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**Bhutan Power Corporation Limited**  
(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)  
Registered Office, Thimphu  
Procurement Services Department  
Thimphu: Bhutan



BPC/PSD/2020 Materials/2019/ 646

September 05, 2019

**Subject:** Addendum No. 1

**Reference:** Tender No: BPC/PSD/2020 Materials/2019/12; BPC/PSD/2020 Materials/2019/14 and BPC/PSD/2020 Materials/2019/16 dated August 15, 2019.

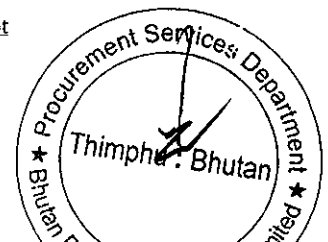
Dear Sir(s),

This is with reference to above-mentioned tenders whereby PSD, BPC has received the queries from the bidders. The response to the queries are given below.

a. Technical Clarification:

| Clause No.   | Query   | Response   |
|--|---|--|
| <b>Tender No: BPC/PSD/2020 Materials/2019/12 dated August 15, 2019</b> |   |  |
| <b>Lot 1: ABC and AAAC Conductors</b>                                  |   |  |
| 5.   | AAAC Covered overhead conductor<br>According to standard AS/NZS 3675:2002<br><br>a) CC- A covered conductor having a 2.0 mm thickness of covering for use on all working voltages up to and including 19.33 (36kV). But in the tender document section V- Schedule of Supply page 69, the minimum thickness of XLPE Cable cover for 33 kV is 8 mm even they mention the same conductor size and type i.e CC.<br><br>Please request you to clarify the above | a) The minimum technical requirement of the AAAC Covered under Section V- Schedule of Supply is amended as Annexure 1.<br><br>b) The Price Schedule for Lot 1 (ABC and AAAC fittings) is amended as Annexure 2.<br><br>c) The GTP for covered AAAC under lot no. 1 is amended as Annexure 3. |

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# འབྲུག་གྲོག་མེ་ལས་འཛིན།

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|  |  |   |
|--|--|---|
|  | thickness of insulation of covered conductor.  |   |
| <b>Tender No. BPC/PSD/2020 Materials/2019/16 dated August 15, 2019</b> |  |   |
| <b>Lot 5 (item no. 3, 4, 5 &amp;6): Switching Equipment</b>            |  |   |
|  | Request to clarify the requirement of insulating stick for item no. 3-6 as it is not mentioned in the tender document. | Insulating stick is not required.   |
| <b>Tender No. BPC/PSD/2020 Materials/2019/14 dated August 15, 2019</b> |  |   |
| <b>Lot 7: CTPT Combined Unit</b>                                       |  |   |
|  | The specification for 33kV CTPT is not mentioned in the tender document.   | The technical Specification for 33kV CTPT Combined Unit is amended as Annexure 4.<br><br>The GTP for 33 kV CTPT Combined Unit is amended as Annexure 5. |

However, due to the above inclusion and additional information, no time extension shall be granted and the submission date and time shall remain the same.

Please acknowledge the receipt of this Addendum No.1.

Thanking you,

Yours sincerely,

(Drukchu Dorji)  
General Manager



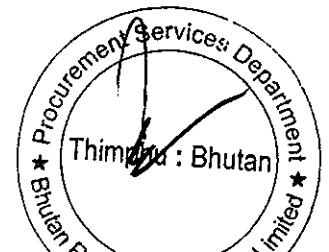
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**Annexure 1: The Minimum Technical Requirement of the AAAC Covered**

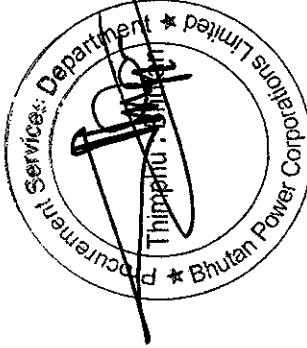
| Parameters                          | Units                | Conductor size and type                 |                  |
|-------------------------------------|----------------------|---|------------------|
| Applicable Standard                 |                      | AS 3675-1993, IEC 60502                 |                  |
| Rated Voltage                       | kV                   | 6.35/11 kV up to and including 19/33 kV |                  |
| Nominal cross-sectional area        | mm <sup>2</sup>      | 49.5                                    | 111              |
| Stranding and nominal wire diameter | No./mm               | 7/3.00 (Fluorine)                       | 7/4.5 (Hydrogen) |
| Conductor Material                  | Aluminium Alloy 1120 |   |                  |
| Cover insulation material           | UV stabilized XLPE   |   |                  |
| Approximate conductor diameter      | mm                   | 9                                       | 13.5             |
| Minimum thickness of XLPE cover     | mm                   | 3.4                                     | 3.4              |
| Approx. overall dia of cable        | mm                   | 12.4-14                                 | 16.9-18.5        |



