
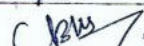



Comprehensive Audit:

1. Name of the Sub-Station: CHANDRAPUR GSS
2. Voltage level: 132/33 KV
3. Owner: AEGCL
4. Date of Audit: 15-11-2021
5. Members of Auditing Team:

Sl.No.	Name	Designation	Organization	Signature
1.	Rajib Das	AE	NERPC	
2.	Bikash Kishore Borca	Engineer.	PGCIL.	
3.	Ashim Kumar Nath	Engineer	NERLDC, POSOCO	
4.	Komal K-R-D			

6. Representatives of the Sub-station/Generating Station assisting the auditing team:

[illegible]

Observations/Recommendations:

Sl.No.	Parameters	Yes/NO	Remarks
1	Whether redundant supply for station auxiliaries is available?	Yes	100 KVA QDG SET
2	Whether SCADA system is present?	Yes	
3	Whether SAS has been implemented? If no, whether panels are SAS compliant?	Yes	
4	Whether protection relays for transformers/ICTs/reactors are operational?	Yes	
5	Whether reliability by way of Bus-Bar scheme is present in 132kV station?	NO	
6	Whether Double Main Arrangement is present in 220kV Station? If yes, whether operational or not?	—	
7	Whether Bus Bar Protection is available for the 220kV and above station?	—	
8	Whether protection relays for emanating lines are operational?	Yes	
9	Whether time synchronisation facility is available in the Sub-station?	NO	
10	Whether existing RTUs are healthy and reporting?	—	
11	Whether existing communication via PLCC or OPGW? If PLCC then healthiness of PLCC panels	Yes PLC	PLCC Healthy


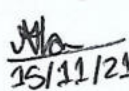
12	In case of OPGW connectivity to the station, whether end equipments are available and functional?	NO	
13	Whether all analog/digital points are reporting in local SCADA?	Yes	
14	Healthiness of Protection coupler/Coupling device?	Yes	
15	Whether sufficient lighting is available in the switchyard?	Yes	
16	DC Supply- Whether two DC sources are available?	NO	1 nos. 220 V Source 1 nos. 48 V Source for PLC
17	Earthing System in the switchyard: Whether as per IS?	Yes	
18	List of diagnostic tools, testing equipments etc. and whether are present in sufficient quantity?		
19	Whether firefighting provision is available in the station?	NO	
20	Whether Protection Audit has ever been carried out before? If yes then compliance status of Audit Observations/Recommendations	NO	
21	Whether all relay settings have been submitted in PDMS? If no, then compliance status	NO	
22	Whether CTs, PTs/CVTs of sufficient accuracy is present in the station?	Yes	

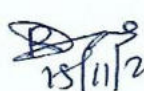

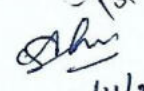
Any other specific observations/recommendations:

1. Gateway ~~2~~ & SAS-II are in "OFF" Condition; Requires rectification
2. Breaker Status in DR NOT present
3. CT Ratio mis-match found in Transformer Differential Protection
4. Time Sync error observed in all relays
5. For DISPUR-CTI AND RAPUR CKT-II 7L, LA is placed After CVT (CVT is placed first w.r.t to incoming line); whereas LAs should be placed first
6. Isolator operation requires manual intervention for every single operation.

7. Useful Life of Both the Transformers has passed long back. Requires Augmentation.
8. Silica gel Condition is very bad for both transf.
9. OTI of Ict-1 is not working
10. Graveling is required for all the Switchyard
11. Grass/vegetation growth observed in all over Switchyard.
12. Structure rusting observed; warrants immediate action
13. Only 1 nos. 220v & 1 nos. 48v Battery Source ; As per norms 2 nos. Battery Source with independent source is required
14. Cable is lying all over the Switchyard
15. Cable Trench is broken ~~stab~~ Condition
16. Scrap items lying idle in Switchyard
17. Inadequate oil for DG ~~Set~~ Set
18. DC earth fault relays is ~~not~~ not available
19. Capacitor bank non functional
20. 33 kv colony feeder, heavy leakage of SF6 observed
21. Audit format to be Submitted
22. PDMS data to be Submitted.
23. 3rd Party Protection Audit - 2021 to be submitted
24. PLEC room no Acs. Overall very less no. of Acs in S/S for Audit party

