2nd.

ANNEXURE 'F' -2

PROFORMA FOR INSPECTION OF 33 KV, H. T. SUB STATIONS

Reference to Inspection fee
Paid Rs———————
G. R. No.———————
& date———————

1. Department :
2. Name of the owner :
3. Name of the Sub. Station :
   i) Location :
   ii) District :
4. Capacity of the Sub Station :
5. System of valtage
6. General condition of the system :

Rule of J & K Electricity rule 1978 :	Requirement :	Report
3 i)	Is the list of authorised persons properly kept upto date duly attested ?	
ii)	Whether the authorised persons competent for the work assigned to them ?	
29	State if the Sub Station is constructed, installed, protected, worked and maintained in accordance with the standards of the I. S. I. so as to prevent danger. If so state the following :	
i)	Has layout of earthing grid indicating position of equipment and their interspacing, earth mat, earth electrods & fencing been enclosed : If so, State the following;	
ii)	Has earth mat conductor and spike electrodes (in case used) been placed 0.5 mtr. below the ground level ?	
iii)	In case pipe electrodes earthing, has the pipe terminated below the ground level and proper inspection chambers provided conforming to I. S.	
iv)	What is the arrangement for measuring the earth resistance of individual electrode independently ?	
v)	Indicate the earth resistance of individual electrode and the combined grid separately.	

II FOR 33 KV SIDE :

Has the sectional elevation drawing of the yard been enclosed. If so, state the following :

i) Minimum clearance between live parts i e. bare connectors & terminals to ground in the yord. (Should not be less than 3.7 mtrs).

ii) Minimum sectional clearance between equipment (should not be less than 2.3 mtrs).

iii) Minimum phase to phase clearance at the gntry structure (should not be less than 1,5 mtr).

iv) Minimum clearance between gantry to structure.

III EQUIPMENT :

Rule 63 & 65

i) Has all the routing tests prescribed as per ralevent I. S. been carried out on the equipment installed at the manufactur's premises ? If so enclose the copies of test certificates.

ii) Has all the site tests prescribed as per relevent I. S. been carried out on the equipment installed. If so, enclose the copies of test results.

iii) Has the apparatus been energised for testing purposes ? If so what was the performence.

1 TRANSFORMER :

i) Has the netural and body of the Ner been earthed with two independent earth electrode connections and those in turn connected with earth mat.

GIVE THE VELUES :

ii (a) Has Bucholz relay been provided for Transformer of reting 100$_0$ KVA & above.

(i) HasBucholz relay been tested and found satisfactory ?

iii) Has wdg & oil temp; protection been installed and meters set at the required temperatures.

iv) State the minimum clearance of 11 KV Transformer outgoing bare conductor per terminal to ground ' should not be less than 2.75 mtrs.).

v) Has the 11 KV bus bar been properly insulated and colour coded ?

iv) Has the 11 KV bus bar outgoing structure been properly earthed with two separate earth connections, state the value ?

x) State IR values of the Transformer at the prevailing temperature of ..... °C and the test voltage applied .....

1	2	3
	After one minute application of test voltage.	After 10 minute application of test voltage.

a) HV/LV.

b) HV/E.

c) LV/E.

ix) Does these results coincide with manufacture's test report.

x) Polarisation Index (should not be less than 1.5)

viii) (a) State the minimum distance between Transformer and the nearest building including control room ?

b) Has the soakage pit been provided conforming to cl., 6.3 of I. S 1646-1982 where Sub. Station or a switching station has apparatus having more than 2000 Ltrs. , of oil installed.

c) If the Xers. are within 9 mtrs, of the doors and windows, opening of surrou ding buildings ;

i) Are the doors protected by fire proof construction ?

ii) Are the windows provided with 6 mm. thick wire glass in steel frames ?

iii) Has the fire protection wall been provided between transformer ? , (In case of Transformers having aggregate oil capacity exceeding 5000 litres but individual oil capacity of less than 2000 litres and also if the distance between Transformer is less than 6 mtrs. and are not protected by high velocity water sparay system).

7 ISOLATORS :

i Whether line & isolator is provided with earthing blade and is effectively earthed alongwith the structure with/two earthing terminals ? If so, indicate the earthing resistance.