Annexure 2: Price Schedule

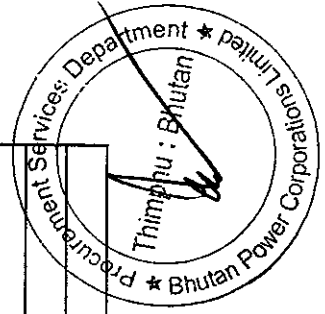
Lot 1: ABC and AAAC Conductors

| Sl. No. | Materials Description for tendering        | Unit | Qty                       | Restricted Brand  | Offered Brand and Country of Origin | Unit Price DDP (Nu.) | Amount DDP (Nu.) |
|---------|--|------|---------------------------|---|-------------------------------------|----------------------|------------------|
| 1       | HV ABC Cable (6.35/11kV): 3 core, 95 sq.mm | KM   | 7.82                      | PT KMI Wires and Cable Tbk; PT Supreme Cable Manufacturing & Commerce Tbk (PT Sucaco Tbk); PT Voksel Electric Tbk; PT Jembo Cable Company Tbk.; |                                     |                      |                  |
| 2       | HV ABC Cable (6.35/11kV): 3 core, 50sq.mm  | KM   | 10                        |   |                                     |                      |                  |
| 3       | LV ABC Conductor: 4 core, 50sq.mm          | KM   | 93.087                    |   |                                     |                      |                  |
| 4       | LV ABC Conductor 4 core, 95sq.mm           | KM   | 45.8                      |   |                                     |                      |                  |
| 5       | LV ABC Conductor 4 core, 120sq.mm          | KM   | 3                         |   |                                     |                      |                  |
| 6       | LV ABC Conductor: 2 core, 50sq.mm          | KM   | 85.214                    |   |                                     |                      |                  |
| 7       | LV ABC Conductor: 2 core, 95sq.mm          | KM   | 0.642                     |   |                                     |                      |                  |
| 8       | Covered AAAC, 111 sq. mm                   | KM   | 3.3                       |   |                                     |                      |                  |
| 9       | Covered AAAC, 49.5 sq. mm                  | KM   | 1                         |   |                                     |                      |                  |
|         |  |      | <b>Total Amount (Nu.)</b> |   |                                     |                      |                  |



**Annexure 3-GTP for Bidders to fill up for Covered AAC**

| SL. No. | Parameters                                   | Units | Bidders to fill up |                |
|---------|--|-------|--------------------|----------------|
|         |  |       | Covered AAC        | (Item no. 8-9) |
| 1       | Name of Manufacturer and Country             |       | 111 sq. mm         | 49.5 sq. mm    |
| 2       | Applicable Standards                         |       |                    |                |
| 3       | Rated voltage (U/U <sub>0</sub> )            | kV    |                    |                |
| 4       | <b>Conductor</b>                             |       |                    |                |
| 4.1     | Materials                                    |       |                    |                |
| 4.2     | Cross-sectional area                         |       |                    |                |
| 4.3     | Whether stranded?                            |       |                    |                |
| 5       | Insulation                                   |       |                    |                |
| 5.1     | Materials                                    |       |                    |                |
| 5.2     | Thickness                                    | mm    |                    |                |
| 6       | Total Over all diameter                      | mm    |                    |                |
| 7       | Test Voltage                                 | kV    |                    |                |
| 7.1     | AC Test Voltage                              |       |                    |                |
| 7.2     | One minute power frequency withstand voltage | kVp   |                    |                |
| 7.3     | Water immersion test voltage                 |       |                    |                |
| 8       | Type of cable end sealing                    |       |                    |                |
| 9       | Cable drums                                  |       |                    |                |
| 9.1     | Dimensions                                   | mm    |                    |                |
| 9.2     | Weight                                       | kg    |                    |                |
| 9.3     | Nominal Length per drum                      | Mtr   |                    |                |



**LOT 7: TECHNICAL SPECIFICATIONS FOR 33kV COMBINED CT PT UNIT****1. GENERAL:**

This specification covers the design, engineering, manufacture, assembly, stage testing, inspection, supply and delivery of 33kV outdoor type combined CT PT Unit. The bidder shall buy the combined CT/PT unit from the list of approved vendor as indicated in the NIT. The combined CT/PT unit shall be of the relevant design conforming to IS: 2705 (Part I & II) and IS: 3156(Part I &II) respectively and have obtained type test certificates for the same from recognized test laboratories.

