white fibre marking strip with clear plastic, /clip-on terminal covers. Markings on the terminal strips shall correspond to wire numbers on the wiring diagrams.

Terminal blocks for current transformer and voltage transformer secondary leads shall be provided with test links and isolating facilities. The current transformer secondary leads shall also be provided with short-circuiting and earthing facilities.

The conducting part in contact with the cable shall preferably be tinned or silver-plated however; nickel-plated copper shall also be acceptable. Insulating barriers shall be provided between the terminal blocks.

Manufacturer's standard practice for internal wiring of cubicles shall be acceptable to the Employer. However all external cabling requirements shall be strictly as per TS.

The Supplier shall furnish all wire, conduits and terminals for the necessary inter-phase electrical connections (where applicable) as well as between phases and common terminal boxes or control cabinets.

3.17 Degree of protection

The enclosures of the control cabinets, Junction boxes and Marshalling boxes, panels etc. to be installed as detailed here under:

The minimum requirements for panels are as follows:

Installed out door: IP- 55
Installed indoors in air-conditioned area: IP-32
Installed in covered area: IP-52
Installed indoors in non air-conditioned area where possibility of entry of water is limited: IP-41.
For LT Switchgear (AC & DC distribution Boards): IP-52.

The degree of protection shall be in accordance with IS:13947 (Part-I) / IEC-947 (Part-I) / IS 12063 / IEC 529. Type test report for degree of protection test, on each type of the box shall be submitted for approval

3.18 Welding and welders' qualifications

All welding shall be in accordance with the corresponding standards of the American Welding Society or the American Society of Mechanical Engineers. Welding shall comply with powergrid approved quality plan.

Other standards to determine the quality of welding processes and qualifications of welders may be considered, provided that sufficient information is first submitted for the approval of the Employer.

Prior to the start of fabrication, the Supplier shall submit to the Employer for approval, a description of each of the welding procedures which he proposes to adopt, together with certified copies of reports of the results from tests made in accordance with these procedures.

The Supplier shall be responsible for the quality of the work performed by his welding organization. All welding operators shall be assigned to the work, including for repair of castings, shall pass the required tests for qualification of welding procedures. The Employer reserves the right to witness the qualification tests for welding procedures and operators and the mechanical tests of the samples. If the Inspector so requires, the Supplier shall furnish to the Inspector certified copies of reports of the mechanical test results of the samples.

The Supplier shall bear all his own expenses in connection with the qualification tests. If the work of any operator at any time appears questionable, such operator shall be required to pass appropriate re-qualification tests as specified by the Inspector and at the expense of the Supplier.

Strict measures for quality control shall be exercised throughout the Equipment/Works. The Engineer may call for an adequate NDT test of the work of any operator, who, in his opinion, is not maintaining the required standard of workmanship. Should this NDT test prove defective, all work done by that operator, since his last test shall be tested at the Supplier's expense. If three or more of these tests prove defective, the operator shall be removed from the project.

A procedure for the repair of defects shall be submitted to the Employer for his approval prior to any

repairs being made.

3.19 Motors

All motors shall conform to IEC-60034-5 / IS Standard and with principal dimensions in accordance with IEC 60072-1 (1991), IEC 60072-2 (1990) and IEC 60072-3 (1994).

Motors rated 0.5 kW and above, and reversing motors, shall be rated 415 V, three phase, grounded neutral;

Motors rated below 0.5 kW shall be rated 240 V one phase;

All motors shall be designed to operate at full load dynamic conditions with a voltage range of variation of +10%, -20% and a frequency range variation of +5%,-10%. Motors shall also be designed to operate at 125% of the rated speed without mechanical damage, and to start with 80% of their rated voltage;

All motors shall be designed and rated for continuous operation at maximum ambient temperature of 50oC. The class of insulation shall be at least one class higher than used for defining the temperature rise of the motor;

Vertical motors rated 60 kW and above shall be provided with oil-lubricated self-cooled pivoted shoe-type thrust bearing. Vertical motors below 60 kW shall be provided with re-greasable anti-friction ball or roller bearings;

All anti-friction bearings shall be guaranteed to operate successfully for a minimum of 131,000 hours;

All bearings shall be quiet operating and statically and dynamically balanced;

All belts to be used shall be "V" type and designed for the maximum power to be transmitted and for the maximum speed. The selection of the "V" belt drive for any application shall also be based on the nature of the load and the type of the driving unit. Belts installed outdoors shall be suitably protected.