(ii) Whether Transformer isolator is without earthing blade and isolator and its structure is effectively earthed with two earthing terminals. If so, indicate the earthing resistance.

LAs

(i) Whether LAs used on 33 KV side are Sub. Station type provided with independent earth for each LA and then connected with the main earthing mat, If so indicate the earthing resistance.

(ii) Whether 11 KV Station type LAs have been provided on Transformer LV side and those are properly earthed with two independent earth electrodes ? If so state the value.

CBs OIL BREAKERS :

(i) Whether 33 KV circuit breakers have been properly earthed alongwith its structures with two independent electrodes ? State its values.

(ii) If Not is above 2.5 MVA capacity, state if the MOCB Circuit Breaker has been provided If so whether it is effectively earthed with two independent earth connection alongwith its structure.

HORN GAP FUSE SET :

For Transformer's below 2.5 MVA in urban areas and 2.5 in rural areas).

(i) Has proper fuse set protection been provided ?

(ii) Has the equipment alongwith its structure been effectively earthed Give the earth resistance values.

CTs & PTs

Has the CTs & PTs been effectively earthed alongwith its structures with two separate earth connections, If so, state its value ?

STRUCTURES :

(i) Has all supporting structures been Properly designed and constructed ?

(ii) Has each of the gantry columns been earthed with two separate earth connections ? Give its values.

(iii) Has shielding of the Sub. Station from lightening been provided ? If so, state the angle of shield.

iv) What is the angle of entrance of line at the gantry structure ? (it should be as nearly right angle as possible).

v) What is the length of span terminating of gantry

BUS BAR ARRANGEMENT :

i) Size & type of bus bar conductor uesd for bus bars and jumpers (It should not be less than 50 mm².)

ii) Height of bus bar conductor above ground. Would not be less than 4500 mm.

iii) Phase to phase clearance of the Bus Bar (should not be less than 1200 mm.).

iv) Phase to metal pack of the column clearance (should not be less than 1050 mm.)

CABLE & CABLE DUCTS :

A CABLES :

i) Size of 11 KV cables used.

a) For incoming 1
2

b) For outgoing 1
2
3
4
5

ii) State the insulation resistance of each of cable with————KV megger at————°C

a) Incoming

	Phase to earth. ——ohms——	Phase to Phase. —— ohms.
1		
2		

b) Outgoing

1		
2		
3		
4		
5		

(Note : The insulation resistance between conductor and earth should roughly be equal to the value given by the following formula with 1 KV megger)

IR in M. ohms = $\frac{10 \times \text{voltage in KV}}{\text{length in km.}}$

iii) Has the armour and metal sheath of the cable terminals been bounded and provided with separate earth connection ? Give the values ?

v) Has the 11-KV outgoing cables been properly laid upto the outgoing structure duly clamped to support its weight ?

B--CABLE DUCTS :

i) Has separate cable ducts been provided for power and control cables ?

ii) Has the cable ducts been covered with R.C.C. covers or filled with sand ?

iii) Has proper slope been provided for drainage of rain water ?

iv) If it not possible to drain out rain water naturally, what alternative arrangement has been made for the same ?

v) SUB STATION YARD :

a) Has the out-door yard been laid with adequate quantity or uniform seized broken metal ?

b) FENCING :

i) Has the entire out-door Sub Station Yard been properly fenced with mesh fencing @ 2,44 mtr.

ii) Has the proper entry gates been provided ?

iii) Has the fencing and gates been effectively earthed with independent earth electrodes (it should have no connection with the earthing mat of the yard) ? State the value of earth resistances.

vi) ILLUMINATION :

i) Has illumination yard and passage to the control room been properly illuminated ?

ii) Has over current protection been provided for each of the illumination point ?

iii) Has the poles/metallic poles and lighting fixtures used for illumination been effectively earthed ? Give its values.

vii) CONTROL ROOM & INDOOR EQUIPMENT :

A- Indoor equipment :

i) Has over current and earth fault protection been provided on 33 KV & 11 KV panels ?

iv) Has differential protection been provided on transformers of rating 10 KVA & above ratio ?

v) Has volt meters, ammeters and energy meters etc. been provided and tested ?

vi) Has the protective relays and indicating meters been successfully tested at the Load Dispatch and Meter Testing Division ? If so enclose the Test Report.

vii) Has all indoor equipments been provided with two separate earth connections ? If so, state the values

viii) Has the control panels and breaker panels been properly labelled ?

