सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

सं: उ.क्षे.वि.स./प्रचालन/106/01/2023/4072-4113 दिनांक: 13.04.2023

विषय: प्रचालन समन्वय उप-समिति की 206वीं बैठक की कार्यसूची।

Subject: Agenda of 206th OCC meeting.

प्रचालन समन्वय उप-समिति की **206वीं** बैठक का आयोजन वीडियो कॉन्फ्रेंसिंग के माध्यम से दिनांक **18.04.2023** को **10:30** बजे से किया जायेगा। उक्त बैठक की कार्यसूची उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है।

बैठक में सम्मिलित होने के लिए लिंक व पासवर्ड सभी सदस्यों को ई-मेल द्वारा प्रदान किया जाएगा।

कृपया बैठक में उपस्थित होने की सुविधा प्रदान करें।

206th meeting of the Operation Co-ordination sub-committee will be conducted through Video Conferencing on **18.04.2023** from **10:30 Hrs**. The agenda of this meeting has been uploaded on the NRPC web-site http://164.100.60.165.

The link and password for joining the meeting will be e-mailed to respective e-mail IDs in due course.

Kindly make it convenient to attend the meeting.

13/4/23

(संतोष कुमार)
अधीक्षण अभियंता (प्रचालन)

सेवा में : प्रचालन समन्वय उप समिति के सभी सदस्य।
To : All Members of OCC

18-ए, शहीदजीतसिंहमार्ग, कटवारियासराय, नईदिल्ली- 110016 फोन:011-26513265 ई-मेल: seo-nrpc@nic.inवेबसाईट: www.nrpc.gov.in
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1. Confirmation of Minutes

The minutes of the 205th OCC meeting were issued vide letter of even number dated 14.03.2023.

Sub-committee may deliberate and kindly confirm the Minutes.

2. Review of Grid operations

2.1 Power Supply Position (Provisional) for March 2023

Anticipated Power Supply Position v/s Actual Power Supply Position (Provisional) of Northern Region during the month of March-2023 is as under:

State / UT	Req. / Avl.	Energy (MU)			Peak (MW)		
		Anticipated	Actual	% Variation	Anticipated	Actual	% Variation
CHANDIGARH	(Avl)	130	102	-21.8%	290	204	-29.7%
	(Req)	110	102	-7.6%	250	204	-18.4%
DELHI	(Avl)	3019	2130	-29.4%	4700	3979	-15.3%
	(Req)	2125	2131	0.3%	4700	3979	-15.3%
HARYANA	(Avl)	4590	3909	-14.8%	10560	7732	-26.8%
	(Req)	4400	3912	-11.1%	8400	7732	-8.0%
HIMACHAL PRADESH	(Avl)	1023	996	-2.6%	1970	1922	-2.4%
	(Req)	1029	999	-2.9%	1954	1922	-1.6%
J&K and LADAKH	(Avl)	1150	1718	49.4%	1400	2859	104.2%
	(Req)	1790	1726	-3.6%	2900	2859	-1.4%
PUNJAB	(Avl)	5890	4247	-27.9%	11720	8840	-24.6%
	(Req)	4410	4263	-3.3%	7670	8840	15.3%
RAJASTHAN	(Avl)	8960	7513	-16.1%	19000	15637	-17.7%
	(Req)	8990	7546	-16.1%	16140	15833	-1.9%
UTTAR PRADESH	(Avl)	11780	9676	-17.9%	21000	19572	-6.8%
	(Req)	11470	9682	-15.6%	21000	19572	-6.8%
UTTARAKHAND	(Avl)	1228	1151	-6.3%	2110	2185	3.6%
	(Req)	1240	1164	-6.1%	2190	2185	-0.2%
NORTHERN REGION	(Avl)	37771	31443	-16.8%	77400	56000	-27.6%
	(Req)	35564	31522	-11.4%	60100	56200	-6.5%

AAs per above, negative / significant variation (≥5%) in Actual Power Supply Position(Provisional) vis-à-vis Anticipated figures is observed for the month of March-2023 in terms of Energy Requirement for Chandigarh, Haryana, HP, UTs of J&K and Ladakh, Punjab, Rajasthan, UP, and Uttarakhand and in terms of Peak Demand similar variation is noted for Chandigarh, Delhi, Haryana, HP, UTs of J&K and Ladakh, Punjab, Rajasthan, UP, and Uttarakhand. These states/UTs are requested to submit reason for such variations so that the same can be deliberated in the meeting.

All SLDCs are requested to furnish provisional and revised power supply position in prescribed formats on NRPC website portal by 2nd and 15th day of the month respectively for the compliance of Central Electricity Authority (Furnishing of Statistics, Returns and Information) Regulations, 2007.

3. Maintenance Programme of Generating Units and Transmission Lines

3.1. Maintenance Programme for Generating Units

The meeting on proposed maintenance programme for Generating Units for the month of May-2023 is scheduled on 17-April-2023 via Video Conferencing

3.2. Outage Programme for Transmission Elements

The meeting on proposed outage programme of Transmission elements for the month of May-2023 is scheduled on 17-April-2023 via Video conferencing.

4. Planning of Grid Operation

4.1. Anticipated Power Supply Position in Northern Region for May 2023

The Anticipated Power Supply Position in Northern Region for May 2023 is as under:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	170	340	No Revision submitted
	Requirement	192	400	
	Surplus / Shortfall	-22	-60	
	% Surplus / Shortfall	-11.5%	-15.0%	
DELHI	Availability	3010	6170	No Revision submitted
	Requirement	3950	7430	
	Surplus / Shortfall	-940	-1260	
	% Surplus / Shortfall	-23.8%	-17.0%	
HARYANA	Availability	6030	9412	07-Apr-23
	Requirement	6030	10541	
	Surplus / Shortfall	0	-1129	
	% Surplus / Shortfall	0.0%	-10.7%	
HIMACHAL PRADESH	Availability	1083	1782	10-Apr-23
	Requirement	1085	1755	
	Surplus / Shortfall	-2	27	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	% Surplus / Shortfall	-0.2%	1.5%	
J&K and LADAKH	Availability	2110	3530	No Revision submitted
	Requirement	1610	2780	
	Surplus / Shortfall	500	750	
	% Surplus / Shortfall	31.1%	27.0%	
PUNJAB	Availability	6570	12330	No Revision submitted
	Requirement	6620	11320	
	Surplus / Shortfall	-50	1010	
	% Surplus / Shortfall	-0.8%	8.9%	
RAJASTHAN	Availability	10270	18410	No Revision submitted
	Requirement	9690	16420	
	Surplus / Shortfall	580	1990	
	% Surplus / Shortfall	6.0%	12.1%	
UTTAR PRADESH	Availability	15345	23900	12-Apr-23
	Requirement	15190	27200	
	Surplus / Shortfall	155	-3300	
	% Surplus / Shortfall	1.0%	-12.1%	
UTTARAKHAND	Availability	1365	2370	12-Apr-23
	Requirement	1387	2380	
	Surplus / Shortfall	-23	-10	
	% Surplus / Shortfall	-1.6%	-0.4%	
NORTHERN REGION	Availability	45953	72300	
	Requirement	45754	74100	
	Surplus / Shortfall	199	-1800	
	% Surplus / Shortfall	0.4%	-2.4%	

SLDCs are requested to update the anticipated power supply position of their respective state / UT for the month of May-2023 and submit the measures proposed to be taken to bridge the gap between demand & availability, as well to dispose-off the surplus, if any, in the prescribed format.

5. Submission of breakup of Energy Consumption by the states

5.1 The updated status on the submission of energy consumption breakup is presented below:

State / UT	From	To
DELHI	Apr-2018	Feb-2023
HARYANA	Apr-2018	Jan-2023
HIMACHAL PRADESH	Apr-2018	Feb-2023
PUNJAB	Apr-2018	Jan-2023
RAJASTHAN	Apr-2018	Feb-2023
UTTAR PRADESH	Apr-2018	Jan-2023
UTTARAKHAND	Apr-2018	Dec-2022

All the remaining UTs viz., J&K and Ladakh and Chandigarh are requested to submit the requisite data w.e.f. April 2018 as per the billed data information in the format given as under:

Category→	Consumption by Domestic Loads	Consumption by Commercial Loads	Consumption by Agricultural Loads	Consumption by Industrial Loads	Traction supply load	Miscellaneous / Others
<Month>						

6. Follow-up of issues from previous OCC Meetings- Status update.

The updated status of agenda items is enclosed at ***Annexure-A.I***.

All utilities are requested to update the status.

7. NR Islanding scheme

7.1 A physical meeting was called on 28.03.2023 with DTL, DELHI SLDC, NRLDC at NRPC Secretariat to deliberate on steady state analysis of PSSE basecase of Delhi islanding scheme.

7.2 A meeting was held on 11.04.2023 among NRPC, NRLDC, HPSLDC, HPSEBL, HPPTCL and various generators involved in Shimla-Solan islanding scheme to review the progress of the Shimla-Solan islanding scheme.

Latest status of Islanding Scheme of NR is attached as **Annexure-A.II.**

Members may kindly deliberate.

8. Coal Supply Position of Thermal Plants in Northern Region

8.1 In 186th OCC meeting, it was agreed that coal stock position of generating stations in northern region may be reviewed in the OCC meetings on the monthly basis.

8.2 Accordingly, coal stock position of generating stations in northern region during current month (till 09th April 2023) is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
ANPARA C TPS	1200	90.02	17	6.0

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
ANPARA TPS	2630	62.86	17	27.5
BARKHERA TPS	90	38.21	26	31.6
DADRI (NCTPP)	1820	66.24	26	11.5
GH TPS (LEH.MOH.)	920	49.91	26	24.5
GOINDWAL SAHIB TPP	540	65.44	26	7.6
HARDUAGANJ TPS	1265	45.03	26	17.6
INDIRA GANDHI STPP	1500	56.37	26	13.0
KAWAI TPS	1320	61.18	26	29.3
KHAMBARKHERA TPS	90	28.82	26	49.2
KOTA TPS	1240	83.29	26	5.3
KUNDARKI TPS	90	55.50	26	41.0
LALITPUR TPS	1980	59.14	26	25.6
MAHATMA GANDHI TPS	1320	59.58	26	25.6
MAQSOODPUR TPS	90	38.68	26	42.0
MEJA STPP	1320	87.98	26	14.6
OBRA TPS	1094	60.35	26	6.5
PANIPAT TPS	710	43.91	26	43.5
PARICHHA TPS	1140	45.51	26	6.6
PRAYAGRAJ TPP	1980	63.52	26	19.5
RAJIV GANDHI TPS	1200	60.62	26	24.6
RAJPURA TPP	1400	76.56	26	22.7
RIHAND STPS	3000	84.42	17	29.4
ROPAR TPS	840	46.58	26	37.8
ROSA TPP Ph-I	1200	49.58	26	13.3
SINGRAULI STPS	2000	72.38	17	17.4
SURATGARH TPS	1500	45.24	26	3.3
TALWANDI SABO TPP	1980	64.30	26	7.0
TANDA TPS	1760	67.95	26	10.5
UNCHAHAR TPS	1550	68.38	26	15.9

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
UTRAULA TPS	90	38.63	26	55.6
YAMUNA NAGAR TPS	600	79.69	26	24.1
CHHABRA-I PH-1 TPP	500	64.61	26	7.4
KALISINDH TPS	1200	61.97	26	9.8
SURATGARH STPS	1320	59.37	26	8.8
CHHABRA-I PH-2 TPP	500	69.92	26	14.0
CHHABRA-II TPP	1320	57.37	26	5.9

9. SPS protection logic review at PPGCL (Agenda by UPSLDC)

9.1 UPSLDC vide its letter dated 13.04.2023 has intimated that 1500MVA, 765/400kV ICT-2 has been commissioned on 31.03.2023 at Bara TPS.

9.2 Following the commissioning of aforementioned ICT, SPS installed at Bara TPS needs to be revised. (Copy of old SPS scheme and revised proposed scheme is attached as **Annexure-A.III.)**

Members may kindly deliberate.

खण्ड-ख: उ.क्षे.भा.प्रे.के. Part-B: NRLDC

10. NR Grid Highlights for March 2023

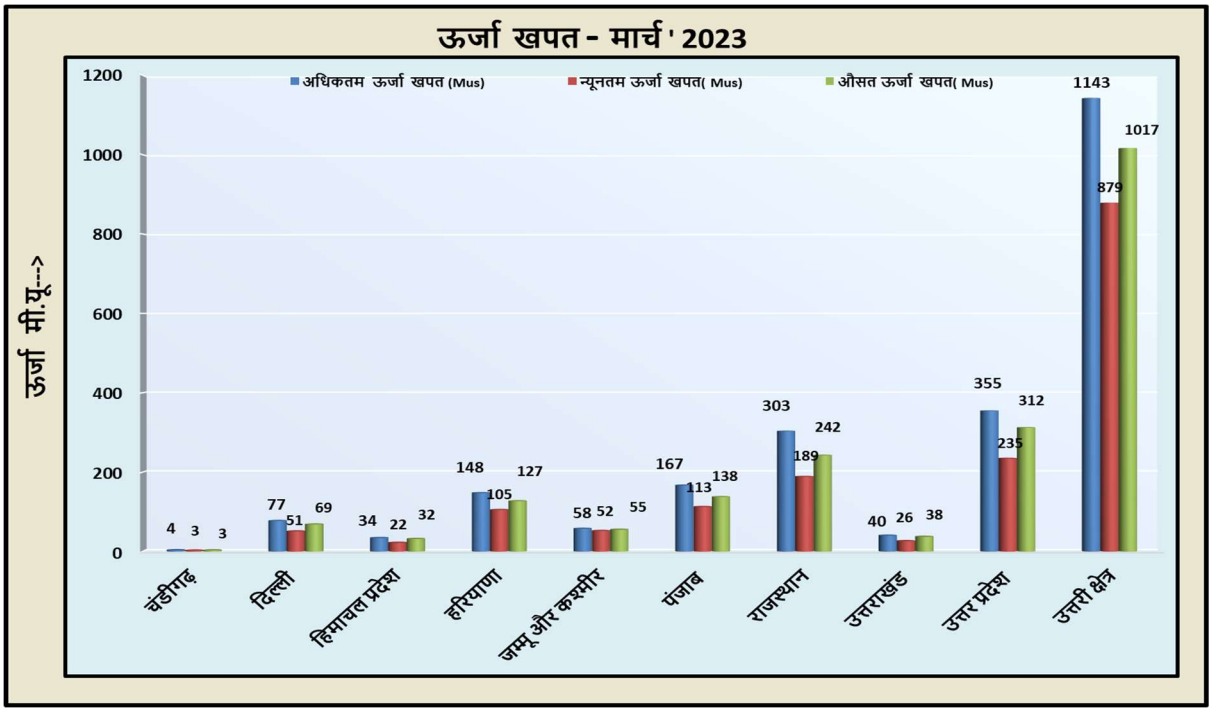
Following are major grid highlights of March 2023:

- Maximum energy consumption of Northern Region was **1143 Mus** on 03rd March'23 and it was 3.3 % lower than March' 2022 (1182 Mus 31st March'22)
- Average energy consumption per day of Northern Region was **1017 Mus** and it was 7.0 % lower than March'22 (1093 Mus per day)
- Maximum Demand met of Northern Region was **56004 MW** on 03rd March'23 @10:00 hours (*based on data submitted by Constituents)* as compared to 53577 MW on 21st March'22 @20:00 hours.

Northern Region all time high value recorded in March'23:

	All Time High Record	
	Value (MU)	Achieved on
Solar Generation	**142.8**	**28.03.2023**

Energy Consumption:



- **Comparison of Average Energy Consumption (MUs/Day) of NR States for the March'22 vs March'23**

क्षेत्र/राज्य	मार्च - 2022	मार्च - 2023	% अंतर
चंडीगढ़	3.5	3.3	-5.6%
दिल्ली	73.2	68.6	-6.2%
हिमाचल प्रदेश	30.0	32.1	6.9%
हरियाणा	135.5	127.4	-6.0%
जम्मू और कश्मीर	51.1	55.4	8.5%
पंजाब	148.9	137.6	-7.6%
राजस्थान	261.1	242.4	-7.2%
उत्तराखंड	37.4	37.5	0.3%
उत्तर प्रदेश	352.7	312.3	-11.5%
उत्तरी क्षेत्र	**1093.4**	**1016.5**	**-7.0%**

Frequency Data

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
Mar'23	50.03	50.48	49.82	9.0	65.4	25.6
Mar'22	50.02	50.30	49.81	14.6	73.4	12.0

Detailed presentation on grid highlights of Mar'2023 will be shared by NRLDC in OCC meeting

11. Data Preparation for Resource Adequacy Studies

Ministry of Power has notified the Electricity (Amendment) Rules, 2022, which inter alia, aims to implement Resource Adequacy (RA) Framework to ensure reliable supply of Electricity to the consumers.

As per Rule 16 of the Electricity (Amendment) Rules, 2022 Ministry of Power has to issue guidelines for assessment of resource adequacy during the generation and operational planning stages. Accordingly, CEA has prepared draft Resource Adequacy Guidelines, which are currently in approval stage. As per the draft Resource Adequacy Guidelines published in September 2022, Central Electricity Authority is entrusted to prepare Long Term-National Resource Adequacy Plan (LT-NRAP). Further Distribution Utility need to carry out LTDRAP (Long term Discom Resource Adequacy Plan) to meet the utility peak and energy requirement reliably.

A letter dated 25th Jan 2023 was sent to all the States, regulatory commission, and NDLC/RLDC/SLDCs for collection of data from CEA office. For preparing the LT-NRAP State-wise information viz. Demand, Installed Capacity, Generation (both RE and conventional), financial data etc. is required

Chairperson CEA vide their letter dated 29.03.2023 (**Annexure-B.I**) has asked all utilities to assign this task to a team of officers for data preparation and to carry out RA studies. CEA will guide & hand hold the team of officers in data collection, power system modelling and analysis of result for carrying out state specific resource adequacy studies. Format in which data is to be submitted by respective utilities is available @ *https://docs.google.com/spreadsheets/d/1yHDNxVEUHuWdCunNLr7vg009LZX7JMkf/edit?usp=share_link&ouid=101952646418859842988&rtpof=true&sd=true.*

It is requested to furnish the data and nomination of officers for data preparation and to carry out RA studies to CEA with copy to NRPC/ NRLDC.

Members may please discuss.

12. TTC/ATC of state control areas for summer 2023 & Revision in Reliability Margin

Most of the NR states except J&K, Ladakh and Chandigarh U/Ts are sharing basecase and ATC/TTC assessment with NRLDC. OCC has advised all states to timely declare TTC/ATC for prospective months and revise the figures as per requirement.

Based on feedbacks received till date, SLDCs are requested to go through the tentative ATC/TTC limits for May 2023 as shown below and provide comments. If no comments are received, these limits will be assumed confirmed and uploaded on NLDC website. SLDCs are also requested to upload these limits in their respective websites. States are also requested to regularly provide update regarding the upcoming transmission elements which would improve import capability of respective state control area.

STATE	PRESENT IMPORT TRANSFER CAPABILIT	CONSTRAINTS	REMEDIAL ACTION TO MITIGATE THE CONSTRAINTS

	Y		
Haryana	TTC: 9100MW RM: 600MW ATC: 8500MW	N-1 Contingency of 2*315 MVA ICT at Deepalpur	New 500MVA ICT approved in 4 NRPCTP held on 05.10.2021. SPS commissioned as immediate measure. ICT commissioning delayed to PPP substation model issues as informed by HVPN. In 204 OCC meeting, it was informed by Indigrid representative that talks are underway between Indigrid and HVPN to resolve issues for commissioning of new ICT at Deepalpur. No progress reported in 205 OCC meeting.
		N-1 Contingency of 3*150+500 MVA ICT at Panipat BBMB	Proposal for new ICT to be given by HVPN/DTL. Drawl to be planned from other nearby stations. Lack of space at Panipat as informed by BBMB in OCC meeting. Other options to be explored by HVPN.
		N-1 Contingency of 2*500 MVA ICT at Kurukshetra (PG)	New 500MVA ICT approved in 4 NRPCTP held on 05.10.2021. Expected before by Jun 2023.
		High loading of 220kV Hissar (PG)-Hissar (IA)	Following was agreed in meeting taken by CEA on 20.03.2023: (i) Reconductoring of 220 kV Hisar (PG) - Hisar (IA) D/c line with HTLS conductor was agreed. PGCIL to intimate the type of HTLS conductor which can be implemented on towers of existing 220 kV Hisar (PG) - Hisar (IA) D/c line within two weeks. (ii) HVPNL to carry out the augmentation of line bay equipment at Hisar (IA) substation in the matching time frame of reconductoring of the 220 kV Hisar (PG) - Hisar (IA) D/c line. (iii) HVPNL to examine the issue of high loading on Hisar (IA) - Hisar (BBMB) 220 kV D/c line and plan adequate measures to relieve loading on the line. HVPNL to submit the relevant system studies with CEA/CTUIL. (iv) HVPNL to plan necessary augmentation /network strengthening so as to meet the future load growth in

			and around Hisar.
		Upcoming following transmission elements would help increase import capability of Haryana: • 220kV Sec 32 Panchkula and 220kV lines to Panchkula (PG) • 220kV Rai Substation and 220kV lines to Sonepat (PG)) • 400/220kV Bhiwani(BBMB) ICT (under long outage)	
Punjab	TTC: 9000MW RM: 500MW ATC: 8500MW	N-1 Contingency of 2*500 MVA ICT at Patran	New 500MVA ICT approved in 11 CMETS held on 30.09.2022. (Expected May'2024)
		N-1 Contingency of 2*315 MVA ICT at Nakodar	ICT capacity at Nakodar would be augmented from 315MVA to 500MVA by July 2023 (1st ICT) and Sep 2023 (2nd ICT). One 315MVA ICT damaged, to be borrowed from POWERGRID. (Expected by May'23)
		N-1 Contingency of 2*500+1*250+1*315 MVA ICT at Moga	One 250MVA ICT to be replaced by 500MVA ICT. Bay equipment of higher ratings to be used. Approved in 11 CMETS held on 30.09.2022 (Expected by May'23)
		N-1 Contingency of 2*315+2*500 MVA ICT at Ludhiana	One 315MVA ICT to be replaced by 500MVA ICT (expected May 2023). Approved in 11 CMETS held on 30.09.2022. (Expected by May'23)
Rajasthan	TTC: 7600MW RM: 600MW ATC: 7000MW	N-1 Contingency of 2*315 MVA ICT at Chittorgarh	Rajasthan STU has planned and implemented SPS at these locations. (except Bhilwara & Hindaun)
		N-1 Contingency of 2*315 MVA ICT at Jodhpur	
		N-1 Contingency of 2*315 MVA ICT at Ajmer	
		N-1 Contingency	

		of 2*315 MVA ICT at Bikaner	
		N-1 Contingency of 2*315 MVA ICT at Merta	New 1*500MVA ICT under bidding at these S/s by RVPNL.
		N-1 Contingency of 2*315 MVA ICT at Hindaun	
		N-1 Contingency of 1*315+1*500 MVA ICT at Bhilwara	Capacity augmentation at Chittorgarh expected by July 2023, for all other substations after next winter season.
	(Issues observed with load >14500MW)	Low voltage issues at Hindaun, Alwar.	New 400/220kV Dholpur S/s likely to provide some relief, however approved by CEA on 27Jan 2023, so issue likely to persist for next 1-2 winter seasons. Other immediate measures required by RVPN. 400kV Bharatpur is under internal approval with LILO of 400kV Agra-Sikar.
			Severe issues observed during Dec 2022-Jan 2023 months.
		Low voltage issues in RE generation pockets	Additional reactive power support devices for maintaining grid voltages within IEGC prescribed limits to be planned. Intrastate RE generators to support the grid by operating in voltage control mode.
		N-1 contingency of 400kV Barmer-Bhinmal D/C (under high wind gen.)	Commissioning of 765kV Jodhpur (Kankani) to be expedited. Additional transmission system requirement to be assessed by RVPN
		Huge MVAR drawl at RVPN during winter months (even below	As intimated by RVPN, Capacitor banks to be installed after PSDF funding. Capacitor planning & implementation to be done in expeditious manner at transmission & distribution level.

		0.8 at number of 400/220kV ICTs)	
Uttar Pradesh	TTC: 15100MW RM: 600MW ATC: 14500MW	N-1 Contingency of 2*500 MVA ICT at Azamgarh	New ICT/ Capacity augmentation to be planned by UPPTCL. SPS implemented. Commissioning of 400/220kV Jaunpur S/S likely to provide relief (commissioned).
		N-1 Contingency of 3*315+1*500 MVA ICT at Sarnath	New ICT/ Capacity augmentation to be planned by UPPTCL. SPS implemented. Commissioning of 400/220kV Sahupuri S/S likely to provide relief (Oct'2023)
		N-1 Contingency of 2*315+1*240 MVA ICT at Obra	New ICT/ Capacity augmentation to be planned by UPPTCL. SPS has been implemented by UPPTCL as confirmed in meeting.
		N-1 Contingency of 3*315 MVA ICT at Allahabad	New ICT/ Capacity augmentation may be proposed by UPPTCL. Commissioning of 400/220kV Jaunpur S/s likely to provide relief (commissioned).
		N-1 Contingency of 2*315 MVA ICT at Sohawal(PG)	New 500MVA ICT approved in 3 NRPCTP held on 19.02.2021. New ICT expected before summer 2023.
		N-1 Contingency of 1*240+1*315+1*500 MVA ICT at Gorakhpur (UP)	Capacity augmentation at Gorakhpur (UP) from 1055MVA to 1315MVA to be expedited. SPS implemented.
Delhi	TTC: 7100MW RM: 300MW ATC: 6800MW	N-1 contingency of 2*315 MVA ICT at Bawana	After bus -split due to high fault level at Bawana, ICTs N-1 non-compliant. Additional ICT/ load shifting to other station to be planned. Delhi SLDC to make sure that essential loads such as hospitals, DMRC, other important loads have alternate supply available so as to avoid load loss in case of N-1 contingency. ***In 205 OCC meeting, DTL representative agreed to provide SPS***

			logic for SPS implementation at Bawana (2 ICTs section) in next OCC meeting. DTL to provide update.
		N-1 Contingency of 3*315 MVA ICT at Mundka	New ICT/ Capacity augmentation to be planned by DTL. One ICT under prolonged outage to be revived (to be borrowed from Ludhiana(PG)). SPS implemented
Himachal Pradesh	TTC: 1400MW RM: 100MW ATC: 1300MW (lean hydro) No major transmission issues during summer/ monsoon	N-1 Contingency of 3*315 MVA ICT at Nallagarh	New ICT/ Capacity augmentation to be proposed by HPPTCL/ PSTCL, based on future load growth. Drawl by Punjab, Chandigarh & HP from 400/220kV Nallagarh CT ratio at Nallagarh end to be uprated for utilising full line capacity of 220kV Nallagarh- Upernangal D/C. POWERGRID informed work to be done in next shutdown of line (17-18 Apr 2023.
Uttarakhand	T TC: 1700MW RM: 100MW ATC: 1600MW	N-1 Contingency of 2*315 MVA ICT at Kashipur High loading of 220kV CB Ganj-Pantnagar	New ICT/ Capacity augmentation to be planned by PTCUL. SPS implemented at Kashipur. As intimated by SLDC Uttarakhand, no Bid received for new 315MVA ICT at Kashipur 400kV Pantnagar is under study to relieve loading of 220kV CBGanj-Pantnagar
		High loading of 220kV lines from Roorkee (PG)	Additional connectivity/ conductor upgradation to be planned by PTCUL (400kV Landhora S/S by LILO of 400kV Kashipur-Roorkee line under discussion). Under discussion with CTUIL and CEA.
J&K	TTC: 2200MW RM: 100MW ATC: 2100MW (lean hydro) No major	N-1 Contingency of 2*315 MVA ICT at Amargarh	New ICT/ Capacity augmentation may be expedited by NRSSXXIX (planned for Mar'2026). Additional planned 220kV and low voltage lines to be expedited to manage drawl from Amargarh. As per latest discussion held in 16 CMETS held on 28.02.2023, new ICT to be implemented in next 21 months.

	transmissio n issues during summer/ monsoon	High loading of 220kV lines from Wagoora(P G)	Additional connectivity to be planned and already approved schemes to be expedited by JKPTCL
		Low voltage issues during winter season	Large dependency on SVC at New Wanpoh for MVAR support. Capacitor installation at low voltage level to be expedited.

J&K

Loading of 400/220kV Amagarh ICTs was above N-1 contingency limits for last 30 days. 220kV Amargarh-Ziankote D/C lines are also N-1 non-compliant for most of the time during winter months.

Apart from above, there are issues related to huge MVAR drawl by J&K control area during winter season.

Not assessing its ATC. J&K representatives had intimated during 47th TCC and 49th NRPC meeting that they would be sharing ATC/TTC assessment with NRLDC from October 2021, however the same is still awaited.

NRLDC had taken online training sessions for J&K representative on 20th & 21st Feb 2023 and 9th March 2023. J&K and Ladakh U/Ts are once again requested to advise the concerned officers to evaluate their ATC/TTC limits in coordination with NRLDC and share latest assessment with NRLDC and NRPC.

Punjab, Haryana, HP & UP are communicating with NRLDC regularly regarding ATC/TTC assessment for summer/monsoon 2023. However, other states such as Delhi, Rajasthan, Uttarakhand and J&K are yet to provide their ATC/TTC assessments for summer/monsoon 2023.
As discussed in 62 NRPC meeting and 205 OCC meeting, all states are requested to assess ATC/TTC limits of their respective state control area for summer 2023 and share with NRLDC/ NRPC at the earliest.

It is again requested that SLDCs may ensure that loading of ICTs and lines are below their N-1 contingency limits. While requisitioning power from various sources, states should take care to limit their scheduled drawl as well as actual drawl in real time within the Available Transfer Capability (ATC) limits assessed by SLDC and NRLDC. NRLDC is continuously sending emails in real-time for ensuring N-1 compliances as well as restricting schedule till ATC limit and maximizing internal generation. SLDCs need to ensure this during real-time operation.

CEA has recently published manual on transmission planning criteria which is available *@https://cea.nic.in/wp-content/uploads/psp___a_ii/2023/03/Manual_on_Transmission_Planning_Criteria_2023.pdf*

In the published document, definition of reliability margin has been provided under section 3.15.2 which is quoted below:

"3.15.2 "Transmission Reliability Margin (TRM)" means the margin kept in the total transfer capability necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in the system conditions. The ***TRM may be considered as minimum of 2% of demand of area/region or size of largest generating unit in that area/region****"*

Presently, most of the NR states are declaring their TRM based on largest unit size as per the CERC congestion management procedure available @ https://cercind.gov.in/2013/regulation/26_4.pdf.

Since now, it has been exclusively mentioned in Transmission planning criteria to take reliability margin as minimum of 2% of demand of area/region or size of largest generating unit in that area/region, states are requested to provide revised ATC/TTC limits based on above consideration.

As discussed in last several OCC meetings, all SLDCs need to furnish ATC/TTC details of their control area at respective SLDC websites. Now, it is being observed that most of the SLDCs except J&K are uploading ATC/TTC limits on their websites.

SLDC	Link for ATC on website
UP	https://www.upsldc.org/documents/20182/0/ttc_atc_24-11-16/4c79978e-35f2-4aef-8c0f-7f30d878dbde
Punjab	https://www.punjabsldc.org/downloads/ATC-TTC0321.pdf
Haryana	https://hvpn.org.in/#/atcttc
Delhi	https://www.delhisldc.org/resources/atcttcreport.pdf
Rajasthan	https://sldc.rajasthan.gov.in/rrvpnl/scheduling/downloads
HP	https://hpsldc.com/mrm_category/ttc-atc-report/
Uttarakhand	https://uksldc.in/ttc-atc
J&K and Ladakh U/T	**NA**

It is seen that most of the links are old and have old ATC/TTC limits. It is requested to regularly update ATC/TTC limits as agreed between SLDC and NRLDC.

Members may like to discuss.

13. AMC (Annual Maintenance) extension of AMR (Automatic Meter Reading) meters in NR region

According to Sub-proviso (22) of proviso (4) of Regulation 6 of Indian Electricity Grid Code 2010, NRLDC is responsible for processing SEM data on a weekly basis for Northern region and forwarding the processed meter data to NLDC for loss calculation and to NRPC for issuing Deviation Settlement Account on weekly basis.

To perform the statutory function mentioned above, NRLDC requires meter data, which is provided either online via AMR or collected via DCD by individual stations and sent to us.

Currently, there are approximately 2700 SEMs installed in the Northern region, out of which about 1800 meter data is provided to NRLDC via AMR and the rest is provided by individual stations after collecting via DCD. Powergrid has a contract with a third-party vendor M/s Kalkitech to fetch meter data online via AMR on a weekly basis and provide to NRLDC.

The contract with M/s Kalkitech is going to expire in June month of 2023.

Powergrid was requested to take up the matter regarding contract renewal and the copy of the letter was also given to NRPC Sectt for kind information vide letter dtd. 23rd Feb 2023 (**Annexure- B.II**).

As the present AMC contract between Powergrid and M/s Kalkitech is going to expire in June 2023, POWERGRID is requested to provide update regarding contract renewal.

Members may please discuss

14. Grid Operation related issues

a) Procedure for integration of power system element into the grid

An online session was taken by NRLDC FTC team on **03.04.2023** to familiarize the "**procedure for integration of power system element into the grid**" for new and modified elements. NRLDC officials from SCADA, Metering, Protection department and FTC coordinator explained the requirement and issued faced during the process of new element charging. Various officials from Powergrid, RTAMCs and site were present during the session.

It was a healthy discussion between the Powergrid and NRLDC officials and it is expected that utilities will be benefited from such session as well it will ease the coordination between the two while facilitating the new element charging.

List of the participant is attached as **Annexure-B.III**.

This is for kind information of OCC forum.

b) Long outage of transmission elements

It is requested to expedite restoration of the Grid elements under long outage at the earliest and also provide an update regarding their expected restoration date/time in the meeting/ NRLDC outage portal.

Some of the key elements that need to be revived at the earliest:

- 765 KV Anpara_D-Unnao (UP) Ckt-1
- 400/220 kV 240 MVA ICT 2 at Orai(UP)
- 400/220 kV 315 MVA ICT 2 at Mundka(DV)
- 400/220 kV 500 MVA ICT 1 at Bhiwani(BB)
- 400/220 KV 240 MVA ICT 3 AT Moradabad (UP)
- 400KV Bus 1 at Vishnuprayag(JP)
- 400KV Bus 2 at Parbati_2(NH)
- 400KV Bus 2 at Parbati_3(NH)
- 400KV Bus 2 at Noida Sec 148(UP)
- 400 KV Jodhpur-Kankani (RS) Ckt-1

- 400 KV NOIDA SEC 148-NOIDA SEC 123 (UP) CKT-2
- 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) Ckt-1
- 220 KV Gazipur(DTL)-Noida Sec62(UP) (UP) Ckt-1
- 220 KV Gazipur(DTL)-Shahibabad(UP) (UP) Ckt-2
- 220 KV Kishenpur (PG)-Mir Bazar (PDD) Ckt-1
- 220 KV Debari(RS)-RAPS_A(NP) (RS) Ckt-1

List of generating units under long outage is attached as **Annexure-B.IV**. It can be seen that number of thermal generating units are under outage in Rajasthan. It is requested to provide update regarding the likely revival date for these generating units in the meeting/ NRLDC outage portal.

Member may like to discuss.

c) Update of Important grid element document in line with IEGC:

In line with section 5.2. (c) of IEGC, list of important grid elements in Northern region would be compiled by NRLDC shortly. Such elements shall be opened/closed only on instructions from NRLDC. NRLDC has requested utilities to submit the list of all elements with details charged under their jurisdiction from 1.4.2022 till date including those expected to be commissioned till May 2023 so that the same could be included in the list vide email dated 23rd March 2022.

However, response from most of the utilities is still pending. It is requested to provide details before 30th April 2023. Last updated document is available at following link https://nrldc.in/download/important-grid-element-of-northern-region-may-2022/?wpdmdl=10389. Any other feedback related to inclusion/deletion of elements may also be provided.

Utilities may provide update.

15. Frequent forced outages of transmission elements in the month of March'23:

The following transmission elements were frequently under forced outages during the month of **March'23**:

S. No.	Element Name	No. of forced outages	Utility/SLDC
1	220 KV Debari(RS)-RAPS_A(NP) (RS) Ckt-1	6	NPCIL/Rajasthan
2	400 KV Aligarh-Muradnagar_1 (UP) Ckt-1	4	UP
3	400 KV Anpara_B(UPUN)-Mau(UP) (UP) Ckt-1	3	UP
4	400 KV Bareilly-Unnao (UP) Ckt-1	3	UP
5	400 KV Gumma (HP)-Panchkula(PG) (PG) Ckt-1	3	HP/POWERGRID
6	400 KV Suratgarh(RVUN)-Bikaner(RS) (RS) Ckt-1	3	Rajasthan

The complete details are attached at **Annexure-B.V**. It may be noted that frequent outages of such elements affect the reliability and security of the grid. Hence, utilities

are requested to analyze the root cause of the tripping and share the remedial measures taken/being taken in this respect.

Members may like to discuss.

16. Multiple element tripping events in Northern region in the month of March '23:

A total of 21 grid events occurred in the month of March'23 of which **03** are of GD-1 category, **07** are of GI-2 Category & **08** is of GI-1 category. The tripping report of all the events have been issued from NRLDC. A list of all these events is attached at **Annexure-B.VI.**

Further, despite persistent discussions/follow-up in various OCC/PCC meetings, it is observed that provisions 5.2(r) and 5.9.4(d) of the IEGC, pertaining to reporting of events / tripping to RLDC, is not being complied with by many utilities.

Maximum Fault duration observed is 5.4 secs in the event of multiple element tripping at 400/220kV Panki(UP) & 400kV Kanpur(PG) at 13:07hrs on 23rd Mar, 2023. During the event, R & Y ph pole of CB at Panki end of 220kV Panki-Kanpur South ckt damaged.

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total 4 events out of **18** grid events occurred in the month. The other events with delayed clearance of faults are as follows:

1. Multiple elements tripping at 400/220kV Panki(UP) & 400kV Kanpur(PG) at 13:07hrs on 23rd March, 2023, fault clearance time: 5400ms
2. Multiple elements tripping at 400kV Koldam(NTPC) at 17:00hrs on 13th March, 2023, fault clearance time: 320ms
3. Multiple elements tripping at 220kV Moga(PG) & Mogan(PS) at 19:07hrs on 27th March, 2023, fault clearance time: 1560ms
4. Multiple elements tripping at 220/66kV Jamalpur(BBMB) at 21:17hrs on 30th March, 2023, fault clearance time: 240ms

Remedial actions taken by constituents to avoid such multiple elements tripping may be shared.

Members may take necessary preventive measures to avoid such grid incidents / disturbances in future and report actions taken by respective utilities in OCC & PSC forum. Moreover, utilities may impress upon all concerned for providing the Preliminary Report, DR/EL & Detailed Report of the events to RLDC in line with the regulations.

Members may like to discuss.

17. Details of tripping of Inter-Regional lines from Northern Region for March' 23:

A total of 11 inter-regional lines tripping occurred in the month of March'23. The list is attached at **Annexure-B.VII.** The status of receipt of preliminary reports, DR/EL within 24hrs of the event and fault clearing time as per PMU data has also been mentioned in the table. The non-receipt of DR/EL & preliminary report within 24hrs of the event from SLDCs / ISTS licensees / ISGSs is in violation of regulation 5.2(r) of IEGC and regulation 15(3) of CEA Grid Standards. As per regulations, all the utilities shall furnish the DR/EL, flag details & preliminary report to RLDC/RPC within 24hrs of the event. They shall also furnish the detailed investigation report within 7 days of the

event if fault clearance time is higher than that mandated by CEA (Grid Standard) Regulations.

Members may please note and advise the concerned for taking corrective action to avoid such tripping as well as timely submission of the information.

18. Status of submission of DR/EL and tripping report of utilities for the month of March'23.

The status of receipt of DR/EL and tripping report of utilities for the month of March'2023 is attached at **Annexure-B.VIII**. It is to be noted that as per the IEGC provision under clause 5.2 (r), detailed tripping report along with DR & EL has to be furnished within 24 hrs of the occurrence of the event. However, it is evident from the submitted data that reporting status is not satisfactory and needs improvement. Also, it is observed that reporting status has been improved from POWERGRID, HP, Haryana, UP, Rajasthan & Uttarakhand in March'2023 compared to the previous month. However, reporting status from Punjab, Delhi, J&K & RE stations need improvement.

Members may please note and advise the concerned for timely submission of the information. It is requested that DR/EL of all the trippings shall be **uploaded on Web Based Tripping Monitoring System "http://103.7.128.184/Account/Login.aspx"** within 24 hours of the events as per IEGC clause 5.2.r and clause 15.3 of CEA grid standard. Apart from prints of DR outputs, the corresponding COMTRADE files may please also be submitted in tripping portal / through email.

