REWARD SCHEME FOR MSETCL

The Board under its Resolution No.52/6 dt.23.04.2010 has in principle accorded approval to the proposed Reward Scheme for O&M of Sub-Stations, O&M of EHV Lines, Project Execution and Testing Divisions/Units as per the *Annexure-'A'*.

2. The Board has also authorised the M.D. in consultation with Director(O), Director(Proj.), Director(F) and E.D.(HR) to decide detail modalities of the scheme including amount of reward etc.

3. Before finalisation of the scheme in detail, it is proposed to elicit views of all concerned. All concerned are, therefore, requested to send their views/comments on the proposed scheme in the name of C.G.M.(HR) by 31.5.2010.

Place: Mumbai
Date : 17.05.2010

Executive Director(HR)

Proposed Reward Scheme for MSETCL

This scheme has been designed with inputs from MSETCL based on discussions at various levels and based on the inputs from schemes in operation in similar organisations.

The Reward Scheme for Mahatransco shall be rolled out as the first stage of creating a performance oriented culture. It is relatively easy to implement and does not require a comprehensive MIS or performance data capturing mechanism

The Objectives of this scheme are:

- To introduce the concept of performance linked rewards and drive a performance oriented culture
- To recognize performance in:
  - **Operations and Maintenance of Substations** for employees in Operations and Maintenance of Substations and the Substation Maintenance Subdivisions associated with them
  - **Maintenance of EHV Transmission Lines** for employees in Line Maintenance Subdivision and Hot Line Maintenance Subdivision
  - **Project Execution – Completion of Construction milestones** for employees in Construction Division and Construction Subdivisions, Civil Division and Civil Subdivisions
  - **Testing of Substation Equipment** for employees in Testing Division (including the Testing Units attached to the division

It is important to note that this scheme consists of 4 mutually independent reward categories. The 4 reward categories may be introduced simultaneously or one after the other depending on the organisation's strategy.

The 4 reward categories are primarily meant for the field level staff and are designed to reward employees in the following field offices only:

- **Substations and Substation Maintenance Subdivisions**
- **Line Maintenance / Hot line Maintenance Subdivisions**
- **Construction Divisions and Subdivisions**
- **Testing Divisions and the Testing Units attached to them**

Thus it can be seen that the Rewards shall be given out in 4 mutually independent categories

All the rewards shall be awarded based on an assessment by two committees that need to be constituted as given below:

Formation of a Zonal Committee:

The CE Trans O&M cum Construction Zone shall chair a committee consisting of the following members:

- SE – TCC
- SE – Trans. O&M Circle
- SE – EHV CCCM
- SE – EHV Construction Circle

Formation of the Corporate Office Committee:

The Managing Director shall constitute a Committee consisting of

- ED – HR
- ED – Operations
- ED – Projects
- ED – STU
- CE – Trans. O&M
- CE – Projects
- CE – LD Centre

1.1 Reward for Operations and Maintenance of Substations

This reward shall be given to the following groups:

- Top 2 best performing 132 KV or less voltage Substation in each Zone
- Top 2 best performing 220 KV substation in each Zone
- Top 2 best performing 400 KV / 500 KV HVDC substations across MSETCL

In addition, there shall be a reward for the top 3 best 132 KV or less voltage Substations across MSETCL selected from the 14 substations that are rewarded in each zone

Similarly, there shall also be a reward for the top 3 best 220 KV Substations across MSETCL selected from the 14 substations that are rewarded in each zone.

Process to be followed:

This reward shall be given on an annual basis. The process of evaluation of substations shall be on an annual basis. The Zonal committee shall visit all the substations in the Zone which fall under each of the above groups and conduct an objective assessment of the substation and its employees. These visits shall be completed before the end of the financial year (March 31st) for the year that is under consideration. (for e.g. for the year 2009 – 2010, the assessment by the zonal committee shall be completed before 31st March 2010). In essence, It needs to be ensured that the Zonal Committee visits all substations in a Zone at least once in a year.

The Zonal Committee shall prepare an assessment report on each substation. The assessment report shall contain the basic information of the Substation such as:

- Name and Location with Division, Circle and Zone details\
- Basic Specifications such as number of bays / feeders, transformer capacity etc
- Date of Commissioning including date of completion of any augmentation work, R&M Work etc.
- Name of Substation In Charge and since when he / she has been posted there
- Current Manpower position (Sanctioned, Filled, Vacant) of the Substation
- Name of Substation Maintenance Subdivision that is attending to the Substation
- Name of Testing Division that is attending to the Substation
- Name of Civil Subdivision that is attending to the Substation

The assessment report shall also contain the assessment sheet that is explained below. It may be noted that the assessment also includes an assessment of awareness levels of employees posted in the Substation.

