

### Comprehensive Audit:

1. Name of the Sub-Station: 132/33 KV, 191.5 MVA, KAHILIPARA SUBSTATION
2. Voltage level: 132/33 KV
3. Owner: AEGCL
4. Date of Audit: 17.11.2021
5. Members of Auditing Team:

Sl.No.	Name	Designation	Organization	Signature
01	UJJWAL KR-GUPTA	Exgr	PGCIL	24/11/21
2	Chitra Bahadur Thapa	Dy - Mgr	NERLDC	C. Thapa
3	SRIJIT MUKHERJEE	DD	NERPC	S. Mukherjee

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

Sl.No.	Name	Designation	Contact details	Signature
01	Ashwini Kumar Gopi	Asst M	9435720669	Ashwini

24/11/21  
17/11/21

Observations/Recommendations:

Sl.No.	Parameters	Yes/NO	Remarks
1	Whether redundant supply for station auxiliaries is available?	Yes.	200 + 250 KVA SST & 1x250 KVA DG 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?	Yes	Double Main Busbar scheme present.
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?	Yes	—
10	Whether existing RTUs are healthy and reporting?	NA	Data Communication through Gateway
11	Whether existing communication via PLCC or OPGW? If PLCC then healthiness of PLCC panels	PLCC	Healthy.

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12	In case of OPGW connectivity to the station, whether end equipments are available and functional?	Not available	OPGW connectivity to be provided for redundancy
13	Whether all analog/digital points are reporting in local SCADA?	Partially Yes	Non reporting isolator points to be made reporting.
14	Healthiness of Protection coupler/Coupling device?	Yes	Healthy
15	Whether sufficient lighting is available in the switchyard?	No	Additional lighting to be provided
16	DC Supply- Whether two DC sources are available?	Yes	48V Second Source to be kept in service
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	To be procured as per list
19	Whether firefighting provision is available in the station?	Partially Yes	Fire Hydrant/NIPS to be provided in all ICTs except ICT-4 (availability)
20	Whether Protection Audit has ever been carried out before? If yes then compliance status of Audit Observations/Recommendations	Yes	Compliance as per attachment.
21	Whether all relay settings have been submitted in PDMS? If no, then compliance status	No	Relay settings to be submitted
22	Whether CTs, PTs/CVTs of sufficient accuracy is present in the station?	No	May be upgraded to 0.2s class accuracy.

Any other specific observations/recommendations:

- \*1) Earthing of the switchyard equipment needs improvement. Earth Pits need to be made as per IS standard with checker plate and covered.
- 2) Jointing and Welding has been observed from multiple equipment earthing as well as in Earth Pit.
- 3) 44 & 1 wire earthing in the 132 kV side needs to be replaced with plate earthing.

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Gundlupeta



# Audit Observations/Recommendation of 132/33 KV Kahilpura S3

- 4) Considering present power transfer/carry of the 132 KV Bus (Peak around 800 MW), 132 KV Main Bus-A and Main Bus-B needs to be upgraded from ACSR Zebra to HTLS Zebra/Twin Zebra.
- 5) Grouting of weeds needs to be done in the entire switchyard.
- 6) PCC to be done after proper levelling of the switchyard.
- 7) CT/CVT Secondary cable of most 132 KV Bays is overhanging. Same needs to be laid through cable trench in line with safety norms.
- 8) Auto-Reclosure to be implemented for all 132 lines.
- 9) Outer PVC cover of CT secondary cable is missing at connecting terminals. Glanding of 132 KV Sarusajai III line. Glanding of the same needs to be done.
- 10) 132 KV Isolators without Earth Switch and non motorised needs to be replaced with motorised and ES. (dist as per Annexure-1)
- 11) Obsolete/Unserviceable CTs for 132KV Sarusajai-III and Umbra-I to be replaced.
- 12) Obsolete/Unserviceable CVTs of Y-ph in 132KV Umbra 1 & 2 to be replaced.
- 13) 33 KV Isolators with/without ES and non motorised to be replaced with ES and motorised (dist as per Annexure-2)
- 14) Old/Unserviceable 33 KV relays to be replaced as per Annexure-3.
- 15) Presently all 132 KV CTs are having only 3 cores which is not sufficient for implementing Busbar protection. Considering present Busbar arrangement (Double Main), it is recommended to upgrade all CTs and to implement Busbar protection.
- 16) Touching up painting to be done for switchyard equipment surrounding Gantry structure and MBs.