19. Status of PSS tuning/ re-tuning and Step Response Test of generator

In last 23 OCC meetings, this point was discussed and Utilities were requested to submit the present status of PSS tuning/re-tuning and Step Response Test of their respective generators as per the below mentioned format.

S. No.	Name of the Generating Station	Date of last PSS tuning / re-tuning performed (in DD/MM/YYYY format)	Date of last Step Response Test performed (in DD/MM/YYYY format)	Report submitted to NRLDC (Yes/ No)	Remarks (if any)

The status of test performed till date is attached at **Annexure-B.IX.**

It is to be noted that as per regulation 5.2(k) of IEGC, Power System Stabilizers (PSS) in AVRs of generating units (wherever provided), shall be got properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the CTU/RPC from time to time.

Members were requested to update about their future plan for PSS tuning as there is no significant progress despite including this agenda in every OCC meeting and a separate meeting may be called for detail discussion on this matter.

Members may like to discuss.

20. Frequency response characteristic:

Three FRC based event occurred in the month of **March-2023**. Description of the event is as given below:

Table:

S. No.	Event Date	Time (In hrs.)	Event Description	Starting Frequency (in Hz)	End Frequency (in Hz)	*Δf*
1	16-Mar-23	09:16hrs	On 16th March 2023, as reported, at 09:16 hrs, both running units of MB Power tripped due to loss of evacuation path and resulted in generation loss of around 1102 MW. Hence, same figure has been considered in FRC Calculation.	50.03	50.00	0.03
2	28-Mar-23	10:37hrs	KSTPS 400kV Bus-4 was under Emergency shutdown. On 28th March, 2023 at 10:37 Hrs, 400kV Bus-1, 2 & 3 also got tripped due to fault in 400kV Bus-3. It resulted in black out of KSTPS Station and generation loss of 2416 MW occurred. Hence, same figure has been considered in FRC Calculation.	50.01	49.93	0.08

Details of 16th March 2023 event:

Status of Data received till date:

Status of Field Data received of FRC of Grid event occurred at MB Power in Western Region at 09:16 Hrs on 16.03.2023			
Data Received from		Data Not Received from	
Koteshwar HEP*	TSPL	Uttarakhand	APCPL Jhajjar
Chhabra TPS*	Singrauli NTPC	Haryana	Rihand NTPC
Tehri HEP*	Rajasthan*	Punjab	Unchhahar NTPC
Rosa Reliance	Anpara D	Delhi	NHPC
	Nathpa Jhakri	BBMB	Dadri NTPC
		UP	
		HP	

*Unit wise raw data not shared

FRC of ISGS generators:

Generator	16-Mar-23 event	Generator	16-Mar-23 event
Singrauli TPS	93%	Salal HEP	29%
Rihand-1 TPS	-31%	Tanakpur HEP	131%
Rihand-2 TPS	-52%	Uri-1 HEP	-2%
Rihand-3 TPS	36%	Uri-2 HEP	-34%
Dadri-1 TPS	56%	Dhauliganga HEP	No generation
Dadri -2 TPS	357%	Dulhasti HEP	No generation
Unchahar TPS	-4%	Sewa-II HEP	0%
Unchahar stg-4 TPS	34%	Parbati-3 HEP	No generation
Jhajjar TPS	174%	Jhakri HEP	-441%
Dadri GPS	0%	Rampur HEP	-1255%
Anta GPS	-2%	Tehri HEP	148%
Auraiya GPS	-16%	Koteswar HEP	-98%
Narora APS	15%	Karcham HEP	No generation
RAPS-B	12%	Malana-2 HEP	No generation
RAPS-C	31%	Budhil HEP	0%
Chamera-1 HEP	No generation	Bhakra HEP	-1%
Chamera-2 HEP	-43%	Dehar HEP	37%
Chamera-3 HEP	-54%	Pong HEP	1%
Bairasiul HEP	No generation	Koldam HEP	No generation
		AD Hydro HEP	No generation

FRC of State generators:

Generator	16-Mar-23 event	Generator	16-Mar-23 event
PUNJAB		UP	
Ropar TPS	11%	Obra TPS	-11%
L.Mohabbat TPS	236%	Harduaganj TPS	358%
Rajpura TPS	118%	Paricha TPS	196%
T.Sabo TPS	9%	Rosa TPS	0%
Goindwal Sahib TPS	497%	Anpara TPS	-14%
Ranjit Sagar HEP	-12%	Anpara C TPS	132%
Anandpur Sahib HEP	-8%	Anpara D TPS	1%
HARYANA		Bara TPS	75%
Panipat TPS	29%	Lalitpur TPS	0%
Khedar TPS	26%	Meja TPS	0%
Yamuna Nagar TPS	No generation	Vishnuprayag HEP	20%
CLP Jhajjar TPS	5%	Alaknanda HEP	No generation
Faridabad GPS	No generation	Rihand HEP	No generation
RAJASTHAN		Obra HEP	No generation
Kota TPS	-6%	UTTARAKHAND	
Suratgarh TPS	8%	Gamma Infra GPS	No generation
Kalisindh TPS	0%	Shravanti GPS	No generation
Chhabra TPS	No generation	Ramganga HEP	No generation
Chhabra stg-2 TPS	-9%	Chibra HEP	6%
Kawai TPS	184%	Khodri HEP	0%
Dholpur GPS	No generation	Chilla HEP	-29%
Mahi-1 HEP	0%	HP	
Mahi-2 HEP	No generation	Baspa HEP	-20%
RPS HEP	0%	Malana HEP	No generation
JS HEP	0%	Sainj HEP	No generation
DELHI		Larji HEP	-5%
Bawana GPS	No generation	Bhabha HEP	No generation
Pragati GPS	No generation	Giri HEP	131%
		J&K	
		Baglihar-1&2 HEP	No generation
		Lower Jhelum HEP	No generation

Details of 28th March 2023 event:

Status of Data received till date:

Status of Field Data received of FRC of Grid event occurred at Korba STPS in Western Region at 10:37 Hrs on 28.03.2023			
Data Received from		**Data Not Received from**	
Koteshwar HEP*	TSPL	Uttarakhand	APCPL Jhajjar
Tehri HEP*	Singrauli NTPC	Haryana	Rihand NTPC
UP*	Rajasthan	Punjab	Unchhahar NTPC
Dadri NTPC	Kawai TPS	Delhi	NHPC
		BBMB	
		HP	

*Unit wise raw data not shared

FRC of ISGS generators:

Generator	28-Mar-23 event	Generator	28-Mar-23 event
Singrauli TPS	-3%	Salal HEP	-2%
Rihand-1 TPS	6%	Tanakpur HEP	10%
Rihand-2 TPS	12%	Uri-1 HEP	2%
Rihand-3 TPS	7%	Uri-2 HEP	-13%
Dadri-1 TPS	179%	Dhauliganga HEP	No generation
Dadri -2 TPS	269%	Dulhasti HEP	0%
Unchahar TPS	No generation	Sewa-II HEP	0%
Unchahar stg-4 TPS	No generation	Parbati-3 HEP	No generation
Jhajjar TPS	179%	Jhakri HEP	No generation
Dadri GPS	No generation	Rampur HEP	No generation
Anta GPS	No generation	Tehri HEP	8%
Auraiya GPS	No generation	Koteswar HEP	0%
Narora APS	-10%	Karcham HEP	0%
RAPS-B	2%	Malana-2 HEP	0%
RAPS-C	3%	Budhil HEP	No generation
Chamera-1 HEP	No generation	Bhakra HEP	4%
Chamera-2 HEP	No generation	Dehar HEP	-4%
Chamera-3 HEP	No generation	Pong HEP	No generation
Bairasiul HEP	No generation	Koldam HEP	No generation
		AD Hydro HEP	No generation

FRC of State generators:

Generator	28-Mar-23 event	Generator	28-Mar-23 event
PUNJAB		UP	
Ropar TPS	No generation	Obra TPS	23%
L.Mohabbat TPS	No generation	Harduaganj TPS	193%
Rajpura TPS	37%	Paricha TPS	-12%
T.Sabo TPS	7%	Rosa TPS	45%
Goindwal Sahib TPS	278%	Anpara TPS	-2%
Ranjit Sagar HEP	No generation	Anpara C TPS	57%
Anandpur Sahib HEP	No generation	Anpara D TPS	-8%
HARYANA		Bara TPS	137%
Panipat TPS	0%	Lalitpur TPS	1%
Khedar TPS	23%	Meja TPS	-18%
Yamuna Nagar TPS	No generation	Vishnuprayag HEP	0%
CLP Jhajjar TPS	27%	Alaknanda HEP	No generation
Faridabad GPS	No generation	Rihand HEP	No generation
RAJASTHAN		Obra HEP	No generation
Kota TPS	-53%	UTTARAKHAND	
Suratgarh TPS	-6%	Gamma Infra GPS	No generation
Kalisindh TPS	6%	Shravanti GPS	No generation
Chhabra TPS	No generation	Ramganga HEP	No generation
Chhabra stg-2 TPS	-2%	Chibra HEP	8%
Kawai TPS	No generation	Khodri HEP	0%
Dholpur GPS	No generation	Chilla HEP	-17%
Mahi-1 HEP	No generation	HP	
Mahi-2 HEP	No generation	Baspa HEP	0%
RPS HEP	No generation	Malana HEP	No generation
JS HEP	No generation	Sainj HEP	-15%
DELHI		Larji HEP	-4%
Bawana GPS	34%	Bhabha HEP	0%
Pragati GPS	No generation	Giri HEP	0%
		J&K	
		Baglihar-1&2 HEP	No generation
		Lower Jhelum HEP	No generation

Memebers who haven't shared the data yet are requested to share the data and analysis of FRC of their control area.

Members may like to discuss.

21. Details of the major trippings in UP control area and status of action taken:

It is to bring to your kind notice that multiple grid incident/disturbances in UP control area has been reported during March 2023. Needless to emphasize that such frequent grid events endanger the security and reliability of the state grid as well as that of the regional and national grid. In this connection, your kind attention is drawn to the multiple elements tripping at 400kV Jehta Hardoi(UP) on 22nd March 2023, at 400/220kV Panki(UP) on 23rd March 2023 and at 400/220kV Agra(UP) on 28th March 2023. Tripping incidents were analysed based on PMU & SCADA data and details received from sites. However, few of the points are still not clear. For reference, tripping report of the events is attached as **Annexure-B.X**. Further, it is requested to share the details of all three incidents w.r.t. following points:

I. Multiple elements tripping at 400kV Jehta Hardoi(UP) on 22nd March 2023:
   a) Exact location and nature of fault?
   b) Reason of occurrence of fault?
   c) Why did bus bar protection of both the 400kV Bus (Bus-1 & 2) operate?

II. Multiple elements tripping at 400/220kV Panki(UP) on 23rd March 2023:
   a) Exact location and nature of fault?
   b) It seems that protection didn't clear from 220kV side of Panki(UP) which further led to the tripping of elements at 400kV level on back up protection. Reason of delayed clearance of fault from Panki(UP) end?
   c) As per current status, no DR/EL of 220kV side of Panki(UP) received. Details need to be shared at the earliest.
   d) Remedial action taken report to be shared.

III. Multiple elements tripping at 400/220kV Agra(UP) on 28th March 2023:
   a) Why did LBB protection operate during charging of 400kV Agra(PG)-Agra(UP) ckt?
   b) What was the bus-wise arrangement of elements during the antecedent condition of the event? Why did elements connected at both the bus trip?
   c) Disturbance recorder file of LBB relay need to be shared.
   d) As reported, bus bar protection is obsolete and new panel for bus bar protection has been procured and implementation work is in process. Status of completion of the same need to be shared.

It is requested to SLDC-UP, UPPTCL to share the status of corrective actions taken.

Members may like to discuss.

22. Status of Bus bar protection:

Clause - 4 in schedule - V of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010 reads as
"Bus bar protection and local breaker backup protection shall be provided in 220kV and higher voltage interconnecting sub- stations as well as in all generating station switchyards".

During analysis of many grid incidents/disturbances, it has been found that the Busbar protection at the affected substation was **not present or non-operational** which resulted in considerably increasing both the number of affected elements and fault clearance time. Accordingly, it becomes critical to monitor and keep Busbar protection at all the 220 kV and above voltage level substations healthy and operational.

Constituents were requested vide NRLDC letter dated 28th Dec 2022 to furnish status of Busbar protection in the following format in your control area positively by **15 January 2023.**

As of now details are received from POWERGRID(NR-1 & NR-2), Haryana, NTPC, BBMB, Uttarakhand, HP and UP

Constituent wise status of bus bar protection where bus bar protection is either not installed or installed but not operational is attached as **Annexure-B.XI**. Constituents are requested to share the present status w.r.t. to the same.

Members may like to discuss.

Follow up issues from previous OCC meetings

Annexure-A.I

<table>
<tr><td>1</td><td>Down Stream network by State utilities from ISTS Station</td><td>Augmentation of transformation capacity in various existing substations, addition of new substations along with line bays as well as requirement of line bays by STUs for downstream network are under implementation at various locations in Northern Region. Further, 220kV bays have already been commissioned at various substations in NR. For its utilization, downstream 220kV system needs to be commissioned.</td><td>List of downstream networks is enclosed in Annexure-A.I.I.</td></tr>
<tr><td>2</td><td>Progress of installing new capacitors and repair of defective capacitors</td><td>Information regarding installation of new capacitors and repair of defective capacitors is to be submitted to NRPC Secretariat.</td><td>Data upto following months, received from various states / UTs:
<table><tr><td>◎</td><td>CHANDIGARH</td><td>Sep-2019</td></tr><tr><td>◎</td><td>DELHI</td><td>Mar-2023</td></tr><tr><td>◎</td><td>HARYANA</td><td>Dec-2022</td></tr><tr><td>◎</td><td>HP</td><td>Jan-2023</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not Available</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Jul-2022</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Feb-2023</td></tr><tr><td>◎</td><td>UP</td><td>Jan-2023</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Mar-2023</td></tr></table>All States/UTs are requested to update status on monthly basis.</td></tr>
<tr><td>3</td><td>Healthiness of defence mechanism: Self-certification</td><td>Report of mock exercise for healthiness of UFRs carried out by utilities themselves on quarterly basis is to be submitted to NRPC Secretariat and NRLDC. All utilities were advised to certify specifically, in the report that “All the UFRs are checked and found functional”.</td><td>Data upto following months, received from various states / UTs:
<table><tr><td>◎</td><td>CHANDIGARH</td><td>Not Available</td></tr><tr><td>◎</td><td>DELHI</td><td>Dec-2022</td></tr><tr><td>◎</td><td>HARYANA</td><td>Mar-2023</td></tr><tr><td>◎</td><td>HP</td><td>Feb-2023</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not Available</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Jun-2022</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Dec-2022</td></tr><tr><td>◎</td><td>UP</td><td>Dec-2022</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Mar-2023</td></tr><tr><td>◎</td><td>BBMB</td><td>Dec-2022</td></tr></table>All States/UTs are requested to update status for healthiness of UFRs on monthly basis for islanding schemes and on quartely basis for the rest .</td></tr>
<tr><td></td><td></td><td>In compliance of NPC decision, NR states/constituents agreed to raise the AUFR settings by 0.2 Hz in 47th TCC/49th NRPC meetings.</td><td>Status:
<table><tr><td>◎</td><td>CHANDIGARH</td><td>Not Available</td></tr><tr><td>◎</td><td>DELHI</td><td>Increased</td></tr><tr><td>◎</td><td>HARYANA</td><td>Increased</td></tr><tr><td>◎</td><td>HP</td><td>Increased</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not increased</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Increased</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Increased</td></tr><tr><td>◎</td><td>UP</td><td>Increased</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Increased</td></tr><tr><td>◎</td><td>BBMB</td><td>Increased</td></tr></table></td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td colspan="3">J&K and LADAKH were requested to update status for increasing settings of UFRs.</td></tr>
<tr><td>4</td><td>Status of FGD installation vis-à-vis installation plan at identified TPS</td><td>List of FGDs to be installed in NR was finalized in the 36th TCC (special) meeting dt. 14.09.2017.
All SLDCs were regularly requested since 144th OCC meeting to take up with the concerned generators where FGD was required to be installed.
Further, progress of FGD installation work on monthly basis is monitored in OCC meetings.</td><td colspan="3">Status of the information submission (month) from states / utilities is as under:
◎ HARYANA — Sep-2022
◎ PUNJAB — Mar-2023
◎ RAJASTHAN — Mar-2023
◎ UP — Feb-2023
◎ NTPC — Feb-2023
FGD status details are enclosed as Annexure-A.I.II.
All States/utilities are requested to update status of FGD installation progress on monthly basis.</td></tr>
<tr><td>5</td><td>Information about variable charges of all generating units in the Region</td><td>The variable charges detail for different generating units are available on the MERIT Order Portal.</td><td colspan="3">All states/UTs are requested to submit daily data on MERIT Order Portal timely.</td></tr>
<tr><td>6</td><td>Status of Automatic Demand Management Sysytem in NR states/UT's</td><td>The status of ADMS implementation in NR, which is mandated in clause 5.4.2 (d) of IEGC by SLDC/SEB/DISCOMs is presented in the following table:</td><td colspan="3">Status:
◎ DELHI — Fully implemented
◎ HARYANA — Scheme not implemented
◎ HP — Scheme not implemented
◎ PUNJAB — Scheme not implemented
◎ RAJASTHAN — Under implementation. Likely completion schedule is 30.06.2023.
◎ UP — Scheme implemented by NPCIL only</td></tr>
</table>

7	Reactive compensation at 220 kV/ 400 kV level at 15 substations			
	State / Utility	Substation	Reactor	Status
i	POWERGRID	Kurukshetra	500 MVAr TCR	Anticipated commissioning: May'23
ii	DTL	Peeragarhi	1x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under final stage inspection. GIS Bay is already available.
iii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under final stage inspection. GIS Bay is already available.
iv	DTL	Mundka	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
v	DTL	Bamnauli	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
vi	DTL	Indraprastha	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
vii	DTL	Electric Lane	1x50 MVAr at 220 kV	Under Re-tendering due to Single Bid
viii	PUNJAB	Dhuri	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	400kV Reactors - LOA issued on dated. 17.08.2021 and date of completion of project is 18 months from the date of LOA. 220kV Reactors - LOA issued on dated 19.07.2021 and date of completion of project is 18 months from the date of LOA. Commsioned 27th Jan'23
ix	PUNJAB	Nakodar	1x25 MVAr at 220 kV	1x25 MVAR Reactor at Nakodar has been commissioned on dated 13th February' 2023.
x	PTCUL	Kashipur	1x125 MVAR at 400 kV	Price bid has been opened and is under evaluation. Retendered in Jan'23
xi	RAJASTHAN	Akal	1x25 MVAr	1x25 MVAR Reactor at Akal has been commissioned on dated 25th July' 2022.

xii	RAJASTHAN	Bikaner	1x25 MVAr	Main bus shutdown is required for commissioning of 1x25 MVAR reactor at Bikaner, same is expected upto March’ 2023.
xiii	RAJASTHAN	Suratgarh	1x25 MVAr	1x25 MVAR Reactor at Suratgarh has been commissioned on dated 25th November’ 2022.
xiv	RAJASTHAN	Barmer & others	13x25 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Instalment received on dt.19.02.21 &work order placed on dt. 7.04.2022 to M/s Kanohar Electricals Ltd. Schedule time is 18 months.
xv	RAJASTHAN	Jodhpur	1x125 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Instalment received on dt.19.02.21 &work order placed on dt. 7.04.2022 to M/s Kanohar Electricals Ltd. Schedule time is 18 months.

Annexure-A-I.I

1. Down Stream network by State utilities from ISTS Station:

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
1	400/220kV, 3x315 MVA Samba	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays.	Mar'23	02 No. of bays shall be utilized for LILO-II of 220kV Hiranagar Bishnah Transmission Line, the work of which is under progress and shall be completed by March'2023. Updated in 204th OCC by JKPTCL.
2	400/220kV, 2x315 MVA New Wanpoh	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV New Wanpoh - Alusteng D/c Line	End of 2023	02 No. of bays are to be utilized for connecting 220kV New Wanpoh-Alusteng D/c Line. The work is in progress and expected to be commission by the end of 2023. Updated in 204th OCC by JKPTCL.
				• 220 kV New Wanpoh - Mattan D/c Line	End of 2024	02 No. of bays are to be utilized for connecting 220kV New Wanpoh-Mattan D/c Line. The funding source for the project is being identified and the project is expected to be completed by ending 2024. Updated in 204th OCC by JKPTCL.
3	400/220kV, 2x315 MVA Amargarh	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• 220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri	End of 2024	02 No. of bays are proposed to be utilized for connecting 220/132 kV GSS Loolipora. The funding source for the project is being identified and the project is expected to be completed by ending 2024. Updated in 204th OCC by JKPTCL.
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• 220kV Bhadson (Kurukshetra) – Ramana Ramani D/c line	Jul'24	Updated in 205th OCC by HVPNL
5	400/220 kV, 2x315 MVA Dehradun	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• Network to be planned for 4 bays	-	PTCUL to update the status.
6	Shahjahanpur, 2x315 MVA 400/220 kV	Commissioned: 6 Approved/Under Implementation:1 Total: 7	Utilized: 5 Unutilized: 1 (1 bays to be utilized shortly) Approved/Under Implementation:1	• 220 kV D/C Shahajahanpur (PG) - Gola line	Apr'23	Updated in 205th OCC by UPPTCL
				• LILO of Sitapur – Shahjahanpur 220 kV SC line at Shahjahanpur (PG)	Commissioned	Energization date: 25.02.2022 updated by UPPTCL in 196th OCC
7	Hamirpur 400/220 kV Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4 (2 bays to be utilized shortly)	• 220 kV Hamirpur-Dehan D/c line	Commissioned	Commisioned date: 09.06.2022. Updated in 198th OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
8	Sikar 400/220kV, 1x 315 MVA S/s	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• LILO of 220 kV Sikar (220 kV GSS)-Dhod S/c line at Sikar (PG)	Commissioned	LILO of 220 kV S/C Sikar-Dhod line at 400 kV GSS PGCIL, Sikar has been charged on dt. 31.03.2022
				• Network to be planned for 2 bays.	-	Against the 3rd ICT at 400 kV GSS Sikar, only 2 bays were constructed and same has been utilized by RVPN by constructing LILO of 220 kV S/C Sikar – Dhod line as updated by RVPNL in 195th OCC
9	Bhiwani 400/220kV S/s	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV D/C line Bhiwani (PG) – Bhiwani (HVPNL) line	Commissioned	Updated in 202nd OCC by HVPNL
				• 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line.	Jun'23	Issue related to ROW as intimated in 202nd OCC by HVPNL.
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	Apr'24	Issue related to ROW as intimated in 192nd OCC by HVPNL.
10	Jind 400/220kV S/s	Commissioned: 4 Approved:4 Total: 8	Utilized: 4 Unutilized: 0	• LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind) with 0.5 sq inch ACSR conductor	May'24	Tender is under process Updated in 205th OCC by HVPNL.
11	400/220kV Tughlakabad	Commissioned: 6 Under Implementation: 4	Utilized: 6 Unutilized: 0	• RK Puram – Tughlakabad (UG Cable) 220kV D/c line – March 2023.	-	DTL to update the status.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
	GIS	Total: 10	Under Implementation:4	• Masjid Mor – Tughlakabad 220kV D/c line.	-	DTL to update the status.
12	400/220kV Kala Amb GIS (TBCB)	Commissioned: 6 Total: 6	Utilized: 0 Unutilized: 6	• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s	Jun'23	Updated in 205th OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
13	400/220kV Kadarpur Sub-station	Commissioned: 8 Total: 8	Utilized: 0 Unutilized: 8	• LILO of both circuits of 220 KV Pali - Sector 56 D/C line at Kadarpur along with augmentation of existing conductor from 220 KV Sector-56 to LILO point with 0.4 sq inch AL-59 conductor.	Dec'23	Forest approval is pending for 220 KV Pali - Sector 56 D/C line. Updated in 205th OCC by HVPNL
				• LILO of both circuits of 220KV Sector 65 - Pali D/C line at Kadarpur along with augmentation of balance 0.4 sq. inch ACSR conductor of 220 kV Kadarpur - Sector 65 D/C line with 0.4sq inch AL-59 conductor	Dec'23	Updated in 205th OCC by HVPNL
14	400/220kV Sohna Road Sub-station	Commissioned: 8 Total: 8	Utilized: 2 Unutilized: 4	• LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road	Jun'23	Updated in 197th OCC by HVPNL
				• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road	-	The matter is subjudice in Hon'ble Punjab & Haryana High court, Chandigarh Updated in 205th OCC by HVPNL. **Status:-** Earlier 02 nos 220 kV line bays were to be utilized for the 220 kV GIS S/Stn. Sec-77, Gurugram but due to denotification of land of the 220 kV GIS S/Stn. Sec-77 the said substation is now going to be dismantled and a new substation is proposed at Sec-75A, Gurugram. Now, these 02 no. 220 kV line bays may be utilized at 220 kV GIS S/Stn Sec-75A, Gurugram.
15	400/220kV Prithla Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4 Under Implementation:2	• Prithla - Harfali 220kV D/c line with LILO of one ckt at Meerpur Kurali	31.03.2024	Updated in 205th OCC by HVPNL
				• LILO of both ckt of 220kV D/c Ranga Rajpur – Palwal line	Commissioned	Commisioned date: 31.12.2021. Updated in 198th OCC by HVPNL
				• 220kV D/C for Sector78, Faridabad	31.03.2024	Issue related to ROW and Pending crossing approval from Northern Railways and DFCCIL. as intimated in 205th OCC by HVPNL.
				• Prithla - Sector 89 Faridabad 220kV D/c line	31.03.2024	Updated in 205th OCC by HVPNL
16	400/220kV Sonepat Sub-station	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 2 Unutilized: 4 Under	• LILO of both circuits of 220kV Samalkha - Mohana line at Sonepat	05.10.2023	Updated in 205th OCC by HVPNL
				• Sonepat - HSIISC Rai 220kV D/c line	-	Updated in 205th OCC by HVPNL. **Status:** Due to non-performance of work of 220KV GIS Rai S/Stn, the Contract has been terminated & blacklisted by O/o XEN/WB O/o CE/PD&C, HVPNL, Panchkula vide Ch-100/HDP-2418/REC-254/Xen(WB) Dated 24.02.2023. Now pending work will be caried out by HVPNL/ Departmentely

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
		Total: 8	Implementation:2	• Sonepat - Kharkhoda Pocket A 220kV D/c line	31.07.2024	Updated in 205th OCC by HVPNL. **Status:** The Possession of land for construction of 220KV S/Stn. Pocket-A i.e 6.33 Acres and for Pocket-B is 5.55 Acres has been taken over by HVPNL. Work order yet to be issued by O/o CE/PD&C, Panchkula for construction of 2 no. 220KV GIS S/Stn Pocket-A & Pocket-B.
17	400/220kV Neemrana Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• LILO of Bhiwadi - Neemrana 220kV S/c line at Neemrana (PG)	-	Work order is finalized as updated in 201st OCC by RVPNL. 5 months from layout finalization.
18	400/220kV Kotputli Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Kotputli - Pathreda 220kV D/c line	-	Bid documents under approval as updated in 195th OCC by RVPNL.
19	400/220kV Jallandhar Sub-station	Commissioned: 10 Total: 10	Utilized: 8 Unutilized: 2	• Network to be planned for 2 bays	May'24	LILO of 220 kV BBMB Jalandhar - Butari line at 400 kV PGCIL Jalandhar being planned. Work expected to be completed by May 2024. Updated in 198th OCC by PSTCL.
20	400/220kV Roorkee Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Roorkee (PG)-Pirankaliyar 220kV D/c line	Commissioned	Roorkee (PG)-Pirankaliyar 220kV D/c line comiisioned in 2020 as intimated by PTCUL in 197th OCC
21	400/220kV Lucknow Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 2 bays	Jun'23	• Lucknow -Kanduni, 220 kV D/C line expected energization date Jun'23 updated by UPPTCL in 205th OCC due to sub-station commissioning delay _____ • No planning for 2 no. of bays upated by UPPTCL in 196th OCC. The same has been communicated to Powergrid.
22	400/220kV Gorakhpur Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	Apr'23	• Gorakhpur(PG)- Maharajganj, 220 kV D/C line expected energization date is 15.04.2023 updated by UPPCL in 205th OCC
23	400/220kV Fatehpur Sub-station	Commissioned: 8 Under Implementation:2 Total: 10	Utilized: 6 Unutilized: 2 Under Implementation:2	• Network to be planned for 2 bays	-	• UPPTCL intimated that 02 no. of bays under finalization stage. In 201st OCC, UPPTCL intimated that it is finalized that Khaga s/s will be connected (tentative time 1.5 years). _____ • No planning for 2 no. of bays updated by UPPTCL in 196th OCC. The same has been communicated to Powergrid.
24	400/220kV Abdullapur Sub-station	Commissioned: 10 Under Implementation:2 Total: 12	Utilized: 10 Unutilized: 0 Under Implementation:2	• Abdullapur – Rajokheri 220kV D/c line	Jul'23	SCDA System work pending at 220 KV S/stn. Rajokheri Updated in 205th OCC by HVPNL
25	400/220kV Pachkula Sub-station	Commissioned: 8 Under tender:2 Total: 10 Out of these 10 nos. 220kV Line Bays, 2 bays would be used by the lines being constructed by POWERGRID (Chandigarh-2) and balance 8 nos. bays would be used by HVPNL	Utilized: 2 Unutilized: 4 Under Implementation:2	• Panchkula – Pinjore 220kV D/c line	Sep'23	Updated in 205th OCC by HVPNL
				• Panchkula – Sector-32 220kV D/c line	Sep'23	Updated in 205th OCC by HVPNL
				• Panchkula – Raiwali 220kV D/c line	Commissioned	Updated in 194th OCC by HVPNL
				• Panchkula – Sadhaura 220kV D/c line: Sep'23	Jul'24	Updated in 205th OCC by HVPNL
		Commissioned:7	Utilized: 6	• Amritsar – Patti 220kV S/c line	May'23	Route survey/tender under process. Work expected to be completed by May 2023. Updated in 198th OCC by PSTCL.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
26	400/220kV Amritsar S/s	Approved in 50th NRPC- 1 no. Total: 8	Unutilized: 1 Approved in 50th NRPC- 1 no.	• Amritsar – Rashiana 220kV S/c line (2 bays shall be required for above lines. However, 1 unutilized bay shall be used for Patti and requirement of one additional bay approved for Rashiana by NRPC)	May'23	Route survey/tender under process. Work expected to be completed by May 2023. Updated in 198th OCC by PSTCL.
27	400/220kV Bagpat S/s	Commissioned: 8 Total: 8	Utilized:6 Unutilized: 2	• Bagpat - Modipuram 220kV D/c line	Commissioned	Updated in 201st OCC by UPPTCL
28	400/220kV Bahardurgarh S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• LILO of 220 kV Nunamajra-Daultabad S/c line at 400 kV Bahadurgarh PGCIL	31.03.2024	Updated in 205th OCC by HVPNL. **Status:** Tentative route stands submitted by TS wing and accordingly BOQ has been submitted by design wing to contracts wing for award of work.
				• Bahadurgarh - METL 220kV D/c line (Deposit work of M/s METL)	31.03.2024	Updated in 205th OCC by HVPNL. **Status:** Tentative route stands submitted by TS wing and accordingly BOQ has been submitted by design wing to contracts wing for award of work.
				• Bahadurgarh - Kharkhoda Pocket B 220kV D/c line	31.07.2024	
29	400/220kV Jaipur (South) S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• Network to be planned for 2 bays.	-	LILO case of 220 kV Dausa – Sawai Madhopur line at 400 kV GSS Jaipur South (PG) is under WTD approval as updated by RVPNL in 195th OCC
30	400/220kV Sohawal S/s	Commissioned: 8 Total: 8	Utilized: 8	• Sohawal - Barabanki 220kV D/c line	Commissioned	Energization date: 14.04.2018 updated by UPPTCL in 196th OCC
				• Sohawal - New Tanda 220kV D/c line	Commissioned	Energization date: 28.05.2019 updated by UPPTCL in 196th OCC
				• Network to be planned for 2 bays	Commissioned	• Sohawal - Gonda 220kV S/c line (Energization date: 27.04.2020) updated by UPPTCL in 196th OCC _____ • Sohawal - Bahraich 220kV S/c line (Energization date: 15.02.2021) updated by UPPTCL in 196th OCC
31	400/220kV, Kankroli	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	-	RVPNL to update the status
32	400/220kV, Manesar	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 4 bays	-	Status:- 2nos bays are being utilised for 220 kV D/C Panchgaon (PGCIL)-Panchgaon Ckt-I & 220 kV D/C Panchagon (PGCIL)-Panchgaon Ckt-II, charged on dated 05.09.2022 & 20.10.2022 respectively. The 2nos bays may be utilised by HVPNL in future.
33	400/220kV, Saharanpur	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	Mar'23	Saharanpur(PG)-Devband D/c line expected energization date last week of March'23 updated by UPPTCL in 205th OCC
34	400/220kV, Wagoora	Commissioned: 10 Total: 10	Utilized: 6 Unutilized: 4	• Network to be planned for 4 bays	-	PDD, J&K to update the status.
35	400/220kV, Ludhiana	Commissioned: 9 Total: 9	Utilized: 8 Unutilized: 1	• Network to be planned for 1 bay	May'23	Direct circuit from 220 kV Lalton Kalan to Dhandari Kalan to be diverted to 400 kV PGCIL Ludhiana. Work expected to be completed by May 2023.Updated in 205th OCC by PSTCL.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
36	400/220kV, Chamba (Chamera Pool)	Commissioned: 3 Under tender:1 Total: 4	Utilized:3 Unutilized: 0 Under tender:1	• Stringing of 2nd ckt of Chamera Pool – Karian 220kV D/c line	-	Stringing of 2nd Circuit of Chamera Pool-Karian Tansmission line has been completed & terminal bay at 400/220 kV chamera pooling substation (PGCIL) is not ready.Updated in 198th OCC by HPPTCL
37	400/220kV, Mainpuri	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	-	• 02 no. of bays under finalization stage updated by UPPTCL in 196th OCC. Mainpuri S/s planned. Land is not finalized, therefore timeline not available as intimated by UPPTCL in 201st OCC.
38	400/220kV, Patiala	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays	May'24	2 Nos. bays for 400 kV PGCIL Patiala - 220 kV Bhadson (D/C) line being planned. Work expected to be completed by May 2024. Updated in 198th OCC by PSTCL.

2. Establishment of new 400/220kV substations in Northern Region:

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule		Downstream connectivity by States
1	400/220kV Dwarka-I GIS (8 nos. of 220kV bays)	4x 500	Mar'22		DTL to update the status
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Apr'22		Chandigarh to update the status.
3	400/220kV Jauljivi GIS Out of these 8 nos. 220kV Line Bays, 4 nos. (Pithoragath-2, & Dhauliganga-2) would be used by the lines being constructed by POWERGRID and balance 4 nos. bays would be used by the lines being constructed by PTCUL.	2x315	Feb'22		• 220kV Almora-Jauljibi line • 220kV Brammah-Jauljibi line PTCUL to update the status of lines.

FGD Status

Updated status of FGD related data submission

NTPC (27.02.2023)
MEJA Stage-I
RIHAND STPS
SINGRAULI STPS
TANDA Stage-I
TANDA Stage-II
UNCHAHAR TPS
UPRVUNL (15.02.2023)
ANPARA TPS
HARDUAGANJ TPS
OBRA TPS
PARICHHA TPS

PSPCL (16.02.2023)
GGSSTP, Ropar
GH TPS (LEH.MOH.)
RRVUNL (16.03.2023)
CHHABRA SCPP
CHHABRA TPP
KALISINDH TPS
KOTA TPS
SURATGARH SCTPS
SURATGARH TPS

Updated status of FGD related data submission

Lalitpur Power Gen. Co. Ltd. (17.10.2022)
Lalitpur TPS
Lanco Anpara Power Ltd. (18.06.2022)
ANPARA-C TPS

HGPCL (14.09.2022)
PANIPAT TPS
RAJIV GANDHI TPS
YAMUNA NAGAR TPS

Adani Power Ltd. (18.02.2022)
KAWAI TPS

Rosa Power Supply Company (18.06.2022)
Rosa TPP Phase-I
Prayagraj Power Generation Company Ltd. (17.10.2022)
Prayagraj TPP
APCPL (25.02.2022)
INDIRA GANDHI STPP

Pending submissions

GVK Power Ltd.
GOINDWAL SAHIB

NTPC
DADRI (NCTPP)
Talwandi Sabo Power Ltd.
TALWANDI SABO TPP
L&T Power Development Ltd.
Nabha TPP (Rajpura TPP)

Target Dates for FGD Commissioning (Utility-wise)

Adani Power Ltd.	KAWAI TPS U#1 (Target: 31-12-2024), KAWAI TPS U#2 (Target: 31-12-2024)
APCPL	INDIRA GANDHI STPP U#1 (Target: 31-01-2022), INDIRA GANDHI STPP U#2 (Target: 30-09-2023), INDIRA GANDHI STPP U#3 (Target: 30-06-2023)
GVK Power Ltd.	GOINDWAL SAHIB U#1 (Target: 30-04-2020), GOINDWAL SAHIB U#2 (Target: 29-02-2020)
HGPCL	PANIPAT TPS U#6 (Target: 31-12-2022), PANIPAT TPS U#7 (Target: 31-12-2022), PANIPAT TPS U#8 (Target: 31-12-2022), RAJIV GANDHI TPS U#1 (Target: 31-12-2024), RAJIV GANDHI TPS U#2 (Target: 31-12-2024), YAMUNA NAGAR TPS U#1 (Target: 31-12-2024), YAMUNA NAGAR TPS U#2 (Target: 31-12-2024)

NTPC	DADRI (NCTPP) U#1 (Target: 31-12-2020), DADRI (NCTPP) U#2 (Target: 31-10-2020), DADRI (NCTPP) U#3 (Target: 31-08-2020), DADRI (NCTPP) U#4 (Target: 30-06-2020), DADRI (NCTPP) U#5 (Target: 30-06-2022), DADRI (NCTPP) U#6 (Target: 31-03-2023), RIHAND STPS U#1 (Target: 31-10-2025), RIHAND STPS U#2 (Target: 30-06-2026), RIHAND STPS U#3 (Target: 31-12-2024), RIHAND STPS U#4 (Target: 31-03-2025), RIHAND STPS U#5 (Target: 30-06-2025), RIHAND STPS U#6 (Target: 31-10-2025), SINGRAULI STPS U#1 (Target: 31-12-2024), SINGRAULI STPS U#2 (Target: 31-12-2024), SINGRAULI STPS U#3 (Target: 31-12-2024), SINGRAULI STPS U#4 (Target: 31-12-2024), SINGRAULI STPS U#5 (Target: 31-03-2025), SINGRAULI STPS U#6 (Target: 31-06-2024), SINGRAULI STPS U#7 (Target: 31-03-2024), UNCHAHAR TPS U#1 (Target: 31-12-2023), UNCHAHAR TPS U#2 (Target: 31-12-2023), UNCHAHAR TPS U#3 (Target: 30-09-2023), UNCHAHAR TPS U#4 (Target: 30-09-2023), UNCHAHAR TPS U#5 (Target: 30-09-2023), UNCHAHAR TPS U#6 (Target: 31-08-2022), MEJA Stage-I U#1 (Target: 31-10-2023), MEJA Stage-I U#2 (Target: 30-06-2023), TANDA Stage-I U#3 (Target:), TANDA Stage-I U#4 (Target:), TANDA Stage-II U#3 (Target: 31-03-2023), TANDA Stage-II U#4 (Target: 30-09-2023)

L&T Power Development Ltd (Nabha)	Nabha TPP (Rajpura TPP) U#1 (Target: 30-04-2021), Nabha TPP (Rajpura TPP) U#2 (Target: 28-02-2021)
Lalitpur Power Gen. Company Ltd.	LALITPUR TPS U#1 (Target: 31-12-2026), LALITPUR TPS U#2 (Target: 30-09-2026), LALITPUR TPS U#3 (Target: 30-06-2026)
Lanco Anpara Power Ltd.	ANPARA C TPS U#1 (Target: 31-12-2023), ANPARA C TPS U#2 (Target: 31-12-2023)
Prayagraj Power Generation Company Ltd.	PRAYAGRAJ TPP U#1 (Target: 31-12-2024), PRAYAGRAJ TPP U#2 (Target: 31-12-2024), PRAYAGRAJ TPP U#3 (Target: 31-12-2024)
PSPCL	GH TPS (LEH.MOH.) U#1 (Target: 31-12-2026), GH TPS (LEH.MOH.) U#2 (Target: 31-12-2026), GH TPS (LEH.MOH.) U#3 (Target: 31-12-2026), GH TPS (LEH.MOH.) U#4 (Target: 31-12-2026), GGSSTP, Ropar U#3 (Target: 31-12-2026), GGSSTP, Ropar U#4 (Target: 31-12-2026), GGSSTP, Ropar U#5 (Target: 31-12-2026), GGSSTP, Ropar U#6 (Target: 30-12-2026)

Rosa Power Supply Company	ROSA TPP Ph-I U#1 (Target: 31-12-2026), ROSA TPP Ph-I U#2 (Target: 31-12-2026), ROSA TPP Ph-I U#3 (Target: 31-12-2026), ROSA TPP Ph-I U#4 (Target: 31-12-2026)
RRVUNL	KOTA TPS U#5 (Target: 31-08-2024), KOTA TPS U#6 (Target: 31-08-2024), KOTA TPS U#7 (Target: 31-08-2024), SURATGARH TPS U#1 (Target: 31-12-2026), SURATGARH TPS U#2 (Target: 31-12-2026), SURATGARH TPS U#3 (Target: 31-12-2026), SURATGARH TPS U#4 (Target: 31-12-2026), SURATGARH TPS U#5 (Target: 31-12-2026), SURATGARH TPS U#6 (Target: 31-12-2026), SURATGARH SCTPS U#7 (Target: 28-02-2025), SURATGARH SCTPS U#8 (Target: 28-02-2025), CHHABRA TPP U#1 (Target: 31-12-2026), CHHABRA TPP U#2 (Target: 31-12-2026), CHHABRA TPP U#3 (Target: 31-12-2026), CHHABRA TPP U#4 (Target: 31-12-2026), CHHABRA SCPP U#5 (Target: 28-02-2025), CHHABRA SCPP U#6 (Target: 28-02-2025), KALISINDH TPS U#1 (Target: 28-02-2025), KALISINDH TPS U#2 (Target: 28-02-2025)
Talwandi Sabo Power Ltd.	TALWANDI SABO TPP U#1 (Target: 28-02-2021), TALWANDI SABO TPP U#2 (Target: 31-12-2020), TALWANDI SABO TPP U#3 (Target: 31-10-2020)
UPRVUNL	ANPARA TPS U#1 (Target: 31-12-2023), ANPARA TPS U#2 (Target: 31-12-2023), ANPARA TPS U#3 (Target: 31-12-2023), ANPARA TPS U#4 (Target: 31-12-2023), ANPARA TPS U#5 (Target: 31-12-2023), ANPARA TPS U#6 (Target: 31-12-2023), ANPARA TPS U#7 (Target: 31-12-2023), HARDUAGANJ TPS U#8 (Target: 31-12-2024), HARDUAGANJ TPS U#9 (Target: 31-12-2024), OBRA TPS U#9 (Target: 31-12-2024), OBRA TPS U#10 (Target: 31-12-2024), OBRA TPS U#11 (Target: 31-12-2024), OBRA TPS U#12 (Target: 31-12-2024), OBRA TPS U#13 (Target: 31-12-2024), PARICHHA TPS U#3 (Target: 30-04-2022), PARICHHA TPS U#4 (Target: 31-12-2024), PARICHHA TPS U#5 (Target: 31-12-2024), PARICHHA TPS U#6 (Target: 31-12-2024)

MIS Report for Status of Islanding Schemes

Implemented Schemes

Sl. No.	Islanding Scheme	SLDC	Status	Submission of Self Certification of Healitheness	SOP	SCADA Display Page	Remarks
1	Delhi IS	Delhi	Implemented	Yes (Sept - 2021)	No	Yes	List of officials in-charge and relays in Delhi IS submitted by DTL on 16.08.2021. Revision of island is under discussion.
2	NAPS IS	UP	Implemented	Yes (08-10-2021)	Yes	Yes	-
3	RAPS IS	Rajasthan	Implemented	16-Aug-21	Yes	Yes	List of officials in-charge, format for generation, islanding scheme sld and relays in RAPP IS submitted by RVPN on 04.12.2021.