The substation shall be assessed as per the following parameters (given below is a template that can be used by the Zonal Committee for Assessment):

No.	Parameter	Score obtained	Maximum Score
1	Equipment Availability as per MERC Guidelines		20
2	Maintenance of all equipment as per maintenance scheduling (*based on checklist provided in Annexure I of this document – Substation Inspection Report)*		15
3	Failures and interruptions caused by equipment or transformer failure in substation below KPI Target / Reduction in number of interruptions due to Substation problems		5
4	Maintaining Tulip links for data transmission at 100%		5
5	Losses (Variation in % terms below 2.5%)		5
6	Development and Upkeep of Substation records, files and registers		5
7	ABT Metering – Monitoring		5
8	Availability of related literature and drawings		5
9	No. of Accidents – Fatal & Non Fatal		5
10	Scrap Disposal / Efforts taken for scrap disposal		5
11	Upkeep of Operating Manual and Safety Instructions / Safety Manual		5
	TOTAL on Substation O&M parameters		80
	Awareness of Employees		
1	On measures to reduce interruption time		4
2	On maintenance schedule / maintenance procedures		4
3	Safety procedures and precautions		4
4	Awareness of Min & Max load		4
5	Awareness of availability of equipment and factors affecting them and causes for failure		4
	TOTAL on Awareness level		20
	TOTAL SCORE		100

Based on the Assessment on the above parameters, the Zonal Committee shall finalise the rewards for the following 2 groups:

- Top 2 best performing 132 KV or less voltage Substation in the Zone
- Top 2 best performing 220 KV substation in the Zone

Each Zonal Committee shall also forward the Assessment Reports of the above substations (2 in each group) to the Corporate Office Committee for the reward for the top 3 best 132 KV or less voltage (and top 3 best 220 KV) Substations across MSETCL to be chosen from the 14 substations in each group.

For the Reward for Top 2 best performing 400 KV / 500 KV HVDC substations across MSETCL, each Zonal Committee shall send 2 nominations along with the Assessment Report to the Corporate office Committee.

The Corporate Office Committee shall form 2 teams and visit all the substations for which they have received the Assessment Reports (i.e. 14 each in each of the groups) across 7 Zones and validate / modify the scoring given in the Assessment Reports to finalise the rewards applicable across MSETCL.

MSETCL needs to finalise the budget for the above cash rewards and allocate the same for each Group. This cash prize shall be given to the substation in charge on the Foundation Day of MSETCL.

Out of the total cash that is awarded to a substation, 10% shall be given to the Substation Maintenance Subdivision that is responsible for that Substation.

The Reward shall be shared equally amongst all permanent employees attached to the substation (or Substation Maintenance Subdivision) irrespective of cadre / seniority / discipline.

Note: in 400 KV and 500 KV HVDC substations, the staff attached to the substation includes staff attached to office of SE / EE (including HR and Finance)

1.2 Reward for Maintenance of EHV Transmission Lines

This reward shall be given to the following groups:

- Top 2 best performing Line Maintenance Subdivisions in each Zone
- Top 2 best performing Hot Line Maintenance Sub divisions across MSETCL

In addition, there shall be a reward for the top 3 best performing Line Maintenance Subdivisions across MSETCL selected from the 14 Subdivisions that are rewarded in each zone

Process to be followed:

This reward shall be given on an annual basis. The process of evaluation of Line Maintenance / Hot Line Maintenance Subdivisions shall be on an annual basis. The Zonal committee shall visit all the subdivisions (and a sample of lines) in the zone which fall under each of the above groups and conduct an objective assessment of the subdivision. These visits shall be completed before the end of the financial year (March 31st) for the year that is under consideration. (for e.g. for the year 2009 – 2010, the assessment by the zonal committee shall be completed before 31st March 2010). In essence, it needs to be ensured that the Zonal Committee visits all Subdivisions in a Zone at least once in a year.

The Zonal Committee shall prepare an assessment report on each subdivision. The assessment report shall contain the basic information of the Subdivision such as:

- Name and Location with Division, Circle and Zone details
- List of lines with corresponding Route length and circuit length that are covered by the Subdivision
- Date of Commissioning including date of completion of any R&M Work etc.
- Name of Subdivision In Charge and since when he / she has been posted there
- Current Manpower position (Sanctioned, Filled, Vacant) of the Subdivision

The assessment report shall also contain the assessment sheet that is explained below.
The subdivision shall be assessed as per the following parameters (given below is a template that can be used by the Zonal Committee for Assessment):

