




## ✓

- Ranzia gss (132/33 kv)  
132/33 kv  
Aeg d  
16-11-2021

Sl.No.	Name	Designation	Organization	Signature
1.	Rajib Das	AE	NERPL	
2.	Bikash Kishor Borra	Engineer.	PGCIL.	
3.	Ashim Kumar Nath	Engineer	NEKLDC, POSOCO	

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	
2	Whether SCADA system is present?	NO	
3	Whether SAS has been implemented? If no, whether panels are SAS compliant?	NO	
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?	-NA-	
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?	<del>Yes</del> NO	
11	Whether existing communication via PLCC or OPGW? If PLCC then healthiness of PLCC panels	Yes	Unhealthy

12	In case of OPGW connectivity to the station, whether end equipments are available and functional?	-NA-	
13	Whether all analog/digital points are reporting in local SCADA?	-NA-	
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	
17	Earthing System in the switchyard: Whether as per IS?	NO	
18	List of diagnostic tools, testing equipments etc. and whether are present in sufficient quantity?	NO	
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	Yes	not Complied
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. Scada System not yet Commissioned
2. ~~CB DC Source 2 Bank~~
- 2a
2. ~~DC~~ The Condition of DC Source 2 is very bad/poor.  
Replacement Recommended
3. Load Test not performed for DC Source -1
4. No ~~DC~~ DC Earth fault Relay Available at Site
5. Persistent TC -1/11 he unhealthy alarm in 33 kV Rangin feeder  
& SF6 Gas pressure low alarm in 33 kV Tongla feeder.  
Immediate Rectification Required



6. RTCC ~~to~~ Panels for Both the Transformers are in Off Condition
7. Switchyard Graveling is not as per norms
8. Cable Trench in broken Condition. ~~the~~ Cables have mud due to seasonal flash flood.
9. Cable/Spare CT/Conductor lying idle in Switchyard
10. Isolator of  $\phi$  132 kV Side Transformer-1 has alignment issue
11. LA(s) Counter of Sipahar bay ~~are~~ <sup>are</sup> not working
12. Bay marking & phase marking is absent
13. Outdoor ACDB panel is very poor condition
14. ~~The~~ Oil leakage observed in Transformer -1
15. ~~The~~ 3<sup>rd</sup> Party Protection Audit format to be Submitted
16. Task force Committee format to be Submitted
17. PDMS format data to be Submitted.

for Rangia 132/33 kV GSS

Rakesh Das J.M. RGSS, AEGCL.