**2. APPLICABLE STANDARDS:**

Unless otherwise modified/specified in this specification, the CT/PT Unit shall comply with the latest version of the following standards:-

- 1) Current Transformers - IS:2705
- 2) Potential Transformers - IS:3156
- 3) HV Porcelain Bushing - IS:2099
- 4) Oil - IS:335
- 5) Terminal Connector - IS:5561
- 6) Application guide for CT - IS:4201

**3. TYPE RATING AND PERFORMANCE REQUIREMENTS:**

3.1. The 3 Phase 4 Wire, CT/PT unit should be of pole mounting type for outdoor use. They are to be used in 33kV Three Phase with solidly earthed neutral and suitable for 50Hz network. The equipment is required for operation of HT meters installed inside the substation building of 33/11kV Sub Stations and should be oil cooled.

3.2. 33kV CT/PT Metering Equipment unit shall comprise of 3 nos CTs conforming to IS:2705 and 1 No Three phase PTs conforming to IS-3156, with latest amendments.

3.3. The rating and other Electrical Characteristics shall be as follows:-

**3.3.1. 33kV Metering CT**

| Sl. No. | Technical Description     | Requirement    |
|---------|---------------------------|----------------|
| 1       | Purpose                   | Metering       |
| 2       | Primary Current Rating    | 100-50 A       |
| 3       | Secondary Current Rating  | 1A             |
| 4       | Rated Burder              | 10 VA          |
| 5       | Accuracy Class            | 0.5s           |
| 6       | Short time current rating | 16kA for 1 sec |
| 7       | Dynamic peak current      | 40kA           |



## 3.3.2. 33kV Metering PT

| Sl. No. | Technical Description | Requirement       |
|---------|-----------------------|-------------------|
| 1       | Purpose               | Metering          |
| 2       | Primary Voltage       | 33/ $\sqrt{3}$ kV |
| 3       | Secondary Voltage     | 110/ $\sqrt{3}$ V |
| 4       | Rated Burder          | 15 VA             |
| 5       | Accuracy Class        | 0.5               |
| 6       | Winding connector     | Star-Star         |

- 3.4. Highest System Voltage : 36kV  
 3.5. Normal System Voltage : 33kV  
 3.6. Frequency : 50Hz +3% and -5%  
 3.7. 1.2/50 $\mu$ s impulse withstand voltage : 170kV (peak)  
 3.8. One minute power frequency withstand Voltage (Dry & wet) : 70kV (rms)  
 3.9. Creepage Distance : 900mm  
 3.10. One minute power frequency withstand voltage on secondary winding : 3kV (rms)  
 3.11. Max temperature rise above ambient temp as relevant IS : 55<sup>0</sup>C  
 3.12. Minimum Clearances  
 3.12.1. Phase to Phase : 320 mm  
 3.12.2. Phase to earth : 320 mm

## 4. CLIMATIC CONDITIONS

4.1. The CT PT unit shall be suitable to work satisfactorily under the following climatic conditions:

|       |  |             |
|-------|--|-------------|
| i)    | Maximum ambient temperature (°C)               | 60          |
| ii)   | Minimum ambient temperature (°C)               | -15         |
| iii)  | Maximum average daily ambient temperature (°C) | 40          |
| iv)   | Maximum average daily ambient temperature (°C) | 40          |
| v)    | Maximum altitude above mean sea level (m)      | 2400        |
| vi)   | Minimum Relative humidity (%)                  | 26          |
| vii)  | Maximum Relative humidity (%)                  | 95          |
| viii) | Average No of rainy days/year                  | 120         |
| ix)   | Average Annual rainfall                        | 900 mm      |
| x)    | Maximum Wind pressure                          | 195 kg/m sq |



## 5. DESIGN AND CONSTRUCTION

5.1. The equipment shall be designed to ensure satisfactory operation under all conditions of service as per Cl 4.1 to facilitate easy inspection, cleaning and repairs.

5.2. The metering equipments (CT and PT) shall be contained in a weather proof outdoor structure/RCC mounting type M.S. tank with 6 nos. of 33 KV weather proof bushings with Brass stud as per rating of combined CT: PT (metering equipment) units.