No.	Parameter	Score obtained	Maximum Score
1	Frequency of patrolling of lines		10
2	Tree Cutting / Clearing the corridor		5
3	Replacement of missing tower members / missing bolts to main leg		5
4	Replacement of damaged Conductors / Earthwire (During Breakdown)		5

5	Replacement of damaged discs / string insulators		5
6	Providing missing number and phase plate & Danger Board.		5
7	Providing Anti-climbing Device		5
8	Thermovision Inspection of Joints and rectification of same (Partly)		10
9	No. of Accidents – Fatal & Non Fatal		5
10	Tower footing resistance and earthing of the same		5
11	Line Signature Analysis (Taurus Signature)		5
12	Frequency and Duration of Line Interruptions		25
13	Identification of Hotspots and attending to the same		10
	TOTAL for Line Maintenance Subdivision		100
	Hot Line Maintenance		
1	Work carried out by Hot Line maintenance without interruption		35
2	PID of the insulator		15
3	Thermoscanning		15
4	Hot Line Washing		15
5	Replacement of insulators and faulty jumpers by Hot Line Method		20
	TOTAL on Hot Line Maintenance Subdivision		100

Based on the Assessment on the above parameters, the Zonal Committee shall finalise the rewards for the following:

- Top 2 best performing Line Maintenance Subdivisions in each Zone

Each Zonal Committee shall also forward the Assessment Reports of the above 2 subdivisions to the Corporate Office Committee for the reward for the top 3 best Line Maintenance Subdivisions across MSETCL to be chosen from the 14 subdivisions.

For the Reward for Top 2 best performing Hot Line Maintenance Subdivisions across MSETCL, each Zonal Committee shall send 2 nominations along with the Assessment Report to the Corporate office Committee.

The Corporate Office Committee shall form 2 teams and visit all the subdivisions for which they have received the Assessment Reports (i.e. 14 each in each group) across 7 Zones and validate / modify the scoring given in the Assessment Reports to finalise the rewards applicable across MSETCL.

MSETCL needs to finalise the budget for the above cash rewards and allocate the same for each Group. This cash prize shall be given to the substation in charge on the foundation day of MSETCL.

The Reward shall be shared equally amongst all permanent employees attached to the subdivision irrespective of cadre / seniority / discipline.

1.3 Reward for Project Execution – Completion of Construction milestones

This reward shall be given to the Top 3 performing Construction Divisions out of the 16 Construction Divisions at MSETCL.

Process to be followed:

This reward shall be given on an annual basis. The process of evaluation of Construction Divisions shall be on an annual basis. The Corporate Office Committee shall review the performance of all Construction Divisions and conduct an objective assessment of the Division and its employees. This

review shall be completed before the end of the financial year (March 31st) for the year that is under consideration. (for e.g. for the year 2009 – 2010, the assessment by the Corporate Office committee shall be completed before 31st March 2010).

The Corporate Office Committee shall obtain a Division wise Performance Report from the Project Monitoring team at Corporate Office. The performance report shall contain the basic information of each Scheme / project under the Division such as

- Name and Location with Division, Circle and Zone details
- Basic Specifications such as details of the project with name of contractor etc
- Key Milestones in the Project from the date of Scheme Approval to Commissioning
- Name of Division In Charge and since when he / she has been posted there
- Current Manpower position (Sanctioned, Filled, Vacant) of the Division
- Name of Testing Division that is attending to the project requirements
- Name of Civil Division that is attending to the project requirements

The performance report shall also contain the performance of the division on each of the schemes under its jurisdiction as per the Project Monitoring Framework in terms of Targeted and Actual dates on the milestones and as per Work Schedule.

Based on the performance report, the Corporate Office Committee shall finalise the reward for the Top 3 Construction Divisions.

MSETCL needs to finalise the budget for the above cash rewards and allocate the same for each Group. This cash prize shall be given to the substation in charge on the foundation day of MSETCL.

Out of the total cash that is awarded to a Division, 25% shall be given to the Civil Division that is associated with the Construction Division.

The Reward shall be shared equally amongst all permanent employees attached to the Construction Division (or Civil Division) including the Subdivisions irrespective of cadre / seniority / discipline.

Note: The staff attached to the Division includes staff attached to office of EE (including HR and Finance)

1.4 Reward for Testing of Substation Equipment

This reward shall be given to the Top 3 performing Testing Divisions at MSETCL.

Process to be followed:
This reward shall be given on an annual basis. The process of evaluation of Testing Divisions shall be on an annual basis. The Corporate Office Committee shall review the performance of all Testing Divisions and conduct an objective assessment of the Division and its employees. This review shall be completed before the end of the financial year (March 31st) for the year that is under consideration. (for e.g. for the year 2009 – 2010, the assessment by the Corporate Office committee shall be completed before 31st March 2010).