Under Implementation/ Newly Proposed/Under Discussion

Sl. No.	Islanding Scheme	SLDC	Status	Details of progress	DPR for PSDF funding (Required /	Timelines Status - Proposed/Actual									
						Study		Design		Approval		Procurement		Commissioning	
						Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual
1	Lucknow-Unchahar IS	UP	Under Implementation	Scheme has been approved in 59th NRPC meeting held on 31.10.2022.		-		-	-	-	-	-	-	-	-
2	Agra IS	UP	Under Study	UP has placed offer to CPRI for dynamic study in July, 2022. The estimated time of study is 5 months from date of acceptance.		-		-	-	-	-	-	-	-	-
3	Jodhpur-Barmer-Rajwest IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Scheme implementation timeline: July,2023	-	-		-	-	-	-	-	-	-	-
4	Suratgarh IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. SCADA display implementation timeline: Dec, 2022; Scheme implementation timeline: July,2023	-	-		-	-	-	-	-	-	-	-
5	Patiala-Nabha Power Rajpura IS	Punjab	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. SCADA display implementation timeline: Dec, 2022; Scheme implementation timeline: July,2023		-		-	-	-	-	-	-	-	-
6	Pathankot-RSD IS	Punjab	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022.. SCADA display as well as scheme implementation timeline: Dec, 2022		-		-	-	-	-	-	-	-	-
7	Kullu-Manali-Mandi IS	HP	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Timeline to be intimated by HPSLDC											
8	Shimla-Solan IS	HP	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Timeline to be intimated by HPSLDC											

Annexure-A.III

उत्तर प्रदेश राज्य भार प्रषण कन्द्र
उ0प्र0पॉवर ट्रांसमिशन कारपोरेशन लि0
(उत्तर प्रदेश सरकार का उपक्रम)
यू0पी0एस0एल0डी0सी0 परिसर, विभूति खण्ड–II
गोमती नगर, लखनऊ–226010
ई–मेल : cepso@upsldc.org
sera@upsldc.org

U.P. State Load Despatch Centr
U.P. Power Transmission Corporation Ltd.
(A U.P. Govt. Undertaking)
UPSLDC Complex, Vibhuti Khand – II
Gomti Nagar, Lucknow- 226010
E-mail: cepso@upsldc.org
sera@upsldc.org

No: - 769 /SE(R&A)/EE-II/SPS Dated: - 10/04/ 2023

Member Secretary, NRPC,
18 – A, SJSS Marg, Katwaria Sarai,
New Delhi, 110016.

AGENDA FOR OCC Meeting

Subject - Regarding revision of System Protection Scheme (SPS) at Bara TPS.

It is to inform you that 1500MVA, 765/400kV ICT-II has been commissioned on 31.03.2023 at Bara TPS. Following the commissioning of aforementioned ICT, SPS installed at Bara TPS needs to be revised. The old SPS scheme and revised SPS scheme is enclosed herewith.

It is requested to kindly include this proposal as agenda in 206th OCC meeting of NRPC so that the same may be discussed and approved.

Encl: - As above

Arshad Jamal Siddiqui)
Superintending Engineer (R&A)

No: - 769 /SE(R&A)/EE-II/SPS Dated: - 10/04/ 2023

Copy forwarded to following for kind information and necessary action:-

1. Director, UPSLDC, Vibhuti Khand – II, Gomti Nagar, Lucknow.
2. Director (Operation), UPPTCL, 11th Floor, Shakti Bhawan Extn., Lucknow.
3. Chief Engineer (PSO), UPSLDC Vibhuti Khand – II, Gomti Nagar, Lucknow.
4. General Manager, NRLDC18-A, SJSS Marg, Katwaria Sarai, New Delhi – 110016.
5. President, M/s Prayag Raj Thermal Power Plant, Village-Khansemra, PO-Lohgara, Tehsil-Bara, Distt-Allahabad 212107.

(Arshad Jamal Siddiqui)
Superintending Engineer (R&A)

Northern Region SPS Details (old Logic)

Item	Information Explanation
Reporting Party	UPPTCL/ NRLDC
Scheme's Name	Bara SPS
Classification	SPS related to Safe evacuation of Generation
Reference No.	SPS/NR/GEN/
Operating Procedure	Refer to Chapter 12, Point No 12.5 of Operating Procedure of NR
Design Objectives	SPS for Reliable Evacuation of Bara TPS Generation.
Operation	Tripping the Generating units to bring the generation within safer limit.
Modelling	There are 2 number of 400 kV lines and 1 number of 765kV line for evacuation of generation at Bara TPS (1980 MW). 1 number of 1500 MVA 765/400 kV ICT and 3 number of 660 MW units (connected at 7650kV voltage level) also available at Bara TPS. A SPS at Bara TPS dropping some generation at Bara in case of problem in the evacuation system would help in preventing complete loss of generation at Bara. **400 kV lines from Bara are as listed below:** 1. 400 KV Bara- Mejat TPS ckt -1 2. 400 KV Bara- Mejat TPS ckt -2 **765 kV line from Bara are as listed below:** 1.765 KV Bara- Mainpuri ckt -2 **SPS Scheme logic:** **Condition for SPS Action** If P is greater than or equal to 1250 MW where P is MW flow on HV side of 1500 MVA ICT (765/400 KV) at Bara TPS **AND** Main CB (707-52) & Tie CB (708-52) of 765 KV Bara -Mainpuri ckt -2 tripped (Along with 86A/B trip relay operated **Tripping Action** One of the three Units at Bara TPS shall trip based on the selection
Original In-Service Year	
Recent Assessment Group	UPPTCL/ NRLDC/ NRPC
Recent Assessment Date	

Study on Revised Logic for SPS at Bara TPS after Commissioning of 1500 MVA ICT –II at Bara TPS

Base Case – All the elements at Bara TPS are in service and Full Generation of 1875 MW at Bara TPS and 1250 MW at Meja TPS has been considered. The load flow on different transmission elements is shown in figure 1

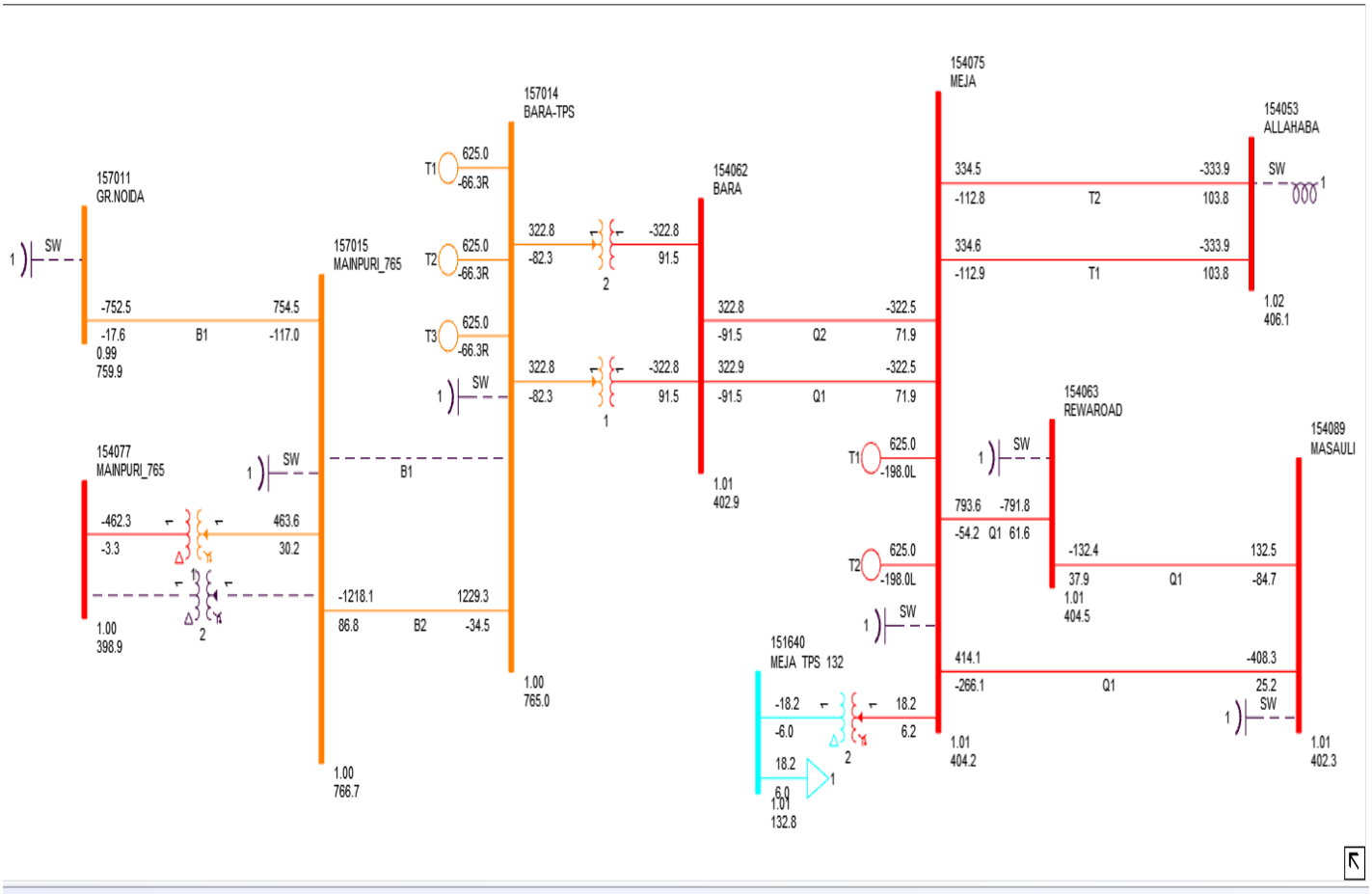


Figure -1

Contigency No.1 - Tripping of 765 kV Bara –Mainpuri Ckt -2 Tripped

Observation- In the load flow, following the above contingency, loading observed on 400 kV Meja-Allahabad (PG) DC line is more than 730 MW (Figure -2). Therefore, backing down of generation at Bara TPS is required. 300 MW generation reduction at Bara TPS , brings down the loading on 400 kV Meja-Allahabad (PG) DC line to 630 MW (Figure-3

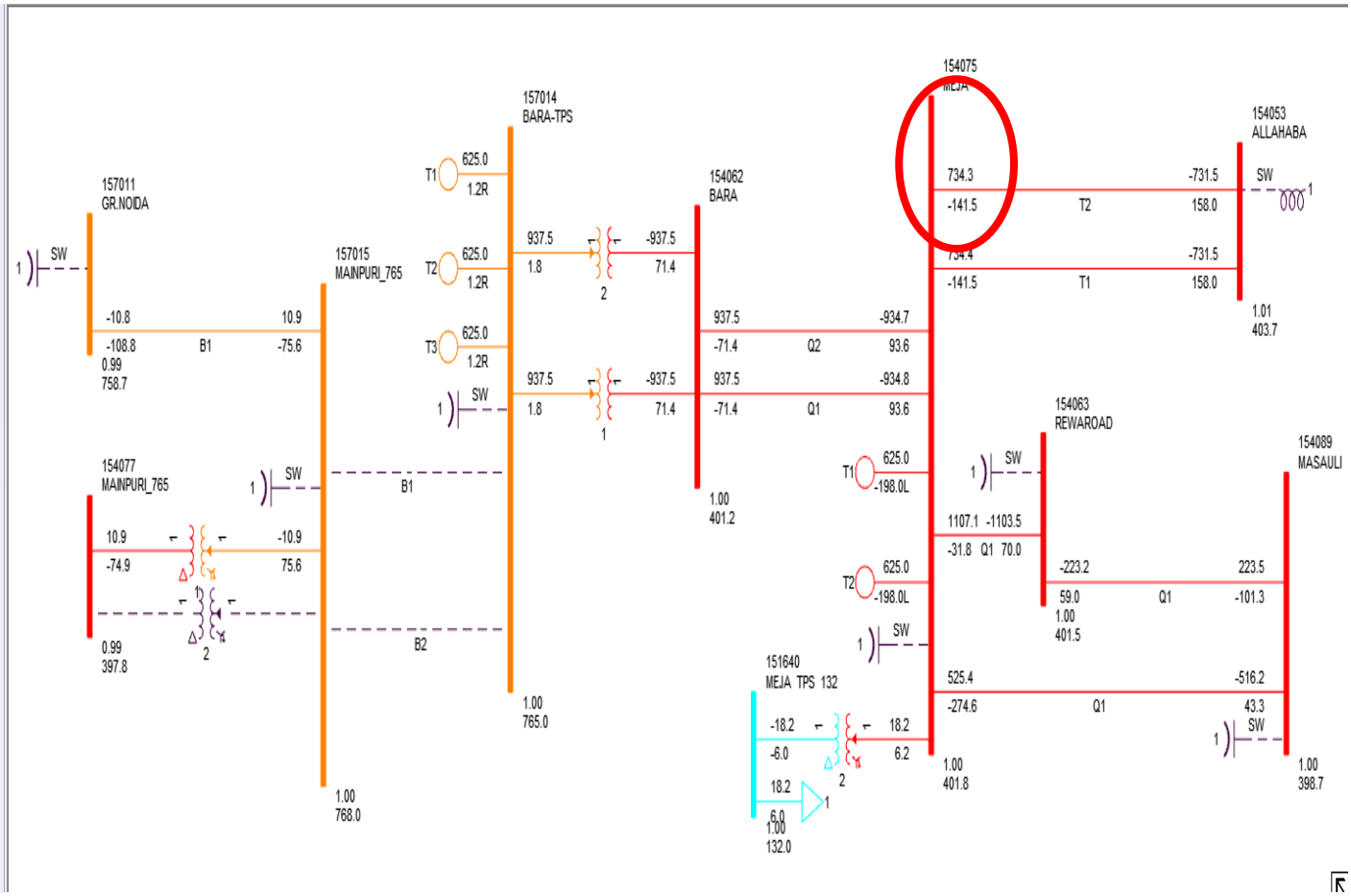


Figure -2

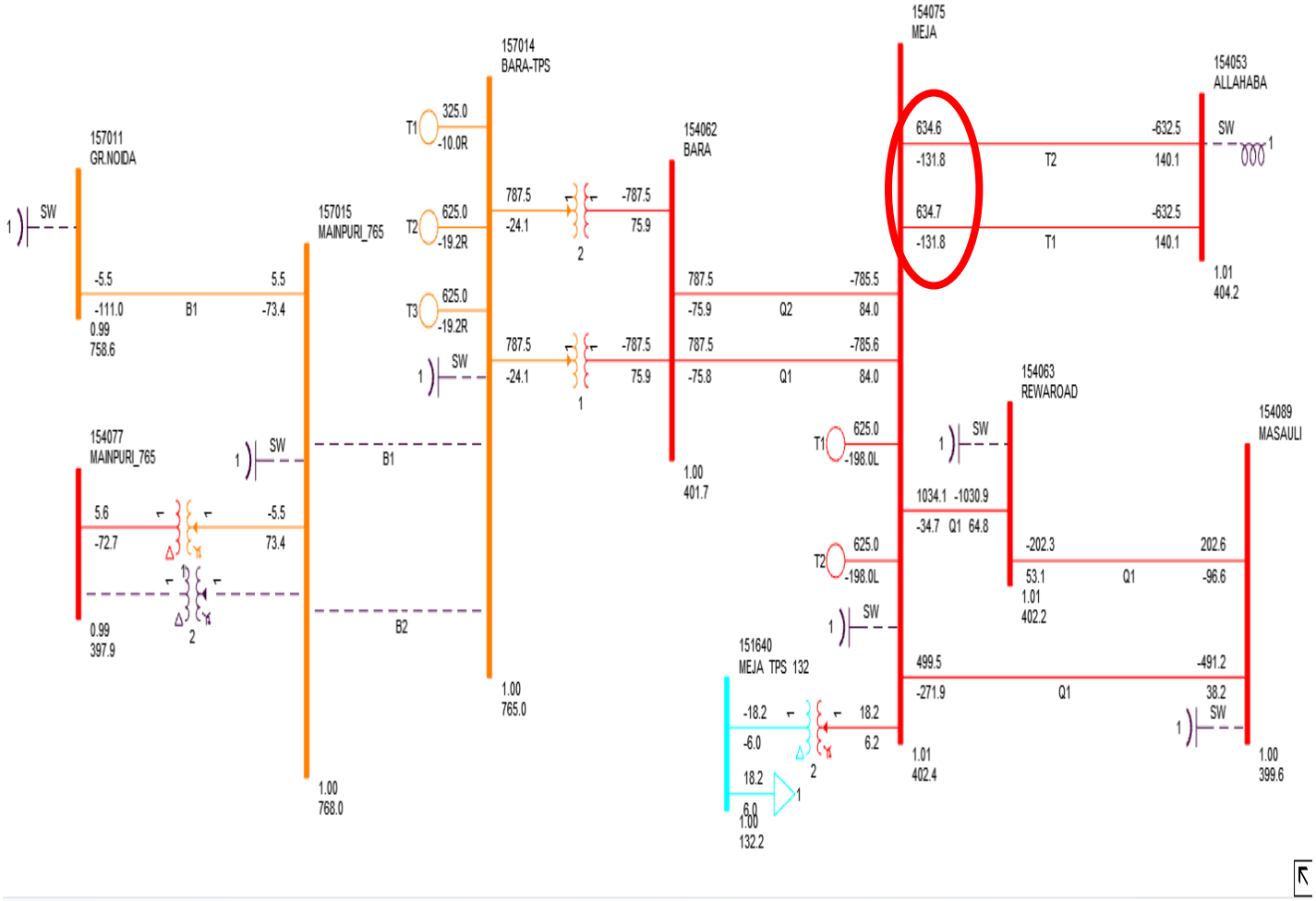

157011
GR.NOIDA
157015
MAINPURI_765
157014
BARA-TPS
154062
BARA
154075
MEJA
154053
ALLAHABA
154063
REWAROAD
154089
MASAULI
154077
MAINPURI_765
151640
MEJA TPS 132
SW
B1
B2
T1
T2
T3
Q1
Q2
325.0
-10.0R
625.0
-19.2R
787.5
-787.5
-24.1
75.9
-5.5
5.5
-111.0
-73.4
0.99
758.6
1.00
768.0
1.00
765.0
1.00
401.7
634.6
-131.8
-632.5
140.1
634.7
1.01
404.2
-785.5
84.0
-785.6
-75.9
-75.8
625.0
-198.0L
1034.1
-1030.9
-34.7
64.8
-202.3
202.6
53.1
-96.6
1.01
402.2
499.5
-491.2
-271.9
38.2
1.01
402.4
1.00
399.6
5.6
-5.5
-72.7
73.4
0.99
397.9
-18.2
18.2
-6.0
6.2
1.00
132.2

Figure -3

Contingency No.2- Both the 1500 MVA ICTs at Bara TPS trip **OR** Both the 400 kV Bara –Meja Ckt trip

Observation- It is observed in the load flow , the loading on 765 kV Bara –Mainpuri ckt -2 is around 1850 MW. Although the loading on this line is below the thermal limit of line but keeping in view of single 1000 MVA ICT at 765 kV substation Mainpuri, this loading has to be restricted at 1000 MW

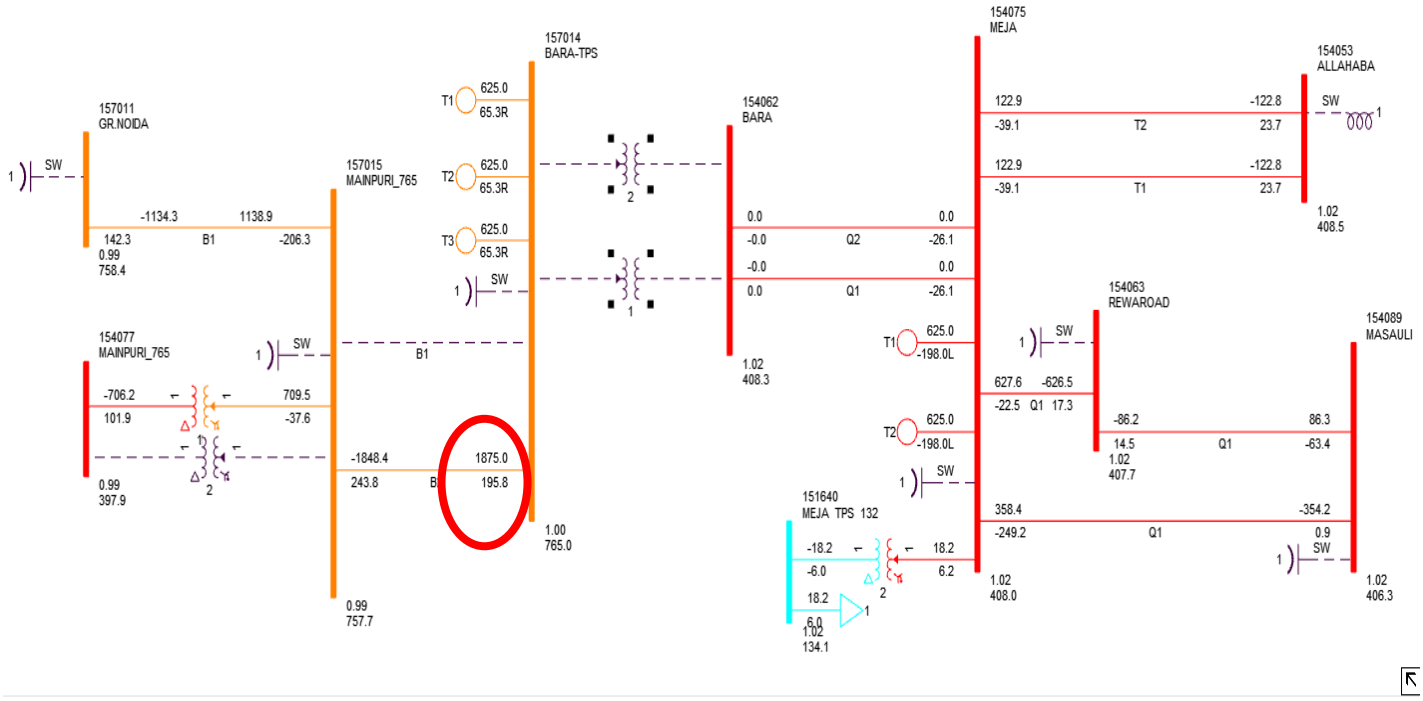


Figure -4

Contingency No.3- Tripping of 765 kV Bara –Mainpuri Ckt -2 **AND** 1500 MVA ICT-I **OR** 1500 MVA ICT-II at Bara TPS Trip

Observation- It is observed in the load flow, the loading on remaining 1500 MVA ICT at Bara TPS gets overloaded if total ex-bus generation at Bara TPS is more than 1500 MW (Figure-5). Therefore, to avoid overloading on said ICT the ex –bus generation has been restricted to 1450 MW.

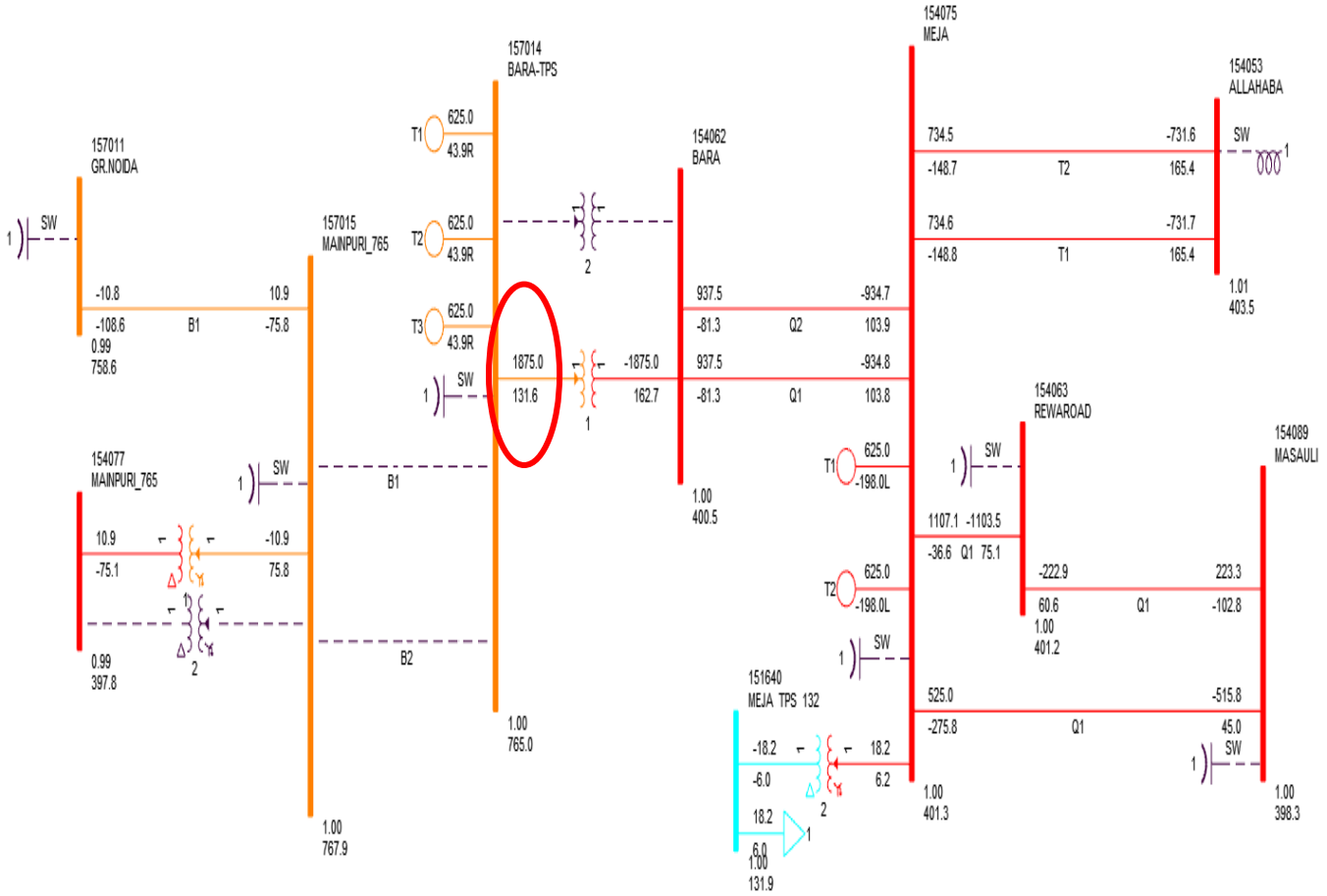
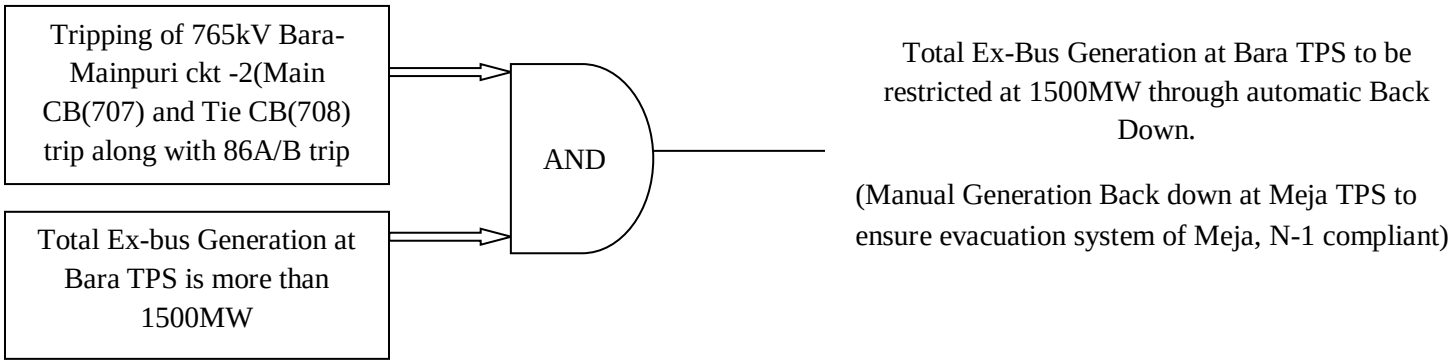


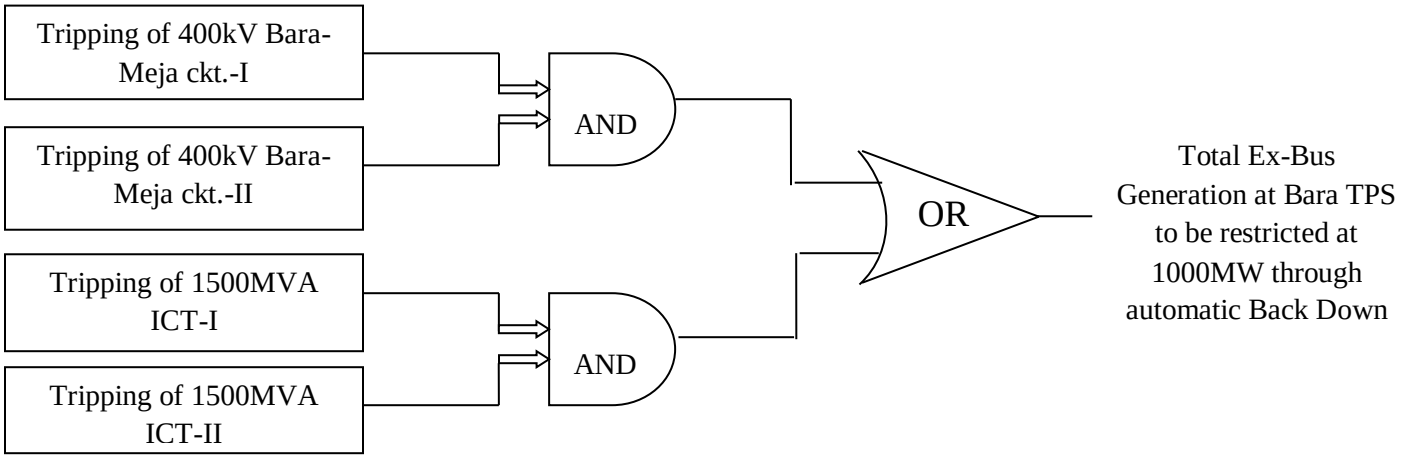
Figure -5

Revised logic for SPS at Bara TPS

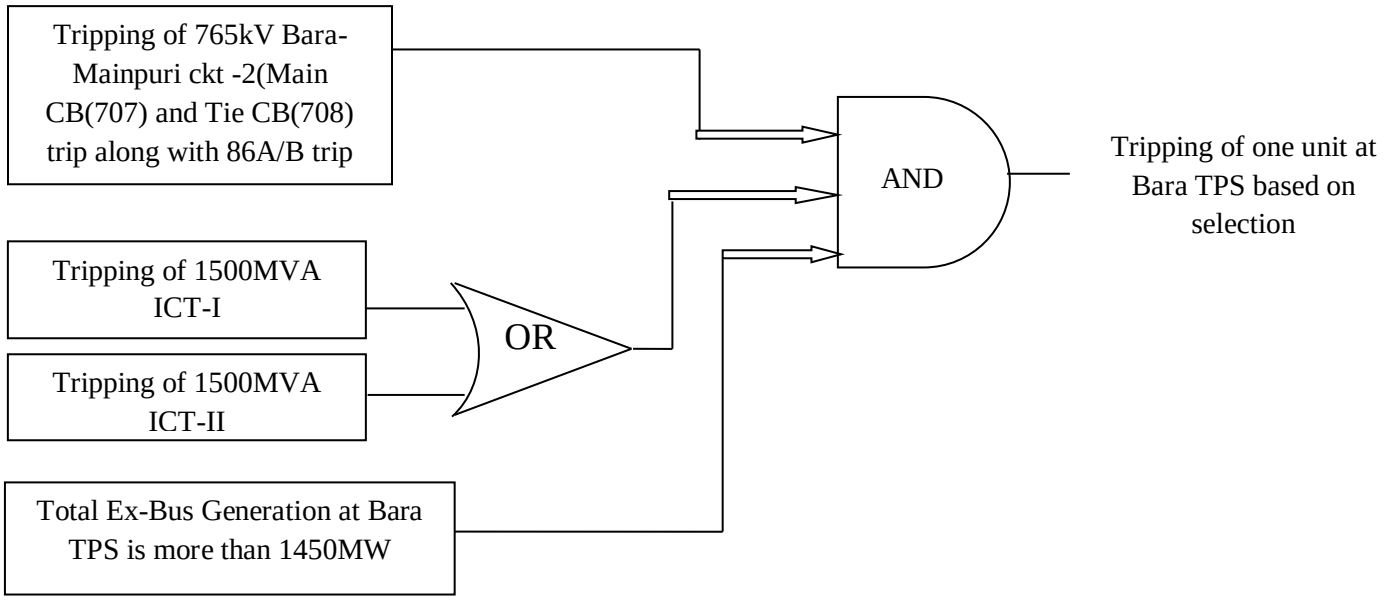
Logic-1



Logic-2



Logic-3



Annexure-B.I

घनश्याम प्रसाद
अध्यक्ष तथा पदेन सचिव भारत सरकार
GHANSHYAM PRASAD
Chairperson & Ex-officio Secretary
To the Government Of India

केन्द्रीय विद्युत प्राधिकरण
भारत सरकार
विद्युत मंत्रालय
सेवा भवन, आर,के, पुरम
नई दिल्ली–110066
Central Electricity Authority
Ministry of Power
Sewa Bhawan, R. K. Puram
New Delhi-110066

DO No: CEA-PL-11-37/1/2018-IRP

29th March, 2023

Dear Sir,

Ministry of Power has notified the Electricity (Amendment) Rules, 2022, which inter alia, aims to implement Resource Adequacy (RA) Framework to ensure reliable supply of Electricity to the consumers.

As per Rule 16 of the Electricity (Amendment) Rules, 2022 Ministry of Power has to issue guidelines for assessment of resource adequacy during the generation and operational planning stages. Accordingly, CEA has prepared draft Resource Adequacy Guidelines, which are currently in approval stage. As per the draft Resource Adequacy Guidelines published in September 2022, Central Electricity Authority is entrusted to prepare Long Term-National Resource Adequacy Plan (LT-NRAP). Further Distribution Utility need to carry out LTDRAP (Long term Discom Resource Adequacy Plan) to meet the utility peak and energy requirement reliably.

For preparing the LT-NRAP State-wise information viz. Demand, Installed Capacity, Generation (both RE and conventional), financial data etc. (As per the attached format) is required. A letter dated 25th Jan 2023 has been sent to all the States, regulatory commission, and NDLC/RLDC/SLDCs for collection of data.

I request you to kindly assign this task to a team of officers for data preparation and to carry out RA studies. CEA will guide & hand hold the team of officers in data collection, power system modelling and analysis of result for carrying out state specific resource adequacy studies.

With regards.

Yours sincerely,

29/3/23

(**Ghanshyam Prasad**)

Annexure- 1

ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
भारत सरकार का उद्यम
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
उत्तर क्षेत्रीय भार प्रेषण केन्द्र / Northern Regional Load Despatch Centre
कार्यालय : 18-ए, शहीद जीत सिंह सनसनवाल मार्ग, कटवारिया सराय, नई दिल्ली-110016
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NRLDC/MO/ Date:23nd Feb2023

To,

CGM, NRTS-1,
Power grid Corporation of India Limited Sector-16A, Faridabad, Haryana-121002

Subject: Regarding renewal of contract between Powergrid and M/s Kalkitech for AMR. Dear Sir, According to Sub-proviso (22) of proviso 4 of Regulation 6 of Indian Electricity Grid Code 2010, NRLDC is responsible for processing SEM data on a weekly basis for Northern region and forwarding the processed meter data to NLDC for loss calculation and to NRPC for issuing Deviation Settlement Account on weekly basis.

To perform the statutory function mentioned above, NRLDC requires meter data, which is provided either online via AMR or collected via DCD by individual stations and sent to us.

Currently, there are approximately 2700 SEMs installed in the Northern region, out of which about 1800 meter data is provided to NRLDC via AMR and the rest is provided by individual stations after collecting via DCD. Powergrid has a contract with a third-party vendor M/s Kalkitech to fetch meter data online via AMR on a weekly basis and provide to NRLDC.

We recently learned that the contract with M/s Kalkitech is set to expire in May month of 2023.The meter data is required for Deviation account settlement on weekly basis where several Utilities are involved. Additionally, the deviation amount for some constituents is in the range of crores of rupees. NRLDC requires the meter data in a timely manner for the weekly processing of SEM data, and it will be difficult to do so if the AMR function is hampered due to the contract's expiry.

Hence Powergrid is requested to inform us at the earliest regarding the action being taken at their end for timely renewal of the contract/AMC with M/s Kalkitech.