5.3. The design shall incorporate every reasonable precaution and provisions for safety of all those concerned in the operation and maintenance of the equipment. A pressure relief valve/Explosion vent shall be invariably provided at the top cover of the tank of the ME.

5.4 All outdoor apparatus shall be so designed that water cannot collect at any point and enter the ME. The top cover of the tank, secondary terminal cover, inspection chamber cover plate may be designed accordingly to prevent the accumulation/stagnation of water on the ME surface.

5.5. All connections and terminals shall be of sufficient size for carrying the specified currents continuously without undue heating.

5.6. All bolts, nuts, washers in contact with non-ferrous parts shall be of brass.

5.7. Top cover flange of metering unit should be provided with 4 nos. bolt with sealing holes for proper sealing arrangement at all four corners of the tank and cover. Secondary terminal box cover should have 8 nos. nuts & bolts with 4 bolt duly hole for sealing arrangement. For this, 8 nos. holes should be provided on the cover & flange of secondary terminal box at the corners & middle of each face for fixing nut bolts.

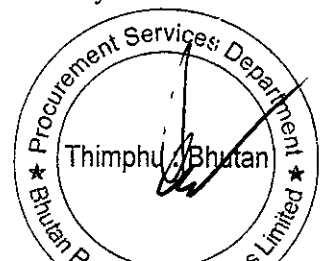
5.8. All ferrous parts including bolts & nuts liable to corrosion, forming integral part of the equipment shall be hot dip galvanized.

5.9. The core shall be high grade non-ageing electrical silicon laminated steel of low hysteresis loss and high permeability to ensure high accuracy, at both normal and over current/ voltage.

5.10. All winding shall be of insulated high grade Electrolytic copper wire and the manufacturing of the units shall be done in completely closed and air-conditioned room otherwise Fibre glass insulation sleeves are to be provided for primary winding. Details of winding and core shall be furnished.

5.11. The volume above the oil level in the tank shall be filled with Nitrogen gas conforming to commercial grade as per IS:1747:72. A suitable space needs to be provided for dry nitrogen in order to accommodate the volumetric expansion of oil due to change in temperature. The volume of space to be provided for dry nitrogen shall be atleast 10% in volume that of total quantity of oil in ME.

5.12. The procedure for filling of dry nitrogen and making the unit hermetically sealed shall be as per manufacturer's standard practice but subject to approval by the purchaser.





5.13. Sealing bolts for sealing at 4 points on the secondary terminal box (both inner & outer door), inspection cover, the top cover of the tank shall be provided. This may be made by providing a hole on tail of corner bolts of adequate size to pass the sealing wire of above 13 SWG.

5.14. The voltage and current transformers shall have normal continuous rating as indicated in the technical requirements.

5.15. The voltage transformer shall be so designed that the increased magnetizing currents due to any persisting over voltage, does not produce injurious overheating. Phase barriers shall be provided.

5.16. The peak value of the rated dynamic current shall not be less than 2.5 times the rated short time thermal current unless stated otherwise. (6.62 of ISS: 2705/Part-I of 1992, latest version).

5.17. The winding shall be neatly laid and anchored. The CT & PT winding within the tank shall have proper mounting arrangement. Floating windings with paper insulation are not acceptable. The windings must be secured & fixed to guard against physical movements during transit and/or during system short circuits. This shall be got verified during final inspection of the lot, on opening of one CT:PT Unit at firms work.

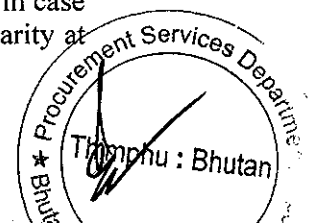
5.18. The metering set tank and other metal parts shall be galvanized both inside & outside as per latest IS applicable.

5.19. Primary terminals: - Primary Terminals shall be adequately sized as per current rating of the CT/PT Unit. No undue overheating shall occur even for 150% overloading of the CT/PT unit. The primary winding shall be of adequate cross section to carry continuously the rated current plus 50% over load continuously.

5.20. The oil filled container incorporating the CT and VT should be fitted with incoming and outgoing primary terminals and secondary terminal box. Adequate level of oil shall be maintained in the tank for proper cooling & curb flashover. M and L (Main side and Load side) shall be indelibly marked/embossed on the top cover of MS tank to identify the incoming and outgoing terminals of CT/PT unit.