The Zonal Committee of each Zone shall prepare a performance report on each Testing Division under his jurisdiction and submit the same to the Corporate Office Committee for final evaluation across MSETCL.

The assessment report shall contain the basic information of the Substation such as:

- Name and Location with Division, Circle and Zone details
- List of Substations and their basic specifications that are covered by the Testing Division
- List of new substations / Augmentation works completed and tested by the Division
- Name of Testing Division In Charge and since when he / she has been posted there
- Current Manpower position (Sanctioned, Filled, Vacant) of the Substation

The assessment report shall also contain the assessment sheet that is explained below.

The Testing Division shall be assessed as per the following parameters (given below is a template that can be used by the Zonal Committee for Assessment):

No.	Parameter	Score obtained	Maximum Score
1	Completion of all routine relay testing		25
2	Calibration of all meters		15
3	Trouble Shooting works		15
4	Tan Delta bushing and winding of transformers (in diagnostic testing)		5
5	SFRI of the Transformer		5
6	Leakage Current Value of Lightning Arrestor		5
7	Breaker Closing / Opening time with frequency (Preventive Maintenance)		5
8	Contacts resistance measurement of the breaker		5
9	Relay Coordination (Annual)		5
10	Reduction in Malfunctioning of the Relay		15
	TOTAL on Testing Parameters		100

Based on the Assessment on the above parameters, the Corporate Office Committee shall finalise top 3 best performing Testing Divisions.

MSETCL needs to finalise the budget for the above cash rewards and allocate the same for each Group. This cash prize shall be given to the substation in charge on the foundation day of MSETCL.

The Reward shall be shared equally amongst all permanent employees attached to the Testing Division irrespective of cadre / seniority / discipline.

1.5 Budget Calculations for Incentive Scheme

To estimate the tentative budget required for the incentive scheme, the Hewitt – Powergrid Consortium carried out a sample analysis, as has been indicated below. It must be noted that the calculations are tentative and are to be used only for arriving at an approximate budget.

In the sheet shown below, the sanctioned strengths of the different offices have been taken from MSETCL's Staffing Norms (Modified up to 30.11.2008). The actual sanctions may vary from zone to zone and this will have to be factored in to arrive at accurate financials.

As has been discussed in this document, two levels of awards shall be given:

Level 1: Zonal Level (two places / award category)
Level 2: Overall for MSETCL (three places / award category)
The first prize has been assumed to be Rs. 5000, second prize at Rs. 3000 and hird prize at Rs. 2000.

Sub Total 1 reflects the total payments for the 7 zones and Sub Total 2 reflects corresponding payments to the support functions.

As has been estimated, a total sum of Rs. Forty Three Lacs Two Thousand Six Hundred may be allocated towards incentives.

Sl	Name of Award	Sanctioned Strength	Value of Award		Total Value Disbursed			Awards to Support Functions				Grand Total
			1st Place	2nd Place	1st Place	2nd Place	Sub Total1	Function	Sanctioned Strength	% Allocation	Sub Total2	
Zonal Level Awards												
1	220 KV SS	20	5000	3000	100000	60000	1120000	S/S Maint.SD	23	10%	128800	128800
2	132 and lower KV S/S	9	5000	3000	45000	27000	504000	S/S Maint.SD	23	10%	128800	632800
3	Line Maintenance Sub Division	10	5000	3000	50000	30000	560000					560000
4	Hot Line Maintenance Sub Division	11	5000	3000	55000	33000	616000					616000
Overall Awards for MSETCL												
5	400 KV/500 KV HVDC	40	5000	3000	200000	120000	400000	S/S Maint. SD	23	10%	23000	423000
6	220 KV SS	20	5000	3000	100000	60000	200000	S/S Maint. SD	23	10%	23000	223000
7	132 and lower KV S/S	9	5000	3000	45000	27000	90000	S/S Maint. SD	23	10%	23000	113000
8	Line Maintenance Sub	10	5000	3000	50000	30000	100000					100000
9.	Construction Division	15	5000	3000	75000	45000	150000	Civil Division	13	20%	26000	176000
10	Testing Division	21	5000	3000	105000	63000	210000					210000
												4302600