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Audit Observations / Recommendations of 132/33 KV Kahilipara SS

- 17) Cable is not properly laid through cable trench. Same needs to be laid through cable trays in the cable trench and properly covered with cover slabs throughout the switchyard.
- 18) PLC panels needs to be installed with protection coupler for 132 KV Umfou D/C, Kamalpur, Singuram.
- 19) Earthing of 110V Battery Bank 2 structure to be done.
- 20) AC to be done in Battery Bank room.
- 21) Bay marking/phase marking to be done for the switchyard.
- 22) Tan Delta Kit, THRC Measurement Kit, Digital IR Testing Kit, DCR/CRM, SF6 Gas leakage detector, DC Earth Fault locator, Thermoscan Camera to be provided in the Substation immediately.
- 23) Oil leakage observed near top sample valve in ICT-3 which needs to be attended immediately.
- 24) LA counters for ICT-3 HV side found defective and same has to be replaced.
- 25) R ph LA of ICT-2 HV side needs to be tested as no leakage current observed.
- 26) Calibration of WTI of ICT-2 and 5 is incorrect and needs to be corrected immediately.
- 27) Silica Gel Breathes of ICT-3 and 5 needs to be changed.
- 28) Scrap items needs to be disposed off at the earliest.
- 29) Proper protection of SSTs to be ensured through CT, CB and relay.
- 30) Healthiness of 3x5 MVAR Capacitor Banks to be ensured by periodically pulling the Capacitor Banks in service.
- 31) Protection Audit Formats to be submitted.

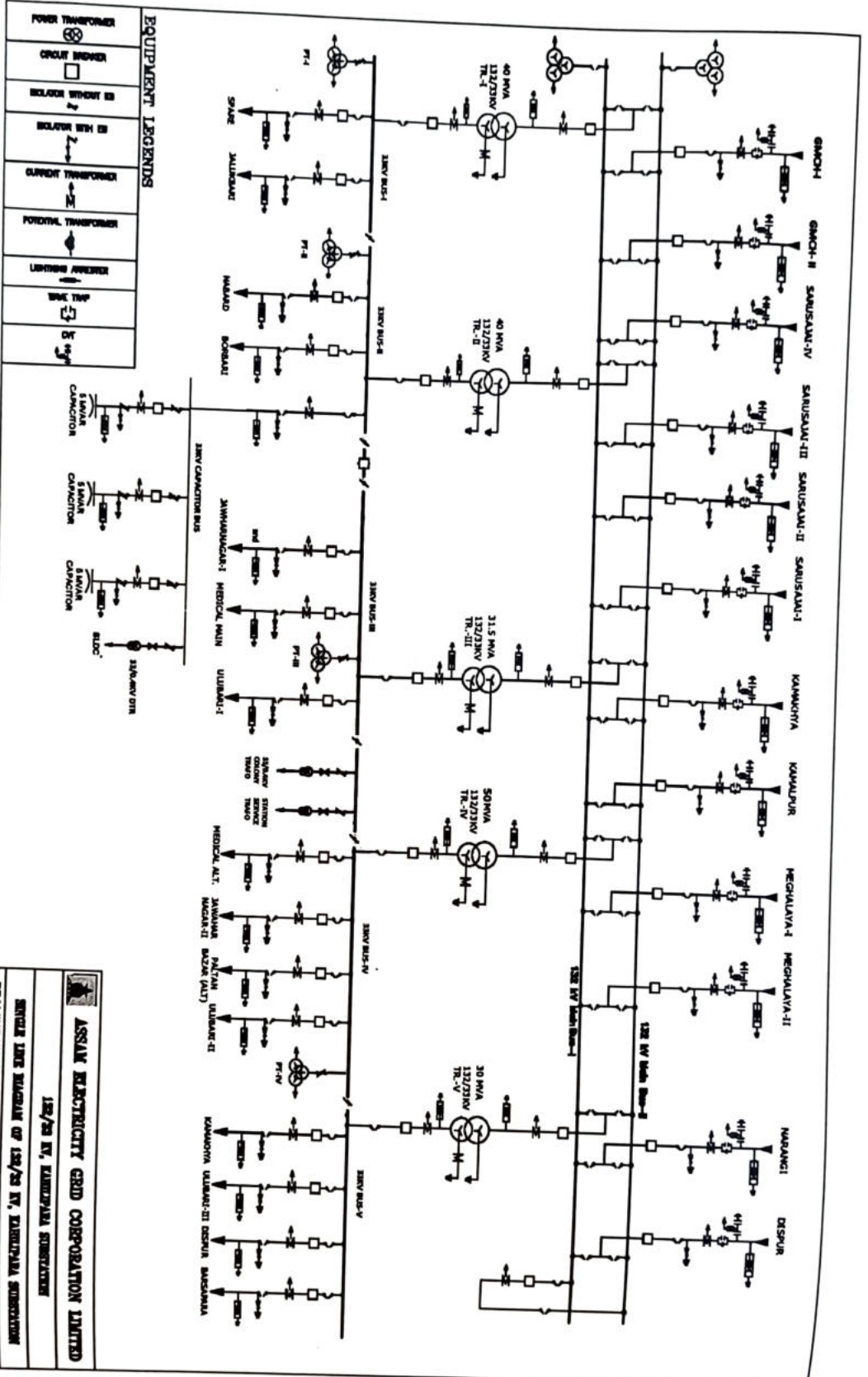
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PSDF project proposed item list