for CIPS

- 1)  (KOVID DAS)
15/11/21
- 2)  (NABAJYOTI THAKURJA)
15/11/21

1.  (RAJIB DAS)
15/11/21
2.  (BIKASH KISHOR BOKA)
15/11/21
3.  (ASHIM KUMAR NATH),
15/11/2021

14A. PERIODICITY OF MAINTENANCE OF SUBSTATION EQUIPMENT / TRANSMISSION LINE COMPONENTS/ELEMENTS

Sl. No.	Equipment	Tests being conducted	Preiodicity of Tests being conducted (Put "Y" under appropriate column)				
			3 months	6 months	1 year	> 1 year	No test is being done
1	Transformer / Reactor	Winding resistance measurement				Y	
		Voltage Ratio test for transformer				Y	
		Magnetising current test				Y	
		Magnetic balance test				Y	
		Insulation Resistance (IR) Measurement				Y	
		Polarisation Index (PI)				Y	
		Capacitance & Tandelta Measurement for					
		(a) Winding			Y		
		(b) Bushing			Y		
		Break Down Voltage (BDV) Test for oil			Y		
		Dissolved Gas Analysis (DGA)			Y		
		Sweep Frequency Response Analysis (SFRA)				Y	
		Partial Discharge (PD) Measurement					
		Degree of Polymerisation (DP) for cellulose insulation					
		Furan Analysis					
		Vibration Measurement for reactors					
		Check of various earthing connections					
		Any other test (Please mention)					
2	Circuit Breaker (CB)	Static Contact Resistance Measurement			Y		
		Dynamic Contact Resistance Measurement (DCRM)					No test
		Operating timing of CB (Opening Time, Closing time, CO)			Y		
		Operating timing of Pre Insertion Resistor (Pre-insertion time)					
		Capacitance & Tandelta measurement for Grading capacitors					
		Healthiness of Trip Coil (TC) & Closing Coil (CC)			Y		
		Healthiness of Operating Mechanism					
		Dew point measurement of SF6 gas				Y	
		Check of various earthing connections				Y	
		Any other test (Please mention)					
3	Isolator / Disconnectors	Static Contact Resistance Measurement					No test
		Healthiness of Operating Mechanism			Y		
		Checking of Interlocks with CB, Earthing switches etc.					No test
		Check of various earthing connections					
		Any other test (Please mention)					
4	Current Transformer (CT)	Capacitance & Tandelta Measurement			Y		
		Insulation Resistance (IR) Measurement			Y		

14A.PERIODICITY OF MAINTENANCE OF SUBSTATION EQUIPMENT / TRANSMISSION LINE COMPONENTS/ELEMENTS

	Current Transformer(CT)	Measurement of secondary winding resistance				Y	
		Partial Discharge (PD) measurement					
		Check of various earthing connections					
		Any other test (Please mention)					
5	Potential	Capacitance & Tandelta Measurement					
		Insulation Resistance (IR) Measurement					
		Partial Discharge (PD) measurement					
		Check of various earthing connections					
		Any other test (Please mention)					
6	Capacitive Voltage Transformer (CVT)	Capacitance & Tandelta Measurement				Y	
		Insulation Resistance (IR) Measurement				Y	
		Secondary Voltage Measurement				Y	
		Partial Discharge (PD) measurement					
		Check of various earthing connections					
		Any other test (Please mention)					
7	Surge Arrester (SA)	3rd Harmonic Leakage Current Measurement					No test
		Capacitance Measurement					No test
		Insulation Resistance (IR) Measurement					No test
		Check of various earthing connections					No test
		Any other test (Please mention)					
8	Relays	Functional tests of each Protection relay				Y	
		Operating timings				Y	
		Testing of DR/EL with TSE				Y	
9	PLCC system	Checking of PLCC system				Y	
10	Battery	Measurement of specific gravity of electrolyte (for flooded battery)	Y				
		Topping of battery using Demineralized / Distilled water (for flooded battery)	Y				
		Open Circuit Voltage of Cells Tests	Y				
		Capacity test	Y				
		Checking of earth fault due to leakage (for flooded battery)					No test
11	Earthing	Resistance of Earth mat				Y	
12	Hot Spot	Infrared scanning	Y				
		(a) Inside switch yard / substation (for clamps, connectors etc.)	Y				
		(b) Transmission lines (Clamps, connectors, Jumpers etc.)	Y				
13	Insulator	Punncture Insulator Detection					
		Cleaning of Porcelain / Glass insulators					
		(a) Normal washing					
		(b) Hotline washing					
14	Tower	Tower footing resistance measurement					