1.6 Annexure – I

Checklist for Maintenance of Substation Equipment

Sr. No.	Description	Monthly	Quarterly	Annually
1	**Maintenance of CT**			
	Check oil level from gauge glass	√		
	Check for any crack in insulator	√		
	Check for any visible oil leakage	√		
	Check for any visible deterioration of primary connections	√		
	HV Connection/joints checking by thermovision Camera	√		
	Clean thoroughly all parts including porcelain bushing		√	
	Check the bushing for cracks and chipping etc. if any, Repair the Chipped spots		√	
	Check, H.V. connections and ratio links for tightness		√	
	Check the secondary terminal connections of the C.T. and junction box for tightness and deteriorated insulation and healthiness		√	
	Check the earthing continuity of C.T. secondary star point		√	
	Check the earthing of the frame work		√	
	Check silica gel and replace if provided and if necessary		√	
	N2 Pressure Checking if provided		√	
	Check Tan delta point for tightness and proper earthing		√	
	Test oil for dielectric strength			√
	Test oil for deposits, colour and Acidity			√
	Megger the windings between Primary to Tandelta point f no tandelta point available take megger between Primary to earth			√
	Checking the tightness of all electrical connections			√
	Measurement of Capacitance & Tan delta			√
	Checking of N2 pressure. if provided			√
	Checking of bellow expansion If provided			√
	Other test needs to be carried out as and when required			
	Measurement of CT secondary resistance			√
	Magnetisation characteristics			√
	CT ratio test			√

Sr. No.	Description	Monthly	Quarterly	Annually
1	**Maintenance of CT (Cont…..)**			
	DGA and other tests of OIL			√
	Measurement of IR Values between Primary, Secondary and Earth(core wise)			√
	CT Marshaling Box			
	Checking of healthiness of gasket			√
	Checking space heater prior to monsoon			√
	Checking of all connections including earthing			√
	Cleaning of marshaling box			√
	Check the box for vermin proofing			√
2	**Maintenance of Battery Sets**			
	Battery Room & Ventilation			
	Check that battery room doors are kept closed			√
	Check exhaust fan is running for air circulation, Overhaul as per motor check list			√
	Check metal structures for corrosion, clean and paint if necessary			√
	Bases or Racks			
	Inspect wooden racks for cracks and deterioration. Repaint with acid resisting paints			√
	Check base pads for deterioration and cracks Clean			√
	Cells & Jars			
	Check for cracks and leaky jars or covers			√
	Replace if necessary, Clean Jars-wash covers and wipe out			√
	Clean the lugs and nuts etc. and cover them with a thin film of vaseline. Take care that metal wrench do not fall avoid short-circuit of terminal. between cells to avoid short-circuit of terminal			√
	Intercell Connector & Terminals			
	Clean corrosion or sulphation from terminals Tighten terminals			√
	Smear vaseline on terminals to avoid corrosion/sulphation			√
	Charge			√
	The output of the charging equipment should be adjusted so that in normal condition battery ampere meter should show a fraction of ampere			√

Sr. No.	Description	Monthly	Quarterly	Annually
2	**Maintenance of Battery Sets (Cont…..)**			
	Charging Equipment			√
	Blow out dust form panels			√
	Check general condition and operating temperature of transformer and rectifiers			√
	Check wiring and connection for tightness			√
	Check dial switch or rheostat contact and operating mechanism, Lubricate wherever necessary			√
	Check contacts for heating and proper pressures			√
	Check and if possible calibrate voltmeter and ampere meters. above test to be carried out after ascertaining of battery capacity			√
	Take the discharge Test			√
3	**Maintenance of Breaker**			
	MOCB			
	Bushings			
	Check for cracks and the porcelain of the breaker		√	
	Check tightness of bolts, clamps, connecting terminals		√	
	Circuit Breaker POLES			
	Check oil sample from bottom of each pole for dielectric strength if the result is not satisfactory or if the excessive carbon is present drain the oil of the poles. Then clean with tested oil and then fill with tested oil		√	
	Circuit Breaker Mechanism Box			
	Check condition of mechanism box(rust, Paint, If required)		√	
	Checks condition of door, hinges, gaskets		√	
	Check tightness of all electrical connections		√	
	Check condition / tightness of lock washers, split pins bolts nuts, etc		√	
	Check auxiliary contacts		√	
	Check control switches / push buttons		√	
	Check condition of fuses		√	
	Check space heater		√	
	Check condition / lubrication of moving parts		√	
	Check lubrication of key interlock mechanism		√	
	Check spring charging motor		√	
	Check conditions of limit switches		√	

