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1. Name of the Sub-Station: *Harikaurdi S/S*
2. Voltage level: *132 kV*
3. Owner: *AEGL*
4. Date of Audit: *20/11/21*
5. Members of Auditing Team:

Sl.No.	Name	Designation	Organization	Signature
1.	Rajib Das	AE	NERPC	
2.	Devaprasad Paul	Ch. Mgr	POWERGRID	
3.	Ashim Kumar Nath	Engineer	NERLPC	

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?	No	1- Available.
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?	NA	
6	Whether Double Main Arrangement is present in 220kV Station? If yes, whether operational or not?	No	
7	Whether Bus Bar Protection is available for the 220kV and above station?	NA	
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?	Yes	
11	Whether existing communication via PLCC or OPGW? If PLCC then healthiness of PLCC panels	Yes	

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?	No	SCADA to be upgraded.
14	Healthiness of Protection coupler/Coupling device?	Yes	
15	Whether sufficient lighting is available in the switchyard?	Partially	To be improved
16	DC Supply- Whether two DC sources are available?	No	
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?	Partial.	To be procured
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. 2nd Source to be ~~not~~ implemented.
2. GPS to be repaired. Time Sync not available.
3. SCADA to be upgraded as data cannot be saved.
4. Tracto. 1 oil leakage observed.
5. Spare equipments to be procured.
6. Adequate TEP to be procured.
7. DG Set to be commissioned.
8. Aux BCU found faulty. To be repaired.



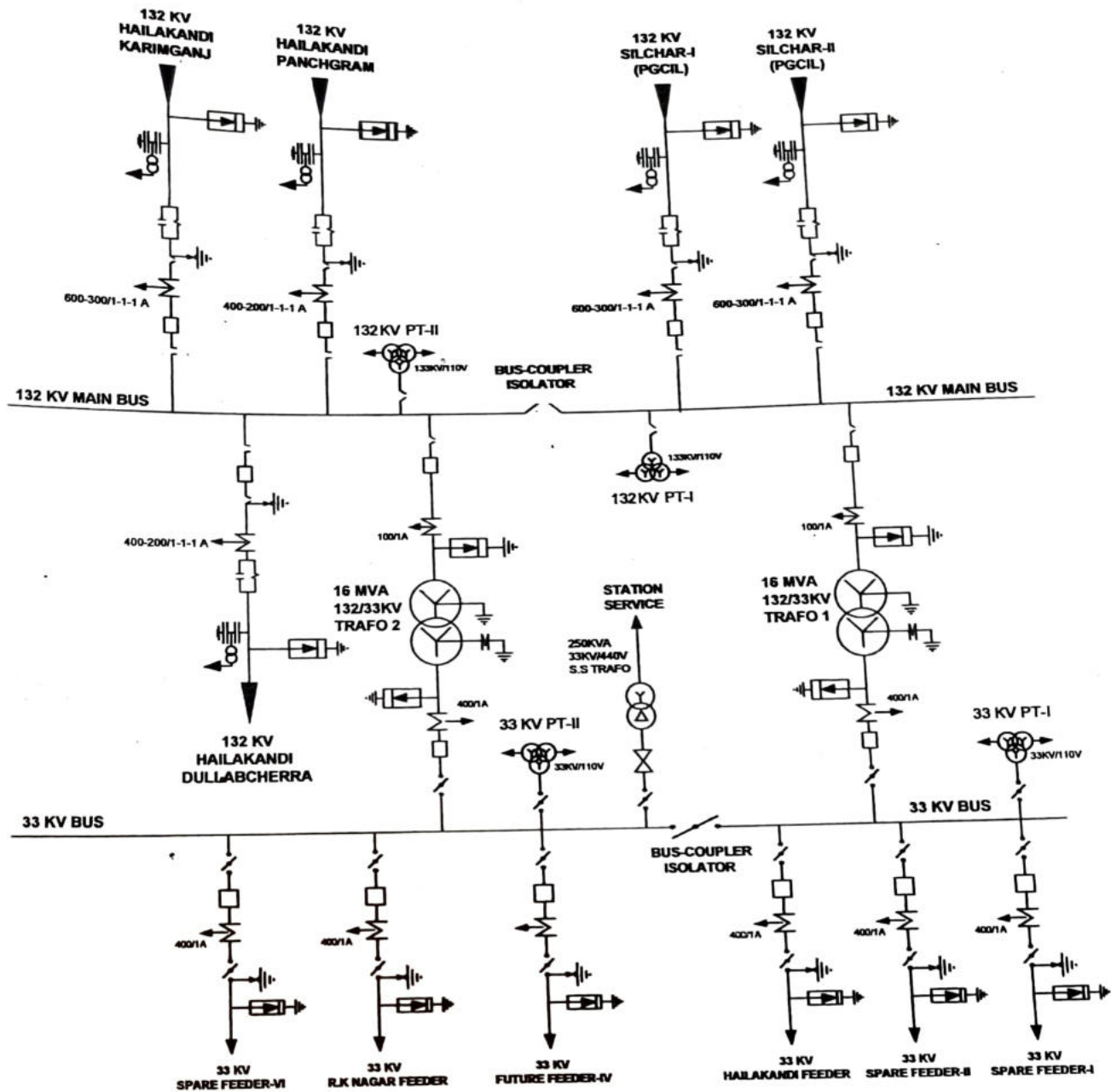
- 9) AC to be provided in URLA Room
- 10) AMF Panel to be ~~on~~ commissioned.
- 11) 50kV 110V system 2nd charger & Battery reqd.
- 12) EF relay to be installed.
- 13) LA counter to be replaced
- 14) oil leakage from Trafo-1 to be arrested
- 15) Painting to be done in equipment box.
- 16) Silica gel to be replaced
- 17) In slave PC operating system to be upgraded.
- 18) AC system in Control Room to be repaired.
- 19) DC voltage  $\rightarrow$  +ve = +62V, -ve = -63V.
- 20) AUX system is not reporting to SEADA.
- 21) FF system to be completed.
- 22) PDMS data to be submitted