Dibakar Khanika JM, RGSS, AEGCL

for Audit team

1. ~~Brs~~ (Rajib Das)  
16/11/21

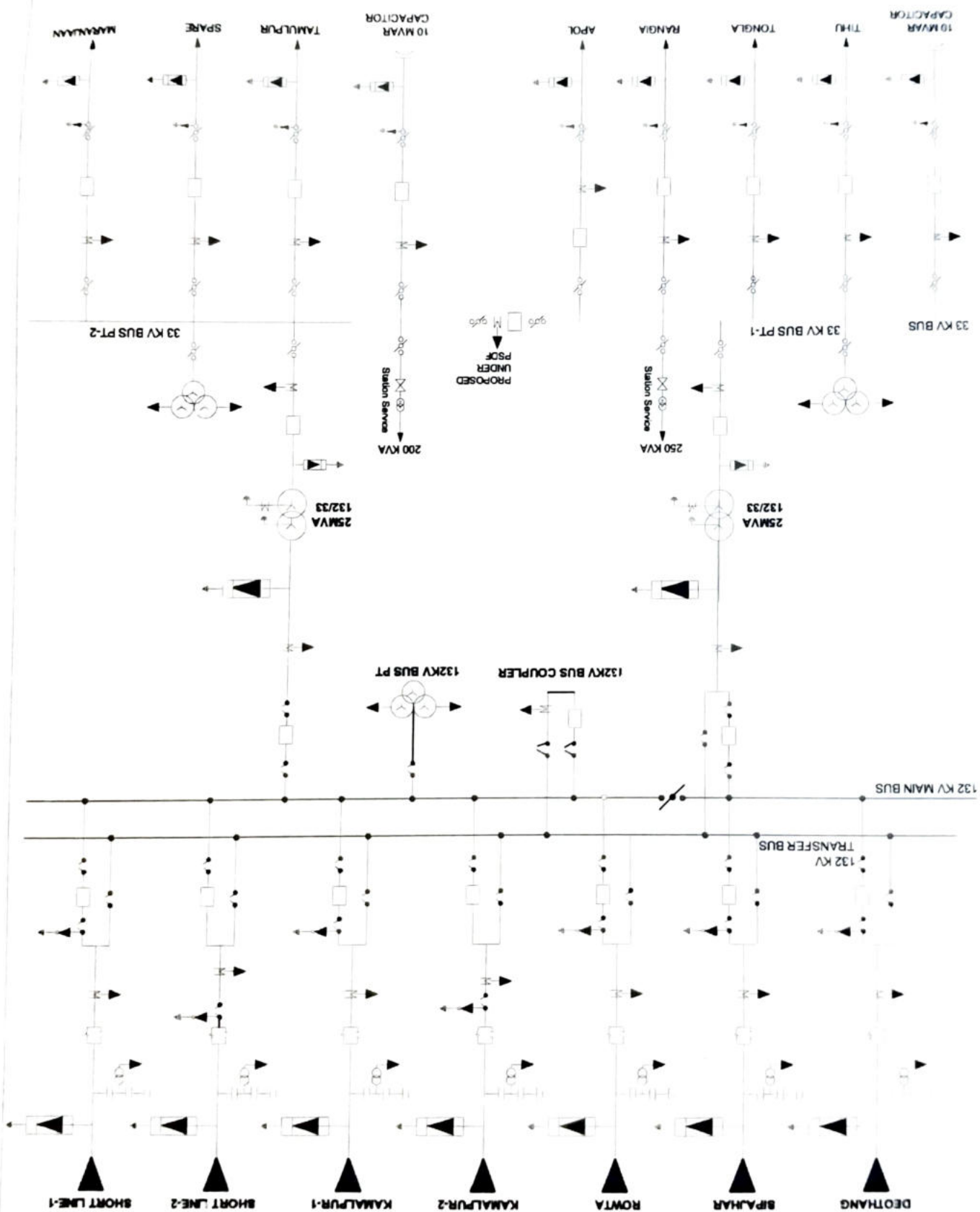
2. ~~UPB~~ (Bikash Kishor)  
16/11/21 BOKA

3. ~~Shr~~ (Ashim Kumar Nath)  
16/11/21





EQUIPMENT LEGENDS





Station Name: 132/33kV Rangia GSS Audit Report

SL No.	Recommendations during Protection Audit 2013	Status as on 06.08.18 (Attended/Not Attended)	If Not complied, target date of completion
2	The old gapped type SA, if exists, need to be replaced by heavy duty station class, gapless type surge arrester of suitable rating. The healthiness of old Gapless Surge Arrester need to be ensured, and may be replaced, if required.	Attended	Attended
3	No. of CT cores are not adequate. CT accuracy class is not as per CEA's regulations, CT ratio is not suitable for bus bar protection. CTs of suitable ratios (if bus bar protection is to be provided) and accuracy class need to be provided. The healthiness of old CTs need to be ensured and may be replaced, if required.		adequate
4	PT/CVTs accuracy class is not as per CEA regulation. PT/CVTs of suitable accuracy class need to be provided. The healthiness of old PT/CVTs need to be ensured and may be replaced, if required.		OK
6	Two sets of batteries (110V) with associated chargers for station DC supply and two sets of batteries (48V) with associated chargers for reliable communication system shall be in place as per CEA's regulations.	Attended	Only 1 source
7	DG set not available	Attended	OK
8	The bus PT / CVT is being used for both protection and metering of transformer and lines. Dedicated line CVT may be used for distance protection	Not Attended	not attended
9	Protection scheme as per CEA's regulations need to be provided for lines, ICT, EM/static relays to be replaced by Numerical relays complying to IEC 61850 protocol. DR, EL and TSE need to be provided. BC&PU and SAS may be provided. Telecommunication link may be established for communication and protection purpose.		no Telecommunication
10	Required FF provision has to be made as per CEA's regulations.		NO
11	Earthing system needs improvement		yes
12	The modern diagnostic tools including relay test kit need to be procured to assess healthiness of transmission line and various substation equipment/material including protective relays. Minimum diagnostic tools are to be provided as per CEA's regulations.		NO