14C. VARIOUS PROVISION IN SUBSTATION / SWITCHYARD

Sl. No.	VARIOUS PROVISION	Availability
		(Y/N)
1	Soak Pit for transformer / reactors of 10MVA and above rating or with oil capacity more than 2000ltrs	N
2	Oil Collecting pit for transformer / reactors	N
3	CO2 and sand buckets	N
4	Foam type fire extinguisher	N
5	Portable type fire extinguisher	N
6	Hydrant Type	N
7	High Velocity Water Spray (HVWS) System	N
8	Nitrogen Injection Based Fire Protection System (NIFPS)	N
9	Both HVWS system & NIFPS	N
10	Fire Fighting wall between Transformers (if distance between transformers < 15m)	Yes
11	Direct Lightning Protection	
	(a) Using Over Head Ground Wire(OHGW)	✓
	(b) Using Spikes	
	(c) Using Lightning Masts(LMs)	
	(d) Combination of OHGW + LM	
	(e)Combination of OHGW + Spikes	
12	Condition of Earthing System	
	(a) Gravels Spread ove Pre-Stressed Concrete (PCC)	→ Gravels in very low quantity
	(b) Only Gravels	
	(c) Gravels are visible	
	(d) Gravels coverd with grass / soil	
13	Operation of On Load Tap Changer (OLTC)	
	(a) As and when required	✓
	(b) Never operated	
14	Operation of Off Load Tap Changer	
	(a) As and when required	
	(b) Never operated	✓
15	DG Set	
	If Yes, Rating (Nos., Voltage level, KVA capacity)	Yes, 100kVA

14B. AVAILABILITY OF VARIOUS DIAGNOSTIC TOOLS

Sl. No.	DIAGNOSTIC TOOLS	Avail- ability	If Yes (i.e. if Available)	
		(Y/N)	Make	Model
1	Winding resistance meter	N		
2	Transformer Voltage Ratio test meter	N		
3	Insulation Resistance (IR) tester	N		
	(a) 5 kV	N		
	(b) 10 kV	N		
4	Capacitance & Tan delta Measurement Instrument	N		
	(a) Automatic	N		
	(b) Manual	N		
5	Break Down Voltage (BDV) Test kit for oil	N		
6	Dissolved Gas Analyser	N		
7	Sweep Frequency Response Analysis (SFRA) test kit	N		
8	Partial Discharge (PD) Measuring Instrument	N		
9	CB operational Analyser	N		
10	DCRM test kit	N		
11	SF6 Gas leakage detector	N		
12	Dew point measuring instrument	N		
13	SF6 Gas Handling Plant (for Evacuation, filling, filtering of gas)	N		
14	Static Contact Resistance Measuring instrument	N		
15	Leakage Current Meter (LCM)	N		
16	Earth Tester	N		
17	Automatic Realy test kit	N		
18	Thermovision camera for detection of hot spots	N		
19	Thermal Scanner (for Transformer / Reactor)	N		
20	Transmission line Response Analyser	N		
21	Puncture Insulator Detector (PID)	N		

22	On line Partial Discharge (PD) monitoring of GIS	2		
	If Yes			
	(a) Using Ultra High Frequency (UHF) technique			
	(b) Using Acoustic technique			
22	Any On line diagnostic tools	2		
	If Yes, List the instruments			
	(a)			
	(b)			
	(c)			