5.21. During lowest temperature condition when oil level is lowest, atleast 40mm of bushing bottom shall remain dipped in the oil. Bidder shall submit clear dimensional drawing indicating the lowest oil level and physical location of bottom of bushing proposed to be used. This drawing shall also indicate the space/volume available above the oil level for dry nitrogen to accommodate expansion of oil without generation of under pressure.

5.22. The mounting of the bushing on the metering equipment should be in oblique plane. CT primary and secondary terminals shall be marked clearly as indicated in Annexure-C of IS: 2705, the terminal marked P1 of primary and S1 of secondary in case of current Transformer and corresponding in case of PT shall have the same polarity at any instant.



5.23. The tank shall be built with a plate of 5 mm thick top and 3 mm sides and bottom and with all fittings shall be capable of withstanding without leakage or distortion at the standard test pressure. All joints of the tank and fittings shall be hot oil tight and no leakage should occur during service. Both side of the joint should have continuous welding.

5.24. The welded joints of the metering unit shall be strengthened by providing 25 x 25 x 3mm angle all along the welded length and welded properly inside the tank. All joints of the tank and fitting shall be oil tight.

5.25. ME shall be provided with an oil gauge. The oil gauge glass shall be fixed to the side of the raised wall of the inspection box for monitoring the oil level of the ME.

5.26. The tank shall be provided with necessary lifting lugs.

5.27. The secondary terminal box cover, tank cover and inspection cover and other vertical joints where gaskets are used may be suitably bent with necessary sealing arrangement with sealing bolts at all corners. Bolts should be at least 10 mm diameter GI bolts spaced maximum 70 mm apart. This is to safeguard against seepage of water into tank in case of damaged gasket.

5.28. The 6 mm gaskets shall be dovetailed without joints to prevent moisture entry. In case of dovetailed joint, they shall not be more than two. The gaskets shall be of good quality Neoprene or superior quality rubberized gasket. The quality of gasket should be selected keeping in mind the ambient temperature of 75°C.

5.29. EARTHING: Two earthing terminals of adequate size protected against corrosion, metallicly clean and identified by means of the sign marked in a legible and indelible manner adjacent to the terminals shall be provided.

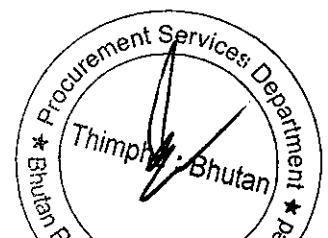
5.30. All bolts should be provided with 2 flat washers and a spring washer with a nut.

5.31. Size of the primary conductor or CT circuit shall be worked out on the basis of nominal current density and also to meet out requirements stipulated in clause 9.6 of IS 5705 (Part-I) 1992 relating to short time thermal current test. The requirements of size of conductor shall be worked out for both criteria and higher of the two cross section area will have to be adopted.

5.32. PT winding should have uniform insulation throughout from live terminal to neutral end, and not the graded insulation. Secondary winding of PT should be three phase star connected with neutral brought out. On secondary side of PT four terminals shall be marked as r, y, b and n.

5.33. The Secondary terminal box incoming hole should be suitable for 40 mm dia GI pipe and at a suitable height from bottom to avoid replacement/ modification of secondary wires pipe when ME is replaced.

5.34. The secondary terminals should be suitable for termination of 4 Sqmm cable. Disconnecting type TBs shall be provided for CT with provision for CT shorting. The terminals should be provided at least 70 mm height from incoming hole and clearances shall be as per IS to avoid shorting terminals due to secondary wires.



5.35. The CT/PT unit shall be supplied with first filling of high grade oil. The insulation oil used in the tank shall comply with the requirements specified in latest relevant IS: 335/93. The test certificate of oil being used shall be provided at the time of inspection. The oil in the CT/PT shall be filled under vacuum. Oil drain valve or sampling cock or non return type oil filling valve provided to facilitate factory processing shall be sealed before dispatch of CT/PT unit.

5.36. The tank should be given three coats of rust preventing paint and finished with light grey no. 631- IS-5 on all external surfaces. The internal surface of the tank shall be painted with two coats of suitable oil -insoluble paint.

5.37. All the fuses and the links for VT shall be provided at the Terminal Boxes.

5.38. The insulating materials for winding between HV & LV between interlayer of the winding and for end turn shall be as per relevant ISS. However, end turns have to be provided with reinforced insulation and end connecting the bushing shall be provided extra insulation of fiber glass sleeve.