SL No.	Observations during Protection Audit 2017	Status as on 06.08.18 (Attended/Not Attended)	If Not Attended, Target date of completion
1	Earthing not proper		not attended
2	Line CVT not available in all the phases. Voltage input for DPR of all 132 kV lines from bus PT	Not Attended	CVT received, Structure not received OK
3	Relay setting as per R K task force recommendation to be implemented.		OK
4	DPR setting of 132 kV Deothang line (REL 670) are not as per RK task force recommendation. Powergrid may review the settings and provide them to audit team/CT ratio in DPR in 300/1. Powergrid may intimate adopted CT ratios		
	Back up protection to be reviewed considering latest fault level		
	Auto recloser not available		yes, MR not available
5	2 independent DC system not available at present, to be commissioned. Redundant trip relays not available for all elements	Attended	NO
6	Proper bay marking/phase identification not available		NO
7	CO2 based manual fire fighting system for 2*25 MVA, 132/33 kV transformers		NO FF
8	DG set of 250 KVA (auto mode not working) available. reliability of auxiliary power supply to be reviewed		
9	Relay time not synced, event logger not present.		Yes
10	Powergrid will submit RPC format for 132 kV deothang line within 1 week.		

→ to be confirmed from Powergrid



## 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)					Not test
		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)					Not 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					Not test
		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					
		Any other test (Please mention)					
4	Current Transformer(CT)	Capacitance & Tandelta Measurement			Y		
		Insulation Resistance (IR) Measurement			Y		
	Current Transformer(CT)	Measurement of secondary winding resistance			Y		

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

		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					Not test
		Capacitance Measurement					Not test
		Insulation Resistance (IR) Measurement			Y		
		Check of various earthing connections					
		Any other test (Please mention)					
8	Relays	Functional tests of each Protection relay					Not test
		Operating timings					Not test
		Testing of DR/EL with TSE					
9	PLCC system	Checking of PLCC system					NA
10	Battery	Measurement of specific gravity of electrolyte (for flooded battery)					-
		Topping of battery using Demineralized / Distilled water (for flooded battery)					-
		Open Circuit Voltage of Cells Tests					Not test
		Capacity test					Not test
		Checking of earth fault due to leakage (for flooded battery)					Not test
11	Earthing	Resistance of Earth mat			Y		
12	Hot Spot	Infrared scanning					
		(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					



# 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			
2	Transformer Voltage Ratio test meter			
3	Insulation Resistance (IR) tester	Y	Megger.	
	(a) 5 kV	✓		
	(b) 10 kV			
4	Capacitance & Tandelta Measurement Instrument			
	(a) Automatic			
	(b) Manual			
5	Break Down Voltage (BDV)Test kit for oil			
6	Dissolved Gas Analyser			
7	Sweep Frequency Response Analysis(SFRA) test kit			
8	Partial Discharge (PD) Measuring Instrument			
9	CB operational Analyser			
10	DCRM test kit			
11	SF6 Gas leakage detector			
12	Dew point measuring instrument			
13	SF6 Gas Hanndling Plant (for Evacuation, filling, filtering of gas)			
14	Static Contact Resistance Measuring instrument			
15	Leakage Current Meter (LCM)			
16	Earth Tester	Y	Green Wattl.	
17	Automatic Realy test kit			
18	Thermovision camera for detection of hot spots			
19	Thermal Scanner (for Transformer / Reactor)			
20	Transmission line Response Analyser			
21	Punncture Insulator Detector (PID)			
22	On line Partial Discharge (PD) monitoring of GIS			
	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 / 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	Y
2	Oil Collecting pit for transformer / reactors	Y
3	CO2 and sand buckets	Y
4	Foam type fire extinguisher	Y
5	Portable type fire extinguisher	Y
6	Hydrant Type	Y
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)	N
11	Direct Lightning Protection	Y
	(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)	
	(b) Only Gravels	
	(c) Gravels are visible	Y
	(d) Gravels coverd with grass / soil	
13	Operation of On Load Tap Changer (OLTC)	
	(a) As and when required	Y
	(b) Never operated	
14	Operation of Off Load Tap Changer	
	(a) As and when required	
	(b) Never operated	Y
15	DG Set	100KVA
	If Yes, Rating (Nos., Voltage level, KVA capacity)	01 No.