Regards,

Yours faithfully,

(Sheikh Shadruddin)
GM (Market Operation)

Copy for kind information:

1. ED,NRTS-1, PGCIL,Haryana
2. MS, NRPC, Katwaria Sarai, New Delhi
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All sessions in India Time (Mumbai, GMT+05:30)
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Generating Unit Outage Report 12-04-2023

B. Forced Outages

S.No	Station	Location	Owner	Unit No	Capacity MW	Reason(s)	Outage		Expected Revival Date
							Date	Time	
	Central Sector (CS)								
1	Kishenganga	J&K	NHPC	1	110	Stator core damaged Stator core damaged	23-11-2022	20:18	19-04-2023
2	Dadri-I TPS	DELHI	NTPC	4	210	Boiler tube leakage	10-04-2023	13:59	13-04-2023
	Sub Total (CS)				320				
	State Sector (SS)								
1	Giral (IPP) LTPS	RAJASTHAN	RRVPNL	1	125	Unit was out on bed material leakage and it is likely to be scrapped.	11-07-2014	08:20	-
2	Giral (IPP) LTPS	RAJASTHAN	RRVPNL	2	125	Unit was out on bed material leakage and it is likely to be scrapped.	27-01-2016	15:27	-
3	Delhi Gas Turbines	DELHI	DTL	9	34	STG Governor oil leakage	12-02-2022	20:00	-
4	Delhi Gas Turbines	DELHI	DTL	5	30	due to tripping of associated STG at 20:00 hrs	12-02-2022	21:04	-
5	Bawana GPS	DELHI	DTL/Pragati	5	253	C&I problem	03-06-2022	22:04	15-04-2023
6	Ramgarh GPS	RAJASTHAN	RRVPNL	2	38	due to fire accident in GT - 2	04-06-2022	01:17	30-06-2023
7	Obra TPS	UP	UPPTCL	10	200	Tripped DUE TO TURBINE PROBLEM . Turbine is under hauling	29-01-2023	21:00	04-05-2023
8	Kota TPS	RAJASTHAN	RRVPNL	5	210	DUE TO PROBLEM IN EHTC GOVERNING SYSTEM OF TURBINE	01-03-2023	15:05	15-04-2023
9	Rajwest (IPP) LTPS	RAJASTHAN	RRVPNL	2	135	Differential relay tripped.	17-03-2023	17:19	30-04-2023
10	Chhabra TPS	RAJASTHAN	RRVPNL	1	250	low condenser vacuume	31-03-2023	00:00	13-04-2023
11	Goindwal(GVK)	PUNJAB	PSPCL	2	270	Non-availability of raw water due to some construction work in river.	31-03-2023	14:59	16-04-2023
12	Bara PPGCL TPS	UP	UPPTCL,JPV	3	660	Turbine bearing vibration very high	06-04-2023	10:58	22-04-2023
13	Ramgarh GPS	RAJASTHAN	RRVPNL	5	50	Fire incident occured	06-04-2023	16:31	31-07-2023
14	Barsingsar (NLC)	RAJASTHAN	RRVPNL	1	125	Due to suspected refractory failure.	06-04-2023	18:00	20-04-2023
15	Suratgarh TPS	RAJASTHAN	RRVPNL	5	250	Drum Level High.	08-04-2023	17:24	13-04-2023
16	Suratgarh TPS	RAJASTHAN	RRVPNL	4	250	Due to heavy clinker formation in the furnace.	09-04-2023	11:21	12-04-2023
17	RGTPP(Khedar)	HARYANA	HVPNL	1	600	Boiler tube leakage	10-04-2023	06:37	13-04-2023
18	Rajwest (IPP) LTPS	RAJASTHAN	RRVPNL	7	135	BED MATERIAL LEAKAGE.	10-04-2023	09:59	13-04-2023
19	Chhabra TPS	RAJASTHAN	RRVPNL	3	250	Due to clinker formation.	10-04-2023	23:35	12-04-2023
20	Harduaganj-D TPS	UP	UPPTCL	9	250	HIGH TURBINE SHIFT VIBRATIONS	11-04-2023	21:02	13-04-2023
21	Kawai TPS	RAJASTHAN	RRVPNL,APL	1	660	Due to Abnormal sound from APH-A gear box.	12-04-2023	06:13	-
22	Suratgarh TPS	RAJASTHAN	RRVPNL	3	250	Due to cold gas temperature very high	12-04-2023	11:15	-
23	Suratgarh TPS	RAJASTHAN	RRVPNL	1	250	DUE TO BLAST IN SWITCH GEAR	12-04-2023	11:45	-
24	Suratgarh TPS	RAJASTHAN	RRVPNL	2	250	Due to low vaccum trip	12-04-2023	11:50	-
25	Rajwest (IPP) LTPS	RAJASTHAN	RRVPNL	6	135	DUE TO BED MATERIAL LEAKAGE	12-04-2023	14:23	-
	Sub Total (SS)				5785				
Total Forced Outage (CS+SS)					6105				

Sr No	Element Name	Outage Date	Outage Time	Reason
1	220 KV Debari(RS)-RAPS_A(NP) (RS) Ckt-1	02-Mar-23	05:10	Y-N fault, Zone-1, Dist. 21.3km, Fault current 1.94kA from Debari. As per DR, Y-N phase to earth fault observed.
		06-Mar-23	14:50	R-N fault, Dist. 130.2km from Debari end; Dist. 81.3km, Fault current 1.973kA from RAPS_A. As per DR, R-N phase to earth fault observed.
		25-Mar-23	03:58	R-N fault, Zone-1, Fault current 1.95kA, Dist. 12.7km from Debari(RS). As per DR, R-N phase to earth fault observed.
		26-Mar-23	13:31	B-N fault, Dist. 67.3km, Fault current 1.98kA from Debari(RS) end; Dist. 142.4km, Fault current 1.233kA from RAPS_A. As per PMU, B-N phase to earth fault observed.
		28-Mar-23	13:36	B-N fault, Zone-1, Dist. 135.1km, Fault current 1.366kA from RAPS_A. As per PMU, B-N phase to earth fault observed.
		30-Mar-23	13:49	Debari End :- M-I R-Ph, Z-II, D=119.5KM IL1=0.79KA, IL2=0.14KA, IL3=0.28KA 86A&B Carrier Send, Carrer Received M-II R-Ph, Z-II, D=115.4KM IL1=0.79KA, IL2=0.14KA, IL3=0.28KA. As per DR, R-N phase to earth fault observed.
2	400 KV Aligarh-Muradnagar_1 (UP) Ckt-1	13-Mar-23	10:14	CP DPT M-I, DPT M-2 RP M-1 INST, A PHASE (ABC) , Ground Z1 , location 1.79 km, IA 11899 A , 86A M2- A PHASE Z1 , A/R OPTD, SOTF / TOR, A/R- L/O, Carriers send 86A ,86B, 86C, IA- 11.87 KA., Location - 178.5 M. As per PMU, R-N fault and unsuccessful auto-reclosing observed.
		17-Mar-23	12:52	Y-N fault, Zone-1, Dist. 77.41km, Fault current 4.93kA from Aligarh. As per PMU, Y-N fault occured, successful autoreclsoing is observed at Muradnagar end.
		24-Mar-23	06:39	Phase to earth fault Y-N. As per PMU, Y-N fault occured, successful autoreclsoing is observed at Muradnagar end.
		30-Mar-23	22:28	B-N fault, Zone-1, Dist. 87.123km, Fault current 4.181kA from Aligarh. As per PMU, B-N fault occured, successful autoreclsoing is observed at Muradnagar end.
3	400 KV Anpara_B(UPUN)-Mau(UP) (UP) Ckt-1	27-Mar-23	02:00	R-N fault, Zone-1, Fault current 2.84kA, Dist. 131.4km from Anpara. As per PMU, R-N fault and unsuccessful auto-reclosing observed.
		27-Mar-23	03:23	R-N fault, Zone-1, Fault current 3.853kA, Dist. 85km from Mau(UP). As per PMU, R-N fault and unsuccessful auto-reclosing observed.
		31-Mar-23	20:50	B-N fault, Zone-1, Dist. 255km, Fault current 15.27kA from Mau end. As per PMU, B-N fault and unsuccessful auto-reclosing observed.
4	400 KV Bareilly-Unnao (UP) Ckt-1	05-Mar-23	03:43	R-N fault, Dist. 256.5km from Bareilly. As per PMU, line tripped after 6 sec of successful A/R operation on R-N fault.
		07-Mar-23	01:13	B-N fault, Zone-1, Dist. 83.5km, Fault current 4.30kA from Unnao & Dist. 179.15km, Fault current 2.06kA from Bareilly. As per PMU, line tripped after 6 sec of successful A/R operation on B-N fault.
		07-Mar-23	19:57	SOTF at Unnao end. As per PMU, B-N fault and unsuccessful auto-reclosing observed.
5	400 KV Gumma (HP)-Panchkula(PG) (PG) Ckt-1	01-Mar-23	06:16	Over voltage. As per PMU, no over voltage observed.
		02-Mar-23	07:39	Zone-1 trip operated. As per PMU, no fault is observed.
		16-Mar-23	14:18	B-N fault, Zone-1 from Gumma (HP). As per PMU, line successfully autoreclosed from Panchkula end on B-N fault.
6	400 KV Suratgarh(RVUN)-Bikaner(RS) (RS) Ckt-1	07-Mar-23	04:10	R-N fault, Dist. 125.48km, Fault current 2.048kA from Suratgarh. As per PMU, no fault is observed. As per DR, B-N fault occured, no auto-reclosing observed.
		22-Mar-23	03:27	BIKANER END: R-N Fault , Fault Location-78.42 Km,Fault Current-3.767 KAmp and SURATGARH END - Zone-I,B-phase,Fault Location-48.49 Km,Fault Current-5664.48 Amp. As per PMU, no fault is observed. As per DR, R-N fault occured, no auto-reclosing observed.
		29-Mar-23	19:33	R-N fault, Zone-1, Dist. 29.11km, Fault current 7.82kA from Bikaner(RS). As per PMU, no fault is observed. As per DR, R-N fault occured, no auto-reclosing observed.

Annexure-B.VI

Grid Event summary for March 2023

S.No.	Category of Grid Disturbance (GD-I to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserved due to Generation loss (MU)	Energy Unserved due to Load loss (MU)	Loss of generation / loss of load during the Grid Disturbance		% Loss of generation / loss of load w.r.t Antecedent Generation/Load in the Regional Grid during the Grid Disturbance		Antecedent Generation/Load in the Regional Grid		Preliminary Report receipt status			DR/EL receipt status			Detailed Report receipt status		Fault Clearance time (in ms)
					Date	Time	Date	Time					Generation Loss(MW)	Load Loss (MW)	% Generation Loss(MW)	% Load Loss (MW)	Antecedent Generation (MW)	Antecedent Load (MW)	within 24hrs	after 24hrs	Not Received	within 24hrs	after 24hrs	Not Received	Received	Not Received	
1	GD-1	1) 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) Ckt-1 2) 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) Ckt-2 3) 400KV Bus 1 at Noida Sec 148(UP) 4) 400KV Bus 2 at Noida Sec 148(UP) 5) 400/220 kV 500 MVA ICT 1 at Noida Sec 148(UP) 6) 400 KV Noida Sec 148-Noida Sec 123 (UP) Ckt-1 7) 400 KV Noida Sec 148-Noida Sec 123 (UP) Ckt-2	Uttar Pradesh	UPPTCL	6-Mar-23	20:47	6-Mar-23	22:12	01:25	i) 400/220/33kV Noida Sec148 GIS has double main single breaker bus scheme. Power comes from 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) D/C and feeds Noida Sec 123 via 400 KV Noida Sec 148-Noida Sec 123 (UP) D/C and feeders connected at 220kV level at Noida Sec 148. There are 2*500MVA ICT at Noida Sec148, during antecedent condition, only ICT-1 was in service. There is 1*160MVA 220/132kV ICT and 1*60MVA 220/33kV transformer. ii) As reported, brief detail of the event are as follows: a) There are two (no.) DC source i.e., I & II with automatic changeover mechanism via mechanical changeover relay which takes approx. minimum 100msec to changeover the DC source. b) There is a logic for initiation of bus bar protection with the delay of 100msec in the case of gas detector stage-3 (GD-3). c) In addition, there is an issue related to arrangements of contacts of DC source that whenever DC source is not available then it raises flag as gas detector stage-3 (GD-3) which further initiates bus bar tripping as DC source changeover takes more than 100msec. d) There is also a preexisting issue related to cards of battery charger which lead to DC source failure during any fluctuation in AC supply. e) So, at 20:47hrs on 06th Mar23, a RYB three phase fault occurred in one of the 33kV feeder (feeder no 14), differential current was approx. 20kA. f)During this fault, DC supply from DC source-I lost due to issue arose in its battery charger. g)And before DC source changeover could have occurred, bus bar tripping initiated with the flag of GD-3. h) Due to bus bar protection operation, all the feeders and elements connected at both the 400kV bus tripped. i) Similar logic/arrangement w.r.t. DC source & GD-3 and bus bar tripping initiation is implemented at 220kV level. However, as bus bar relay at 220kV side is defective that's why tripping didn't initiate to elements connected at 220kV bus although, 1*160MVA 220/132kV ICT tripped, reason of the same is yet to be identified. iii) As per PMU at 765kV Agra(PG), voltage dip of approx. 02kV is observed in all the three phases which suspects RYB fault in downward network. iv) As per SCADA, change in demand of approx. 96MW is observed in UP control area.	0	0.14	0	96	0.000	0.172	51210	55682	Y(UP)			Y(UP)			Y(UP)		NA
2	GD-1	1) 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) Ckt-1 2) 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) Ckt-2 3) 400KV Bus 1 at Noida Sec 148(UP) 4) 400KV Bus 2 at Noida Sec 148(UP) 5) 400/220 kV 500 MVA ICT 1 at Noida Sec 148(UP) 6) 400 KV Noida Sec 148-Noida Sec 123 (UP) Ckt-1 7) 400 KV Noida Sec 148-Noida Sec 123 (UP) Ckt-2	Uttar Pradesh	UPPTCL	8-Mar-23	17:26	8-Mar-23	18:13	00:47	i) 400/220/33kV Noida Sec148 GIS has double main single breaker bus scheme. Power comes from 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) D/C and feeds Noida Sec 123 via 400 KV Noida Sec 148-Noida Sec 123 (UP) D/C and feeders connected at 220kV level at Noida Sec 148. There are 2*500MVA ICT at Noida Sec148, during antecedent condition, only ICT-1 was in service (ICT-2 is under breakdown since 19.08.2020). There is 1*160MVA 220/132kV ICT and 2*100MVA 220/33kV transformer. ii) As reported, brief detail of the event are as follows: a) At 17:26hrs, flashover occurred at Y-phase of earth switch of 402 Bay (400kV Noida Sec148- Noida sec 123 ckt-2) at Noida sec 148 end. Noida Sec123 ckt-2 was connected at 400kV Bus-2 at Noida Sec148. b) On this fault, Bus bar protection operated. However, due to delayed opening of bus coupler bay, elements connected to 400kV bus-1 also tripped. c) Operation of bus bar protection has been tested and it is found okay. d) Reason of delayed opening of bus coupler breaker not identified yet. iii) As per PMU at 765kV Agra(PG), Y-N phase to earth fault which cleared within 100msec is observed. iv) As reported by SLDC-UP, load loss of approx. 80MW occurred in UP control area.	0	0.06	0	80	0.000	0.208	35619	38477	Y(UP)			Y(UP)			Y(UP)	Y(PG)	80
3	GD-1	1) 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) Ckt-1 2) 400KV Bus 1 at Noida Sec 148(UP) 3) 400/220 kV 500 MVA ICT 1 at Noida Sec 148(UP) 4) 400 KV Noida Sec 148-Noida Sec 123 (UP) Ckt-1	Uttar Pradesh	UPPTCL	9-Mar-23	14:59	9-Mar-23	15:19	00:20	i) 400/220/33kV Noida Sec148 GIS has double main single breaker bus scheme. Power comes from 400 KV Gr.Noida_2(UPC)-Noida Sec 148 (UP) D/C and feeds Noida Sec 123 via 400 KV Noida Sec 148-Noida Sec 123 (UP) D/C and feeders connected at 220kV level at Noida Sec 148. There are 2*500MVA ICT at Noida Sec148, during antecedent condition, only ICT-1 was in service. There is 1*160MVA 220/132kV ICT and 2*100MVA 220/33kV transformer. ii) As reported, brief detail of the event are as follows: a) There are two (no.) DC source i.e., I & II with automatic changeover mechanism via mechanical changeover relay which takes more than 100msec to changeover the DC source. b) There is a logic for initiation of bus bar protection with the delay of 100msec in the case of gas detector stage-3 (GD-3). c) In addition, there is an issue related to arrangements of contacts of DC source that whenever DC source is not available then it raises flag as gas detector stage-3 (GD-3) which further initiates bus bar tripping as DC source changeover takes more than 100msec. d) There is also a preexisting issue related to cards of battery charger which lead to DC source failure during any fluctuation in AC supply. e) So, at 14:59hrs on 09th Mar23, a RYB three phase fault occurred in one of the 33kV feeder (feeder no 12), differential current was approx. 20kA. f) During this fault, DC supply from DC source-I lost due to issue arose in its battery charger. g) And before DC source changeover could have occurred, bus bar tripping initiated with the flag of GD-3. h) Due to bus bar protection operation, all the feeders and elements connected at both the 400kV bus tripped. i) Similar logic/arrangement w.r.t. DC source & GD-3 and bus bar tripping initiation is implemented at 220kV level. However, as bus bar relay at 220kV side is defective that's why tripping didn't initiate to elements connected at 220kV bus although, 1*160MVA 220/132kV ICT tripped, reason of the same is yet to be identified. j) It is informed that, defective cards in battery charger has been replaced. Both the DC source are healthy now, same has been tested and confirmed. k) Issue related to logic of bus bar protection is yet to be resolved, follow up has been taken to resolve the same. iii) As per PMU at 400kV Agra(PG), voltage dip of approx. 01kV is observed in all the three phases which suspects RYB fault in downward network. iv) As reported by SLDC-UP, load loss of approx. 100MW occurred in UP control area.	0	0.03	0	100	0.000	0.205	46921	48706	Y(UP)			Y(UP)			Y(UP)		NA
4	GI-2	1) 400 KV Koldam(NT)-Parbati Pooling Banala(PG) (PKTCL) Ckt-1 2) 400KV Bus 2 at Koldam(NT) 3) 400 KV Koldam(NT)-Ludhiana(PG) (PKTCL) Ckt-1	Himachal Pradesh	Koldam-NT, PGCIL	13-Mar-23	17:00	13-Mar-23	22:55	05:55	i) 400kV Koldam(NTPC) S/s has one and half breaker bus scheme. In antecedent condition, there was no generation at Koldam HEP. ii) At 17:00hrs, Y-N phase to earth fault occurred on 400 KV Koldam(NT)-Parbati Pooling Banala(PG) (PKTCL) Ckt-1. On this fault, line took the auto reclosing attempt. As fault was of permanent nature, line tripped but due of some issue in cable, its closing status didn't reset which further led to the operation of LBB protection of main CB of the line. iii) Due to operation of LBB of main CB of 400 KV Koldam(NT)-Parbati Pooling Banala(PG) (PKTCL) Ckt-1, all the Main CBs connected to 400kV bus-1 at Koldam tripped. As Tie CB of 400 KV Koldam(NT)-Ludhiana(PG) (PKTCL) Ckt-1 was already in out condition, this line tripped with the opening of main CB. iv) As per PMU at 400kV Koldam(NTPC), Y-N phase to earth fault with unsuccessful A/R operation due to permeant fault and multiple reclosing attempt if observed, fault cleared with the delay of 320msec. v) As per SCADA, no load loss is observed in HP control area.	0	0.00	0	0	0.000	0.000	45807	45410	Y(NTPC) Y(PG)			Y(NTPC) Y(PG)			Y(NTPC)		320
5	GI-2	1) 400/220 kV 315 MVA ICT 2 at Kota(PG) 2) 220KV Bus 2 at Kota(PG) 3) 220 KV Bhilwara(RS)-Kota(PG) Ckt 4) 220 KV Kota(PG)-KTPS Ckt-2	Rajasthan	RVPNL, PGCIL	13-Mar-23	02:05	13-Mar-23	04:39	02:34	i) 220 kV Kota(PG) has double main transfer bus scheme. During antecedent condition, 400/220 kV 315 MVA ICT 2, 220 KV Bhilwara(RS)-Kota(PG) Ckt and 220 KV Kota(PG)-KTPS Ckt-2 are connected at 220 kV Bus 2 at Kota(PG). ii) As reported by CPCC NR1, 220 kV Bus Coupler CT of B Phase blasted and bus bar protection operated. Due to this, 220kV Bus 2 at Kota(PG) tripped along with 400/220 kV 315 MVA ICT 2 at Kota(PG) and the feeders connected to Bus 2, i.e., 220 KV Bhilwara(RS)-Kota(PG) Ckt and 220 KV Kota(PG)-KTPS Ckt-2. iii) As per PMU at 400kV Kota(PG), B-N phase to ground fault is observed with fault clearance time of 80 ms. iv) As per SCADA, no load loss and generation loss is observed in Rajasthan control area.	0	0.00	0	0	0.000	0.000	35490	39029	Y(Raj)	Y(PG)		Y(PG) Y(Raj)			Y(PG)		80
6	GI-1	1) 220kV/132kV 150MVA ICT-1 at Pampore 2) 220kV/132kV 150MVA ICT-2 at Pampore 3) 220kV/132kV 150MVA ICT-3 at Pampore	Jammu & Kashmir	PDD-JK	13-Mar-23	12:23	13-Mar-23	12:50	00:27	i) As reported, at 12:23 hrs, 220kV/132kV 150MVA ICT-1 at Pampore tripped due to Buchholtz relay operation. ii) With the tripping of ICT-1, 220kV/132kV 150MVA ICT-2 & ICT-3 also tripped on over current protection operation due to overloading. iii) As per PMU, no fault is observed in system. iv) As per SCADA, load loss of approx. 265MW occurred in J&K control area.	0	0.12	0	265	0.000	0.497	51197	53330			Y(J&K)			Y(J&K)		Y(J&K)	NA
7	GI-2	1) 400 kV Tanda(NT)-Basti(UP) Ckt-2 2) 400 kV Lucknow_1(PG)-Basti(UP) Ckt-1 3) 400 kV Lucknow_1(PG)-Basti(UP) Ckt-2 4) 400/220 kV 500 MVA ICT 2 at Basti(UP)	Uttar Pradesh	UPPTCL, Tanda-NT, PGCIL	14-Mar-23	13:50	14-Mar-23	15:38	01:48	i) 400 kV Basti(UP) has double main bus scheme. ii) During antecedent condition, 400 kV Tanda(NT)-Basti(UP) Ckt-2, 400 kV Lucknow_1(PG)-Basti(UP) Ckt-1&2, 400 kV Gorakhpur(PG)-Basti(UP) Ckt-2 and 400/220 kV 500 MVA ICT 2 at Basti(UP) are connected to Bus-2 at 400 kV Basti(UP). Remaining elements were connected at Bus-1. Also, 400 kV Gorakhpur(PG)-Basti(UP) Ckt-2 was under planned shut down for relay testing work. iii) As reported, PLCC was not deactivated at both the ends during relay testing. At 13:50hrs, during testing of 400 kV Gorakhpur(PG)-Basti(UP) Ckt-2 at POWERGRID end, DT was received at Basti end. iv) At the same time, LBB protection operated at Basti end which led to the tripping of all the elements connected to Bus-2. v) At the same time, 33 KV Basti(UP)-Munderwa Ckt also tripped, according to SCADA SOE. vi) As per PMU at Lucknow(PG), no fault is observed. However, voltage dip of approx. 1kV is observed in all the three phases. vii) As per SCADA, no load loss occurred in Uttar Pradesh control area.	0	0.00	0	0	0.000	0.000	52681	53954		Y(PG) Y(UP)			Y(PG)	Y(UP)	Y(UP)		NA
8	GI-2	1) 800 KV HVDC Kurukshetra(PG) Pole-02 2) 800 KV HVDC Kurukshetra(PG) Pole-04	Haryana	PGCIL	14-Mar-23	20:03	14-Mar-23	21:07	01:04	i) During antecedent condition, all four poles were in service and carrying total 2000MW. ii) As reported, brief of detail of event (attached as Annexure-I) are as follows: a) At 20:03:41hrs, T-zone protection of pole-2 latched at Kurukshetra end which blocked pole-2 and initiated CAT B protection to block parallel pole which further led to the block of pole-4. b) As per event logger, it was found that, T-zone protection operated due to faulty measurement of Pole-4 Idl current. c) During investigation, everything was found healthy. It is suspected that faulty measurement occurred due to stray capacitance. d) A modification has been done by OEM to avoid such type of issue by inserting a 1kohm resistor in series for long signals. iii) After Pole-2 & 4 blocked, power compensated by remaining Poles in service. iv) As per PMU, fluctuation in voltage was observed.	0	0.00	0	0	0.000	0.000	42062	51187		Y(PG)			Y(PG)	Y(PG)		NA
9	GI-1	1) 220 KV Unchahar(NT)-Raebareilly(PG) (UP) Ckt-2 2) 210 MW Unchahar TPS - UNIT 2 3) 220 KV Unchahar(NT)-Malwan(UP) (UP) Ckt-2 4) 210 MW Unchahar TPS - UNIT 1	Uttar Pradesh	Unchahar-NT, PGCIL	20-Mar-23	20:07	20-Mar-23	23:55	03:48	i) During antecedent condition, testing of 220kV side CT of 220/33kV transformer of Solar(connected at 220k Bus-2) at Unchahar S/s was being done. 210MW Unit-2 at Unchahar (carrying ~183MW) was connected at 220kV Bus-2 and 210MW Unit-1 at Unchahar (carrying ~178MW) was connected at 220kV Bus-1. ii) As reported, at 20:07hrs, during testing, bus bar protection of 220kV Bus-2 operated. It led to the tripping of all the elements connected at 220kV Bus-2. Station transformer(for auxiliaries of Unit-1&2) also tripped as it was connected at 220kV Bus-2. iii) With the tripping of station transformer, power supply to auxiliary system of Unit-1 also got lost and cooling water pump for 210MW Unit-1 tripped. iv) After approx. 3min of tripping of Bus-2, 210MW Unit-1 at Unchahar also tripped on low vacuum. v) As per PMU at 765kV Kanpur(PG), no fault in system is observed. vi) As per SCADA, generation loss of approx. 360MW at Unchahar is observed.	0	0.00	360	0	1.024	0.000	35143	42145	Y(NTPC)	Y(PG)		Y(NTPC)	Y(PG)		Y(NTPC)		NA
10	GI-2	1) 400 KV Unnao(UP)-Jehta_Hardoi Road (UP) Ckt-1 2)400/220 kV 500 MVA ICT 1 at Jehta_Hardoi Road (UP) 3) 400/220 kV 500 MVA ICT 2 at Jehta_Hardoi Road (UP) 4) 400 KV Lucknow_1(PG)-Jehta_Hardoi Road (UP) Ckt-1 5) 400 KV Lucknow_1(PG)-Jehta_Hardoi Road (UP) Ckt-2 6) 400 kV Jehta_Hardoi Road (UP) Bus-1 7) 400 kV Jehta_Hardoi Road (UP) Bus-2 8) 63 MVAR Bus reactor at 400kV Jehta_Hardoi Road (UP)	Uttar Pradesh	UPPTCL, PGCIL	22-Mar-23	16:51	22-Mar-23	19:54	03:03	i) 400 kV Jehta(UP) has double main bus scheme. ii) During antecedent condition, 400 KV Unnao(UP) Jehta_Hardoi Road (UP) Ckt-2 was under planned shutdown and code issued for charging at 16:27 hrs. iii) As per information received from SLDC UP, at 16:51 hrs while charging 400 KV Unnao(UP)-Jehta_Hardoi Road (UP) Ckt-2, bus bar protection operated at 400 kV Jehta(UP). So, all the elements connected to 400 kV Bus-1 & 2, e.g., 400 KV Unnao(UP)-Jehta_Hardoi Road (UP) Ckt-1, 400 KV Lucknow_1(PG)-Jehta_Hardoi Road (UP) Ckt-1&2, 400/220 kV 500 MVA ICT 1&2 at Jehta_Hardoi Road (UP) got tripped and 400 kV Bus-1 & 2 at Jehta(UP) became dead. DT was received at Lucknow end. iv) Load at Jehta(UP) was managed through 220kV Jehta-Hardoi road ckt 1&2. Hence 220 kV Bus 1& 2 at Jehta(UP) did not trip and substation did not become dead. v) As per PMU at Lucknow(PG), Y-N phase to ground fault with fault clearance time of 80 msec is observed. vi) As per SCADA, no load loss occurred in Uttar Pradesh control area.	0	0.00	0	0	0.000	0.000	38301	38596	Y(PG) Y(UP)			Y(PG) Y(UP)			Y(UP)		80
11	GI-2	1) 400 KV Kanpur(PG)-Panki(UP) (PG) Ckt-1 2) 400 KV Kanpur(PG)-Panki(UP) (PG) Ckt-2 3) 400/220 kV 315 MVA ICT 1 at Panki(UP) 4) 400/220 kV 315 MVA ICT 2 at Panki(UP) 5) 400 KV Fatehpur-Kanpur (PG) Ckt-1 6) 400 KV Fatehpur-Kanpur (PG) Ckt-2 7) 220kV Bus-1 at Panki2(UP) 8) 220kV Bus-2 at Panki2(UP) 9) 220kV Panki-Kanpur South ckt 10) 220kV Panki-Kidwai ckt 11) 220kV Panki-BTHOR ckt 12) 220kV Panki-RPH ckt 13) 220kV Panki-CHIBM ckt	Uttar Pradesh	UPPTCL, PGCIL	23-Mar-23	13:07	23-Mar-23	14:45	01:38	i) During antecedent condition, 400kV Bus-1 at Kanpur(PG) was under shutdown and 400kV Kanpur-Fatehpur ckt-1&2 were connected at same dia with 400kV Kanpur-Panki ckt-1&2 (line length approx. 6km) (Main CB of Kanpur-Fatehpur ckt was in open condition). ii) As reported, at 13:07hrs, R & Y ph pole of CB of at Panki end of 220kV Panki-Kanpur South ckt damaged. On this fault, bus bar protection at 220kV Panki(UP) operated. iii) As per SCADA, elements connected at both the 220kV bus at Panki(UP) tripped. As fault didn't clear in time, 400/220kV 315MVA ICT-1&2 at Panki(UP) and 400kV Kanpur-Panki D/C also tripped with delay. iv) As per SOE & PMU data & DR/EL received, sequence of the event is as follows: a) At 13:06:18:680hrs, fault occurred in R-ph which cleared within 100msec. At the same time, line CB at Kanpur South end of 220kV Panki-Kanpur South ckt opened (as per SOE). b) At 13:07:37:360hrs, again fault occurred in R-phase which didn't clear at that moment. At the same time, line CB at Panki end of 220kV Panki-Kanpur South ckt opened (as per SOE). c) At 13:07:39:880hrs, fault occurred in Y-ph also. d) At 13:07:42:760hrs, fault in R & Y phase cleared and fault in R phase started, R phase fault cleared with the delay of 5.4sec and Y phase fault cleared with the delay of 2.8sec. At the same time, 400/220kV 315MVA ICT-2 at Panki(UP) tripped on directional O/C protection operation at 400kV side (as per SOE & DR). e) At 13:07:45:560hrs, fault in B phase cleared with the delay of 2.8sec. At the same time, 400kV Kanpur-Panki D/C tripped on O/C E/F protection operation at Kanpur end and 400/220kV 315MVA ICT-1 at Panki(UP) tripped on directional O/C protection operation at 400kV side(as per SOE & DR). f) As per fault locator detail of 400kV Kanpur-Panki D/C at Kanpur(PG) end, B phase fault distance was approx. ~200km from Kanpur(PG) end. It shows that fault was at 220kV side of Panki(UP). v) As 400kV Bus-1 at Kanpur(PG) was under shutdown, 400kV Kanpur-Fatehpur D/C tripped with the tripping of 400kV Kanpur-Panki D/C. vi) As per SCADA, load loss of approx. 300MW occurred in Uttar Pradesh control area.	0	0.49	0	300	0.000	0.733	41319	40915	Y(PG)	Y(UP)		Y(PG)			Y(UP)		5400
12	GI-1	1) 220/33 kV 150 MVA ICT 2 at AHEJ2L PSS HB_FGRAH_PG (AHEJ2L)	Rajasthan	AHEJ2L	24-Mar-23	15:39	24-Mar-23	16:02	00:23	i) During the antecedent condition, loading of ICT1 and ICT2 at AHEJ2L were approx. 126 and 183 MW respectively. ii) As reported, at 15:39 Hrs, ICT 2 at AHEJ2L tripped on overloading due to increase in wind generation. iii) As per SCADA data, generation loss of approx. 190 MW occurred at AHEJ2L RE station pooled at Fatehgarh2. iv) As per PMU at AHEJ2L, no fault is observed in the system. v) As per PMU, change in MW generation of 190 MW and change in MVAR generation of 62 MVAR (+42 MVAR injecting to -20 MVAR absorbing) is observed at AHEJ2L RE station pooled at Fatehgarh2.	0.073	0.00	190	0	0.457	0.000	41618	38782			Y(AHEJ3L)			Y(AHEJ3L)		Y(AHEJ3L)	NA
13	GI-1	1) 220 KV Moga(PG)-MOGAN(PS) (PSTCL) Ckt-1 2) 220 KV Moga(PG)-MOGAN(PS) (PSTCL) Ckt-2 3) 220 KV Moga(PG)-MOGAN(PS) (PSTCL) Ckt-3 4) 220 KV Moga(PG)-MOGAN(PS) (PSTCL) Ckt-4	Punjab	PSTCL, PGCIL	24-Mar-23	19:07	24-Mar-23	20:18	01:11	i) As reported, at 19:07hrs, 220kV Moga(PG)-Mogan(PS) (PSTCL) ckt-1,2,3&4 (line length ~400meter) tripped from Moga(PG) end only. No CB opened from Mogan(PS) end. ii) As per DR submitted of Moga(PG) end, over-current earth-fault protection operated in all four lines at Moga(PG) end. Fault current in all the lines were in the range of 750A and cleared after approx. 1-1.5sec. It seems that probably fault was outside the line in the Punjab network. iii) There is differential protection in line which is in blocked condition due to absence of fiber optics. iv) As per PMU at Jalandhar(PG), R-N phase to earth fault with delayed clearance in 1560msec is observed. v) As per SCADA, no load loss has been observed in Punjab control area as Mogan(PS) has alternate connectivity from 220kV Firoz & Botia feeders.	0	0.00	0	0	0.000	0.000	40590	47131		Y(PG)	Y(Pun)		Y(PG)	Y(Pun)	Y(PG)	Y(Pun)	1560
14	GI-1	1) 220KV Amargarh(INDIGRID) – Ziankote(JK)(PDD JK) ckt 1 2) 220KV Amargarh(INDIGRID) – Ziankote(JK)(PDD JK) ckt 2	Jammu & Kashmir	PDD-JK, INDIGRID	26-Mar-23	14:13	26-Mar-23	15:33	01:20	i) 220/132kV Ziankote S/s have two bus at 220kV side i.e., main bus & reserve bus. ii) During antecedent condition, 220kV Ziankote was operating in bus split mode viz. 220kV Amargarh(INDIGRID) –Ziankote(JK) D/C was feeding Ziankote load and 220kV Wagoora-Ziankote(JK) was feeding Alusteng. iii) As reported by J&K, jumper at tower location no. 102 of 220kV Amargarh(INDIGRID) –Ziankote(JK) ckt-1 has snapped and line tripped. Line tripped from Ziankote end only. At the same time, 220kV Amargarh(INDIGRID) –Ziankote(JK) ckt-2 also tripped on over-current protection due to overloading occurred due to load shifting. Hence, load of only Ziankote affected due to tripping. iv) As per PMU at Kishenpur & Amargarh, no fault is observed in system. v) As per SCADA, load loss of approx. 300MW occurred in J&K control area. vi) 220KV Amargarh(INDIGRID) -Ziankote(JK) ckt-2 was restored at 15:33hrs and bus coupler was closed at Ziankote to meet maximum load. Around 120MW load at Ziankote was curtailed during that duration. vii) After restoring 220KV Amargarh(INDIGRID) –Ziankote(JK) ckt-1 at 19:30hrs, again 220kV Ziankote was kept in bus split mode.	0	0.40	0	300	0.000	0.820	40469	36595		Y(J&K)	Y(INDIGRID)	Y(INDIGRID)		Y(J&K)		Y(J&K)	NA
15	GI-2	1) 400/220 kV 500 MVA ICT 1 at Agra(UP) 2) 2400/220 kV 500 MVA ICT 2et Agra(UP) 3) 400 KV Agra(UP)-Agra Fatehbad(UP) (PG) Ckt-1 4) 400 KV Agra(UP)-Agra Fatehbad(UP) (PG) Ckt-2 5) 400 KV Agra(UP)-Unnao(UP) Ckt 6) 220KV Agra(UP)-Agra_220 ckt-2 7) 132kV Agra(UP)-Etmadpur ckt 8) 132kV Agra(UP)-Agra Fondry Nagar ckt 9) 132kV Agra(UP)-Agra Taj ckt 10) 132kV Agra(UP)-Bhimnagari ckt 11) 132kV Agra(UP)-Sadabad ckt	Uttar Pradesh	UPPTCL, PGCIL	28-Mar-23	19:13	28-Mar-23	21:27	02:14	i) 400 kV Agra(UP) has double main transfer bus scheme. ii) During antecedent condition, 400 kV Agra(PG)-Agra(UP) (PG) ckt was under emergency shutdown to attend hot spot in Y-phase wave-trap at Agra(UP). iii) As reported, at 19:13 hrs, while charging 400kV Agra(PG)-Agra(UP) ckt, LBB protection operated at 400 kV Agra(UP) end. iv) Bus coupler did not open after LBB operation. So, all the elements connected to 400 kV Bus-1 & 2 tripped. It was also informed that, 400/220kV ICT-5 didn't trip as it is not incorporated in bus bar protection logic. v) At the same time, 220kV Agra(UP)-Agra_220 ckt-2, 132kV feeders from Agra(UP) to Etmadpur, Agra Fondry Nagar, Agra Taj, Bhimnagari and Sadabad also tripped due to SPS operation. vi) Load at Agra(UP) was managed partially through 220kV Agra(UP)-Shamsabad ckt and 220kV Agra(UP)-Agra_220 ckt-1. Hence, substation did not become dead. vii) As per SOE, while charging 400kV Agra(PG)-Agra(UP) ckt line was first charged from Agra(UP) end. After ~10sec, while attempting charging from Agra(PG) end LBB protection at Agra(UP) operated. viii) As per DR received from Agra(UP), master trip command has not been initiated before LBB operation. After approx. 260ms of line charging attempt from Agra(PG) end, LBB protection operated without any initiation of master trip command. So it seems to be LBB mal-operation. ix) As per PMU at 765 kV Agra(PG), no fault is observed in the system. x) As reported by Agra TnC, LBB relay has been replaced by POWERGRID. However, reason of maloperation of LBB protection is not shared. xi) As per SCADA, load loss of approx. 160MW occurred in Uttar Pradesh control area.	0	0.35	0	160	0.000	0.327	42182	48945	Y(UP)						Y(UP)	Y(UP)	NA