Sr. No.	Description	Monthly	Quarterly	Annually
3	**Maintenance of Breaker (Cont…..)**			
	Resistance Measurement			
	Closing coil		√	
	Tripping Coil - I		√	
	Tripping Coil - II		√	
	Local / Remote Electrical Breaker Operations			
	Closing Operations Local and Remote		√	
	Tripping Operations Through TC-I And TC-II		√	
	Trip Trials of Breaker through Protection		√	
	Breaker timing			
	Closing Time			√
	Tripping Time			√
	Check operation of Pre-insertion resistor if provided			√
	Checking of operation counter			√
	Check pole discrepancy			√
	Check of interlocks			√
	Contacts resistance			√
	Checking of tightness of all the termination in the MB			√
	Checking of door sealing gaskets and replacement thereof if necessary			√
	General cleaning of MB and repainting of metallic surface if required			√
	Check functioning of space heater/illumination			√
	SF6			
	Check any Air / Oil leakage from any place	√		
	Check the Air pressure / Oil Pressure and SF6 pressure	√		
	Check the nitrogen pressure if provided	√		
	Check HV connections by thermo vision camera	√		
	Porcelain			
	Clean all porcelain thoroughly		√	
	Check for cracks		√	
	Check for flash over marks		√	
	Operating Mechanism Box			
	Check connection for tightness		√	
	Check and clean for auxiliary contacts		√	

Sr. No.	Description	Monthly	Quarterly	Annually
3	**Maintenance of Breaker (Cont…..)**			
	Check for Air / Oil leak		√	
	Check for SF6 leakages		√	
	Check the SF6 gas pressure		√	
	Check the Air / Oil pressure		√	
	Check for auto operation of compressor		√	
	check cubicle heater		√	
	Marshalling Box			
	Clean the connection by CTC / Equivalent		√	
	Check connection for tightness		√	
	Check L.T. plug point		√	
	Clean switch contacts		√	
	Check the contactors		√	
	Check the fuses		√	
	Clean the MB		√	
	check MK box for vermin proofing		√	
	Resistance Measurement			
	Closing coil		√	
	Tripping Coil - I		√	
	Tripping Coil - II		√	
	Local / Remote Electrical Operations			
	Closing Operations		√	
	Tripping Operations Through TC-I & TC-II		√	
	Trip Trial of Breaker Through Protection		√	
	Breaker timing			√
	Closing Time			√
	Tripping Time			√
	Check operation of Pre-insertion resistor if provided			√
	Checking of operation counter			√
	Check pole discrepancy			√
	Check of interlocks.			√
	Static Contacts resistance			√
	Checking of tightness of all the termination in the MB.			√

Sr. No.	Description	Monthly	Quarterly	Annually
3	**Maintenance of Breaker (Cont…..)**			
	Checking of door sealing gaskets and replacement there of if necessary			√
	General cleaning of MB and repainting of metallic surface if required			√
	Check functioning of space heater/illumination			√
4	**Maintenance of Control Relay Panel**			
	Clean all the panels from outside	√		
	Replace fused bulbs whenever any	√		
	Check healthy Trip Circuit Lamps	√		
	Check the annunciation and fault indicating Lamps by the test push button.(switch)	√		
	Check the DC tripping voltage is available in control and relay panel measure by an AVO	√		
	Check the semaphore indications		√	
	Check the over heating of relays if any		√	
	Check the flags of the relays if any		√	
	Check the space heaters if provided		√	
	Clean with vacuum cleaner and see that panels are vermin proof			√
	Check all connections for tightness on			√
	a) terminal strips			√
	b) instruments and switches			√
	Check the electrical connections on terminal boards for tightness and deteriorated insulation			√
	Clean and check all the switches			√
	clean and check all the contactors			√
	check the semaphore indications			√
	Polish the panel surface with wax 01 polish			√
	Check for rusting and repaint if necessary			√
	Get all the meters and instruments calibrated			√
	Get all the relays tested. While testing relays check that correct visual and audible indications is obtained on the annunciator panel			√
	Check the earthing of panels			√
	Check the thermostat for space heaters if provided			√

Sr. No.	Description	Monthly	Quarterly	Annually
5	**Maintenance of Isolator**			
	Insulators			
	Clean Insulators, if stain marks or solid deposits cannot be removed, use solvent like C.T.C. etc.		√	
	Report on condition of insulator if coated with 'SILICON' compound		√	
	Switch			
	Check contacts, clips and blades, clean contact surfaces on blades and contact clips with fine emery paper		√	
	Snear lightly 'No oxide' grease or white Vaseline on contact surface and wipe off excess with clean cloth		√	
	Lubricate bearings, joints contact springs		√	
	Clean ground contact clips and blades if provided		√	
	Tighten group connections		√	
	Check adjustment of the arc horns on born gap switch		√	
	Check condition of flexible bonds of (I) connectors (ii) G.O.D. jumpers		√	
	Lubricate bearing, pin joints of the inter-phase cranks and couplings		√	
	Check for split pins		√	
	Clean and lubricate interlock keys		√	
	Auxiliary Switches			
	Check and clean auxiliary contacts in isolators where provided, lightly, smear with petroleum jelly		√	
	Check that wiring is not loose and has no deteriorated insulation		√	
	Check for correct remote semaphore/lamp indication		√	
	Clean and check operation of the interlocking coil push button		√	
	Check condition of interlocking coil		√	
	Hand Operated Mechanism			
	Clean and check the heaters		√	
	Check connections for tightness		√	
	Clean switch contacts		√	
	Check the fuses		√	
	Clean the cubicle		√	