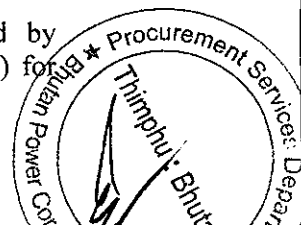
#### **6. NAME PLATE AND MARKING:**

6.1. The CT/PT Unit shall be provided with non-corrosive, legible name plate with the information specified in relevant standards, duly engraved/punched on it. The following details shall be provided on the Name Plate:

- a) Property of "Bhutan Power Corporation"
- b) Manufacturer's Name :
- c) P.O.No & date :
- d) Sr No :
- e) Year and Month of Manufacture :
- f) CT ratio/Accuracy Class/Burden :
- g) PT ratio/Accuracy Class/Burden :
- h) CT Sr No :
- i) PT Sr No :
- j) Overall CT PT multiplying factor :
- k) Rated frequency :
- l) Highest System Voltage :
- m) Rated Insulation Level :
- n) Standard (CT/PT) :
- o) Connection Diagram

6.2. The Primary and Secondary terminals of the CT/PT unit shall be clearly marked. The polarity and the other details shall be permanently etched on the body of the CT/PT unit.

6.3. The terminals of the instrument transformer shall be clearly marked by distinctive letters as stated in Annex "C" of ISS: 3156/Part.I/1992 (latest version) for



voltage transformer and Annex "C" of IS-2705/Part.I/1992 (latest version) for current transformers.

6.4. The above name plate shall be metallic and shall be affixed on a MS Plate which shall be welded to the body of CT PT chamber so that there is no passage hole when the name plate is removed.

#### **7. MOUNTING ARRANGEMENT:**

The CT/PT unit shall be suitable for mounting on RCC or steel structures. The necessary flanges bolts etc for the base of CT shall be supplied and these shall be galvanized.

#### **8. TERMINAL CONNECTORS:**

8.1. The Terminal connector (bimetallic for Cu terminal) shall be provided with the CT/PT unit. The Terminal connector shall be so designed to work effectively without any overheating of the CT/PT unit's Primary terminal in case of over loading. The detail of the conductor used in the Switchyard is ACSR Panther conductor having cross-sectional area of 200 Sqmm.

8.2. The Terminal Connector shall be manufactured and tested as per IS:556 or equivalent IEC

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

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

8.5. Suitable terminal earth connectors for earthing connections shall also be provided.

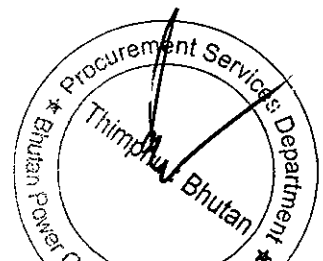
#### **9. TESTS:-**

##### **9.1. TYPE TESTS:-**

The equipment offered should be fully type tested as per the latest edition of Indian Standards from CPRI/NABL accredited lab. In case, the equipment of the type and design offered has already been type tested, the supplier shall furnish 2 sets of type test reports along with the offer. The type test report should not be more than 5 years old, reckoned from the date of Bid opening. The tenderer shall also submit along with type test certificate, copies of drawings of the equipment actually tested (duly authenticated by testing agency) indicating the complete bill of material and material of various parts. Following type test reports shall be submitted by the tenderer:-

##### **9.1.1. Type test for CTs**

- i. Verification of terminal marking and polarity



- ii. Short time current test
- iii. Temperature rise test
- iv. Lightning Impulse test
- v. High Voltage Power Frequency wet withstand voltage test
- vi. Determination of errors or other characteristics according to the requirements of the appropriate designation of accuracy class.

9.1.2. Type test for PTs

- i. Verification of terminal marking and polarity
- ii. Temperature rise test
- iii. Power frequency dry withstand test on primary and secondary windings
- iv. Lightning Impulse test
- v. High Voltage Power Frequency wet withstand voltage test
- vi. Determination of errors or other characteristics according to the requirements of the appropriate designation of accuracy class.

9.1.3. However temperature rise test is covered under type tests, it shall be conducted by the supplier on one piece of total ordered quantity at his premises in the presence of the Inspecting Officer, without any extra charges.

## 9.2. ACCEPTANCE AND ROUTINE TESTS

9.2.1. All acceptance and routine tests as stipulated in the relevant standards shall be carried out by the supplier in the presence of Inspecting officer unless dispensed with in writing by the purchaser.

9.2.2. Sampling for carrying out the routine tests shall be carried out as per the relevant Indian Standards. However, the tests for the sampled quantity will be witnessed by BPC's officer, routine test certificate for the lot inspected shall be furnished for verification/checking.