S.No.	Category of Grid Disturbance (GD-I to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserved due to Generation loss (MU)	Energy Unserved due to Load loss (MU)	Loss of generation / loss of load during the Grid Disturbance		% Loss of generation / loss of load w.r.t Antecedent Generation/Load in the Regional Grid during the Grid Disturbance		Antecedent Generation/Load in the Regional Grid		Preliminary Report receipt status			DR/EL receipt status			Detailed Report receipt status		Fault Clearance time (in ms)
					Date	Time	Date	Time					Generation Loss(MW)	Load Loss (MW)	% Generation Loss(MW)	% Load Loss (MW)	Antecedent Generation (MW)	Antecedent Load (MW)	within 24hrs	after 24hrs	Not Received	within 24hrs	after 24hrs	Not Received	Received	Not Received	
16	GI-1	1) 220 KV Jamalpur(BB)-DandhariKalani(PS) (PSTCL) Ckt-1 2) 220 KV Jamalpur(BB)-DandhariKalani(PS) (PSTCL) Ckt-2 3) 220 KV Jamalpur(BB)-Sangrur(BB) Ckt-1 4) 220 KV Jamalpur(BB)-Ganguwal(BB) Ckt-2 5) 220/66 kV 315MVA ICT-1 at DandhariKalani(PS)	Punjab	BBMB, PSTCL	30-Mar-23	21:17	30-Mar-23	22:39	01:22	i) 220kV Jamalpur(BB) has double main bus scheme. There are two buses Bus-1&2 and Bus 2 is further divided into two part Bus2A & Bus2B separated by bus sectionalizer. ii) As reported, at 21:17hrs, 220 KV Jamalpur(BB)-DandhariKalani(PS) (PSTCL) Ckt-1&2 tripped on RYB 3 phase fault , fault distance was 176.4m and 3.8km from Jamalpur(BB) end for ckt-1&2 respectively. 220 KV Jamalpur(BB)-Ganguwal(BB) Ckt-2 also tripped at the same time on B-N phase to ground fault with distance 79.05km and fault current of 1.235kA from Ganguwal(BB) end. iii) As per SOE, 220/66 kV 315MVA ICT-1 at DandhariKalani(PS) and 220 KV Jamalpur(BB)-Sangrur(PS) (BB) Ckt-1 also tripped at the same time. Bus coupler at 220kV Jamalpur(BB) and bus sectionalizer between Bus2A and Bus2B at 220kV Jamalpur(BB) also got opened. Hence Bus-1 and Bus-2B remained charged and Bus-2A became dead. iv) As per PMU at 400 kV Jalandhar(PG), Y-N phase to ground fault followed by Y-B phase to phase fault with delayed fault clearance time of 240 msec is observed in the system. v) As per SCADA, load loss of approx. 280MW occurred in Punjab control area.	0	0.38	0	280	0.000	0.729	32345	38398	Y(Pun)		Y(BBMB)			Y(BBMB)		Y(BBMB)	240
17	GI-1	1) 220kV Bhadla-Saurya Urja ckt-1	Rajasthan	Saurya Urja, PGCIL	31-Mar-23	12:57	31-Mar-23	15:55	02:58	i) During antecedent condition, 220kV Bhadla-Saurya Urja ckt-1 & ckt-2 was carrying approx. 177MW & 303MW respectively. ii) As reported, at 12:57hrs, 220kV Bhadla-Saurya Urja ckt-1 tripped. Line tripped from Saurya Urja end only. No relay indication is observed. Charging attempt failed at 13:49 hrs. iii) As per PMU, no fault in system is observed. iv) As per SCADA, change in generation of approx. 220MW is observed at Saurya Urja RE station.	0.65	0.00	220	0	0.521	0.000	42193	39914		Y(PG)	Y(Saurya Urja)			Y(Saurya Urja)		Y(Saurya Urja)	NA
18	GI-1	1) 220 KV Tanakpur(NH)-CB Ganj(UP) Ckt 2) 220/132 KV ICT at Tanakpur(NH) 3) 40MW Unit-1 at Tanakpur HEP	Uttarakhand	Tanakpur-NH, UPPTCL	31-Mar-23	16:29	31-Mar-23	17:52	01:23	i) During antecedent condition, 40MW Unit-1 at Tanakpur HEP was running and generating approx. 13MW & 220/132kV ICT was carrying 66 MW towards Mahendranagar (Nepal). ii) As reported, at 16:29hrs, testing work was being done in PT of Unit-1. During testing the PT voltage to relay was disrupted momentarily which resulted in operation of backup impedance relay. The control cable from relay to CB was faulty hence CB could not open which led to LBB protection operation at unit-1. Due to this, 220 KV Tanakpur(NH)-CB Ganj(UP) Ckt, 220/132 KV ICT at Tanakpur(NH) and 40MW Unit-1 at Tanakpur HEP tripped. iii) Due to tripping of 220/132 kV ICT at Tanakpur(NH), power flow to Mahendranagar (Nepal) became zero. iv) Due to opening of the elements, power flow to Sitarganj also became zero. v) As per PMU at Bareilly(PG), no fault in system is observed. vi) As per SCADA, generation loss of approx. 13MW is observed at Tanakpur HEP. vii) As reported by NHPC, fault in control cable from relay to CB of unit-1 has already been rectified.	0.017	0.00	13	0	0.032	0.000	40276	37825			Y(NHPC)			Y(NHPC)		Y(NHPC)	NA

S. No.	Name of Transmission Element Tripped	Owner/ Utility	Outage		Load Loss/ Gen. Loss	Brief Reason (As reported)	Category as per CEA Grid standards	# Fault Clearance Time (>100 ms for 400 kV and 160 ms for 220 kV)	*FIR Furnished (YES/NO)	DR/EL provided in 24 hrs (YES/NO)	Other Protection Issues and Non Compliance (inference from PMU, utility details)	Suggestive Remedial Measures	Remarks
			Date	Time									
1	400 KV RAPS_D(NP)-Shujalpur(PG) (RTCL) Ckt-1	POWERGRID	30-Mar-23	18:12	Nil	Phase to earth fault R-N	NA	NA	No	No			As per PMU & DR submitted, line tripped after unsuccessful A/R operation on permanent R-N fault.
2	765 KV Varanasi-Gaya (PG) Ckt-2	POWERGRID	21-Mar-23	20:41	Nil	Varanasi End Details: Y-N Fault , M 1: FC- 22.42 KA, FD- 200m; M2: FC-22.816 KA, FD-100 M and Gaya End : Y-N Fault , M1-FD-263.4KM,FC-1.68KA.M2-FD-265.4KM,FC-2.49KA .In investigation external flash (Corona shield to bottom flange) on Line Y-Phase SF6 to Air bushing has been observed at Varansi end	NA	NA	yes (After 24 hrs)	yes (After 24 hrs)			As per PMU & DR submitted, line tripped on Y-N fault in zone-1 from Varanasi end on restricted earth fault protection(64R) operation of line reactor.
3	400 KV Varanasi-Biharshariff (PG) Ckt-2	POWERGRID	21-Mar-23	05:49	Nil	Phase to earth fault R-N	NA	NA	yes (After 24 hrs)	yes (After 24 hrs)			As per PMU & DR submitted, line tripped after unsuccessful A/R operation on R-N fault in zone-1 from Varanasi end.
4	400 KV Gorakhpur(PG)-Motihari(BS) (PG) Ckt-2	POWERGRID	18-Mar-23	19:37	Nil	R-N fault, Dist. 163.4km, Fault current 2.11kA from Gorakhpur & Fault current 9.69kA, Dist. 7.1km from Motihari.	NA	NA	yes	yes			As per PMU & DR submitted, line tripped after R-N fault in zone-1 from Gorakhpur end. Carrier was received.
5	765 KV Agra-Gwalior (PG) Ckt-1	POWERGRID	18-Mar-23	01:04	Nil	Phase to earth fault Y-N	NA	NA	yes	yes			As per PMU & DR submitted, line tripped after unsuccessful A/R operationon on permanent Y-N fault in zone-1. from Agra end.
6	765 KV Chittorgarh-Banaskantha (PG) Ckt-1	POWERGRID	18-Mar-23	00:33	Nil	R-B Fault, Dist. 117.306km, Fault current 5.2kA from Chittorgarh & Dist. 185.09km, Fault current 4.8kA from Banaskantha.	NA	NA	yes (After 24 hrs)	yes (After 24 hrs)			As per PMU & DR submitted, line tripped on R-B phase-phase fault in zone-1 from Chittorgarh end.
7	765 KV Chittorgarh-Banaskantha (PG) Ckt-2	POWERGRID	17-Mar-23	15:21	Nil	R-B fault, Dist. 130km, Fault current Ir 5.45kA, Ib 6.35kA from Chittorgarh.	NA	NA	yes (After 24 hrs)	yes (After 24 hrs)			As per PMU & DR submitted, line tripped on R-B phase-phase fault in zone-1 from Chittorgarh end.
8	800 KV HVDC Kurukshetra(PG) Pole-2	POWERGRID	14-Mar-23	20:03	Nil	due to T-zone protection operated at Kurukshetra end as a result of which the parallel pole i.e. Pole-4 also got blocked at same time.	NA	NA	yes (After 24 hrs)	No			As per PMU & EL, fluctuationin voltage is observed. T-zone protection of Pole-2 operated at Kurukshetra end and initiated CAT B protection as a result of which the parallel pole i.e. Pole-4 also got blocked at same time.
9	800 KV HVDC Kurukshetra(PG) Pole-4	POWERGRID	14-Mar-23	20:03	Nil	due to T-zone protection operated at Kurukshetra end as a result of which the parallel pole i.e. Pole-4 also got blocked at same time.	NA	NA	yes (After 24 hrs)	No			As per PMU & EL, fluctuationin voltage is observed. T-zone protection of Pole-2 operated at Kurukshetra end and initiated CAT B protection as a result of which the parallel pole i.e. Pole-4 also got blocked at same time.
10	132 KV Rihand(UP)-Garwa(JS) (UP) Ckt-1	UPPTCL	9-Mar-23	19:35	Nil	Due to blackout at 132kv obra hydro s/s ,Rihand main bus trip and this line manually open for safety purpose	NA	NA	yes (After 24 hrs)	No			As per PMU and DR, no fault is observed. Voltage dip of approx. 2kV is observed in B-phase.
11	400 KV RAPS_D(NP)-Shujalpur(PG) (RTCL) Ckt-1	POWERGRID	8-Mar-23	16:48	Nil	Phase to earth fault R-N	NA	NA	No	No			As per PMU, Line tripped on multiple R-N phase-phase fault.

 # Fault Clearance time has been computed using PMU Data from nearest node available and/or DR provided by respective utilities (Annexure- II)

****Yes, if written Preliminary report furnished by constituent(s)***

R-Y-B phase sequencing (Red, Yellow, Blue) is used in the list content.All information is as per Northern Region unless specified.

^^ tripping seems to be in order as per PMU data, reported information. However, further details may be awaited.

Reporting of Violation of Regulation for various issues for above tripping

1	Fault Clearance time(>100ms for 400kV and >160ms for 220kV)	1. CEA Grid Standard-3.e 2. CEA Transmission Planning Criteria
2	DR/EL Not provided in 24hrs	1. IEGC 5.2(r) 2. CEA Grid Standard 15.3
3	FIR Not Furnished	1. IEGC 5.9.6.a 2. CEA Grid Standard 12.2 (Applicable for SLDC, ALDC only)
4	Protection System Mal/Non Operation	1. CEA Technical Standard of Electrical Plants and Electric Lines: 43.4.A 2. CEA (Technical Standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)
5	A/R non operation	1. CEA Technical Standard of Electrical Plants and Electric Lines: 43.4.C 2. CEA Technical Planning Criteria

Annexure-B.VIII

Status of submission of FIR/DR/EL/Tripping Report on NR Tripping Portal

Time Period: 1st March 2023 - 31st March 2023

S. No.	Utility	Total No. of tripping	First Information Report (Not Received)		Disturbance Recorder (Not Received)	Disturbance Recorder (NA) as informed by utility	Disturbance Recorder (Not Received)	Event Logger (Not Received)	Event Logger (NA) as informed by utility	Event Logger (Not Received)	Tripping Report (Not Received)	Tripping Report (NA) as informed by utility	Tripping Report (Not Received)	Remark
			Value	%	Value		%	Value		%	Value		%	
1	AHEJ2L	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	**DR/EL & Tripping report needs to be submitted**
2	APFOL	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
3	APMPL	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
4	ARP1PL	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
5	AVAADA_SUNRAYS	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
6	BBMB	35	11	**31**	12	6	**41**	14	10	**56**	15	2	**45**	
7	CHAMERA-I-NH	2	2	**100**	2	0	**100**	2	0	**100**	2	0	**100**	
8	CLEANSOLAR_JODHPUR	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
9	CPCC1	32	1	**3**	4	4	**14**	3	4	**11**	6	2	**20**	
10	CPCC2	29	3	**10**	3	2	**11**	3	2	**11**	3	0	**10**	
11	CPCC3	45	5	**11**	5	4	**12**	5	5	**13**	7	0	**16**	
12	DADRI-NT	4	2	**50**	2	0	**50**	2	0	**50**	2	0	**50**	
13	DULHASTI-NH	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	Details Received
14	KOLDAM-NT	3	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	
15	NAPP	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	
16	NJPC	1	0	**0**	0	1	**0**	0	0	**0**	0	0	**0**	
17	NTPC_KOLAYAT SL	3	3	**100**	3	0	**100**	3	0	**100**	3	0	**100**	**DR/EL & Tripping report needs to be submitted**
18	RAPPA	10	0	**0**	3	0	**30**	10	0	**100**	10	0	**100**	
19	RAPPB	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
20	RAPPC	2	2	**100**	2	0	**100**	2	0	**100**	2	0	**100**	
21	SAURYA	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
22	SINGOLI	2	2	**100**	2	0	**100**	2	0	**100**	2	0	**100**	
23	SINGRAULI-NT	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	Details Received
24	SLDC-DV	14	2	**14**	4	6	**50**	4	6	**50**	5	5	**56**	**DR/EL & Tripping report needs to be submitted**

Status of submission of FIR/DR/EL/Tripping Report on NR Tripping Portal

Time Period: 1st March 2023 - 31st March 2023

S. No.	Utility	Total No. of tripping	First Information Report (Not Received)		Disturbance Recorder (Not Received)	Disturbance Recorder (NA) as informed by utility	Disturbance Recorder (Not Received)	Event Logger (Not Received)	Event Logger (NA) as informed by utility	Event Logger (Not Received)	Tripping Report (Not Received)	Tripping Report (NA) as informed by utility	Tripping Report (Not Received)	Remark
			Value	%	Value		%	Value		%	Value		%	
25	SLDC-HP	8	0	**0**	0	5	**0**	0	4	**0**	0	0	**0**	Details Received
26	SLDC-HR	9	0	**0**	0	1	**0**	0	1	**0**	0	0	**0**	
27	SLDC-JK	7	6	**86**	6	0	**86**	6	0	**86**	6	0	**86**	**DR/EL & Tripping report needs to be submitted**
28	SLDC-PS	16	3	**19**	11	3	**85**	12	1	**80**	15	0	**94**	
29	SLDC-RS	46	0	**0**	2	0	**4**	2	0	**4**	10	0	**22**	
30	SLDC-UK	12	0	**0**	0	2	**0**	0	5	**0**	0	0	**0**	Details Received
31	SLDC-UP	148	46	**31**	58	12	**43**	54	13	**40**	61	1	**41**	**DR/EL & Tripping report needs to be submitted**
32	STERLITE	2	2	**100**	0	0	**0**	0	0	**0**	0	2	**0**	Details Received
33	TANAKPUR-NH	2	2	**100**	2	0	**100**	2	0	**100**	2	0	**100**	**DR/EL & Tripping report needs to be submitted**
34	TANDA-NT	2	1	**50**	1	1	**100**	1	1	**100**	1	1	**100**	
35	UNCHAHAR-NT	2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	Details Received
Total in NR Region		**447**	**101**	**23**	**130**	**47**	**33**	**135**	**52**	**34**	**160**	**13**	**37**	

As per the IEGC provision under clause 5.2 (r), detailed tripping report along with DR & EL has to be furnished within 24 hrs of the occurrence of the event

S. No.	Name of the Generatng Station (Capacity in MW)	Date of last PSS tuning / re-tuning performed (in DD/MM/YYYY format)	Date of last Step Response Test performed (in DD/MM/YYYY format)	Report submitted to NRLDC/NRPC (Yes/ No)	Remarks (if any)	Tentative schedule for PSS tuning / re-tuning
1	**THDC**					
	TEHRI HPS(4 * 250)	15.12.2021 to 20.12.2021	15.12.2021 to 20.12.2021	Yes	(Report shared vide email dt.19.01.2019)	
	KOTESHWAR HPS(4 * 100)	17/03/2019 to 19/03/2019	17/03/2019 to 19/03/2019	Yes	(Report shared vide email dt.11.02.2021)	
2	**SJVNL**					
	NATHPA-JHAKRI HPS(Unit1 #250)	10.03.2020	-	No	Excitation system upgraded in 2020	
	NATHPA-JHAKRI HPS(Unit2 #250)	14.03.2013	-	No	The upgradation of old excitation system of Unit No.#2&4 will be carried out during Annual Plant Maintenance of FY 20222-23, therefore PSS tuning shall be carried out at the time of upgradation of unit. It is also submitted that step response test of other Units shall also be carried out during upgradation work of Unit # 2 &4 by the OEM, being a system and software specific job.	
	NATHPA-JHAKRI HPS(Unit3 #250)	03.03.2020	-	No	Excitation system upgraded in 2020	
	NATHPA-JHAKRI HPS(Unit4 #250)	14.03.2013	-	NO	The upgradation of old excitation system of Unit No.#2&4 will be carried out during Annual Plant Maintenance of FY 20222-23, therefore PSS tuning shall be carried out at the time of upgradation of unit. It is also submitted that step response test of other Units shall also be carried out during upgradation work of Unit # 2 &4 by the OEM, being a system and software specific job.	
	NATHPA-JHAKRI HPS(Unit5 #250)	14.05.2016	14.05.2016	NO	Excitation system upgraded in 2013	3rd Quarter
	NATHPA-JHAKRI HPS(Unit6 #250)	14.05.2017	14.05.2017	NO	Excitation system upgraded in 2013	3rd Quarter
	RAMPUR HEP(6 * 68.67)	29.11.2014	27.10.2020,10.02.2021	YES	PSS Response and Step Test response was checked in February, 2021 by Rampur HPS and report of the same was submitted to NRLDC. Now the work of PSS tuning and step response testing has been awarded to BHEL, Bengaluru. Testing shall be carried out in November, 2022.	
3	**HVPNL**					
	PANIPAT TPS(unit1# 250)	29.03.2016	29.03.2016	YES	--	3rd Quarter
	PANIPAT TPS(unit2# 250)	15.01.2018	15.01.2018	YES	--	3rd Quarter
	DCRTPP (YAMUNA NAGAR)(unit1#300)	19-12-2018	19-12-2018	YES	(Report attached)	3rd Quarter
	DCRTPP (YAMUNA NAGAR)(unit1#300)	Will be carried out shortly				
	RGTPP(KHEDAR) (2*600)	5th to 6th July 2013	5th to 6th July 2013	Report attached. Previous record being looked into	No MW capacity addition after 2013 at RGTPP Khedar. No new line addition in vicinity of station	
	JHAJJAR(CLP) (2*660)	20-05-2017	20-05-2017	YES	--	3rd Quarter
4	**NTPC**					
	Rihand (Unit1#500)	03-03-2017	03-03-2017	YES	Next test will be done during re-commissioning of unit after O/H	3rd Quarter
	Rihand (Unit2#500)	02-07-2016	02-07-2016	YES	Next test will be done during re-commissioning of unit after O/H	3rd Quarter
	Rihand (Unit3#500)	15-08-2015	15-08-2015	YES	Next test will be done during re-commissioning of unit after O/H	3rd Quarter

	Rihand (Unit4#500)	25-05-2017	25-05-2017	YES	Next test will be done during re-commissioning of unit after O/H	3rd Quarter
	Rihand (Unit4#500)	11-12-2014	11-12-2014	YES	Next test will be done during re-commissioning of unit after O/H	3rd Quarter
	Rihand (Unit5#500)	11-12-2014	11-12-2014	YES	Next test will be done during re-commissioning of unit after O/H	3rd Quarter
	SINGRAULI STPS(Unit1#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit2#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit3#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit4#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit5#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit6#500)	02.05.2018	02.05.2018	NO	--	3rd Quarter
	SINGRAULI STPS(Unit7#500)	15.07.2018	15.07.2018	NO	--	3rd Quarter
	UNCHAHAR I(2 * 210)	29-03-2016	29-03-2016	YES	--	3rd Quarter
	UNCHAHAR II TPS(unit1# 210)	13-07-2019	13-07-2019	YES	--	
	UNCHAHAR II TPS(unit2# 210)	10-08-2018	10-08-2018	YES	--	3rd Quarter
	UNCHAHAR UNIT6#500	-	31.03.2017	YES	--	3rd Quarter
	KOLDAM HPS(4 * 200)	01-07-2015	01-07-2015	YES	--	3rd Quarter
	DADRI GPS(2 * 154.51) (ST-Steam Turbine)	-	18-11-2015	YES	--	3rd Quarter
	ANTA GPS(3 * 88.71)(GT- Gas Turbine)	08-08-2014	08-08-2014	YES	--	3rd Quarter
	ANTA GPS(1 * 153.2)(ST- Steam Turbine)	08-08-2014	08-08-2014	YES	--	3rd Quarter
5	**Aravali Power Company Private Ltd**					
	ISTPP (JHAJJAR)(3 * 500)	-	25-08-2015	YES	--	3rd Quarter
6	**NHPC**					
	CHAMERA HPS (3*180)	06-08-2020	27-12-2019	YES	--	
	CHAMERA II HPS(3 * 100)	11-10-2015	11-10-2015	NO	Replacement of Excitation system in two uni	3rd Quarter
	CHAMERA III HPS(Unit1#77)	29-10-2015	07-01-2012	YES	--	3rd Quarter
	CHAMERA III HPS(Unit2,3#77)	29-10-2015	19-06-2012	YES	--	3rd Quarter
	PARBATI III HEP (Unit1# 130)	21-01-2016	21-01-2016	YES	Have been done recetly. The report on PSS t	3rd Quarter
	DULHASTI HPS(Unit2#130)	21-01-2020	21-01-2020	YES	--	
	DULHASTI HPS(Unit1#130)	29-12-2019	29-12-2019	YES	--	
	URI HPS(Unit3# 120)	10-01-2021	10-01-2021	YES	--	
	URI HPS(Unit4# 120)	15-02-2021	15-02-2021	YES	--	
	URI HPS(Unit2# 120)	07-03-2016	07-03-2016	YES	--	3rd Quarter
	URI-II HPS(4 * 60)	Mar-14	Mar-14		carriedout in 2021-22	
	SALAL HPS (Unit-3,4,5,6 # 115)	16-12-2014	16-12-2014	YES	--	3rd Quarter
	KISHANGANGA(3 * 110)	18-05-20 18	18-05-20 18	YES	--	3rd Quarter
	BAIRASIUL HPS(3 * 60)	30-07-2015	30-07-2016	YES	--	3rd Quarter
	SEWA-II HPS(3 * 40)	09-07-2016	09-07-2016	YES	--	3rd Quarter
	PARBATI III HEP(4 * 130)	16-12-2016	16-12-2016	YES	--	3rd Quarter
	TANAKPUR HPS(Unit1# 31.42)	09-01-2015	09-01-2015	YES	--	3rd Quarter
	TANAKPUR HPS(Unit2,3#31.4)	24-05-2014	24-05-2014	YES	--	3rd Quarter
	DHAULIGANGA HPS(Unit1 ,2# 70)	04-05-2014	17-04-2018	YES	--	3rd Quarter
	DHAULIGANGA HPS(Unit3,4# 70)	26-06-2014	17-04-2018	YES	--	3rd Quarter
7	**PUNJAB**					
	RAJPURA(NPL) TPS(2 * 700)	22-04-2014	22-04-2014	YES	--	3rd Quarter
8	**Rajasthan**					
	KAWAI TPS(Unt1# 660)	08-08-2014	08-08-2014	YES	--	3rd Quarter
	KAWAI TPS(Unt2# 660)	09-10-2014	09-10-2014	YES	--	3rd Quarter
	CHHABRA TPS(Unit 1#250)	28-02-2023	28-02-2023	NO	--	3rd Quarter
	CHHABRA TPS(Unit 2,3,4#250)	28-02-2023	28-02-2023	NO	--	3rd Quarter
	CHHABRA TPS(Unit5# 660)	10-02-2016	10-02-2016	YES	--	3rd Quarter
	CHHABRA TPS(Unit6# 660)	7/28/2018	7/28/2018	YES	--	3rd Quarter
	KALISINDH TPS(Unit1# 600)	03-02-2023	03-02-2023	YES	--	3rd Quarter
	KALISINDH TPS(Unit2# 600)	03-02-2023	03-02-2023	YES	--	3rd Quarter
	KOTA TPS(Unit1#110)	PSS tuning and step response test of Unit#1,2,3,4,6&7 were sucessfully done on 02.03.22 to 04.03.22		YES		3rd Quarter
	KOTA TPS(Unit2#110)				--	3rd Quarter
	KOTA TPS(Unit3#195)				--	
	KOTA TPS(Unit4#195)				--	
	KOTA TPS(Unit6#110)				--	3rd Quarter
	KOTA TPS(Unit7#110)				--	3rd Quarter
	SURATGARH TPS (Unit5#250)	14-03-2022	14-03-2022	Yes	--	3rd Quarter
	SURATGARH TPS (Unit2,4#250)	06-06-2022		Yes	--	
	SURATGARH TPS (Unit1,3,,6#250)	05.02.22 & 06.02.22		Yes	--	

	SURATGARH SSCTPS (Unit 7&8)	PSS tuning and step response test of Unit#7&8 were carried out on 28.11.20 & 30.03.21.				
	RAJWEST (IPP) LTPS(Unit1# 135)	26-04-2016	26-04-2016	No	--	3rd Quarter
	RAJWEST (IPP) LTPS(Unit2# 135)	14-07-2016	14-07-2016	No	--	3rd Quarter
	RAJWEST (IPP) LTPS(Unit3# 135)	03-01-2014	03-01-2014	No	--	3rd Quarter
	RAJWEST (IPP) LTPS(Unit4# 135)	03-11-2015	03-11-2015	No	--	3rd Quarter
	RAJWEST (IPP) LTPS(Unit5# 135)	21-09-2014	21-09-2014	No	--	3rd Quarter
	RAJWEST (IPP) LTPS(Unit6# 135)	14-08-2014	14-08-2014	No	--	3rd Quarter
	RAJWEST (IPP) LTPS(Unit7# 135)	20-02-2016	20-02-2016	No	--	3rd Quarter
	RAJWEST (IPP) LTPS(Unit8# 135)	11-06-2014	11-06-2014	No		3rd Quarter
9	**UTTAR PRADESH**					
	ANPARA-C TPS(Unit1# 600)	22-08-2015	22-08-2015	Yes	--	Nov-22
	ANPARA-C TPS(Unit2# 600)	08-03-2016	08-03-2016	Yes	--	During next overhauling
	ROSA TPS(Unit1 #300)	05-10-2021	05-10-2021	Yes	--	
	ROSA TPS(Unit2# 300)	15-01-2022	15-01-2022	Yes	--	
	ROSA TPS(Unit3 # 300)	03-02-2017	03-02-2017	Yes	--	Nov-22
	ROSA TPS(Unit4# 300)	05-10-2021	05-10-2021	Yes	--	
	Anpara-A (Unit1#210)	27.09.2021	27.09.2021	Yes	--	
	Anpara-A(Unit2#210)	27.09.2021	27.09.2021	Yes	--	
	Anpara-A(Unit3#210)	25.09.2020	25.09.2020	Yes	--	
	Anpara-B(Unit4#500)	07.12.2014	07.12.2014	Yes		3rd Quarter
	Anpara-B (Unit5#500)	17.08.2014	Dec., 2019	Yes	--	
	Anpara-D(Unit6#500)	15.11.2016	15.11.2016	No	--	3rd Quarter
	Anpara-D (Unit7#500)	15.04.2017	15.04.2017	No	--	3rd Quarter
	Obra-B(Unit9#200)	22.03.2016	22.03.2016	Yes	Report enclosed.	3rd Quarter
	Obra-B(Unit10#200)	28.06.2016	20.06.2016	Yes	Report enclosed.	3rd Quarter
	Obra-B (Unit11#200)	21.01.2017	21.01.2017	Yes	Report enclosed.	3rd Quarter
	Obra-B (Unit12#200)	Unit taken on load after R&M on 22		-	PSS tuning and SRT scheduled in April, 2021.	
	Obra-B(Unit13#200)	Unit closed under R&M.		-	PSS tuning and SRT scheduled in April, 2021.	
	Parichha-B(Unit3#210)	08.01.2016	08.01.2016	Yes	--	3rd Quarter
	Parichha-B (Unit4#210)	08.01.2016	08.01.2016	Yes	--	3rd Quarter
	Parichha-C (Unit5#250)	08.02.2020	08.02.2020	No	--	
	Parichha-C(Unit3#250)	09.01.2016	09.01.2016	No	--	3rd Quarter
	Harduaganj (Unit8#250)	20.08.2015	20.08.2015	No	--	3rd Quarter
	Harduaganj (Unit3#250)	13.04.2016	13.04.2016	No	--	3rd Quarter
	Harduaganj(Unit7#105)	16.07.2021	16.07.2021	yes	--	
	Harduaganj(Unit9#250)	16.07.2021	16.07.2021	yes	--	
	LALITPUR TPS(Unit1# 660)	23.02.2022	23.02.2022	yes	--	
	LALITPUR TPS(Unit2# 660)	30.03.2021	30.03.2021	yes	--	
	LALITPUR TPS(Unit3# 660)	15.01.2022	15.01.2022	yes	--	
	ALAKNANDA HEP(Unit1# 82.5)	12.072017	12.072017	No	--	Apr-23
	ALAKNANDA HEP(Unit2# 82.5)	12.072017	12.072017	No	--	Apr-23
	ALAKNANDA HEP(Unit3# 82.5)	12.072017	12.072017	No	--	Apr-23
	ALAKNANDA HEP(Unit4# 82.5)	12.072017	12.072017	No	--	Apr-23
	MEJA TPS(Unit1#660)	16.10.2018	05.09.2017	yes	--	3rd Quarter
	MEJA TPS(Unit2#660)	16.01.2021	18.05.2020	yes	--	
	Bara Unit#1				Step test for PSS checking was not performed since commissioning by erstwhile owner as per information available. PSS tuning along with step test will be performed in next AOH (May 2022 or planned shutdown)	During next overhauling
	Bara Unit#2	01.02.2022	01.02.2022	Yes		
	Bara Unit#3				Step test for PSS checking was not performed since commissioning by erstwhile owner as per information available. PSS tuning along with step test will be performed in next AOH (May 2022 or planned shutdown)	During next overhauling
	Vishnuprayag Unit#1	06/02/2021	06/02/2021	Submitted in the prescribed format provided by NRLDC to SE (R&A)		
	Vishnuprayag Unit#2	06/04/2021	06/04/2021			
	Vishnuprayag Unit#3	06/04/2021	06/04/2021			
	Vishnuprayag Unit#4	05/02/2021	05/02/2021			
10	**BBMB**					

	BHAKRA HPS(Unit1#108)	--	--	No	PSS is not provided ,shall be provided in ongoing RM&U	
	BHAKRA HPS(Unit1#108)	24.07.2015	24.07.2015	No	--	3rd Quarter
	BHAKRA HPS(Unit3#126)	--	--	No	PSS is not provided ,shall be provided in ongoing RM&U	
	BHAKRA HPS(Unit4#126)	--	--	No	--	
	BHAKRA HPS(Unit5#126)	--	--	No	--	
	BHAKRA HPS(Unit6#157)	--	--	No	The original Rusian excitation system is under replacement PO issued Hence,PSS not got tuned.	
	BHAKRA HPS(Unit7#157)	--	--	No	The original Rusian excitation system is under replacement PO issued Hence,PSS not got tuned.	
	BHAKRA HPS(Unit7#157)	--	--	No	The original Rusian excitation system is under replacement PO issued Hence,PSS not got tuned.	
	BHAKRA HPS(Unit7#157)	18.02.2016	18.02.2016	No	--	3rd Quarter
	BHAKRA HPS(Unit7#157)	18.02.2017	18.02.2017	No	--	3rd Quarter
	DEHAR HPS(Unit#1 165)	08.08.2017	08.08.2017	No	--	3rd Quarter
	DEHAR HPS(Unit#2 165)	08.08.2018	08.08.2018	No	--	3rd Quarter
	DEHAR HPS(Unit#3 165)	08.08.2019	08.08.2019	No	--	
	DEHAR HPS(Unit#4 165)	02.07.2017	02.07.2017	No	--	3rd Quarter
	DEHAR HPS(Unit#5 165)	08.08.2019	08.08.2019	No	--	
	DEHAR HPS(Unit#6 165)	02.07.2017	02.07.2017	No	--	3rd Quarter
	PONG HPS(6 * 66)	--	--	--	PSS not provided.RM&U agenda under considration.	

Tripping report

NRLDC

(Multiple elements tripping at 400kV Jehta (UP))

1. **Date & Time of event:** 16:51 hrs on 22.03.2023

2. **Location/Control Area:** Uttar Pradesh

3. **Plant/Substation Name:** 400/220kV Jehta(UP)

4. **GD/GI Category:** GI-2

5. **Antecedent Condition:**

- NR Load : 38596 MW
- Affected state load(UP) : 10478 MW
- Frequency : 50.01 Hz
- Weather condition : Normal
- IR exchange : 295 MW

6. **Generation loss/Load loss:** No load loss (as per SCADA).

7. **Duration of interruption:** 03:03 (hh:mm) Restoration time (19:54 hrs).

8. **Tripped elements:**

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	400 KV Unnao(UP)-Jehta_Hardoi Road (UP) Ckt-1	16:51 hrs	20:41 hrs	Bus bar protection operated
2.	400/220 kV 500 MVA ICT 1 at Jehta_Hardoi Road (UP)		19:26 hrs	
3.	400/220 kV 500 MVA ICT 2 at Jehta_Hardoi Road (UP)		19:44 hrs	

4.	400 KV Lucknow_1(PG)-Jehta_Hardoi Road (UP) Ckt-1		19:25 hrs	
5.	400 KV Lucknow_1(PG)-Jehta_Hardoi Road (UP) Ckt-2		20:16 hrs	
6.	400 kV Jehta_Hardoi Road (UP) Bus-1		19:54 hrs	
7.	400 kV Jehta_Hardoi Road (UP) Bus-2		19:54 hrs	
8.	63 MVAR Bus reactor at 400kV Jehta_Hardoi Road (UP)		19:46 hrs	

9. Details of fault as per PMU (if any):

i) Nature of fault: Y-N phase to ground fault

ii) Fault clearing time: 80 msec

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10. Brief description of event:

1. 400 kV Jehta(UP) has double main bus scheme.
2. During antecedent condition, 400 KV Unnao(UP)-Jehta_Hardoi Road (UP) Ckt-2 was under planned shutdown and code issued for charging at 16:27 hrs.
3. As per information received from SLDC UP, at 16:51 hrs while charging 400 KV Unnao(UP)-Jehta_Hardoi Road (UP) Ckt-2, bus bar protection operated at 400 kV Jehta(UP). So, all the elements connected to 400 kV Bus-1 & 2, e.g., 400 KV Unnao(UP)-Jehta_Hardoi Road (UP) Ckt-1, 400 KV Lucknow_1(PG)-Jehta_Hardoi Road (UP) Ckt-1&2, 400/220 kV 500 MVA ICT 1&2 at Jehta_Hardoi Road (UP) got tripped and 400 kV Bus-1 & 2 at Jehta(UP) became dead. DT was received at Lucknow end.
4. Load at Jehta(UP) was managed through 220kV Jehta-Hardoi road ckt 1&2. Hence 220 kV Bus 1& 2 at Jehta(UP) did not trip and substation did not become dead.
5. As per PMU at Lucknow(PG), Y-N phase to ground fault with fault clearance time of 80 msec is observed.
6. As per SCADA, no load loss occurred in Uttar Pradesh control area.

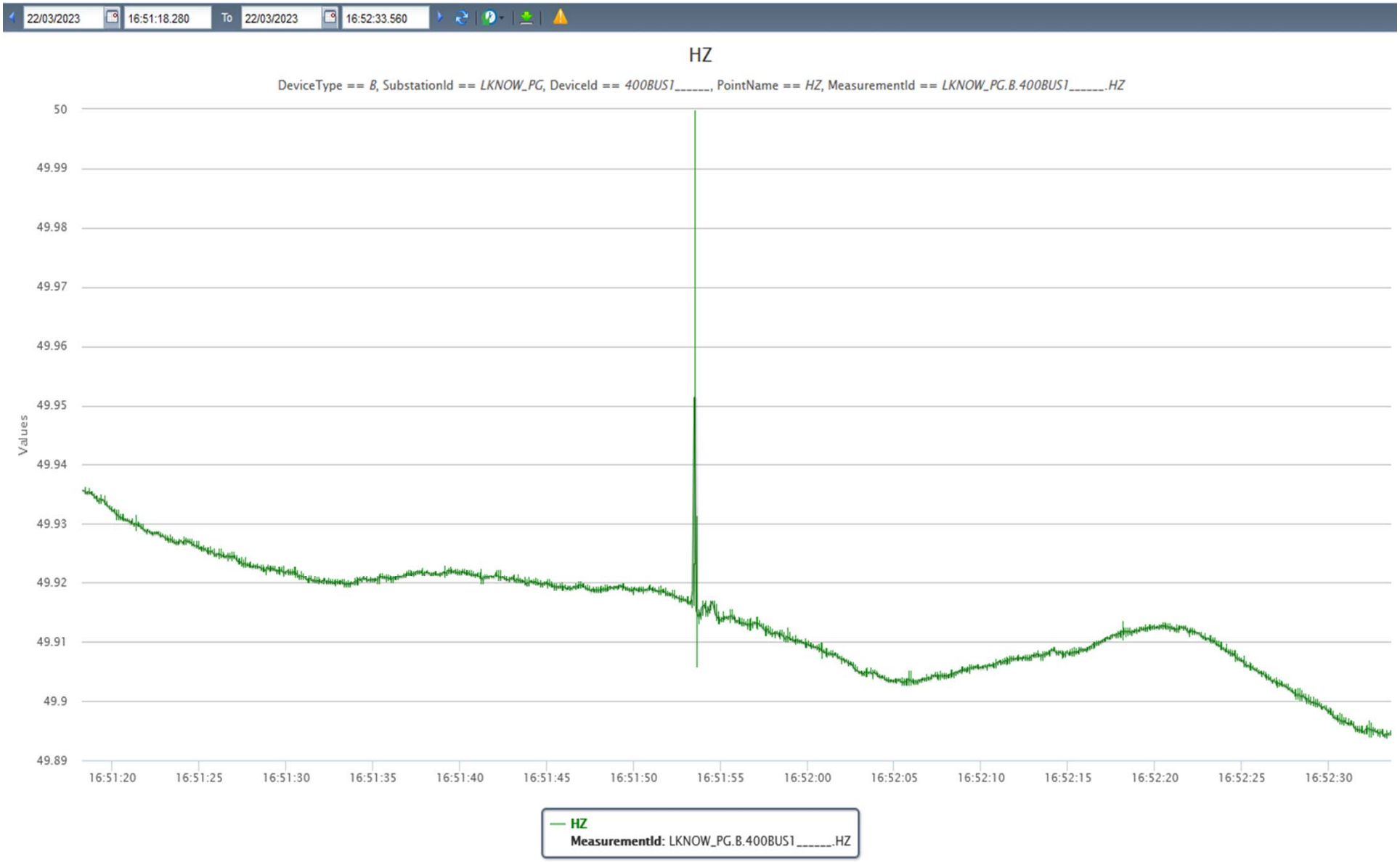
11. Preliminary observation:

i) Why did busbar protection operate during charging of 400 KV Unnao(UP)-Jehta_Hardoi Road (UP) Ckt-2? Exact reason need to be shared.

ii) As per SOE, bus coupler opened before tripping of elements on Bus-1 at 400 kV Jehta(UP). Hence, the reason of tripping of elements on Bus-1 need to be clarified.
iii) Healthiness of SCADA data need to be ensured.
iv) DR, EL status along with tripping report need to be shared.
v) Remedial action taken report to be shared.