Sr. No.	Description	Monthly	Quarterly	Annually
5	**Maintenance of Isolator (Cont…..)**			
	Tests			
	Close and open several times to make the mechanism free		√	
	Check hand operation of isolators for smoothness		√	
	Check that proper contacts are made		√	
	Check that all phases close together		√	
	Test the mechanical interlock		√	
	Test electrical interlock		√	
	Switch		√	
	Examine contact alignments and make sure the blade is parallel with the box when in fully closed position			√
	OPERATING MECHANISM :			
	Tighten all bolts of interphase pipe connection			√
	Clean the bearings of the rotating bushings insulators and lubricate them with grease			√
	MOTOR OPERATED MECHANISM :			
	Check the operation of motor brakes			√
	Lubricate gear, shafts,. Bearings etc.			√
	Check contacts, contact springs and operating levers etc, and auxiliary contacts			√
	TESTS :			
	Check contact resistances with AVO or ducter after closing disconnect			√
	In isolators in which spark tips are provided, check that spark tips touch before the main contacts close and separate after the main contacts open. Clean these tips if badly damaged			√
	Check ground connection of structures			√
	Check supporting structures loose bolts			√
	Clean rusty parts point			√
6	**Maintenance of LA**			
	Clean porcelain of the arrestor		√	
	Check and tighten main and earth connections		√	
	Record surge counter		√	
	Check porcelain for cracks.			√
	Check earth resistance of earth connection. It should be about 0.5 ohms			√

Sr. No.	Description	Monthly	Quarterly	Annually
6	**Maintenance of LA (Cont…..)**			
	Check and tighten grading rings of Lighting arrestors			√
	Check for cracking setting or shifting of base or support. Tighten bolts and nuts			√
	Check and record the reading of surge counter and check whether it is recording			√
	Take stack wise IR values with 500 V megger			√
	Checking of leakage by current Analyses (mA) (On line)			√
7	**Maintenance of PT & CVT**			
	PT			
	Check oil level from gauge glass	√		
	Check for any visible oil leakage	√		
	Clean thoroughly all the parts including porcelain bushing		√	
	Check the bushing for cracks and chipping etc. if any Repairs the chipped spots		√	
	Checks the secondary connections of the P.T. and junction box for tightness and deteriorated insulation		√	
	Check the earthing of the P.T. secondary star		√	
	Check the earthing of the frame work		√	
	Check the silica gel and replace if necessary		√	
	Check the fuses in PT sec. Box and MK		√	
	Megger the windings between Primary and Secondary. Remove Primary Earthing Link and secondary cores Earthing points			√
	Cleaning of secondary box			√
	Tightening of all connections			√
	Measurement of primary winding resistance After restoring of Primary and secondary cores earthing			√
	PT Marshaling Box			
	Checking of healthiness of gasket			√
	Checking space heater and illumination			√
	Checking of all connections including earthing			√
	Cleaning of marshaling box			√
	Measurement of voltage at switch yard MB			√

Sr. No.	Description	Monthly	Quarterly	Annually
7	**Maintenance of PT & CVT (Cont…..)**			
	CVT			
	Check insulator porcelain	√		
	Check for any visible oil leakage	√		
	Clean thoroughly all the parts including porcelain bushing		√	
	Check the bushing for cracks and chipping etc. if any Repairs the chipped spots		√	
	Checks the Primary (HV) and secondary connections of the P.T. and junction box for tightness and deteriorated insulation		√	
	Check the earthing of the P.T. secondary star		√	
	Check the earthing of the frame work		√	
	Check the silica gel if provided and replace if necessary		√	
	Check the fuses in CVT sec. Box and MK		√	
	Check IR values			√
	Cleaning of secondary box			√
	Tightening of all connections			√
	Measurement of Capacitance and Tandelta			√
	PT Marshaling Box			
	Checking of healthiness of gasket			√
	Checking space heater Prior to monsoon			√
	Checking of all connections including earthing			√
	Cleaning of marshaling box			√
	Check MK box for vermin proofing			√
8	**Maintenance of Power Transformers / ICTs**			
	Oil level in main conservator tank (MOG)	√		
	Oil level in oltc conservator tank	√		
	Oil level of bushings	√		
	Manual starting of fans	√		
	Manual starting of oil pumps	√		
	Checking of oil leakage	√		
	Oil level in breather cups	√		
	Condition of silica gel in breather	√		