3.20 Conduits, pipes and accessories

The Supplier shall supply and install all rigid conduits, mild steel pipes, flexible conduits, hume pipes etc. including all necessary sundry materials, such as tees, elbows, check-nuts, bushings, reducers, enlargers, wooden plugs, coupling caps, nipples, gland sealing fittings, pull boxes etc. The size of the conduit/pipe shall be selected to limit the fill to a maximum of 40%. All conduits/pipes shall have their ends closed by caps until cables are pulled. After cables are pulled, the ends of conduits/pipes shall be sealed in an approved manner to prevent damage to threaded portions and en- trance of moisture and foreign materials.

PVC conduits shall be of high impact, heavy gauge (at least class 2) conduit conforming to BS-4607.

The outer surface of the steel conduits shall be coated with hot-dip zinc and chromate conversion coatings. The inner surface shall have silicone epoxy ester coating for easy cable pulling. Mild steel

pipes shall be hot-dip galvanized. All rigid conduits/pipes shall be of a reputed make.

The hume pipes and accessories shall be of reinforced concrete conforming to class NP2 of IS-458. All tests on hume pipes shall be conducted as per IS-458.

Flexible conduits shall be of heat-resistant lead coated steel, water-leak, fire and rust proof.

3.21 Packaging & protection

All the equipments shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at Site till the time of erection. On request of the Purchaser, the Supplier shall also submit packing details/associated drawing for any equipment/material under his scope of supply, to facilitate the Purchaser to repack any equipment/material at a later date, in case the need arises. While packing all the materials, the limitation from the point of view of availability of Railway wagon sizes in India should be taken into account. The Supplier shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. Any demurrage, warping and other such charges claimed by the transporters, railways etc. shall be to the account of the Supplier. Purchaser takes no responsibility of the availability of the wagons.
All coated surfaces shall be protected against abrasion, impact, discolouration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or a non-metallic protecting device. All ends of all valves and piping and conduit equipment connections shall be properly sealed with suitable devices to protect them from damage.

3.22 Auxiliary supply

The sub-station auxiliary supply is normally met through a system having the following parameters. The auxiliary power for station supply, including the equipment drive, cooling system of any equipment, air-conditioning, lighting etc shall be designed for the specified Parameters as under. The DC supply for the instrumentation and PLCC system shall also conform to the parameters as indicated in the following :

Table 24 - 3 Table for Auxiliary Supply

Normal Voltage	*Variation in Voltage*	*Frequency in Hz*	*Phases*	*Neutral Connection*
415V	± 10%	50 ± 5%	3 or 4 Wire	Solidly Earthed
240 V	± 10%	50 ± 5%	2 Wire	Solidly Earthed
220V	190 - 242	DC	-	Isolated 2 wire system DC unearthed system
48 V	41 - 52.8	DC	-	Isolated 2 wire system positive pole directly earthed

Combined variation of voltage and frequency shall be limited to ± 10%.

3.23 Lamps and sockets

Lamps

All incandescent lamps shall use a socket base as per IS-1258, except in the case of signal lamps.

Sockets

All sockets (convenience outlets) shall be suitable to accept both 5 Amp & 15 Amp pin round Standard Indian plugs. They shall be switched sockets with shutters. Degree of protection for outdoor switch sockets shall be IP55.

Hand Lamp

A 240 Volts, single Phase, 50 Hz AC plug point shall be provided in the interior of each cubicle with ON-OFF Switch for connection of hand lamps.