9.2.3. BPC reserves the right to get the tests carried out at the cost of the supplier, by an independent agency whenever there is a dispute regarding the quality of material being supplied.

9.2.4. Immediately after finalization of the programme of routine / acceptance testing, the supplier shall give sufficient advance intimation to the BPC to enable him to depute his representative for witnessing the tests.

9.2.5. Routine Tests for CTs

- i. Verification of terminal marking and polarity
- ii. Power frequency dry withstand test on primary and secondary windings
- iii. Over-Voltage Inter turn tests
- iv. Determination of errors or other characteristics according to the requirements of the appropriate designation of accuracy class.

9.2.6. Routine Tests for PTs

- i. Verification of terminal marking and polarity
- ii. Power frequency dry withstand test on primary and secondary windings



- iii. Determination of errors or other characteristics according to the requirements of the appropriate designation of accuracy class.
- iv. Induced voltage test on PT of metering unit

9.2.7. Breakdown voltage test of transformer oil.

9.2.8. Pressure test on tank of metering unit.

9.2.9. Insulation resistance test with 1kV megger.

## 10. DRAWINGS AND DOCUMENTS

10.1. Technical Guaranteed particulars as per the format attached shall be duly filled and submitted by the vendor along with the bid.

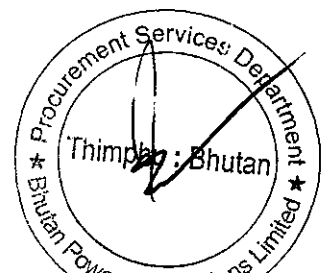
10.2. **Deviations** : The deviations between the tendered CTPT set specification and the CTPT set supplied shall be submitted along with the tender.

10.3. Two sets of following drawings shall be submitted along with the bid.

- i. Outline and assembly drawing
- ii. Dimensional Drawing
- iii. Sectional view of CT/PT unit
- iv. Fitting details and Electrical Connection
- v. Foundation details
- vi. Drawing of Secondary terminal block showing the arrangement of secondary terminals of the CT/PT unit.
- vii. Name Plate drawing
- viii. Graphs showing the magnetization characteristics of core used in CT/PT unit.
- ix. Quality Assurance Plan for the raw materials being used in manufacturing process.

10.4. The Successful supplier shall submit four sets of final versions of all the drawings mentioned in Cl 10.2 within 15 days of date of receipt of acceptance of offer from the purchaser. BPC shall study the drawings submitted and give his comments/approval on the drawings for further clarification. The Supplier shall furnish the modified drawings and get the approval from BPC.

10.5. The manufacture of the CT/PT unit shall be started only after getting the drawing approval from BPC. The manufacturing shall be strictly in accordance with the approved drawings and no deviation shall be permitted without written consent of the BPC.



10.6. Supplier shall submit the final "AS BUILT" drawings along with each set of CT/PT unit at the time of dispatch. The final "AS BUILT" drawings shall be submitted in hard as well as soft copy to the head office BPC.

## 11. INSPECTION

11.1. All tests and inspection shall be made at the place of the manufacturer unless otherwise especially agreed upon by the manufacturer and the purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser, all reasonable facilities, without charge to satisfy him that the material being supplied is in accordance with the specification.

11.2. The purchaser has the right to get the tests carried out at his own cost by an independent agency, whenever there is a dispute regarding the quality of the supply.

11.3. The manufacturer shall be responsible to pay the penalty of Rs 20,000/- for each occasion at which the fake inspection call has been made or the material is rejected during testing/inspection by the authorized agency/representative of the BPC. This penalty would be in addition to the expenses incurred by the BPC in deputing the Inspecting Officer, carrying out such inspection.

## 12. CHALLENGE CLAUSE

The material offered/received after the inspection by the authorized inspecting officer may again be subjected to test for or any parameter from any testing house/i-house technique of the BPC & the results if found deviating un-acceptable or not complying to approved GTPs, the bidder shall arrange to supply the replacement within 30 days of such detection at his cost including to & fro transportation. In addition, penalty @10% of cost of the inspected lot of material be imposed on the supplier.