132kV Kahilipara GSS

Sl. No	Particulars	Nos	Proposed against feeder	Remarks
1	33kV Isolator with ES	13	Tr-1 LV Line isolator	
	Rating: 36kV, DBB		Tr-2 LV Line isolator	
	Motorised		Tr-3 LV Line isolator	
			Tr-4 LV Line isolator	
			Tr-5 LV Line isolator	
			Ulubari-I Line isolator	
			Ulubari-II Line isolator	
			J/N-I Line isolator	
			Dispur Line isolator	
			Barsapara Line isolator	
			Kamakhya Line isolator	
			old Narengi Line isolator	
			Old Jalukbari Bus Iso	
2	33kV Isolator without ES	12	Tr-1 LV Bus isolator	
	Rating: 36kV, DBB		Tr-2 LV Bus isolator	
	Motorised		Tr-3 LV Bus isolator	
			Tr-4 LV Bus isolator	
			Ulubari-I Bus isolator	
			Ulubari-II Bus isolator	
			Old Narengi Bus isolator	
			J/N-I Bus isolator	
			J/N-II Bus isolator	
			Barsapara Bus isolator	
			Medical(M) Bus isolator	
			Old Jalukbari Bus Iso	
3	33kV CB	4	J/N-I	
	Rating: 36kV, 1250 A, 110V DC		Ulubari-II	
	SF6		Old Narengi	
			J/N-II (old)	
4	33kV CT (1-ph)	5	Ulubari-II	
	Rating: 36kV, Ratio-400/200/1		Old Narengi	
			J/N-II (old)	
			Medical(M)	
			Kamakhya	
5	132kV Isolator Without ES	22	Kamakhya (Bus A + Bus B)	
	Rating: 145kV, Single Break/DBB		Kamalpur (Bus A + Bus B)	
	Motorised		Capital (Bus A + Bus B)	
			Narengi (Bus A + Bus B)	
			Tr- 1 (Bus A + Bus B)	
			Tr- 2(Bus A + Bus B)	
			Tr-3 (Bus A + Bus B)	
			Meseb-1 (Bus A + Bus B)	
			Meseb-2 (Bus A + Bus B)	
			SSJ-IV (Bus-A)	
			SSJ-III (Bus-A)	
			SSJ-I/(Bus-A + Bus B)	

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6	132kV CB	3	Bus coupler	<i>Kalukbari</i>
	Rating: 145kV, 2000A, 110V DC		Meseb-1	<i>Kalukbari</i>
	SF6		Meseb-2	
7	132kV CT (1-ph)	6	SSJ-III	
	Rating : 145kV. Ratio- 600/300/1		Meseb-1	
8	132kV CVT (1-ph)	2	Meseb-1	
	Rating: 145kV		Meseb-2	
6	33kV Feeder panel, Dual Type	2	J/N (old)	
	SAS		Old Jalukbari	
			old Narengi	
7	Heavy duty Industrial AC	2	PLCC room	
		6	Control Room	
8	33kV Capacitor Bank		Capacitor Bank 1, 2 & 3	
	a. 33kV CB (Rating, 36kV, 1250A, 110V DC)	3		
	b. 33kV NCT	3		
	c. 33kV CT (1-Ph) Rating: 400/200/1	9		