for Audit team

1. D. S. (Rajib Das)  
20/11/21
2. Dr. P. (Devaprasad Paul).  
20/11/21
3. A. K. (ASHIM KUMAR NATH)  
20/11/21

for Hailakandi GSS

D Mahmudur Rahman  
2) Bikray Mulla



POWER TRANSFORMER	
CIRCUIT BREAKER	
ISOLATOR WITH EB	
ISOLATOR WITHOUT EB	
CURRENT TRANSFORMER	
POTENTIAL TRANSFORMER	
LIGHTNING ARRESTER	
WAVE TRAP	
DVT	

	<b>ASSAM ELECTRICITY GRID CORPORATION LIMITED</b>
SINGLE LINE DIAGRAM OF 132/33 KV HAILAKANDI SUBSTATION	
DRAWING NUMBER: AEGCL/132KV SS/SLD/28	

Hailekandi

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		Y			
		Any other test (Please mention)					
2	Circuit Breaker (CB)	Static Contact Resistance Measurement			Y		
		Dynamic Contact Resistance Measurement (DCRM)					Y
		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			Y		
		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					Y
		Healthiness of Operating Mechanism		Y			
		Checking of Interlocks with CB, Earthing switches etc.					
		Check of various earthing connections		Y			
		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		Y			
		Any other test (Please mention)					
5	Potential	Capacitance & Tandelta Measurement			Y		
		Insulation Resistance (IR) Measurement			Y		
		Partial Discharge (PD) measurement					
		Check of various earthing connections		Y			
		Any other test (Please mention)					
6	Capacitive Voltage Transformer (CVT)	Capacitance & Tandelta Measurement			Y		
		Insulation Resistance (IR) Measurement			Y		
		Secondary Voltage Measurement					
		Partial Discharge (PD) measurement					
		Check of various earthing connections		Y			
		Any other test (Please mention)					
7	Surge Arrester (SA)	3rd Harmonic Leakage Current Measurement					Y
							Y
		Capacitance Measurement			Y		
		Insulation Resistance (IR) Measurement					
		Check of various earthing connections		Y			
		Any other test (Please mention)					
8	Relays	Functional tests of each Protection relay				Y	
		Operating timings				Y	
		Testing of DR/EL with TSE					
9	PLCC system	Checking of PLCC system					
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)					
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	Y				
		Cleaning of Porcelain / Glass insulators					
		(a) Normal washing			Y		
		(b) Hotline washing					
14	Tower	Tower footing resistance measurement	Y				

# 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			
	(a) 5 kV	Y	Cambridge engineering product	CIE /777
	(b) 10 kV			
4	Capacitance & Tandelta Measurement Instrument	N		
	(a) Automatic			
	(b) Manual			
5	Break Down Voltage (BDV)Test kit for oil	Y(Not working)		
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 Hanndling 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	NA	NA
19	Thermal Scanner (for Transformer / Reactor)	N		
20	Transmission line Response Analyser	N		
21	Punncture Insulator Detector (PID)	N		
22	On line Partial Discharge (PD) monitoring of GIS	N/A		
	If Yes			
	(a) Using Ultra High Frequency (UHF) technique			
	(b) Using Acoustic technique			
22	Any On line diagnostic tools			
	If Yes, List the instruments			
	(a)			
	(b)			
	(c)			



# 14C. VARIOUS PROVISION IN SUBSTATION /

Sl. No.	VARIOUS PROVISION	Availability	REMARKS
		(Y/N)	
1	Soak Pit for transformer / reactors of 10MVA and above rating or with oil capacity more than 2000ltrs	Y	
2	Oil Collecting pit for transformer / reactors	Y	
3	CO2 and sand buckets	N	AA HAS BEEN RECEIVED
4	Foam type fire extinguisher	N	AA HAS BEEN RECEIVED
5	Portable type fire extinguisher	N	AA HAS BEEN RECEIVED
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)	Y	DISTANCE B/W TR1 -TR2 MORE THEN 15M
11	Direct Lightning Protection		
	(a) Using Over Head Ground Wire(OHGW)	N	
	(b) Using Spikes	Y	
	(c) Using Lightning Masts(LMs)		
	(d) Combination of OHGW + LM	N	
	(e)Combination of OHGW + Spikes	N	
12	Condition of Earthing System		
	(a) Gravels Spread ove Pre-Stressed Concrete (PCC)	Y	
	(b) Only Gravels	Y	
	(c) Gravels are visible	Y	
	(d) Gravels coverd with grass / soil	N	
13	Operation of On Load Tap Changer (OLTC)		
	(a) As and when required	Y	
	(b) Never operated	Y	
14	Operation of Off Load Tap Changer		
	(a) As and when required		
	(b) Never operated		
15	DG Set	Y	
	If Yes, Rating (Nos., Voltage level, KVA capacity)	100KVA	1NO VOLTAGE 415 V