(viii) Are all the indicating lamps functional ?

viii) Are on-off indications clearly visible on the switching panel ?

ix) Has adequate space been provided in the front and rear of the panels to facilitate proper maintenance ? (A clear space of not less than 0.91 meter in front and 0.61 mtr. at the rear of the panel is recommendatory.)

B) BATTERY ROOM :

i) Has the batteries been placed on non-ignitable, non absorbing, non-conducting materials such as glass porcelain or glazed earthen - ware duly tested on a bench to be kept on an insulated dry stand properly numbered ?

(Note :- A wooden stand duly painted meets the requirements of insulated stand)

ii) Are the batteries so arranged on the bench that a potential difference exceeding 12 volts does not exist between adjacent cells ?

iii) Has the connections been made properly and terminals lubricated ?

iv) Has the Hydro Meter been provided for testing the specific gravity and cell voltage tester for cell voltage ?

v) Has the battery charger & LT distribution boards been properly earthed with two separate earth connection ?
(Give its values)

vi) a) Is the battery room well ventilated ?

b) Has the exhaust fan been provided in the battery room ?

c) CONTROL ROOM BUILDING :

i) Is the control room building properly ventilated ?

ii) Has the control room been properly illuminated including the rear side of the panels

11 11/0,415 KV SUB STATION :

i) Rating of Auxillary Transformer,

ii) Has the Transformer been placed on a plateform so that live parts to ground clearance is not less than 2.75 mtrs. (Provided it is fully protected for authorised entry by fencing).

iii) Has the transformer body and neutral been earthed with two independent electrodes ? Give its values.

iv) Has the LT switch been placed at a height 1.5 mtr. above the ground and properly earthed with two earth connections ?

v) Has the 11-KV bare conductor jumpers and terminals of Transformer been properly insulated to avoid bird faults etc.

vi) Has the auxillarly Sub Station been independently fenced and earthed to avod un-authorised entry.

12 11 KV OUTGOING FEEDERS :

i) Has independent 11 KV outgoing structures been provided for each of the feeders and has those been labelled properly ?

ii) Has C. C. switch and LAs been provided on each outgoing structure ?

iii) Has minimum spacings of 750 mm & 460 mm between phase to phase & phase to structure respectively been maintained at outgoing structure ? If so state the spacings.

iv) Has the G. O. switch and other metallic X-arms and poles been effectively earthed with two independent electrodes ? State the values of earth resistances.

v) Has the LAs been earthed with independent electrodes ? State the values of earth resistance ?

vi) Has each 11 KV outgoing structure been provided with fuse protection ?

13 FIRE FIGHTING :

i) Has the fire fighting equipment suitable for class B & C fires been provided in the control room ?

ii) Has the sand buckets been provided ?

15 Tools & Plants safety equipment recording periodical test results :

i) Has the caution notices been placed at conspicious places indicating the system voltage inside the yard as well as outside the control room ?

ii) Has first aid box kept at the Sub Station ?

iii) Has the following safety T&P articles been provided and staff familiarised for its use, at the Sub Station ?

a) Safety Helmets.

b) Earthing rod.

c) Operating Rod suitable for 11 KV voltage.

d) Hand Gloves suitable for 11 KV voltage.

e) Gum Boots.

f) Rubber mat suitable for 11 KV voltage.

g) Hammer, spanner set, plier, screw driver set, and other special keys required for break down/preventive maintenances.

h) 2.5 KV megger.

iv) Has the register for recording periodical/break-down maintenance, test results of the equipment and the neutral earthing resistance values been maintained? This register should also have annual certificate of relay & meter testing recorded by the Load Despatch & Meter Testing Division.

iv) Is the Sub. Division equipped with earth tester.

Signature of
the owner

Certified that I have inspected and verified and found the Installation fit for energieation/not fit for anergieation as per rule Nos. of J&K Electricity Rules 1978 are not complied with.

ELECTRICAL INSPECTOR.

Name
&
Designation----------