PMU Plot of frequency at Lucknow(PG)

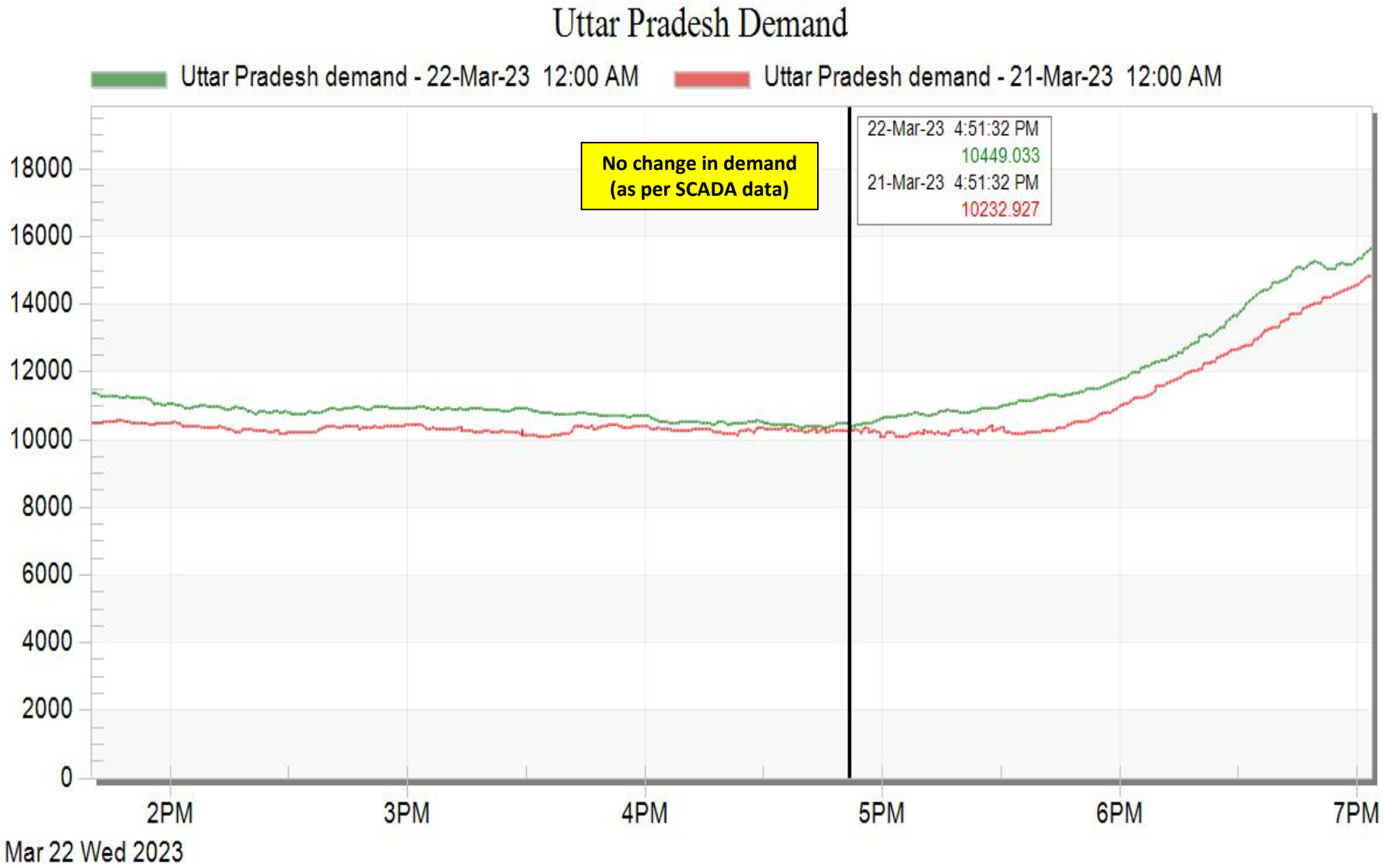
16:51hrs/22-Mar-23



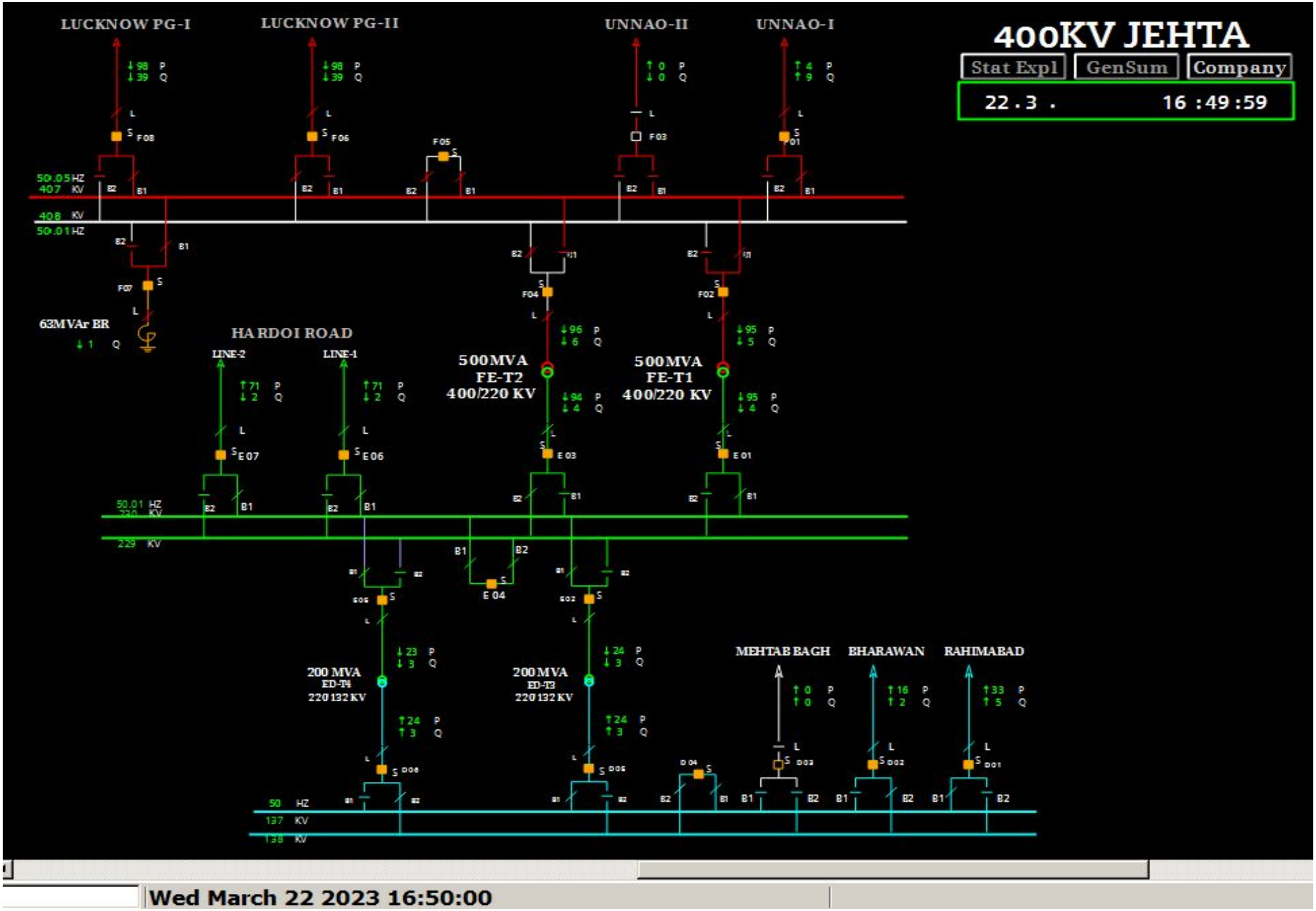
PMU Plot of phase voltage magnitude at Lucknow(PG)

16:51hrs/22-Mar-23

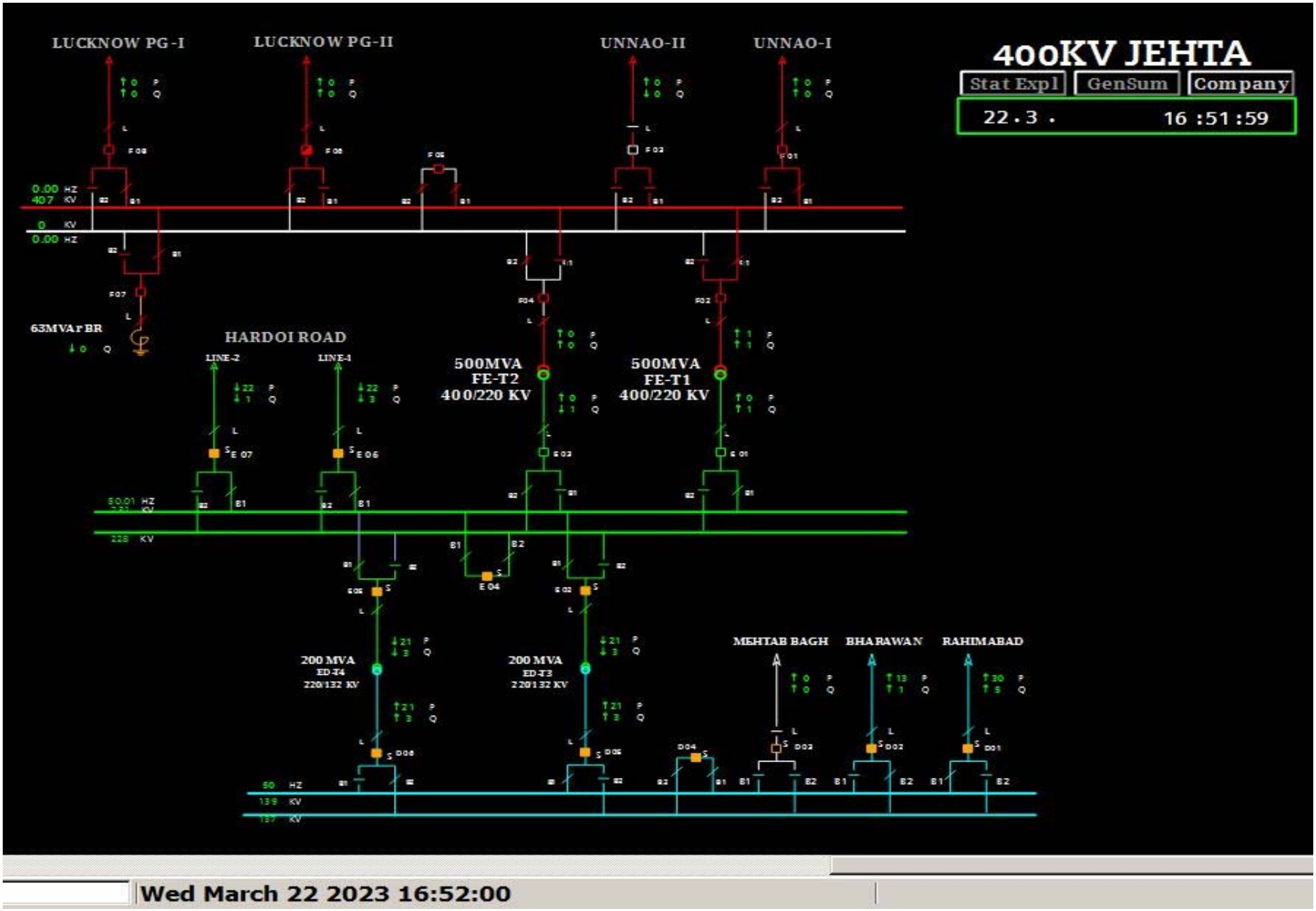
UP demand during the event



SLD of 400/220kV Jehta(UP) before the event



SLD of 400/220kV Jehta(UP) after the event



Electricity Test & Commissioning Division Sarojini Nagar, Lucknow

FAULT ANALYSIS STATEMENT OF PROTECTION GEARS FOR THE MONTH OF MARCH-2023

Sr No	Tripping Date & Time	Closing Date & Time	Name of Substation	CB No / Direction	Type of Protection	Flags Observed				Analysis
						This End	FL Reading	Other End	FL Reading	
						Relay Flags		Relay Flags		
22	20-03-2023 07:40hrs		**400kV S/S, Unnao**	(84) 220kV Phool Bagh-1st Line	Main-1 Micom P442 Main:-2 Ziv	**RP:-MAIN-1:- No Flag** **RP:-MAIN-2:- No Flag**				Transient Earth fault .
23	22-03-2023 16:51hrs	22-03-2023 20:41hrs	**400kV S/S, Unnao**	(CB-97) 400kV Jehta line-1	Main-1 SIPROTEC 7SA611 Main-II MICOM P442	**CP:-Main-2 C/S,Group A trip relay optd,Group B trip relay optd,** **RP:-Main-2:- Y-Ph Pickup , Z-2 Pickup, C/S, C/R,186 R2,186 Y2,186 B2.**				Line tripped on DT Receive.
24										

AE E(T&C)
(400kV SUB-STATION, UNNAO)

Executive Engineer

SIEMENS

400kV Unnao-Jehta-1 Line_prn_11_56_14
Annunciation

SIMATIC **400kV Substation Unnao / Folder / 400kV Unnao-Jehta-1 Line/7SA5...** **23.03.23 11:56:40**

1 Annunciation

1.1 Event Log - 23-03-2023 11:56:40.305 (SIGNALS\OPSIG.SFP)

Event Log - 23-03-2023 11:56:40.305 (SIGNALS\OPSIG.SFP)

Number	Indication	Value	Date and time	Cause
	CB R CLOSE	OFF	23.03.2023 11:13:54.142	Spontaneous
	CB Y CLOSE	OFF	23.03.2023 11:13:54.141	Spontaneous
30053	Fault recording is running	OFF	22.03.2023 20:40:44.834	Spontaneous Com.Issued=AutoLocal
01332	Earth fault protection is BLOCKED	OFF	22.03.2023 20:40:44.336	Spontaneous Com.Issued=AutoLocal
14083	E/F 3I0p is blocked	OFF	22.03.2023 20:40:44.336	Spontaneous Com.Issued=AutoLocal
00301	Power System fault	1101 - OFF	22.03.2023 20:40:44.332	Spontaneous Com.Issued=AutoLocal
00501	Relay PICKUP	OFF	22.03.2023 20:40:44.332	Spontaneous Com.Issued=AutoLocal
10240	Uph-e> Pickup	OFF	22.03.2023 20:40:44.332	Spontaneous Com.Issued=AutoLocal
30053	Fault recording is running	ON	22.03.2023 20:40:44.314	Spontaneous Com.Issued=AutoLocal
10242	Uph-e>(>) Pickup L1	ON	22.03.2023 20:40:44.312	Spontaneous Com.Issued=AutoLocal
10240	Uph-e> Pickup	ON	22.03.2023 20:40:44.312	Spontaneous Com.Issued=AutoLocal
00503	Relay PICKUP Phase L1	ON	22.03.2023 20:40:44.312	Spontaneous Com.Issued=AutoLocal
00501	Relay PICKUP	ON	22.03.2023 20:40:44.312	Spontaneous Com.Issued=AutoLocal
00301	Power System fault	1101 - ON	22.03.2023 20:40:44.312	Spontaneous Com.Issued=AutoLocal
00004	>Trigger Waveform Capture	OFF	22.03.2023 20:40:44.295	Spontaneous Com.Issued=AutoLocal
	M CB B OPN	OFF	22.03.2023 20:40:44.293	Spontaneous
	M CB Y OPN	OFF	22.03.2023 20:40:44.293	Spontaneous
	CB R CLOSE	ON	22.03.2023 20:40:44.291	Spontaneous
	M CB R OPN	OFF	22.03.2023 20:40:44.289	Spontaneous
00591	Single pole open detected in L1	OFF	22.03.2023 20:40:44.292	Spontaneous Com.Issued=AutoLocal
00351	>Circuit breaker aux. contact: Pole L1	ON	22.03.2023 20:40:44.291	Spontaneous Com.Issued=AutoLocal
01332	Earth fault protection is BLOCKED	ON	22.03.2023 20:24:56.208	Spontaneous Com.Issued=AutoLocal
14083	E/F 3I0p is blocked	ON	22.03.2023 20:24:56.208	Spontaneous Com.Issued=AutoLocal
00591	Single pole open detected in L1	ON	22.03.2023 20:24:56.208	Spontaneous Com.Issued=AutoLocal
	CB Y CLOSE	ON	22.03.2023 20:24:56.188	Spontaneous
00352	>Circuit breaker aux. contact: Pole L2	ON	22.03.2023 20:24:56.188	Spontaneous Com.Issued=AutoLocal

SCADA SOE

Time	Station Name	Voltage	Element Name	Element Type	Element Status	Remark
16:51:53,856	UNNAO_UP	400kV	11LKNOW1	Circuit Breaker	Open	Line CB at 400kV Unnao(UP) end of 400 kV Unnao(UP)-Jehta(UP) ckt-1 opened
16:51:53,862	ZEHTA_UP	400kV	06LKOPG2	Circuit Breaker	disturbe	
16:51:53,862	ZEHTA_UP	400kV	05MBC	Circuit Breaker	Open	Bus Coupler at 400 kV Jehta(UP) opened
16:51:53,864	ZEHTA_UP	400kV	04T2	Circuit Breaker	Open	Main CB at 400kV side of 400/220 kV 500MVA ICT-2 at Jehta(UP) opened
16:51:53,867	ZEHTA_UP	220kV	03T2	Circuit Breaker	Open	Tie CB at 400kV side of 400/220 kV 500MVA ICT-2 at Jehta(UP) opened
16:51:53,913	ZEHTA_UP	400kV	08LKOPG1	Circuit Breaker	Open	Line CB at 400kV Jehta(UP) end of 400 kV Jehta(UP)-Lucknow(PG) ckt-1 opened
16:51:53,913	ZEHTA_UP	400kV	01UNNAO1	Circuit Breaker	Open	Line CB at 400kV Jehta(UP) end of 400 kV Jehta(UP)-Unnao(UP) ckt-1 opened
16:51:53,913	ZEHTA_UP	400kV	07BR	Circuit Breaker	Open	CB of 63 MVAR Bus reactor at 400kV Jehta(UP) opened
16:51:53,916	ZEHTA_UP	400kV	02T1	Circuit Breaker	Open	Main CB at 400kV side of 400/220 kV 500MVA ICT-1 at Jehta(UP) opened
16:51:53,918	ZEHTA_UP	220kV	01T1	Circuit Breaker	Open	Tie CB at 400kV side of 400/220 kV 500MVA ICT-1 at Jehta(UP) opened
16:51:53,935	LUCKNOW	400kV	06JEHTA2	Circuit Breaker	Open	Main CB at 400kV Lucknow(PG) end of 400 kV Jehta(UP)-Lucknow(PG) ckt-2 opened
16:51:53,942	LUCKNOW	400kV	05TIE	Circuit Breaker	Open	Tie CB at 400kV Lucknow(PG) end of 400 kV Jehta(UP)-Lucknow(PG) ckt-2 opened
16:51:53,990	LUCKNOW	400kV	02TIE	Circuit Breaker	Open	Tie CB at 400kV Lucknow(PG) end of 400 kV Jehta(UP)-Lucknow(PG) ckt-1 opened
16:51:53,991	LUCKNOW	400kV	03JEHTA1	Circuit Breaker	Open	Main CB at 400kV Lucknow(PG) end of 400 kV Jehta(UP)-Lucknow(PG) ckt-1 opened

Tripping report

NRLDC

(Multiple elements tripping at 400/220kV Panki(UP))

1. **Date & Time of event:** 13:07 hrs on 23.03.2023

2. **Location/Control Area:** Uttar Pradesh

3. **Plant/Substation Name:** 400/220kV Panki(UP)

4. **GD/GI Category:** GI-2

5. **Antecedent Condition:**

- NR Load : 40915 MW
- Affected state load(UP) : 11999 MW
- Frequency : 50.05 Hz
- Weather condition : Normal
- IR exchange : -404 MW

6. **Generation loss/Load loss:** Load loss of approx. 300MW in UP control area loss (as per SCADA).

7. **Duration of interruption:** 01:38 (hh:mm) Restoration time (14:45 hrs), energy unserved: 0.49MUs

8. **Tripped elements:**

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	400 KV Kanpur(PG)-Panki(UP) (PG) Ckt-1	13:07 hrs	15:38 hrs	Lines tripped on O/C E/F protection operation
2.	400 KV Kanpur(PG)-Panki(UP) (PG) Ckt-2		15:41 hrs	

3.	400/220 kV 315 MVA ICT 1 at Panki(UP)		14:45 hrs	Directional O/C protection operation
4.	400/220 kV 315 MVA ICT 2 at Panki(UP)		21:49 hrs	
5.	400 KV Fatehpur-Kanpur (PG) Ckt-1		16:04 hrs	Tripped along with 400kV Kanpur-Panki D/C
6.	400 KV Fatehpur-Kanpur (PG) Ckt-2		15:42 hrs	
7.	220kV Bus-1 at Panki2(UP)		19:54 hrs	R & Y phase pole of CB of 220kV Panki-Kanpur South ckt damaged and bus bar protection at 220kV Panki(UP) operated.
8.	220kV Bus-2 at Panki2(UP)		19:46 hrs	
9.	220kV Panki-Kanpur South ckt			
10.	220kV Panki-Kidwai ckt			
11.	220kV Panki-BTHOR ckt			
12.	220kV Panki-RPH ckt			
13.	220kV Panki-CHIBM ckt			

9. Details of fault as per PMU (if any):

i) Nature of fault:
   a) R-N fault at 13:06:18:680 hrs which cleared within 100msec.
   b) R-N fault at 13:07:37:360 hrs with the delayed clearance in 5.4sec.
   c) Y-N fault at 13:07:39:880 hrs with the delayed clearance in 2.8sec.
   d) B-N fault at 13:07:42:760 hrs with the delayed clearance in 2.8sec

ii) Fault clearing time: 5.4sec

10. Brief description of event:

i) During antecedent condition, 400kV Bus-1 at Kanpur(PG) was under shutdown and 400kV Kanpur-Fatehpur ckt-1&2 were connected at same dia with 400kV Kanpur-Panki ckt-1&2 (line length approx. 6km) (Main CB of Kanpur-Fatehpur ckt was in open condition).

ii) As reported, at 13:07hrs, R & Y ph pole of CB of at Panki end of 220kV Panki-Kanpur South ckt damaged. On this fault, bus bar protection at 220kV Panki(UP) operated.

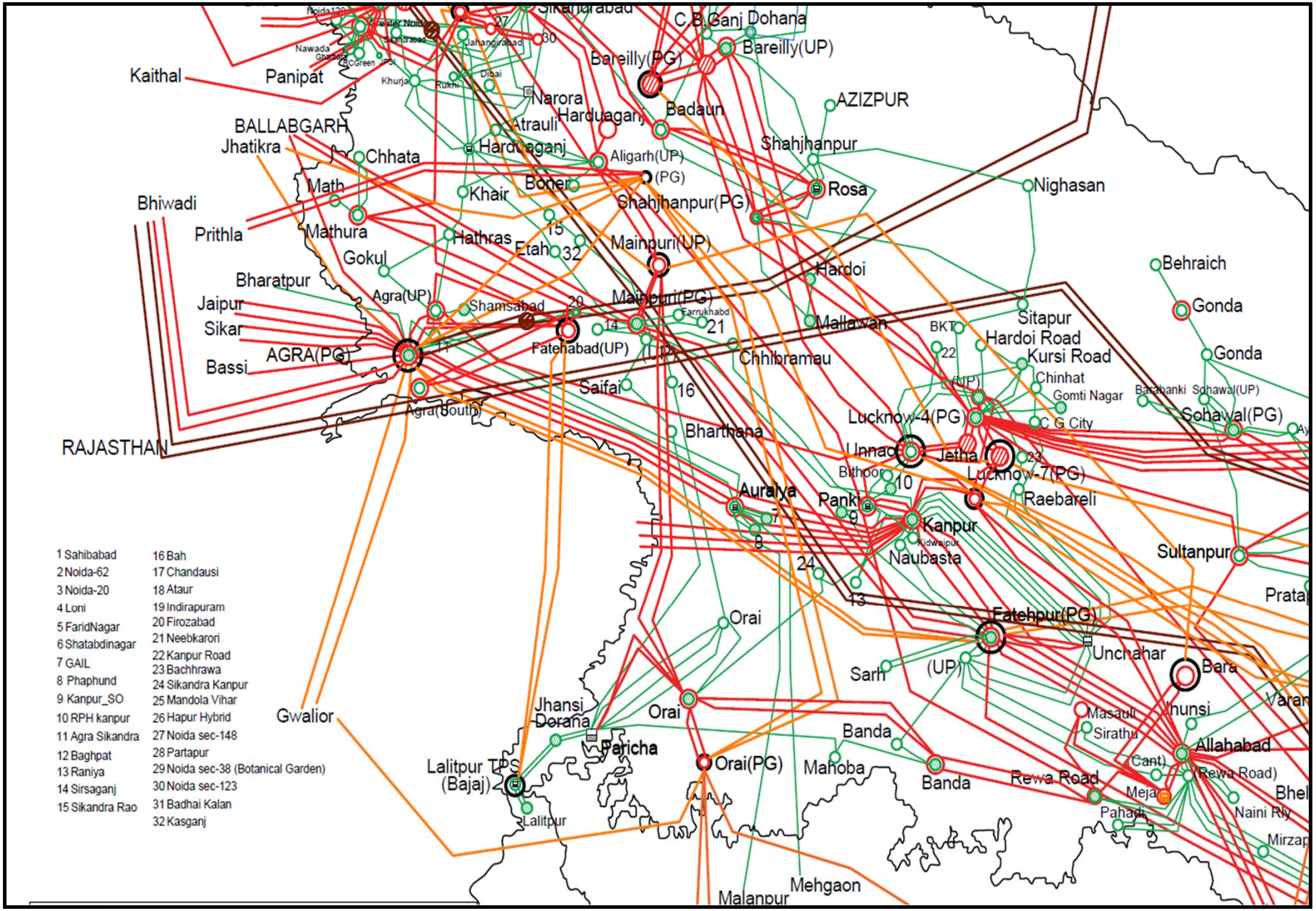
iii) As per SCADA, elements connected at both the 220kV bus at Panki(UP) tripped. As fault didn't clear in time, 400/220kV 315MVA ICT-1&2 at Panki(UP) and 400kV Kanpur-Panki D/C also tripped with delay.

iv) As per SOE & PMU data & DR/EL received, sequence of the event is as follows:
    a) At 13:06:18:680hrs, fault occurred in R-ph which cleared within 100msec. At the same time, line CB at Kanpur South end of 220kV Panki-Kanpur South ckt opened (as per SOE).
    b) At 13:07:37:360hrs, again fault occurred in R-phase which didn't clear at that moment. At the same time, line CB at Panki end of 220kV Panki-Kanpur South ckt opened (as per SOE).
    c) At 13:07:39:880hrs, fault occurred in Y-ph also.
    d) At 13:07:42:760hrs, fault in R & Y phase cleared and fault in R phase started, R phase fault cleared with the delay of 5.4sec and Y phase fault cleared with the delay of 2.8sec. At the same time, 400/220kV 315MVA ICT-2 at Panki(UP) tripped on directional O/C protection operation at 400kV side (as per SOE & DR).
    e) At 13:07:45:560hrs, fault in B phase cleared with the delay of 2.8sec. At the same time, 400kV Kanpur-Panki D/C tripped on O/C E/F protection operation at Kanpur end and 400/220kV 315MVA ICT-1 at Panki(UP) tripped on directional O/C protection operation at 400kV side(as per SOE & DR).
    f) As per fault locator detail of 400kV Kanpur-Panki D/C at Kanpur(PG) end, B phase fault distance was approx. ~200km from Kanpur(PG) end. It shows that fault was at 220kV side of Panki(UP).
v) As 400kV Bus-1 at Kanpur(PG) was under shutdown, 400kV Kanpur-Fatehpur D/C tripped with the tripping of 400kV Kanpur-Panki D/C.
vi) As per SCADA, load loss of approx. 300MW occurred in Uttar Pradesh control area.

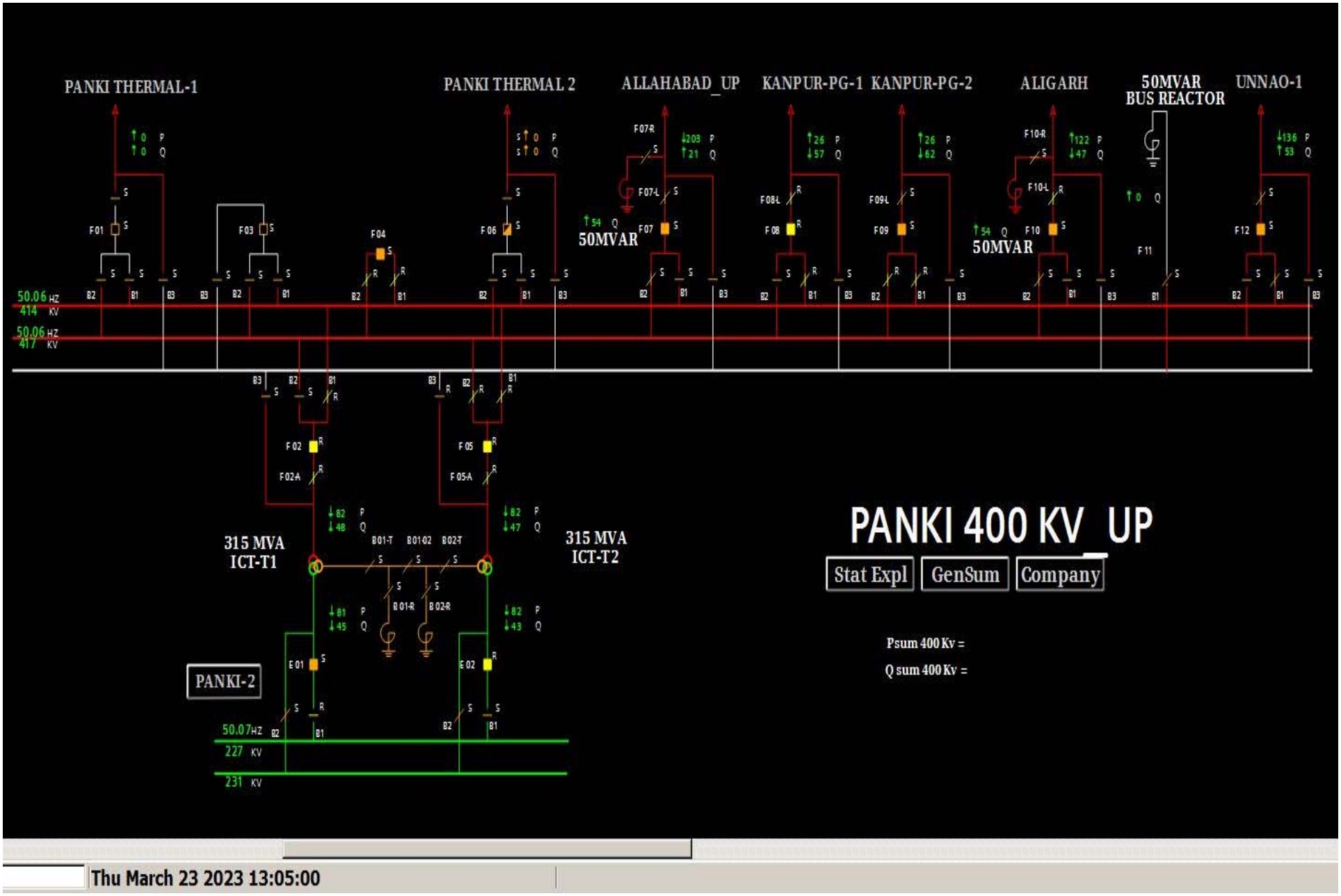
11. Preliminary observation:

i) Exact location and nature of fault?
ii) It seems that protection didn't clear from 220kV side of Panki(UP) which further led to the tripping of elements at 400kV level on back up protection. Reason of delayed clearance of fault from Panki end?
iii) As per the IEGC provision under clause 5.2 (r), strict compliance must be ensured in furnishing the detailed tripping report along with DR & EL within 24 hours of the occurrence of the event. However, as per current status, no DR/EL of 220kV side of Panki(UP) received. Details need to be shared at the earliest.
iv) Remedial action taken report to be shared.

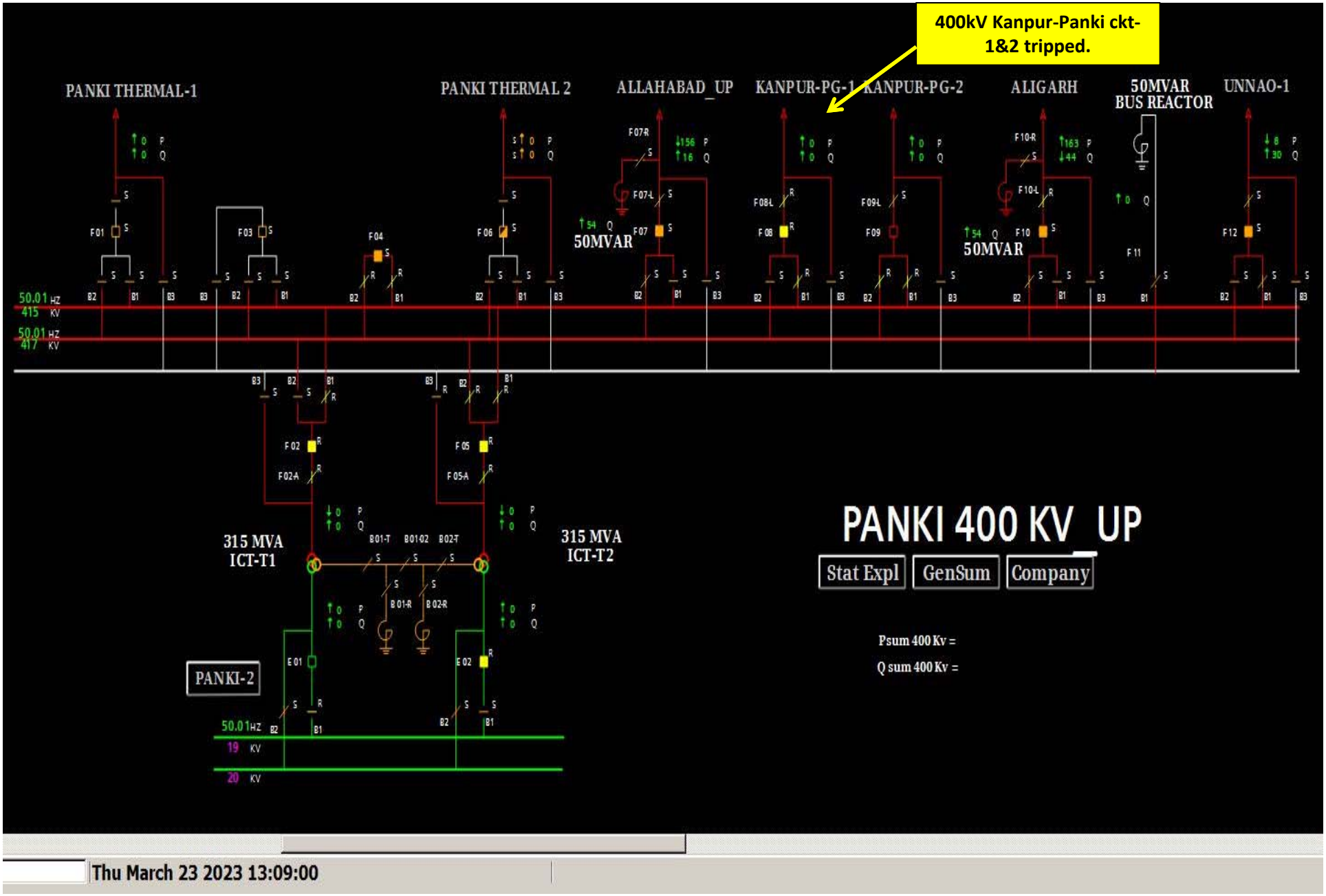
Network diagram



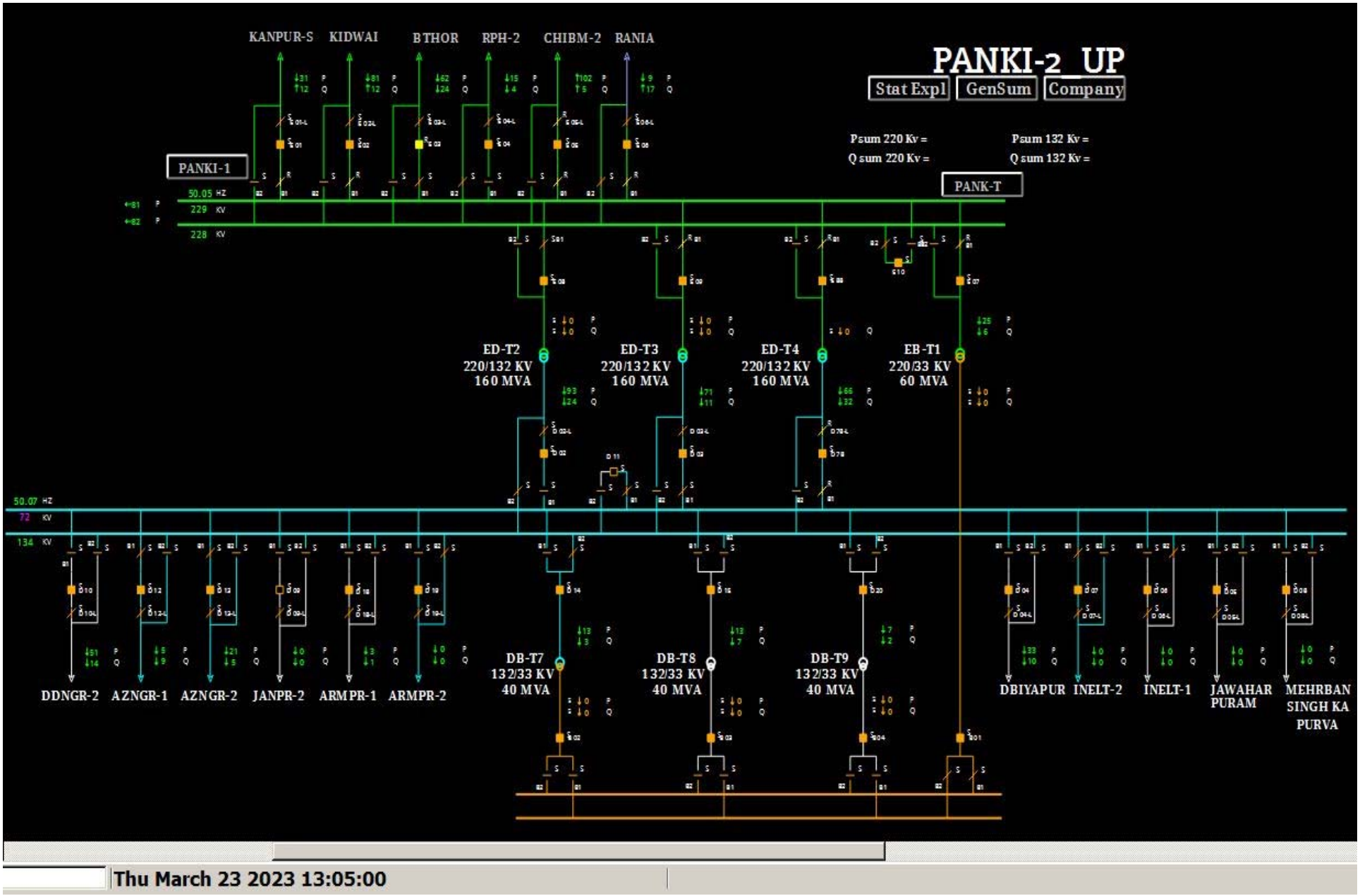
SLD of 400/220kV Panki(UP) before the event



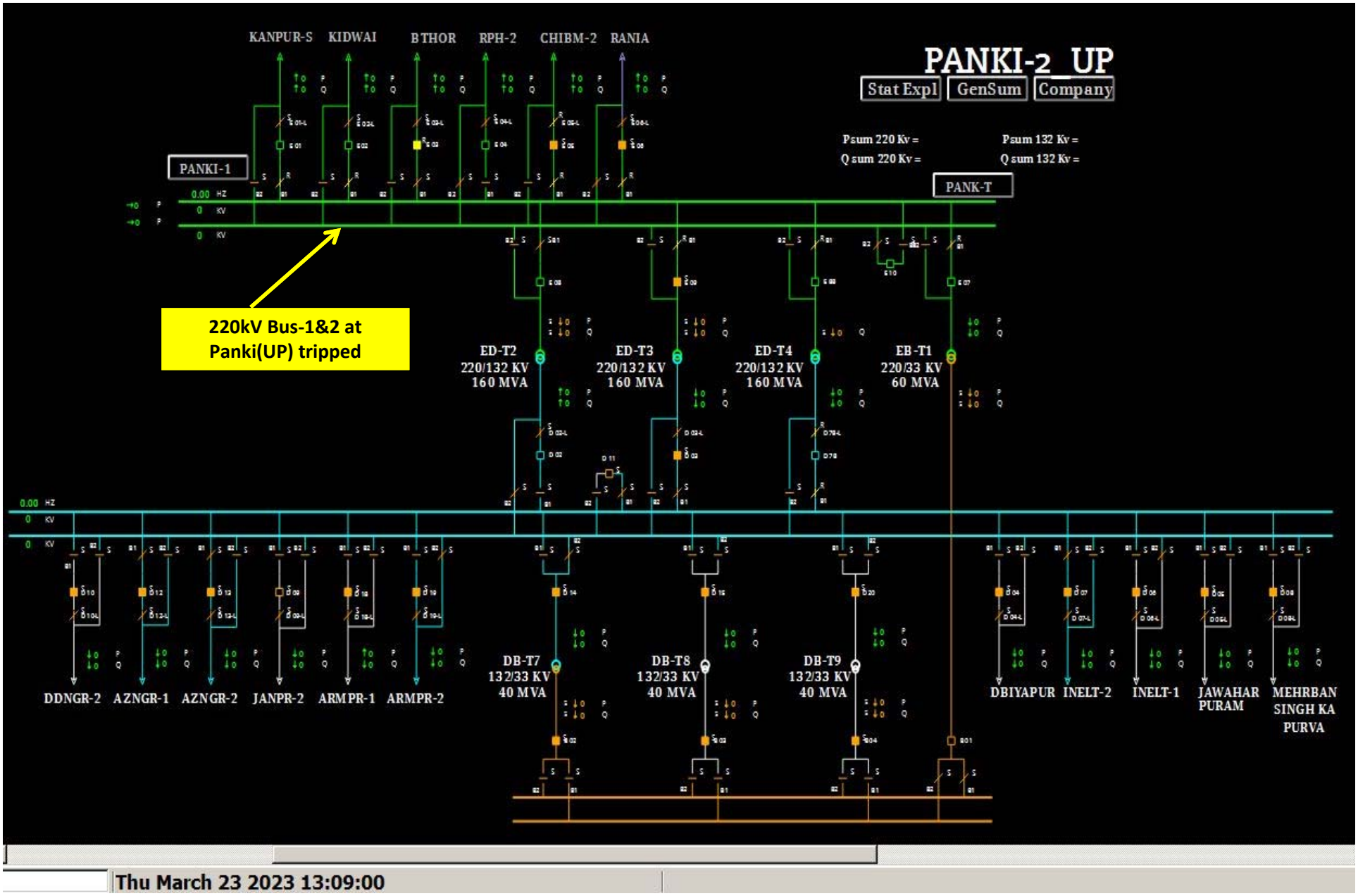
SLD of 400/220kV Panki(UP) after the event