Switches and Fuses

Each panel shall be provided with necessary arrangements for receiving, distributing, isolating and fusing of DC and AC supplies for various control, signalling, lighting and space heater circuits. The incoming and sub-circuits shall be separately provided with switchfuse units. Selection of the main and Sub-circuit fuse ratings shall be such as to ensure selective clearance of sub-circuit faults. Potential circuits for relaying and metering shall be protected by HRC fuses. All fuses shall be of HRC cartridge type conforming to IS:9228 mounted on plug-in type fuse bases. Miniature circuit breakers with thermal protection and alarm contacts will also be accepted. All accessible live connection to fuse bases shall be adequately shrouded. Fuses shall have operation indicators for indicating blown fuse condition. Fuse carrier base shall have imprints of the fuse rating and voltage.

3.24 Availability spares

The Supplier shall supply the spare parts required to meet the specified guaranteed availability, and shall include such spare parts in the scope of supply. The detailed lists of spare parts to meet the guaranteed reliability & availability requirements shall be part of the contract documents. However if it is found during detailed engineering and/or Reliability & Availability prediction calculation that additional spares are required to meet target values, the same shall be made available by the Supplier without any additional cost to the Employer.

3.25 Commissioning spares

The Supplier shall supply additional spares which he expects to consume during installation, testing and commissioning of the systems. The quantity of these spares shall be decided based on his previous experience, such that site work shall not be hampered due to non-availability of these spares.

3.26 Tools & tackles

The Supplier shall also supply at each site one set of all special tools & tackles, testing equipment, handling equipment, etc. which are required by the Employer's maintenance staff to maintain the stations successfully.

3.27 Seismic force consideration

All structures shall be designed for seismic forces in accordance with IS-1893.

The seismic design of electrical equipment shall be performed using estimated actual earth/ ground motion,defined by a response spectrum, rather than the equivalent loads specified in typical Building Codes.

For brittle materials like glass, porcelain and glass fibre reinforced plastic the maximum calculated load should not exceed 2/3 of the guaranteed minimum rupture (breaking) strength (safety factor 1.5) as defined by the manufacturer/supplier of the material used. The minimum rupture value is defined as (X - 2*sigma), where X is the mean value and 'sigma' is the standard deviation. For load combinations in porcelain insulators and similar the following expressions shall be fulfilled:

$\{Ft / (Ft)b\} + \{Mb / (Mb)b\} < 2/3$ and
$\{Fc / (Fc)b\} + \{Mb / (Mb)b\} < 2/3$

Where:

Ft, Fc, Mb : calculated maximum tensile force; compressive force and bending respectively

(F), (F), (M)b : corresponding guaranteed strength values

(For normal operating loads, a higher safety factor more than 1.5 shall be used, normally 2.0-2.5 depending on type of load as per recommendations of manufacturer).

Factor regarding importance of structures (I), as defined in IS-1893, shall not be taken less than 1.5.

3.28 Safety requirements

The requirements regarding provision of additional staircases and approachability as defined in the Fire Protection Manual, issued by the Regional Committees of the Tariff Advisory Committee shall be completely fulfilled. All other safety requirements shall be met as per the factories Act, TAC etc.

ANNEXURE-A
Corona and Radio Interference Voltage (RIV) Test

1. General

Unless otherwise stipulated, all equipment (except Auto Transformer & Shunt Reactor) together with its associated connectors, where applicable, shall be tested for external corona both by observing the voltage level for the extinction of visible corona under falling power frequency voltage and by measurement of radio interference voltage (RIV). The test procedure shall be reviewed for different equipment during submission of MQP/ITP.

2. Test Levels:

The test voltage levels for measurement of external RIV and for corona extinction voltage are listed under the relevant clauses of the specification.

3. Test Methods for RIV:

3.1 RIV tests shall be made according to measuring circuit as per International Special-Committee on Radio Interference (CISPR) Publication 16-1(1993) Part -1. The measuring circuit shall preferably be tuned to frequency with 10% of 0.5 Mhz but other frequencies in the range of 0.5 MHz to 2 MHz may be used, the measuring frequency being recorded. The results shall be in microvolts.