**Note :** Motorised Isolator required for fully operational SAS  
Control voltage : 110V DC

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Sl. No.	Recommendations during Protection Audit 2013	Status as on 06.08.18 (Attended/Not Attended)	If Not completed, target date of completion
1	Old SF6 type CBS may be replaced, if required.	A few replaced.	Balance CB's supplied under PSDF scheme will be replaced during implementation of the scheme.
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.	SA supplied under PSDF scheme replaced.	
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.	3 line feeders and 3 transformer bay feeders CTs replaced under PSDF scheme.	Balance CTs supplied under PSDF scheme will be replaced during implementation of the scheme.
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.	132KV PT(one set) replaced under PSDF scheme.	
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.	
7	DG set of suitable capacity may be provided.		May be provided later.
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		
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.		Will be implemented under PSDF scheme.
10	Required FF provision has to be made as per CEA's regulations.		
11	Earthing system needs improvement		Will be implemented under PSDF scheme.
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.	Not attended.	

Busbar replaced

SA replaced/completed

CT replaced under PSDF scheme

Completed/ok

Completed

provided / completed  
CVT installed in lines.

implemented under PSDF

partly completed  
Completed

not yet received

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Sl No.	Observations during Protection Audit 2017	Status as on 06.08.18 (Attended/Not Attended)	If Not Attended, Target date of completion
1	132 KV Kahilipara Substation is having Double Main Bus Scheme. No Transfer Bus is available and hence there is no redundancy for the circuit breakers.		Not required.
2	DC Earth Fault found in 220 V Battery Bank and 110 V Battery Bank.	Attended partly.	
3	Positive side of 48 V, 300 AH. Positive terminal of 48V source not earthed.		New wavetrap was installed at the 132KV Capital GSS, Dispur.
4	PLCC link for data is working for all 132 KV feeders except for 132 KV Dispur Feeder.		
	PLCC link for protection is working for 132 KV Sarusajal 1, 2 and 3 Feeders. 132 KV Kamalpur feeder is faulty.		SAS will be implemented under PSDF.
	No voice communication is available over PLCC Link.		
5	Bays are not numbered as per standards. No identification marks of R, Y B phase present.	Marking of R,Y,B phase done at switchyard for identification.	Numbering and balance identification marks will be done.
6	Heavy Oil leakage observed in Current Transformers in 132 KV Sishugram and 132 KV Umtru 1 bays and in Breakers for 132 KV Sarusajal # 4 bay. Current Transformers and Breakers need immediate replacements.	Oil leakage in 2 nos. CTs arrested.	
7	Heavy Oil leakage observed in 132/33 KV, 2x30 MVA Transformers. Leakage oil to be cleaned immediately to avoid any kind of fire hazards.	Cleaned.	
8	No soak pits are available in 132/33 KV, 2x30 MVA and 31.5 MVA Transformers.	Not attended.	
9	No Fire-Wall protection available for 132/33 KV, 2x40 MVA, 31.5 MVA and 30 MVA Transformers.	Not attended.	
10	Oil level low in Conservator Tank of 132/33 KV, 40 MVA Transformer- II.		
11	All equipments are to be painted immediately.	Not attended.	
12	No CVT is available in 132 KV Umtru I feeder.	Attended.	
13	All the Lighting Arrestors are connected to a common earth. Each LA should be connected to a separate earth pit.		
14	All the Marshalling Boxes to be changed. Maximum found in rusting condition.	MBS supplied under PSDF scheme replaced.	
15	Most of the LA counters are to be changed immediately.		Will be implemented under PSDF.
16	In 132 KV Narangl and 132 KV Dispur Feeders, Lighting Arrestors are not placed at first.		Design issue. Will be taken up by higher authorities.
17	30 KVA, (Manufacturing Date: 1982) DG set available. New DG Set with higher capacity to be procured under PSDF.		Will be taken up by higher authorities.
18	Secondary voltages to the Protective relays of all feeders are provided from Bus PT. Secondary voltage supply to the distance relays of Sarusajal# 3 & 4 get affected during shut down of Bus -A, due to problem in Bus Voltage selection relay.		Will be rectified with new panels supplied under PSDF scheme.

Common recommendation

OK  
Only 110V Battery is available. OK.  
Completed  
OK.  
SAS has been implemented but no voice communication is available.  
OK.  
Partly done  
Completed  
Not available.  
Completed.  
OK.  
Not completed  
Partly completed  
Partly completed  
Completed  
Completed  
250VKT procured in PSDF  
Completed

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