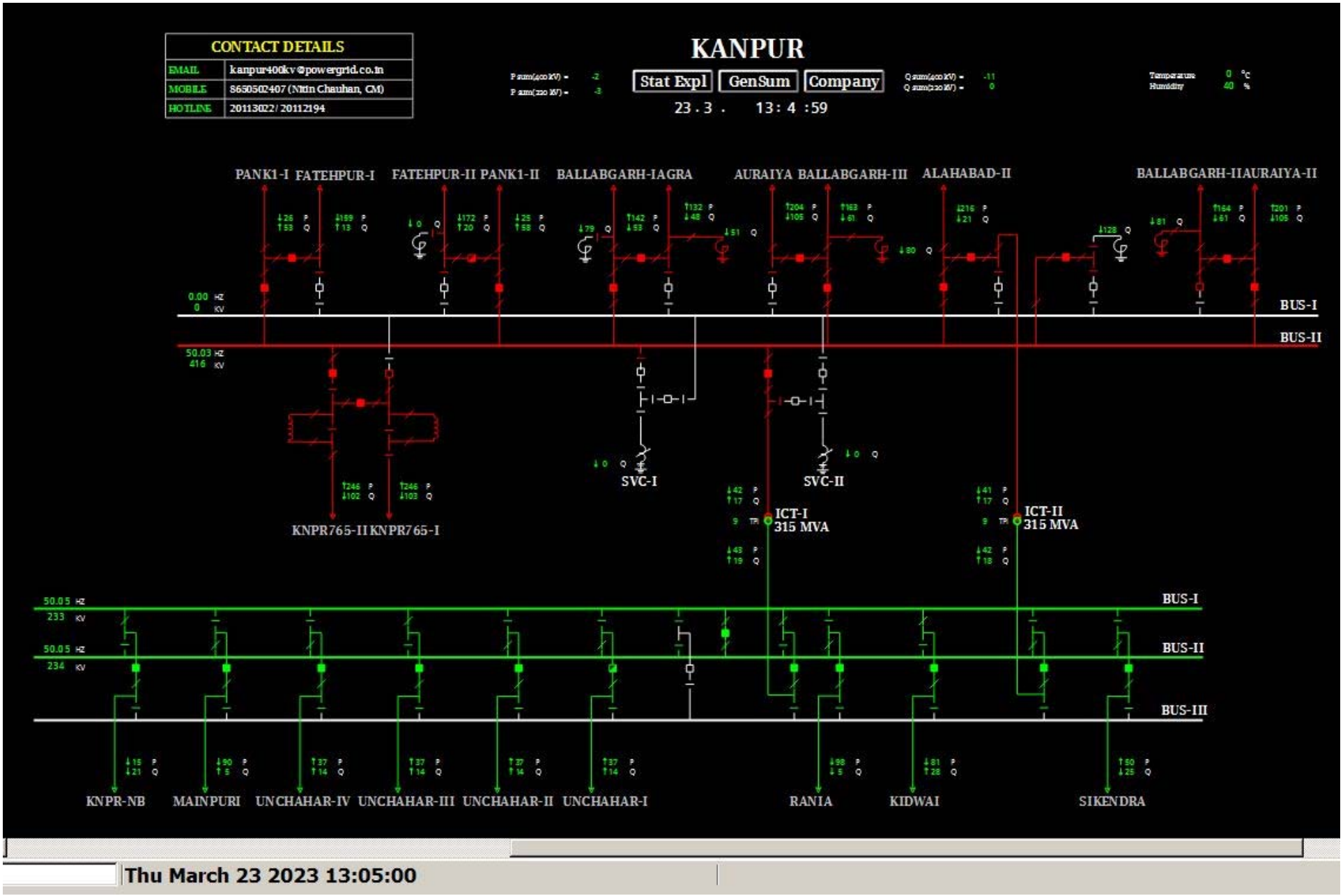
SLD of 220/132kV Panki2(UP) before the event



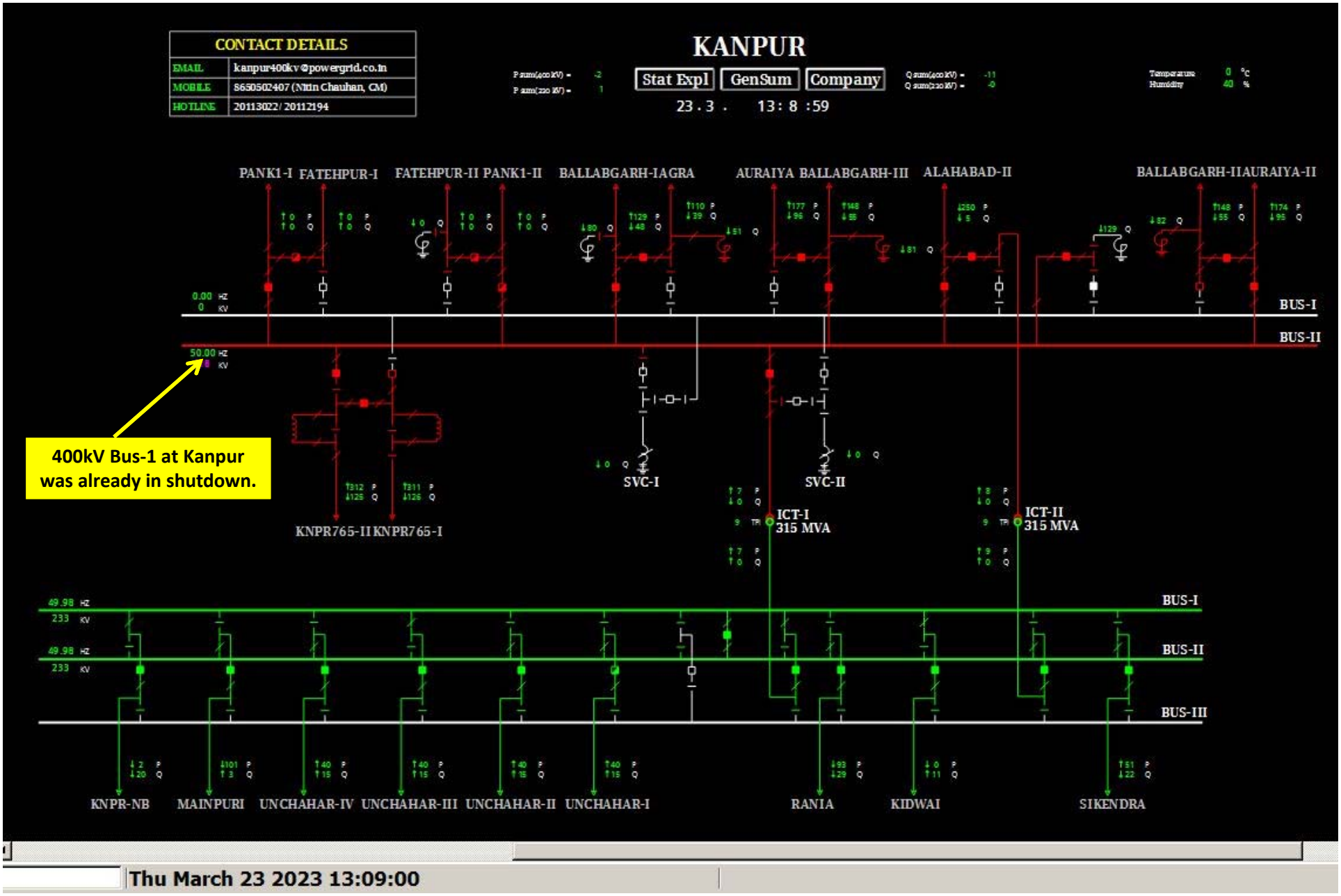
SLD of 220/132kV Panki2(UP) after the event



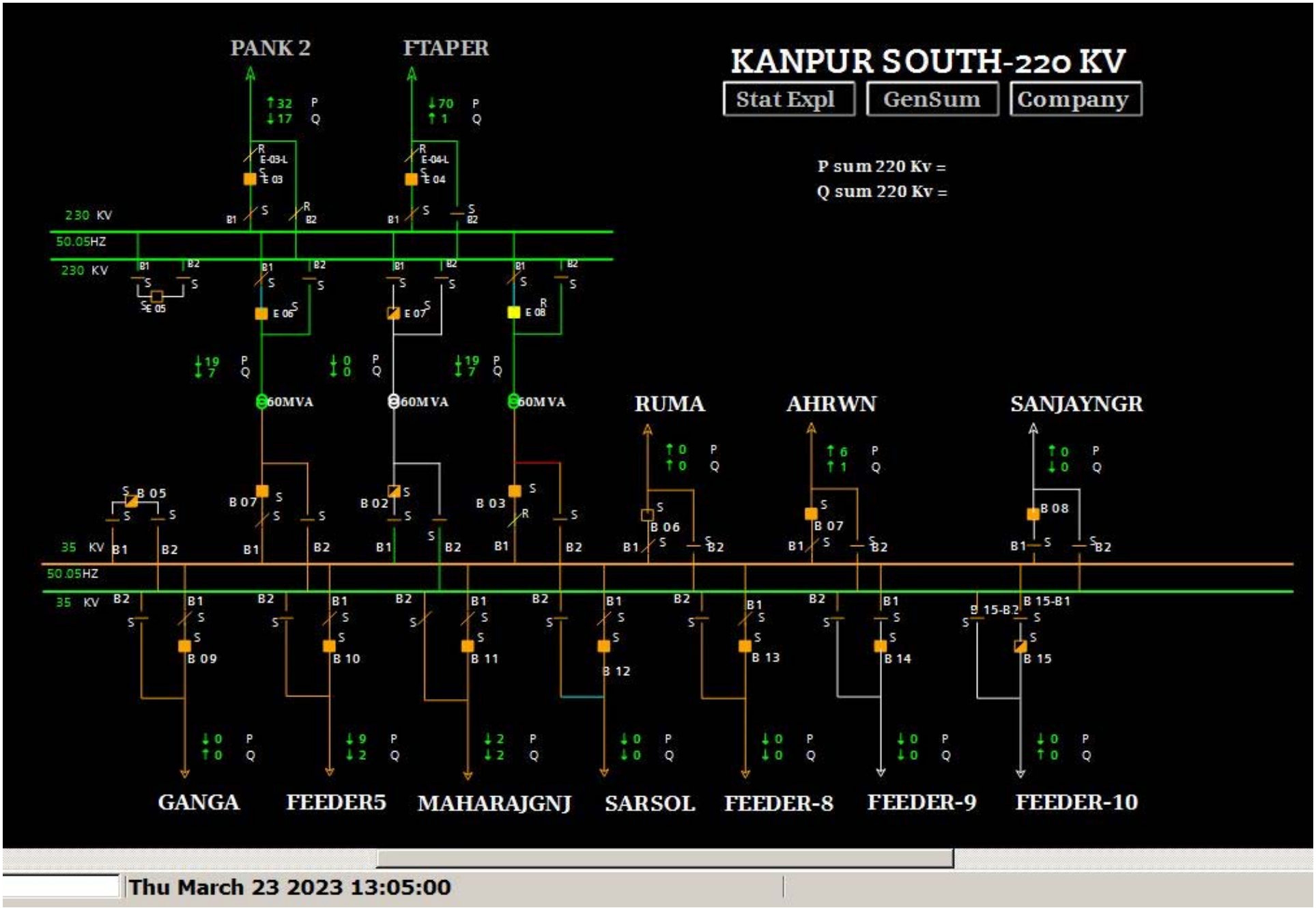
SLD of 400/220kV Kanpur(PG) before the event



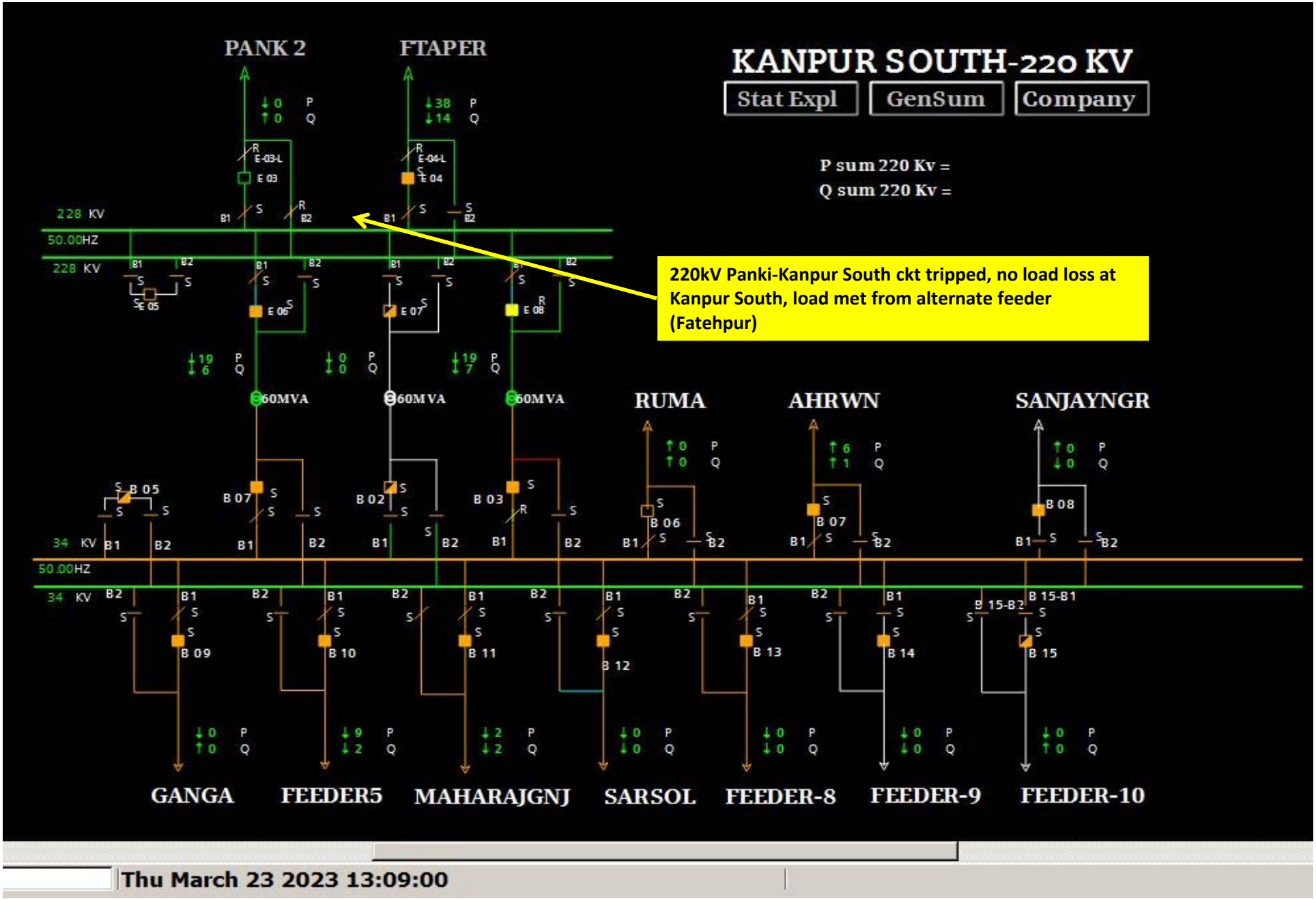
SLD of 400/220kV Kanpur(PG) after the event



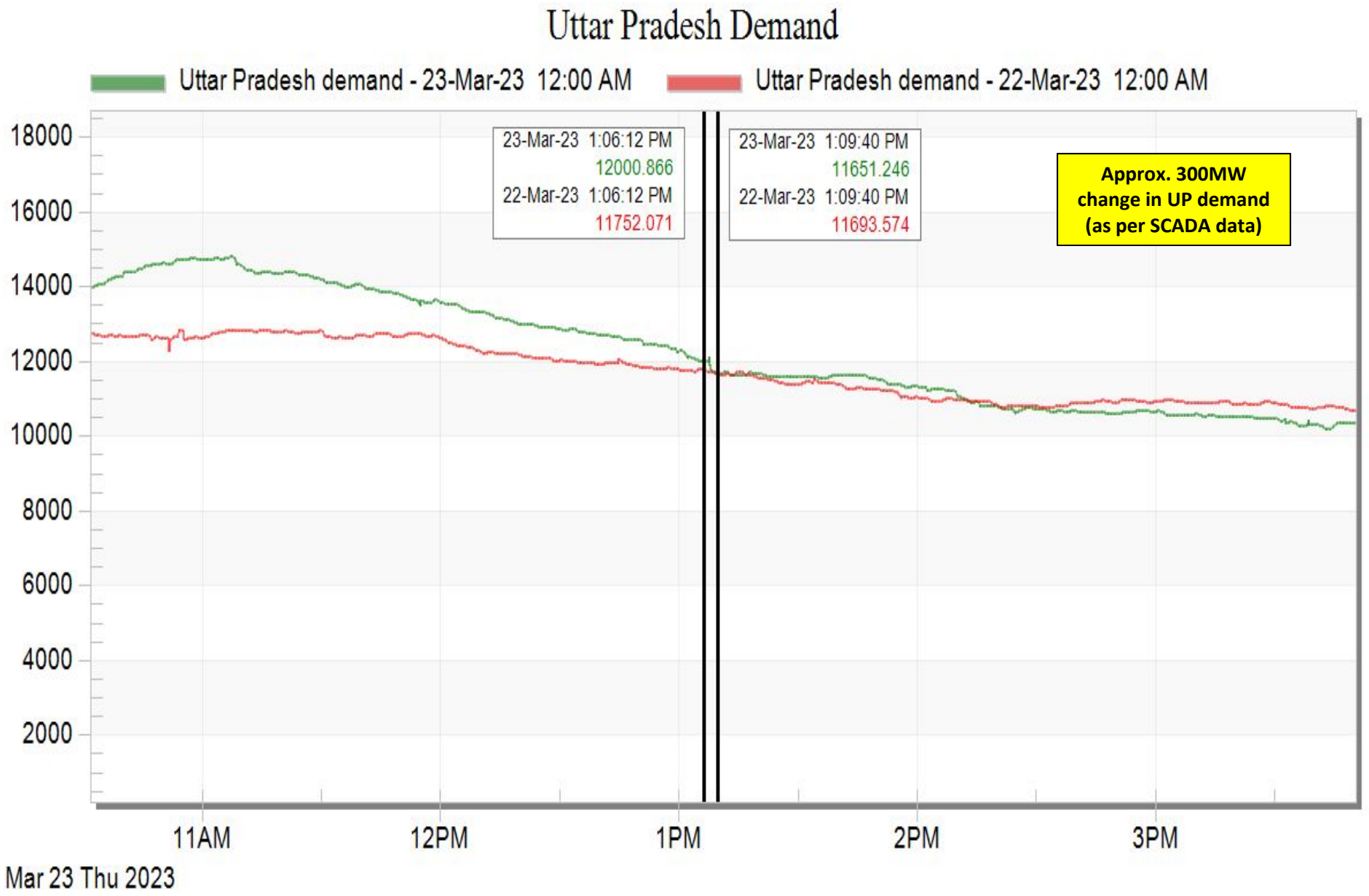
SLD of 220/33kV Kanpur South(UP) before the event



SLD of 220/33kV Kanpur South(UP) after the event



UP demand during the event

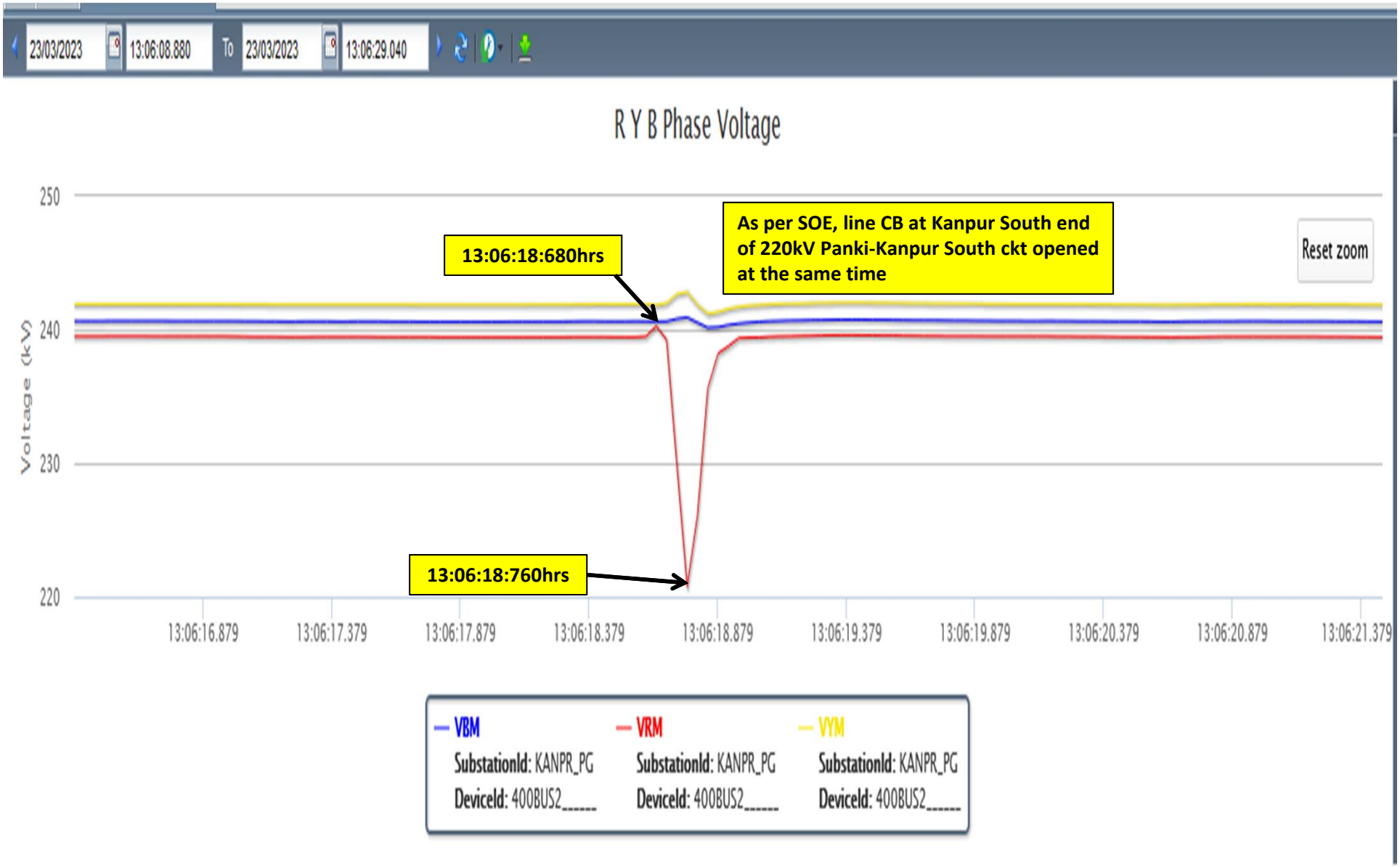


PMU Plot of frequency at Kanpur(PG)

13:07hrs/23-Mar-23

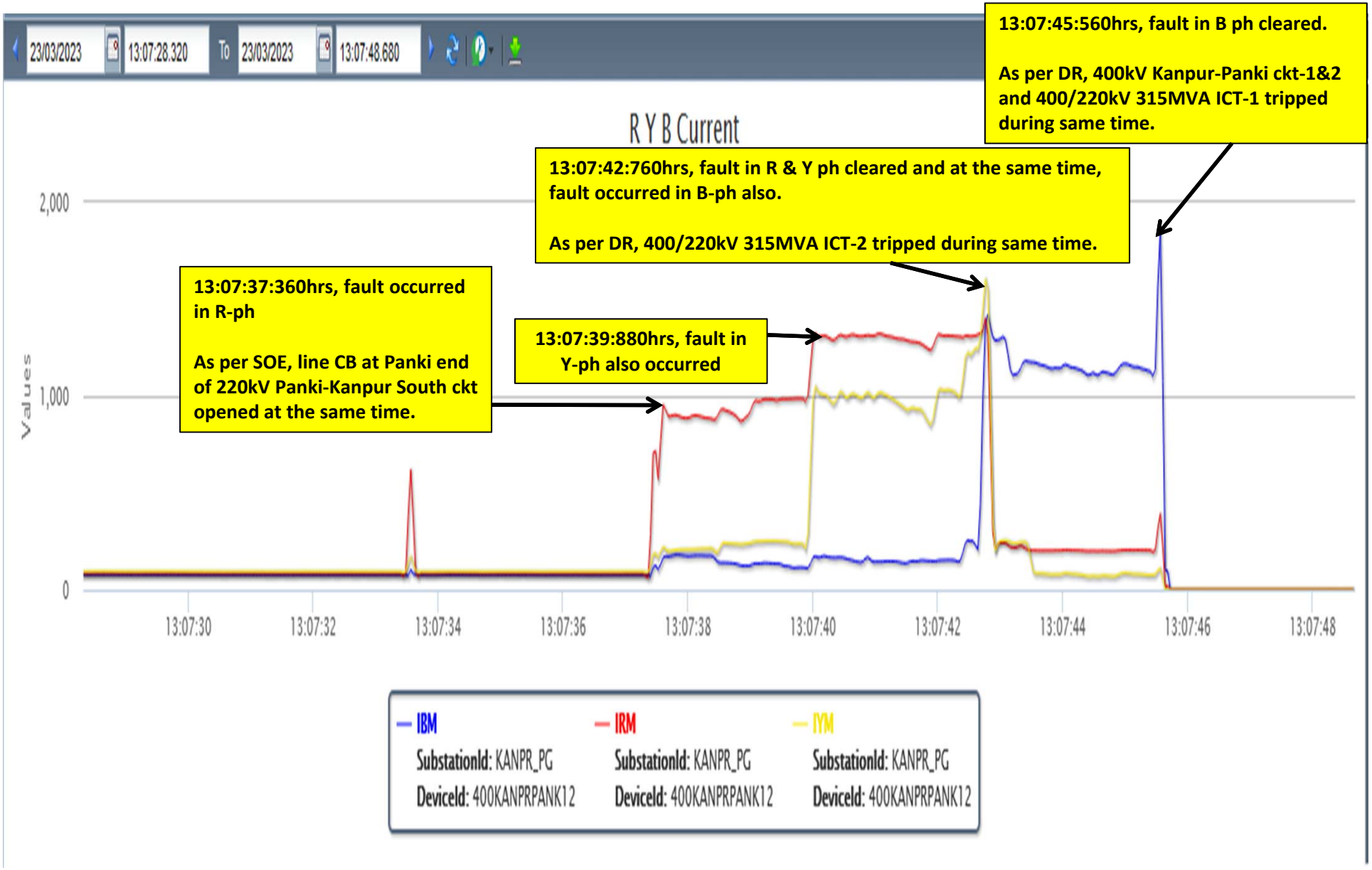
PMU Plot of phase voltage magnitude at Kanpur(PG)

13:07hrs/23-Mar-23



PMU Plot of phase current magnitude at Kanpur(PG)

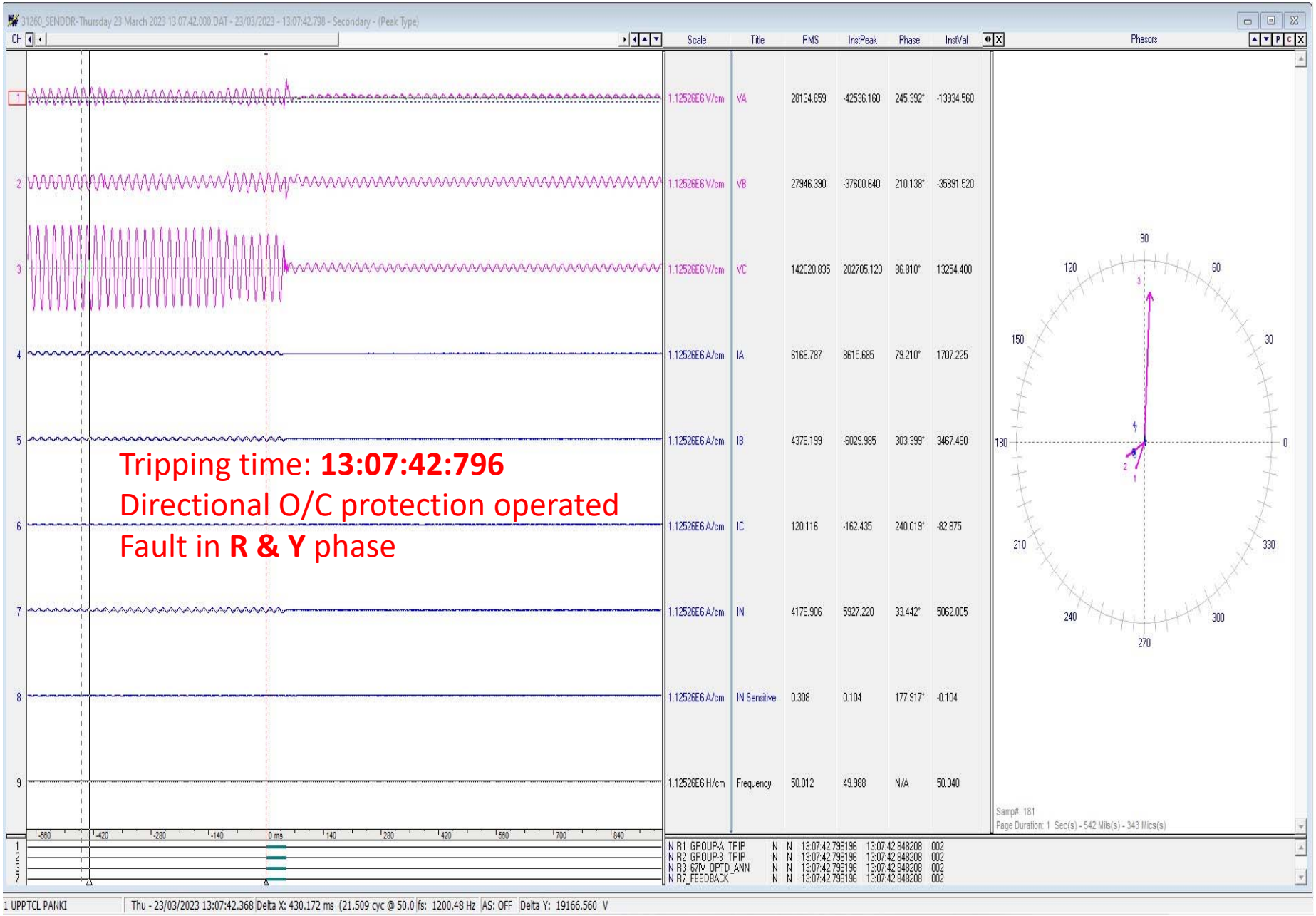
13:07hrs/23-Mar-23



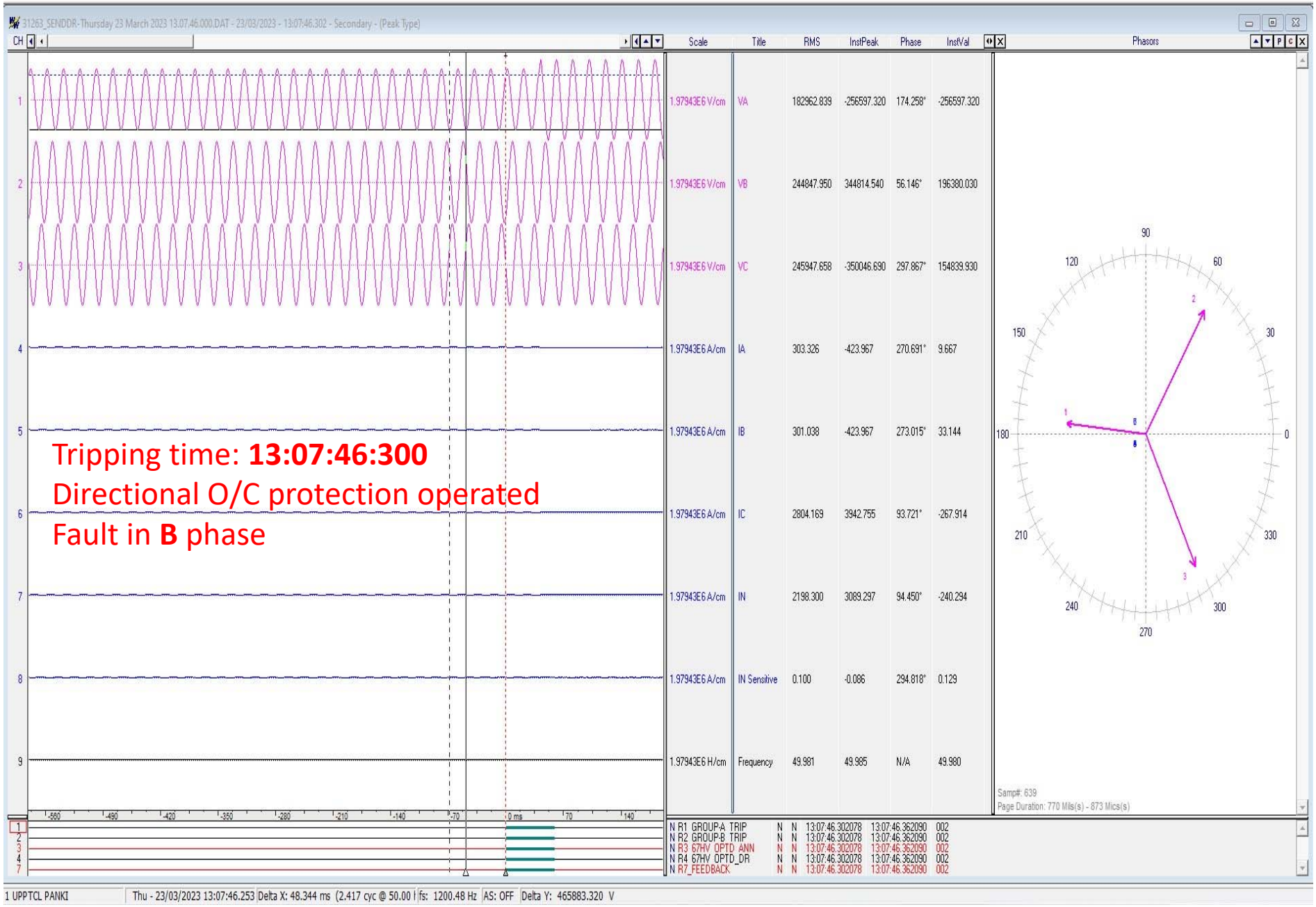
PMU Plot of phase current magnitude at Kanpur(PG)

13:07hrs/23-Mar-23

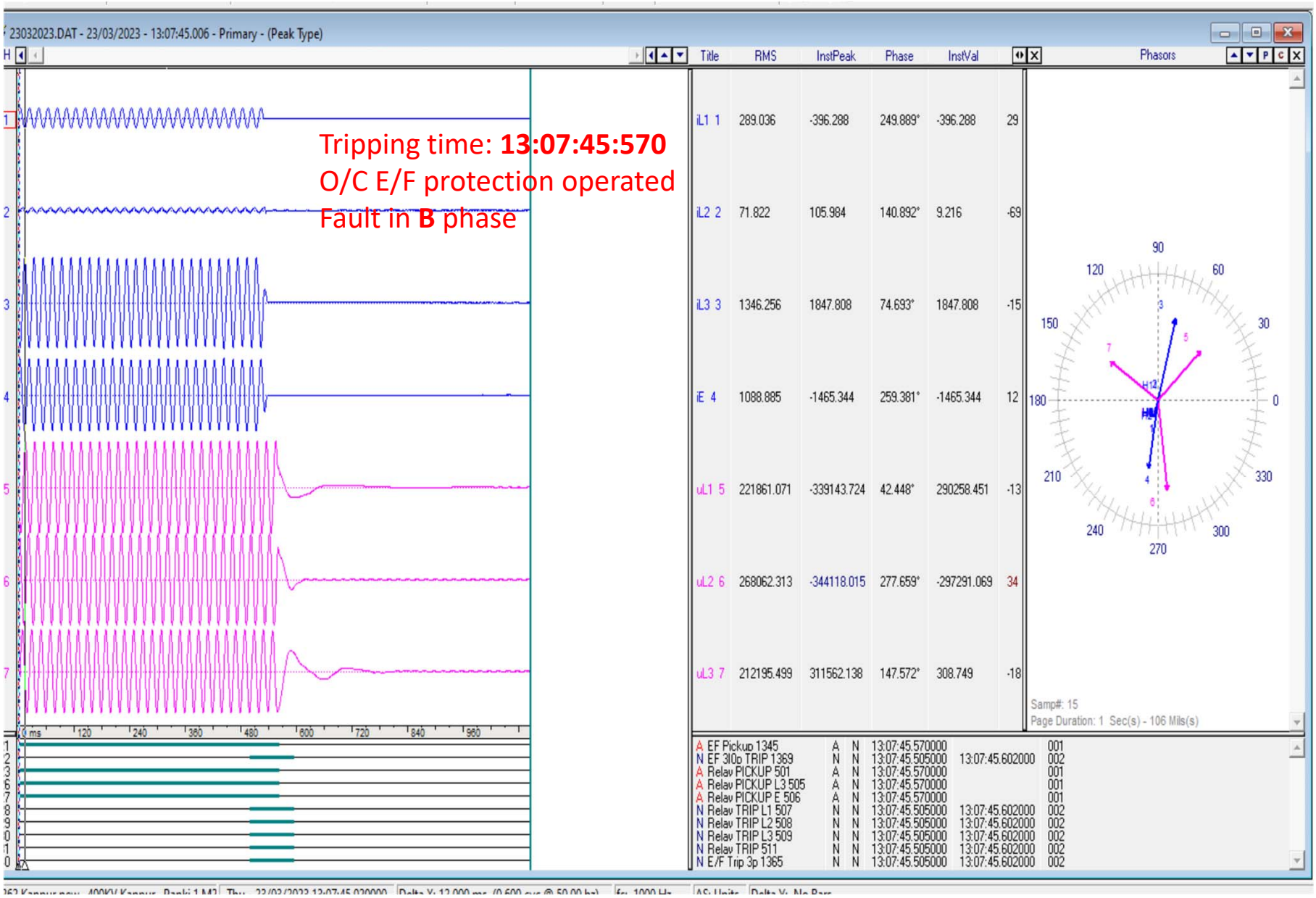
DR of 400/220kV 315MVA ICT-2 at Panki(UP)



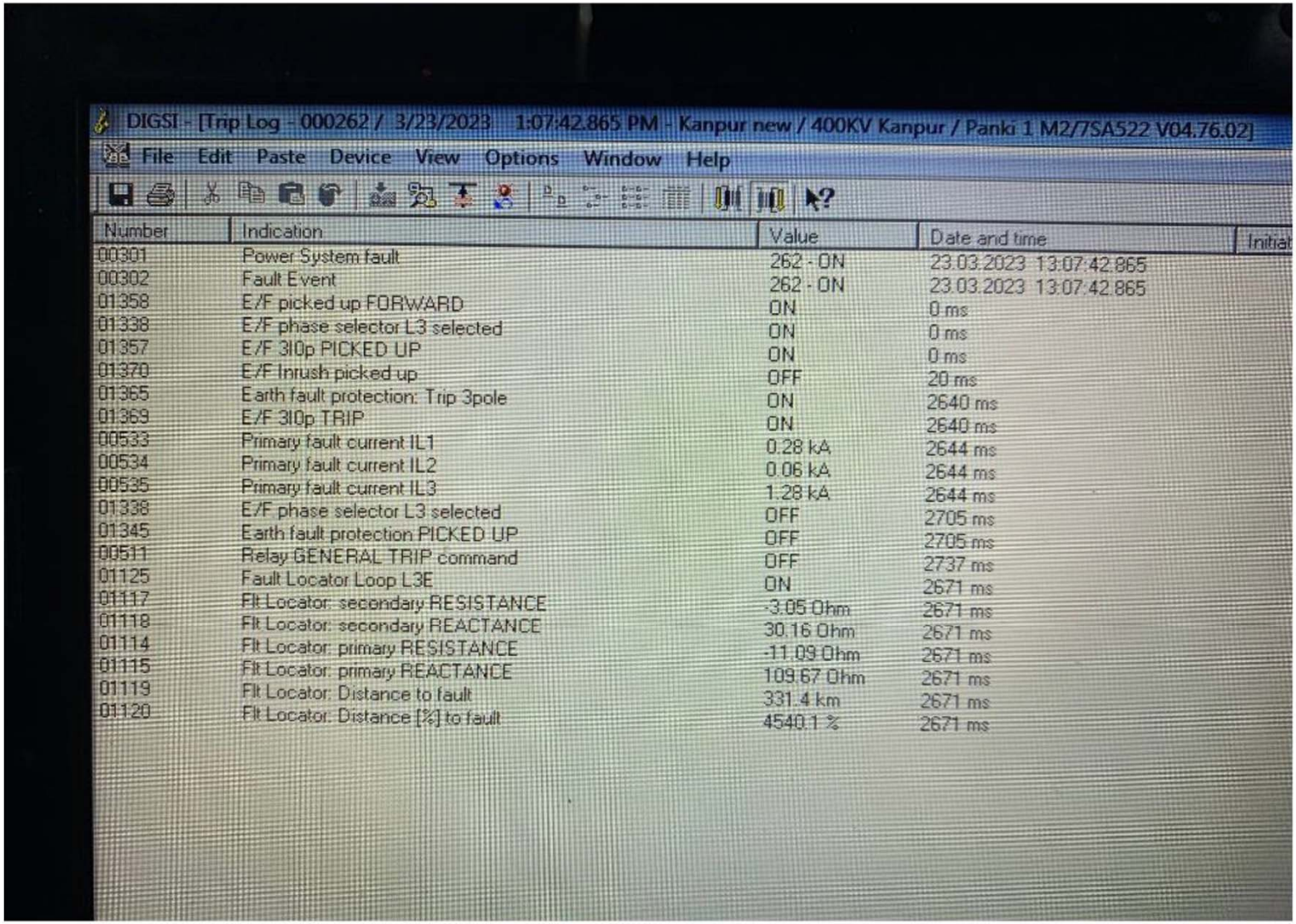
DR of 400/220kV 315MVA ICT-1 at Panki(UP)



