CONDITIONS FOR A TENTATIVE APROVAL FOR CONNECTION OF TRANSFORMERS

Management has tentatively approved your request subject to the following conditions:

1. All distribution materials/equipment must be purchased from a reputable Company.

2. Old, refurbished, (and those not within IBEDC's standards and specification) transformers/equipment are not acceptable.

3. The competence of a contractor must be supported by his status as an Electrical Contractor registered either by **Federal Ministry of Power Category 1/OR COREN REGISTERED ENGINEER.**

4. The installation should be in accordance with IBEDC standard specifications. Special attention must be paid to the following:

a. Aluminium conductor must be of 150mm^2 cross sectional area and **ACSR** type (for both primary and secondary lines).

b. Pre-stressed reinforced concrete pole dug to 1.8m (6ft) depth.

c. Fibre glass cross arms must be used.

	Fibre Glass Cross Arm		Tie Strap	
Type	33kV	11kV	33kV	11kV
Dimension(mm)	100.07 X 74.93 X 2743.2	74.93 X 74.93 X 1828.8		
Thickness (mm)			6	6
Length (mm)			914.4	701.04

NOTE: Tie Straps should be of 6mm angle iron.

(See attached drawing for installation of Fibre Glass Cross Arm and Tie Strap for 11kV and 33kV Lines).

d. The clearance of the HT line from all structures must not be less than 5.5 meters on either side.

5. Authorized IBEDC personnel should inspect and certify the materials/equipment provided by your Company **before commencement of the project**.

6. IBEDC Protection crew will test the installation and the customer will rectify any defect detected before commissioning of the project.

7. **All equipment and materials connected to IBEDC Network and energized shall become and remain the Company's (IBEDC) property.**

8. The LV and HV cables must have at least four metres (4m) loop each.

9. In the case of a transformer with outdoor bushings, the transformer plinth must not be lower than 1.2m above the ground level.

10. The substation must be metal-grill fenced with proper gravelling. (See attached Substation Design Specification).

11. **In case of a dedicated feeder, the condition for approval shall be subject to the fact that "The company (IBEDC) shall be at liberty to needful branch services off the service lines whether on the customer's premises or not, for the purpose of supplying electricity to other premises".**

12. The transformer must be in accordance with the following specifications:

TRANSFORMER SPECIFICATION

Particulars	System Voltage		
	240/415V Phase-to-neutral/ phase-to-Phase	11kV	33kV
Nominal System Voltage	240/415V	11kV	33kV
Highest System Voltage	264/456	12kV	36kV
Number of Phases	1/3	3	3
Frequency (Hz)	50	50	50
Insulation level (BIL/ flashover Voltage)	AC 10kV rms	95kV peak/70kV rms	200kV Peak/70kV rms

The 11KV & 33kV systems are 3 phase, 3 wire, 50 Hz. The transformers are expected to be installed in effectively earthed situations.

TRANSFORMER SPECIFICATION

ITEM	DESCRIPTION
1	11/0.415KV;100kVA;3-Phase; 50Hz; Ground/Pole Mounted; Mineral Oil Insulated; ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV & LV Cable Boxes Fitted
2	11/0.415KV;200kVA;3-Phase; 50Hz; Ground/Pole Mounted; Mineral Oil Insulated; ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV & LV Cable Boxes Fitted
3	11/0.415KV;300kVA;3-Phase; 50Hz; Ground Mounted; Mineral Oil Insulated; ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV & LV Cable Boxes Fitted
4	11/0.415KV;500kVA;3-Phase; 50Hz; Ground Mounted; Mineral Oil Insulated; ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV & LV Cable Boxes Fitted
5	33/0.415KV;50kVA;3-Phase; 50Hz; Pole Mounted; Mineral Oil Insulated; ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV external & LV Cable Boxes Fitted
6	33/0.415KV;100kVA;3-Phase; 50Hz; Pole Mounted; Mineral Oil Insulated; ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV external & LV Cable Boxes Fitted
7	33/0.415KV;200kVA;3-Phase; 50Hz; Ground/Pole Mounted; Mineral Oil Insulated; ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV external & LV Cable Boxes Fitted
8	33/0.415KV;300kVA;3-Phase; 50Hz; Ground Mounted; Mineral Oil Insulated;

	ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV external & LV Cable Boxes Fitted
9	33/0.415KV;500kVA;3-Phase; 50Hz; Ground Mounted; Mineral Oil Insulated; ONAN; Outdoor, Dyn11; Low Impedance Type; 4.5% Impedance; 7 Tap Positions; Tapping Range +10% to -5% at 2.5% Step; HV external & LV Cable Boxes Fitted

GENERAL REQUIREMENT

1. The transformers will be suitable for outdoor use.
2. The transformers will be suitably stiffened and braced to prevent distortion or damage under service conditions or during handling and transport.
3. No part of the transformer (for example; bushings or tapping switch) will impose restrictions on the loading capabilities.
4. Sealed tank type construction will be used; however, the transformers will not be pressurized or incorporate gases other than air.

CORE & WINDINGS

1. All transformer will have electrically separate high and low voltage windings connected to comply with **vector group Dny11**
2. The core and winding assembly will be supported by the main tank and not by the cover.
3. Means will be provided at both the top and the bottom of the core and coil assembly for locating the transformer core centrally in the tank and securing it in position to prevent movement particularly during transport.

4. The core and all metalwork will be electrically bonded to the tank, the bonding will be sbrought to one point only.
5. The insulation between the core and the frame will have a resistance not lower than 50M after assembly, and will withstand 2.5Kv for 1 minute. The core and the frame will be electrically connected together at one point only.
6. Winding material shall be **SUPER ENAMEL COVERED COPPER CONDUCTOR** DPC (Damp Proof Course) covered conductor.
7. Low voltage winding shall be in even layers so that neutral formation will be at the top
8. The winding construction of single HV coil wound over LV coil is preferred
9. Interlayer insulation shall be epoxy dotted craft paper
10. Proper bonding of interlayer insulation with the conductor shall be ensured. Test for bonding strength to be conducted.

INSULATING OIL

1. The transformers will be delivered filled (to cold oil level) with mineral insulating oil complying with: BS 148, and be proven to be non-corrosive by Method B of ASTM D1275-06 Standard Test Method for Corrosive Sulfur in Electrical Insulating Oils and, IEC 62535 Ed. 1.0: Insulating liquids – Test method for detection of potentially corrosive Sulphur in used and unused insulating oil.
2. The quality of Mineral Insulating oil at time of filling (i.e. on release from supplier) must have a moisture content of less than 20 ppm and greater than or equal to 50 kV Breakdown Voltage.
3. Any and each insulating oil offered will be certified as **Polychlorinated Biphenyl** (PCB) **free**.

ROUTINE TEST

1. The following routine tests, as specified in IEEE Std. 62-1995, will be carried out on every transformer supplied:
    - Measurement of winding resistance
    - Measurement of voltage ratio and check of voltage vector relationship
    - Measurement of impedance voltage, short circuit impedance and load loss
    - Measurement of no-load loss and current
    - Separate-source voltage withstand
    - Induced over-voltage withstand
    - Insulation resistance
2. To prove that transformers have been adequately sealed, a routine pressure test will also be performed. Each transformer will be pressurized to not less than 30 kPa with dry air. If after 30 minutes, the pressure has not dropped more than 2 kPa, the transformer is considered to have passed the test.

NOTE: **Any equipment that does not comply with the requirements of this specification will be rejected.**

The contractor is required, therefore, to submit the following documents:

a) Original of Manufacturer's Test Certificate for the transformer and other equipment.

b) Original receipts of all the materials and equipment purchased overseas.

c) Local Manufacturer's Certificate, in case of locally purchased materials/equipment, and Certificate of Importation, in case of materials/equipment purchased overseas.

d) Particulars of the Licensed Electrical Contractor who will undertake the construction.

e) Written guarantee for the replacement of the transformer and other equipment that fails within one year from the date of commissioning of the project.

All the above stipulated conditions should be complied with in order to enhance formal takeover of the scheme, without delay.

METERING:

Payment for meter has to be made through **"Credited Advance Payment for Metering Implementation (CAPMI) Scheme".**

If you agree to the above conditions, please sign on the space provided below and send this back to us at your earliest convenience.

Accepted:

…… ……

Name Signature/Date

……

Tel. NO.