## 13. WARRANTY PERIOD

The supplier shall be responsible to replace, free of cost, with no transportation or insurance cost to the purchaser, up to destination, the whole or any part to the material which in normal and proper use proves the defective in quality or workmanship, subject to the condition that the defect is noticed within 18 months from the date of receipt of material in stores or 12 months from the date of commissioning whichever period may expire earlier. The consignee or nay other officer of BPC actually using the material will give prompt notice of each such defect to the supplier. The replacement shall be effected by the supplier within a reasonable time, but not, in any case, exceeding 45 days/ The supplier shall, also, arrange to remove the defective within a reasonable period, but not exceeding 45 days from the date of issue of notice in respect thereof, failing which, the purchaser reserve the right to dispose of defective material in any manner considered fit by him (purchaser), at the sole risk and cost of the supplier. Any sale proceeds of the defective material after meeting the expenses incurred on its custody, disposal handling etc., shall however be credited to the supplier's account and set off against any outstanding dues of the purchaser against the supplier. The warranty for 12/18 months shall be one time.



**ANNEXURE 5: GUARANTEED TECHNICAL PARTICULARS OF 33 kV CT PT UNIT**

| Sl. No.                  | Description  | Unit         | Bidders to Specify |
|--------------------------|--|--------------|--------------------|
| 1                        | Manufacturer's type, designation & make                            |              |                    |
| 2                        | System Voltage.  | kV           |                    |
| 3                        | Highest System voltage.  | kV           |                    |
| 4                        | Frequency  | Hz           |                    |
| 5                        | Thickness of the M.S. sheet.                                       | mm           |                    |
|                          | Top -  |              |                    |
|                          | Side -   |              |                    |
| 6                        | Base Channel.  | mm x mm      |                    |
| 7                        | Painting.(Paint Colour As per IS - 5 )                             |              |                    |
| 8                        | Lifting Arrangement. (No of Hooks -)                               | Y/N          |                    |
| 9                        | Cable entry hole diameter for secondary box                        | mm           |                    |
| 10                       | Creepage Distance  | mm           |                    |
| 11                       | Provision of Pressure relief device/explosion vent on CT/PT unit   | Y/N          |                    |
| 12                       | Temperature rise above ambient                                     | °C           |                    |
| 13                       | Maximum Dimensions of CT/PT unit                                   | mm x mm x    |                    |
| 14                       | Maximum transportation dimensions                                  | mm x mm x mm |                    |
| 15                       | Maximum weight of CT/PT unit                                       | kgs          |                    |
| 16                       | Window for Meter Box.  |              |                    |
|                          | Dimension -  | Y/N          |                    |
| 17                       | Oil as per specification   | IS 355       |                    |
| 18                       | Terminal Connector suitable for conductor size                     | Mm           |                    |
| 19                       | Terminal connector Bimetallic                                      | Y/N          |                    |
| 20                       | Bushing Stud Diameter and material                                 |              |                    |
| <b>CT SPECIFICATIONS</b> |  |              |                    |
| 1                        | System Voltage   | kV           |                    |
| 2                        | Highest System voltage.  | kV           |                    |
| 3                        | CT Ratio   |              |                    |
| 4                        | Burden   |              |                    |
| 5                        | Accuracy Class   |              |                    |
| 6                        | One minute power frequency dry withstand voltage on primary side   | kV (rms)     |                    |
| 7                        | 1.2/50µs impulse withstand Voltage                                 | kV (peak)    |                    |
| 8                        | One minute power frequency dry withstand voltage on secondary side | kV (rms)     |                    |
| 9                        | Primary Winding  |              |                    |
| a)                       | No of Primary turns  |              |                    |





| Sl. No. | Description  | Unit      | Bidders to Specify |
|---------|--|-----------|--------------------|
| b)      | Primary amp turns  |           |                    |
| c)      | Current density  |           |                    |
| d)      | Area of cross-section  |           |                    |
|         | Secondary Winding  |           |                    |
| 10      | Secondary Winding  |           |                    |
| a)      | No of Primary turns  |           |                    |
| b)      | Primary amp turns  |           |                    |
| c)      | Current density  |           |                    |
| d)      | Area of cross-section  |           |                    |
|         | CT Confirms to IS 2705   |           |                    |
|         | PT SPECIFICATIONS  |           |                    |
| 1       | System Voltage   | kV        |                    |
| 2       | Highest System voltage.  | kV        |                    |
| 3       | Voltage Ratio  |           |                    |
| 4       | Burden   |           |                    |
| 5       | Accuracy Class   |           |                    |
| 6       | One minute power frequency dry withstand voltage on primary side   | kV (rms)  |                    |
| 7       | 1.2/50 $\mu$ s impulse withstand Voltage                           | kV (peak) |                    |
| 8       | One minute power frequency dry withstand voltage on secondary side | kV (rms)  |                    |