3.2 Alternatively, RIV tests shall be in accordance with NEMA standard Publication No. 107-1964, except otherwise noted herein.

3.3 In measurement of, RIV, temporary additional external corona shielding may be provided. In measurements of RIV only standard fittings of identical type supplied with the equipment and a simulation of the connections as used in the actual installation will be permitted in the vicinity within 3.5 meters of terminals.

3.4 Ambient noise shall be measured before and after each series of tests to ensure that there is no variation in ambient noise level. If variation is present, the lowest ambient noise level will form basis for the measurements. RIV levels shall be measured at increasing and decreasing voltages of 85%, 100%, 115% and 130% of the specified RIV test voltage for all equipment unless otherwise specified. The specified RIV test voltage for 400 kV, 220 kV is listed in the detailed specification together with maximum permissible RIV level in microvolts.

3.5 The metering instruments shall be as per CISPR recommendation or equivalent device so long as it has been used by other testing authorities.

3.6 The RIV measurement may be made with a noise meter. A calibration procedure of the frequency to which noise meter shall be tuned shall establish the ratio of voltage at the high voltage terminal to voltage read by noise level meter.

4. Test Methods for Visible Corona

The purpose of this test is to determine the corona extinction voltage of apparatus, connectors etc. The test shall be carried out in the same manner as RIV test described above with the exception that RIV measurements are not required during test and a search technique shall be used near the onset and extinction voltage, when the test voltage is raised and lowered to determine their precise values. The test voltage shall be raised to 130% of RIV test voltage and maintained there for five minutes. In case corona inception does not take place at 130 %, test

shall be stopped, otherwise test shall be continued and the voltage will then be decreased slowly until all visible corona disappears. The procedure shall be repeated at least 4 times with corona inception and extinction voltage recorded each time. The corona extinction voltage for purposes of determining compliance with the specification shall be the lowest of the four values at which visible corona (negative or positive polarity) disappears. Photographs with laboratory in complete darkness shall be taken under test conditions, at all voltage steps i.e. 85%, 100%, 115% and 130%. Additional photographs shall be taken at corona inception and extinction voltages. At least two views shall be photographed in each case using Panchromatic film with an ASA daylight rating of 400 with an exposure of two minutes at a lens aperture of f/5.6 or equivalent. The photographic process shall be such that prints are available for inspection and comparison with conditions as determined from direct observation. Photographs shall be taken from above and below the level of connector so as to show corona on bushing, insulators and all parts of energised connectors. The photographs shall be framed such that test object essentially, fills the frame with no cut-off.

4.1 The test shall be recorded on each photograph. Additonal photograph shall be taken from each camera position with lights on to show the relative position of test object to facilitate precise corona location from the photographic evidence.

4.2 In addition to photographs of the test object preferably four photographs shall be taken of the complete test assembly showing relative positions of all the test equipment and test objects. These four photographs shall be taken from four points equally spaced around the test arrangement to show its features from all sides. Drawings of the laboratory and test set up locations shall be provided to indicate camera positions and angles. The precise location of camera shall be approved by Purchaser's inspector, after determining the best camera locations by trial energisation of test object at a voltage which results in corona.

4.3 The test to determine the visible corona extinction voltage need not be carried out simultaneously with test to determine RIV levels.

4.4 However, both test shall be carried out with the same test set up and as little time duration between tests as possible. No modification on treatment of the sample between tests will be allowed. Simultaneous RIV and visible corona extinction voltage testing may be permitted at the discretion of Purchaser's inspector if, in his opinion, it will not prejudice other test.

5. Test Records:

In addition to the information previously mentioned and the requirements specified as per CISPR or NEMA 107-1964 the following data shall be included in test report:

a) Background noise before and after test.

b) Detailed procedure of application of test voltage.

c) Measurements of RIV levels expressed in micro volts at each level.

d) Results and observations with regard to location and type of interference sources detected at each step.

e) Test voltage shall be recorded when measured RIV passes through 100 microvolts in each direction.

f) Onset and extinction of visual corona for each of the four tests required shall be recorded.