Sr. No.	Description	Monthly	Quarterly	Annually
8	**Maintenance of Power Transformers / ICTs (Cont…..)**			
	Bushings (HV IV LV)			
	Clean of bushing with dry cloth	√		
	Examine the bushings for surface cracks	√		
	Check for oil leakage and oil level	√		
	Connections			
	check the connections carefully for any indication of over heating	√		
	Tighten up the connections	√		
	Oil			
	Check leakage of oil from gauge glass, valves, flanges, gaskets, radiators	√		
	Tighten up the joints if leaky	√		
	Check oil level and top-up if required	√		
	Take sample for BDV	√		
	Breather			
	Check the silica gel if crystals have turned pink ,Replace with reactivated silica gel	√		
	Check for crack in breather bottle	√		
	Check that the breathing line is free and rectify defect if any	√		
	Conservator			
	Check the oil level indicator care fully. If float operating mechanism is provided, check Float and mechanism for correct indication of oil level		√	
	Clean the glass of oil gauge if provided		√	
	Tighten up all cover bolts		√	
	Explosion vent			
	Check Diaphragm for any possible damage		√	
	Temperature indicators			
	Check the indicators for healthiness		√	
	Check control terminal board and clean if necessary		√	

Sr. No.	Description	Monthly	Quarterly	Annually
8	**Maintenance of Power Transformers / ICTs (Cont…..)**			
	Forced air cooling arrangement			
	Check cooling fan connections and fan operations		√	
	Lubricate fan bearings		√	
	Clean the fan blade, fins and protective cover		√	
	Check and clean fan control equipments		√	
	Take auto operation of cooling fans		√	
	Test fan failure alarm		√	
	Forced oil cooling arrangement			
	Check and clean the pump motor and connections lubricate the bearing		√	
	Check and clean the pump control equipments		√	
	Check oil flow systems		√	
	Test pump failure alarm		√	
	On Load Tap Changer control box / MK			
	Clean and check the heater		√	
	Check the connections for tightness		√	
	Clean switch contacts		√	
	Check the contacts		√	
	Check the fuses		√	
	Clean the cubicle		√	
	Miscellaneous			
	Check transformer ground/neutral connections for tightness		√	
	Lubricate transformer wheels		√	
	Clean rusty parts and paint		√	
	Tank & Body			
	Thoroughly clean all parts			√
	Check foundation for any cracking, setting and			√
	see that rail stops are firmly in place			√
	Tighten loose and vibrating parts to stop excessive vibrations			√
	IR values			√
	Oil			
	Collect oil samples from bottom and top for DGA			√

Sr. No.	Description	Monthly	Quarterly	Annually
8	**Maintenance of Power Transformers / ICTs (Cont…..)**			
	OLTC Gear			
	Take oil sample from diverter switch tank and check			√
	For dielectric strength and carbon contains			√
	Check tap changer operating mechanism for local			√
	manual/electrical operations and electrical remote operations			√
	Check tap changer continuity by AVO meter during tap change operations			√
	Check local/remote tap position indications			√
	remote visual and audible indications during tap change			√
	Check the operation of motor brakes			√
	Lubricate gears shafts bearings etc.			√
	Check contacts, contact springs and operating levers			√
	etc of limit switches and auxiliary contacts			√
	Check operation counter for correct registration			√
	Check overload and single phasing relay			√
	Auxiliary units checking			
	Main bucholz alarm			√
	Main bucholz trip			√
	PRV trip			√
	OLTC Buchholz Trip			√
	Oil temperature alarm			√
	Oil temperature trip			√
	SPR Device trip If provided			√
	Winding temperature alarm			√
	Winding temperature trip			√
	Calibrate OIL Temp / Wdg. Temp meters			√
9	**Bus Bar**			
	Replacement of clamp and connectors on Busbar			
	Post Insulator replacement			
	Replacement of Insulators			
10	**Transformers**			
	Tan Delta and Capacitance measurement			
	Attending oil leakages.			

Sr. No.	Description	Monthly	Quarterly	Annually
11	**Current Transformers /Potential Transformers**			
	Attending leakages of Transformers /CT/PT etc.			
12	**Isolators**			
	Insulator Replacement			
13	**Batteries**			
	Maintenance of DCDB.			
14	**Panels**			
	Wires/Connectors/Lugs			
	Spare Relays/meters/Auxiliary Relays/Indicating lamps/Switches			
15	**Others**			
	Maintenance of Lighting			
	Maintenance of Air conditioning system			
16	**Civil Maintenance**			
	Maintenance of Water supply system including Pipe line and Pump sets and Electrical System			