DR of 400kV Kanpur(end)-Panki ckt-1



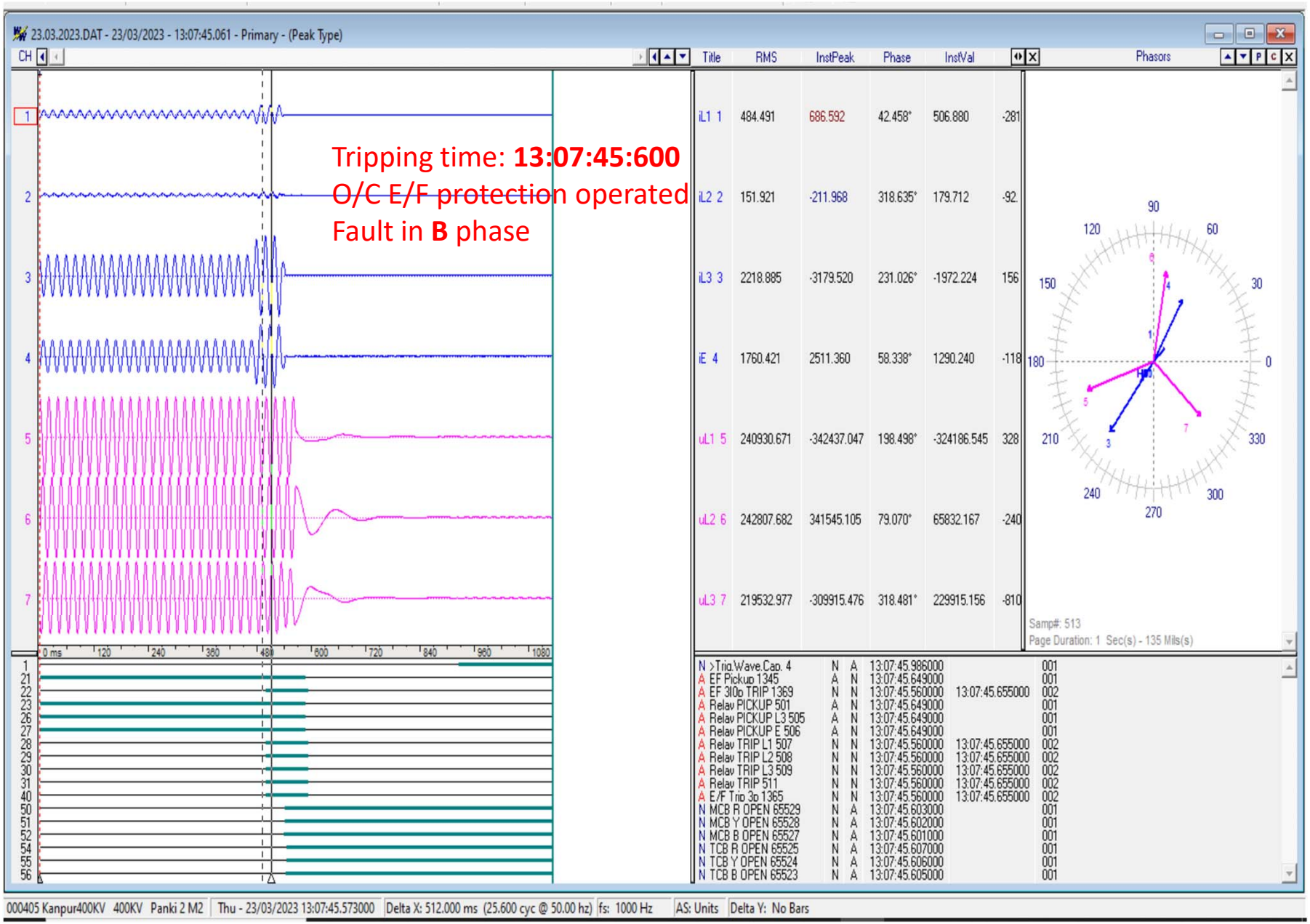
DR of 400kV Kanpur(end)-Panki ckt-1



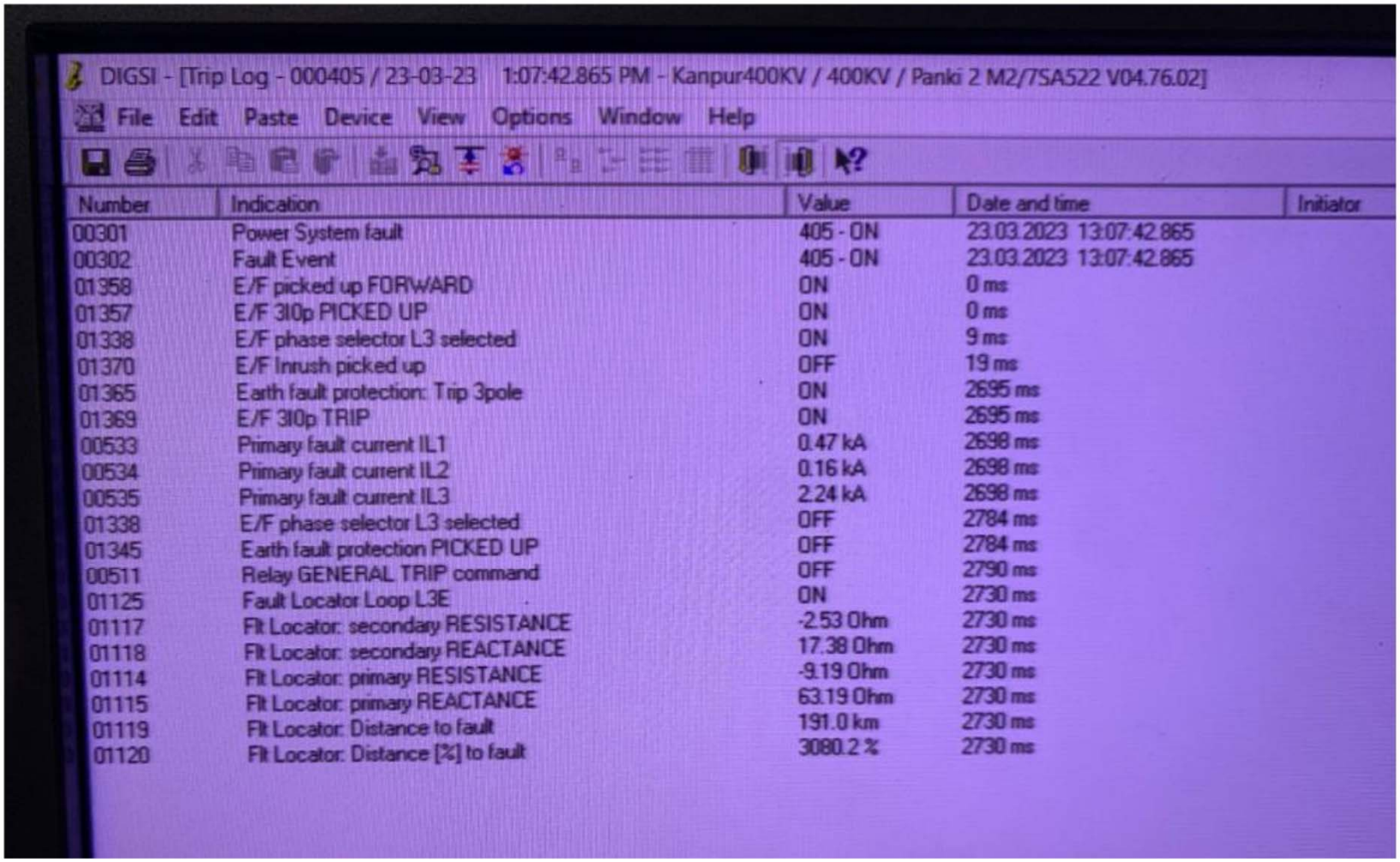
Number	Indication	Value	Date and time	Initiat
00301	Power System fault	262 - ON	23.03.2023 13:07:42.865	
00302	Fault Event	262 - ON	23.03.2023 13:07:42.865	
01358	E/F picked up FORWARD	ON	0 ms	
01338	E/F phase selector L3 selected	ON	0 ms	
01357	E/F 3I0p PICKED UP	ON	0 ms	
01370	E/F Inrush picked up	OFF	20 ms	
01365	Earth fault protection: Trip 3pole	ON	2640 ms	
01369	E/F 3I0p TRIP	ON	2640 ms	
00533	Primary fault current IL1	0.28 kA	2644 ms	
00534	Primary fault current IL2	0.06 kA	2644 ms	
00535	Primary fault current IL3	1.28 kA	2644 ms	
01338	E/F phase selector L3 selected	OFF	2705 ms	
01345	Earth fault protection PICKED UP	OFF	2705 ms	
00511	Relay GENERAL TRIP command	OFF	2737 ms	
01125	Fault Locator Loop L3E	ON	2671 ms	
01117	Flt Locator: secondary RESISTANCE	-3.05 Ohm	2671 ms	
01118	Flt Locator: secondary REACTANCE	30.16 Ohm	2671 ms	
01114	Flt Locator: primary RESISTANCE	-11.09 Ohm	2671 ms	
01115	Flt Locator: primary REACTANCE	109.67 Ohm	2671 ms	
01119	Flt Locator: Distance to fault	331.4 km	2671 ms	
01120	Flt Locator: Distance [%] to fault	4540.1 %	2671 ms	

Fault in B-ph, distance: 331.4km (4540%) from Kanpur end (line length: 5.6km), fault clearance time: 2.64 sec.

DR of 400kV Kanpur(end)-Panki ckt-2



DR of 400kV Kanpur(end)-Panki ckt-2



DIGSI - [Trip Log - 000405 / 23-03-23 1:07:42.865 PM - Kanpur400KV / 400KV / Panki 2 M2/7SA522 V04.76.02]

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Number	Indication	Value	Date and time	Initiator
00301	Power System fault	405 - ON	23.03.2023 13:07:42.865	
00302	Fault Event	405 - ON	23.03.2023 13:07:42.865	
01358	E/F picked up FORWARD	ON	0 ms	
01357	E/F 3I0p PICKED UP	ON	0 ms	
01338	E/F phase selector L3 selected	ON	9 ms	
01370	E/F Inrush picked up	OFF	19 ms	
01365	Earth fault protection: Trip 3pole	ON	2695 ms	
01369	E/F 3I0p TRIP	ON	2695 ms	
00533	Primary fault current IL1	0.47 kA	2698 ms	
00534	Primary fault current IL2	0.16 kA	2698 ms	
00535	Primary fault current IL3	2.24 kA	2698 ms	
01338	E/F phase selector L3 selected	OFF	2784 ms	
01345	Earth fault protection PICKED UP	OFF	2784 ms	
00511	Relay GENERAL TRIP command	OFF	2790 ms	
01125	Fault Locator Loop L3E	ON	2730 ms	
01117	Flt Locator: secondary RESISTANCE	-2.53 Ohm	2730 ms	
01118	Flt Locator: secondary REACTANCE	17.38 Ohm	2730 ms	
01114	Flt Locator: primary RESISTANCE	-9.19 Ohm	2730 ms	
01115	Flt Locator: primary REACTANCE	63.19 Ohm	2730 ms	
01119	Flt Locator: Distance to fault	191.0 km	2730 ms	
01120	Flt Locator: Distance [%] to fault	3080.2 %	2730 ms	

Fault in B-ph, distance: 191km (3080%) from Kanpur end (line length: 5.7km), fault clearance time: 2.69 sec.

SCADA SOE

Time	Station Name	Voltage	Element Name	Element Type	Element Status	Remark
13:06:18,000	KANPS_UP	220kV	03PANK22	Circuit Breaker	Open	Line CB at 220kV Kanpur South(UP) end of 220 kV Kanpur South(UP)-Panki2(UP) ckt opened
13:07:37,253	PANKI2	220kV	01KNPRS2	Circuit Breaker	Open	Line CB at 220kV Panki2(UP) end of 220 kV Kanpur South(UP)-Panki2(UP) ckt opened
13:07:37,482	PANKI2	220kV	10MBC	Circuit Breaker	Open	Bus Coupler at 220 kV Panki2(UP) opened
13:07:38,279	PANKI2	220kV	02KIDWA	Circuit Breaker	Open	Line CB at 220kV Panki2(UP) end of 220 kV Panki2(UP)-Kidwai ckt opened
13:07:38,279	PANKI2	220kV	07T1	Circuit Breaker	Open	CB at 220kV side of 220/33 kV 60 MVA ICT 1 at Panki2(UP) opened
13:07:38,279	PANKI2	33kV	01T1	Circuit Breaker	Open	CB at 33kV side of 220/33 kV 60 MVA ICT 1 at Panki2(UP) opened
13:07:42,850	PANKI2	220kV	04RPH2	Circuit Breaker	Open	Line CB at 220kV Panki2(UP) end of 220 kV Panki2(UP)-RPH_2 ckt opened
13:07:43,079	PANKI2	132kV	78T4	Circuit Breaker	Open	CB at 132kV side of 220/132 kV 160 MVA ICT 4 at Panki2(UP) opened
13:07:43,122	PANKI2	220kV	88T4	Circuit Breaker	Open	CB at 220kV side of 220/132 kV 160 MVA ICT 4 at Panki2(UP) opened
13:07:43,210	PANKI2	220kV	08T2	Circuit Breaker	Open	CB at 220kV side of 220/132 kV 160 MVA ICT 2 at Panki2(UP) opened
13:07:43,210	PANKI2	132kV	02T2	Circuit Breaker	Open	CB at 132kV side of 220/132 kV 160 MVA ICT 2 at Panki2(UP) opened
13:07:45,550	KANPUR	400kV	2TIE	Circuit Breaker	disturbe	
13:07:45,555	KANPUR	400kV	3PANK11	Circuit Breaker	Open	Main CB at 400kV Kanpur(PG) end of 400 kV Kanpur(PG)-Panki(UP) ckt-1 opened
13:07:45,596	KANPUR	400kV	6PANK12	Circuit Breaker	disturbe	
13:07:45,607	KANPUR	400kV	7R1	Circuit Breaker	Close	CB of Bus reactor at 400kV Kanpur(PG) closed
13:07:45,634	PANK1_UP	400kV	09KANPR2	Circuit Breaker	Open	Line CB at 400kV Panki(UP) end of 400 kV Kanpur(PG)-Panki(UP) ckt-1 opened
13:07:46,348	PANK1_UP	220kV	01T1	Circuit Breaker	Open	CB at 220kV side of 400/220 kV 315 MVA ICT 1 at Panki(UP) opened
13:10:16,829	KANPUR	400kV	6PANK12	Circuit Breaker	Open	Main CB at 400kV Kanpur(PG) end of 400 kV Kanpur(PG)-Panki(UP) ckt-2 opened
13:10:16,829	KANPUR	400kV	3PANK11	Circuit Breaker	Open	Main CB at 400kV Kanpur(PG) end of 400 kV Kanpur(PG)-Panki(UP) ckt-1 opened
13:10:16,829	KANPUR	400kV	2TIE	Circuit Breaker	Open	Tie CB at 400kV Kanpur(PG) end of 400 kV Kanpur(PG)-Panki(UP) ckt-1 opened
13:10:16,835	KANPUR	400kV	7R1	Circuit Breaker	Open	CB of Bus reactor at 400kV Kanpur(PG) opened

Tripping report

NRLDC

(Multiple elements tripping at 400/220/132kV Agra(UP))

1. **Date & Time of event:** 19:13 hrs on 28.03.2023

2. **Location/Control Area:** Uttar Pradesh

3. **Plant/Substation Name:** 400/220/132kV Agra(UP)

4. **GD/GI Category:** GI-2

5. **Antecedent Condition:**

- NR Load : 48945 MW
- Affected state load(UP) : 17841 MW
- Frequency : 49.96 Hz
- Weather condition : Normal
- IR exchange : 6763 MW

6. **Generation loss/Load loss:** Load loss of approx. 160MW in Uttar Pradesh control area (as per SCADA).

7. **Duration of interruption:** 02:14 (hh:mm) Restoration time (21:27 hrs), energy unserved: 0.35MUs

8. **Tripped elements:**

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	400/220 kV 500 MVA ICT 1 at Agra(UP)		21:59 hrs	
2.	400/220 kV 500 MVA ICT 2 at Agra(UP)		21:28 hrs	

3.	400 KV Agra(UP)-Agra Fatehbad(UP) (PG) Ckt-1	19:13 hrs	21:27 hrs	LBB protection of 400kV Agra(PG)-Agra(UP) ckt at Agra(UP) operated
4.	400 KV Agra(UP)-Agra Fatehbad(UP) (PG) Ckt-2		21:57 hrs	
5.	400 KV Agra(UP)-Unnao(UP) Ckt		20:34 hrs	
6.	220kV Agra(UP)-Agra_220 ckt-2			
7.	132kV Agra(UP)-Etmadpur ckt			
8.	132kV Agra(UP)-Agra Fondry Nagar ckt			
9.	132kV Agra(UP)-Agra Taj ckt			
10.	132kV Agra(UP)-Bhimnagari ckt			
11.	132kV Agra(UP)-Sadabad ckt			

9. Details of fault as per PMU (if any):

i) Nature of fault: No fault is observed as per PMU

ii) Fault clearing time: NA

10. Brief description of event:

i) 400 kV Agra(UP) has double main transfer bus scheme.

ii) During antecedent condition, 400 kV Agra(PG)-Agra(UP) (PG) ckt was under emergency shutdown to attend hot spot in Y-phase wave-trap at Agra(UP).

iii) As reported, at 19:13 hrs, while charging 400kV Agra(PG)-Agra(UP) ckt, LBB protection operated at 400 kV Agra(UP) end.

iv) Bus coupler did not open after LBB operation. So, all the elements connected to 400 kV Bus-1 & 2 tripped. It was also informed that, 400/220kV ICT-5 didn't trip as it is not incorporated in bus bar protection logic.

v) At the same time, 220kV Agra(UP)-Agra_220 ckt-2, 132kV feeders from Agra(UP) to Etmadpur, Agra Fondry Nagar, Agra Taj, Bhimnagari and Sadabad also tripped due to SPS operation.

vi) Load at Agra(UP) was managed partially through 220kV Agra(UP)-Shamsabad ckt and 220kV Agra(UP)-Agra_220 ckt-1. Hence, substation did not become dead.

vii) As per SOE, while charging 400kV Agra(PG)-Agra(UP) ckt line was first charged from Agra(UP) end. After ~10sec, while attempting charging from Agra(PG) end LBB protection at Agra(UP) operated.

viii) As per DR received from Agra(UP), master trip command has not been initiated before LBB operation. After approx. 260ms of line charging attempt from Agra(PG) end, LBB protection operated without any initiation of master trip command. So it seems to be LBB mal-operation.

ix) As per PMU at 765 kV Agra(PG), no fault is observed in the system.

x) As reported by Agra TnC, LBB relay has been replaced by POWERGRID. However, reason of maloperation of LBB protection is not shared.

xi) As per SCADA, load loss of approx. 160MW occurred in Uttar Pradesh control area.

11. Preliminary observation:

i) Why did LBB protection operate during charging of 400kV Agra(PG)-Agra(UP) ckt? Exact reason need to be shared.

ii) Bus-wise arrangement of elements during the event need to be shared.

iii) As per SOE, bus coupler did not open after LBB operation. Reason of the same can be shared.

iv) 400/220kV ICT-5 at Agra(UP) need to be incorporated in Bus bar protection at Agra(UP).

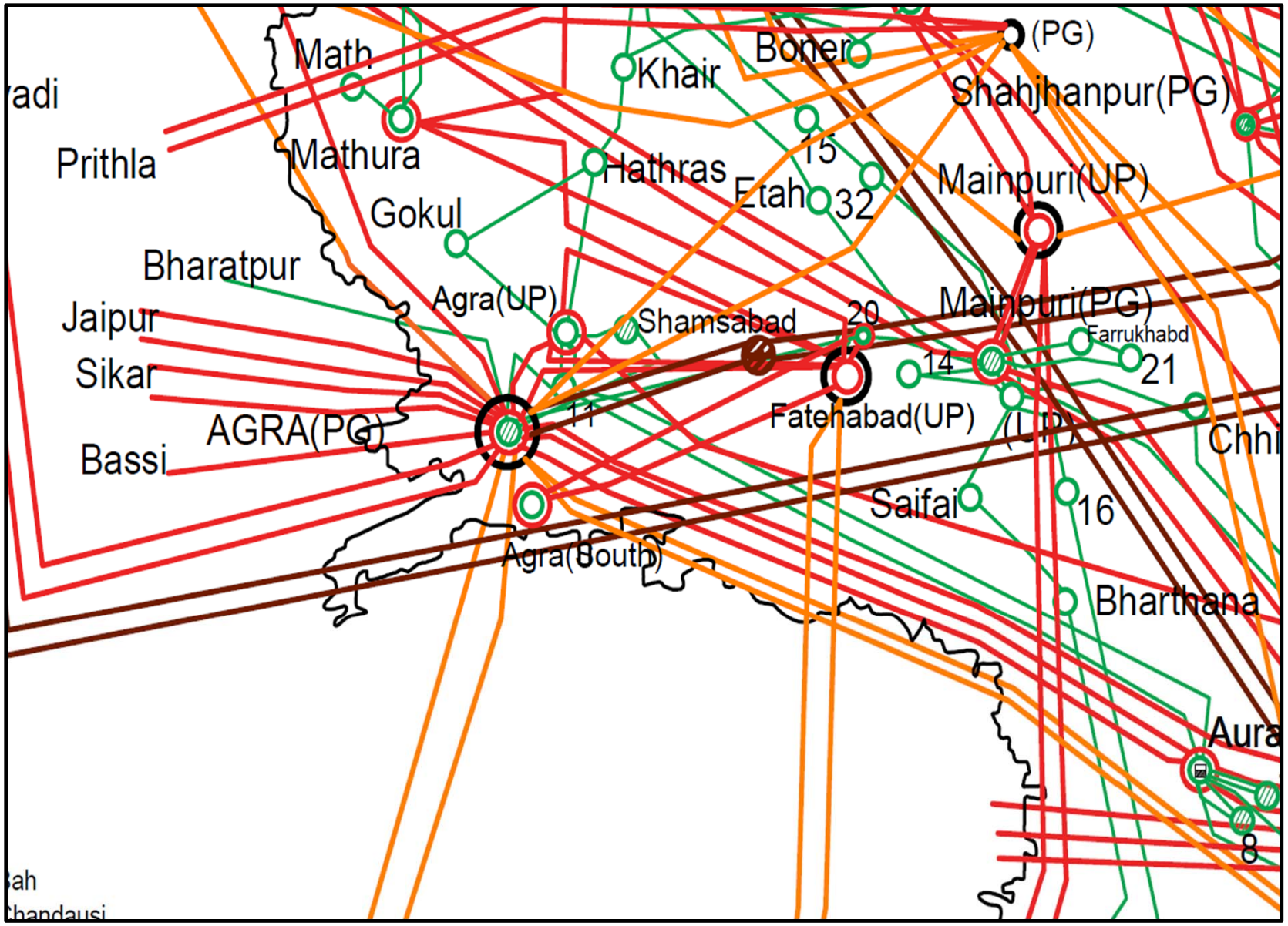
v) Reason of SPS operation need to be analysed.

vi) Healthiness of protection system need to be ensured.

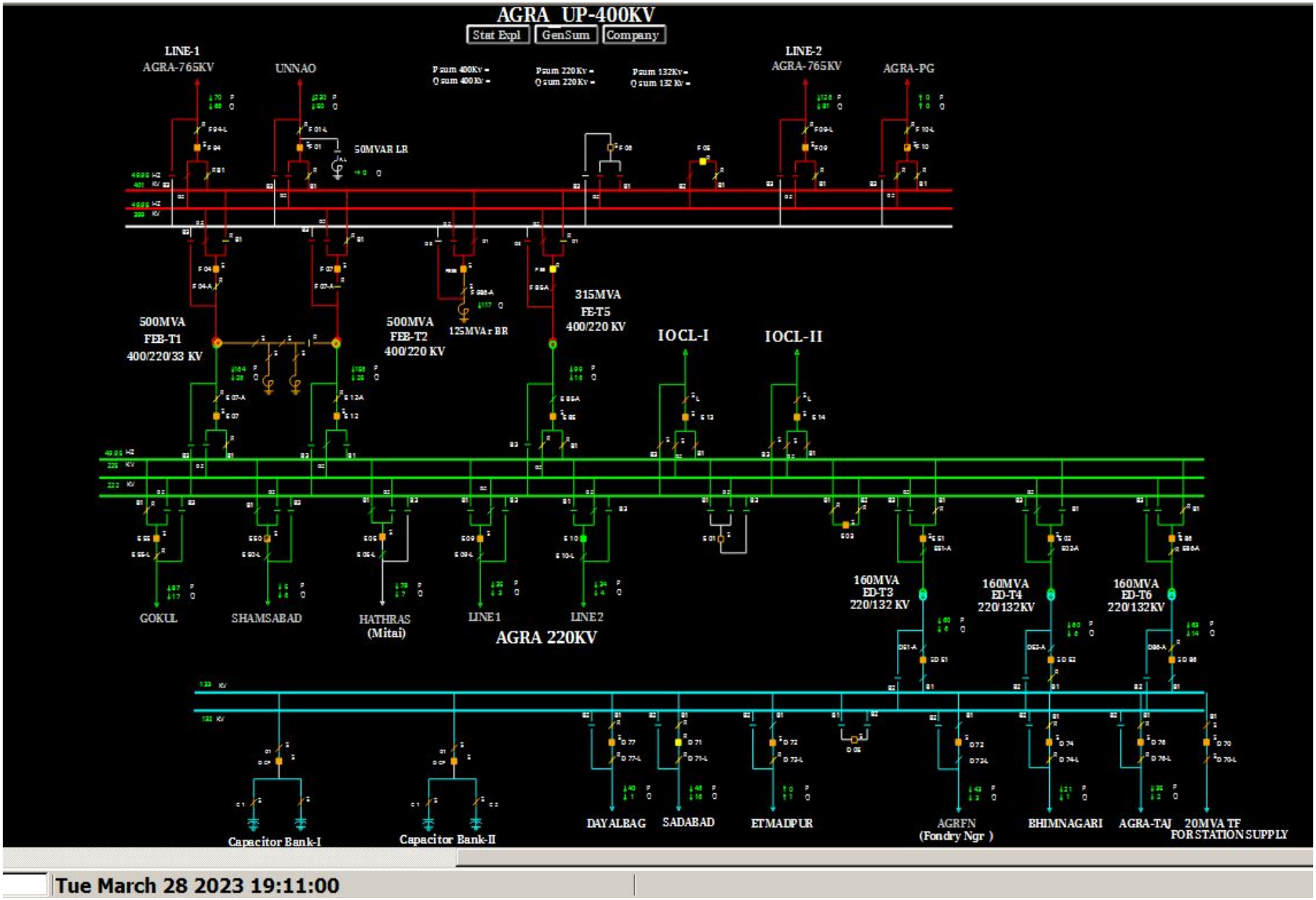
vii) DR, EL status along with tripping report of all the elements need to be shared along with DR of LBB relay.

viii) Remedial action taken report to be shared.

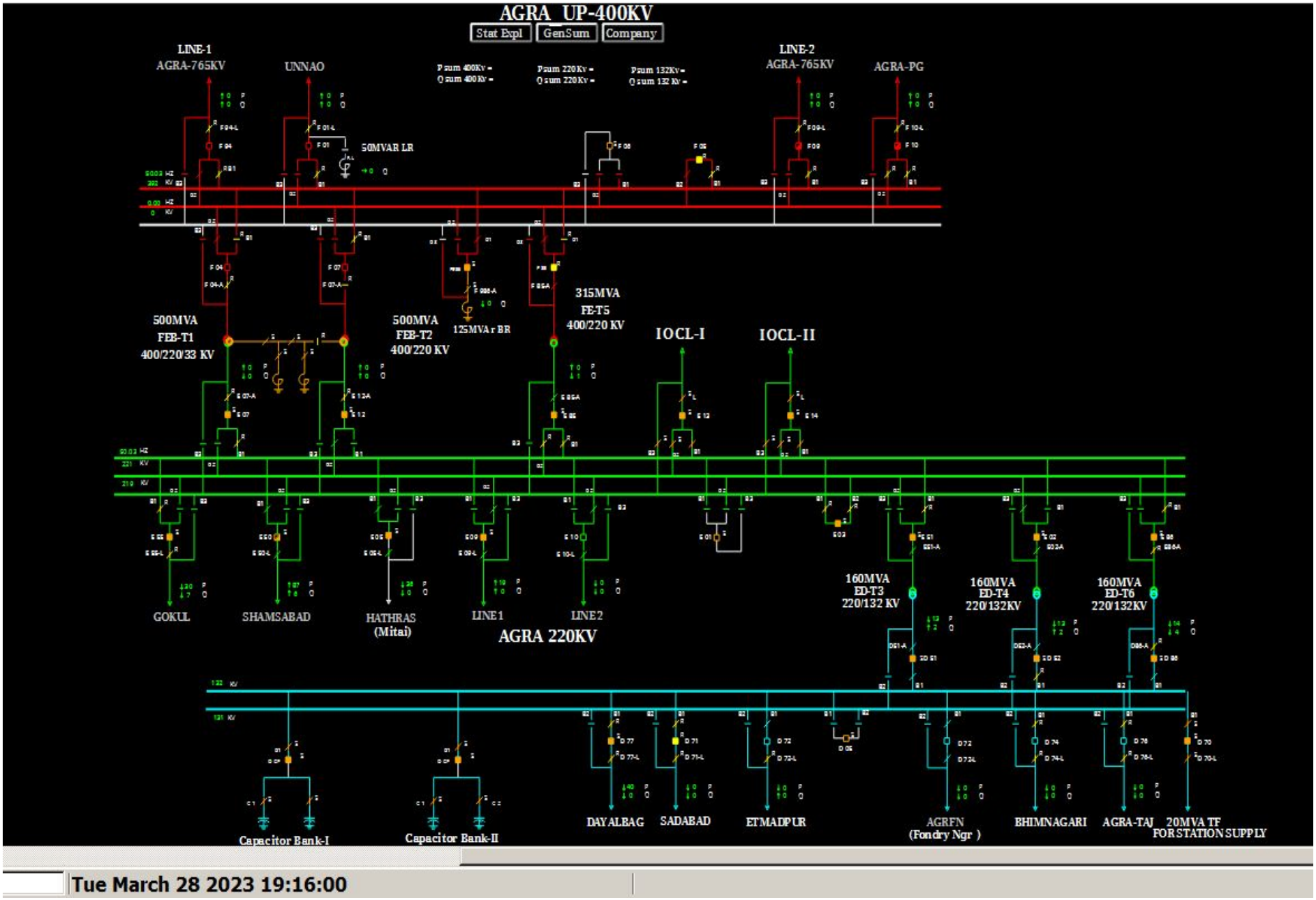
Network diagram



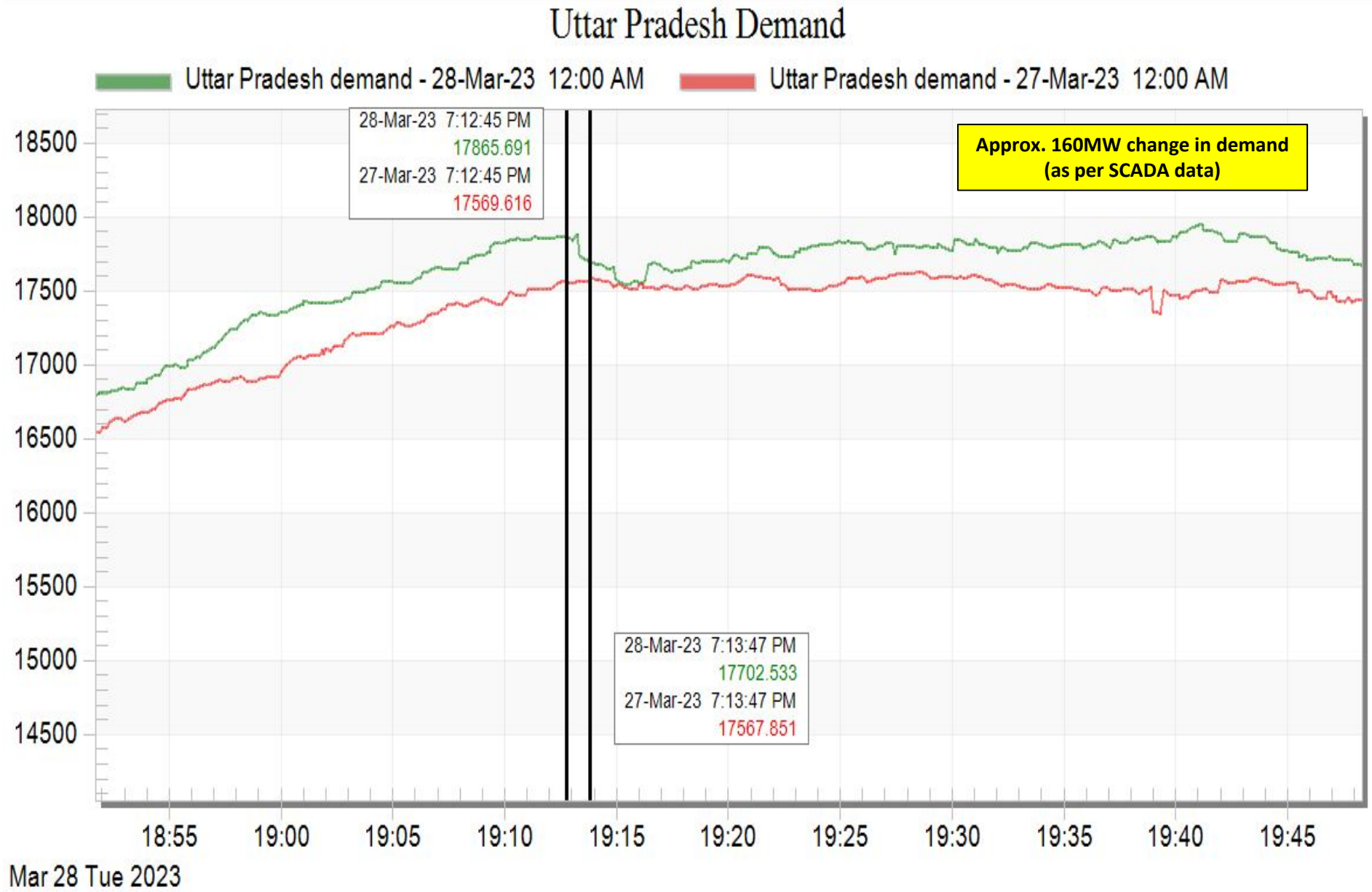
SLD of 400/220/132kV Agra(UP) before the event



SLD of 400/220/132kV Agra(UP) after the event



UP demand during the event



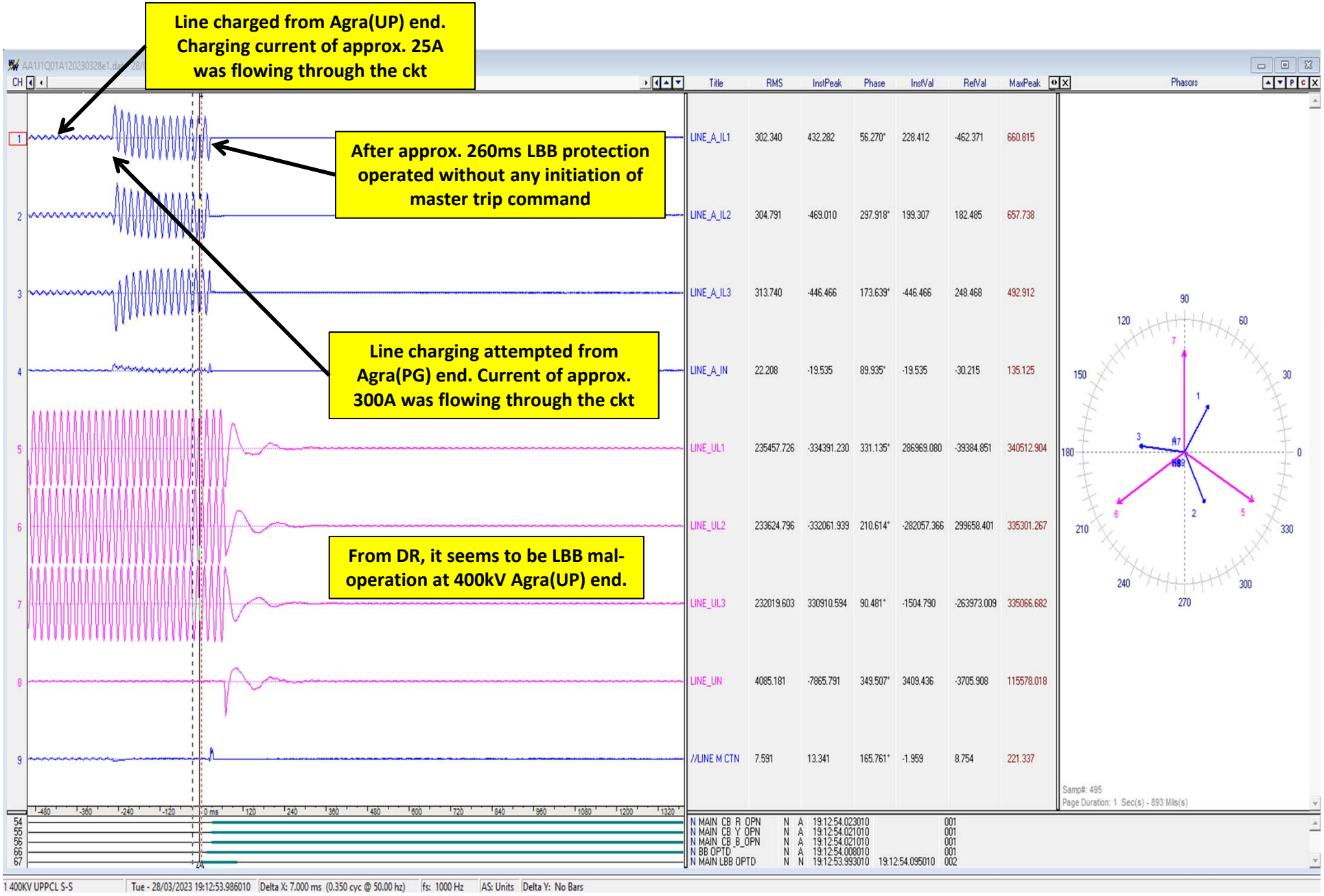
PMU Plot of frequency at 765kV Agra(PG)

19:13hrs/28-Mar-23

PMU Plot of phase voltage magnitude at 765kV Agra(PG)

19:13hrs/28-Mar-23

DR of Agra(UP) end of 400kV Agra(UP)-Agra(PG) Ckt



SCADA SOE

Time	Station Name	Voltage	Element Name	Element Type	Element Status	Remark
19:12:42,885	AGRA1_UP	400kV	10AGRA2	Circuit Breaker	Close	Line CB at 400kV Agra(UP) end of 400 KV Agra(UP)-Agra (PG) ckt closed
19:12:53,712	AGRA__PG	400kV	3AGRA12	Circuit Breaker	Close	Main CB at 400kV Agra(PG) end of 400 KV Agra(UP)-Agra (PG) ckt closed
19:12:53,757	AGRA1_UP	400kV	07T2	Circuit Breaker	Open	CB at 400 kV side of 400/220 kV 500 MVA ICT 2 at 400kV Agra(UP) opened
19:12:53,758	AGRA1_UP	400kV	04T1	Circuit Breaker	Open	CB at 400 kV side of 400/220 kV 500 MVA ICT 1 at 400kV Agra(UP) opened
19:12:53,762	AGRA1_UP	400kV	01UNNAO1	Circuit Breaker	Open	Line CB at 400kV Agra(UP) end of 400 KV Agra(UP)-Unnao(UP) ckt opened
19:12:53,762	AGRA1_UP	400kV	02AGRA71	Circuit Breaker	Open	Line CB at 400kV Agra(UP) end of 400 KV Agra(UP)-Agra Fatehbad(UP) ckt-1 opened
19:12:53,907	UNNAO_UP	400kV	04AGRA11	Circuit Breaker	Open	Line CB at 400kV Unnao(UP) end of 400 KV Agra(UP)-Unnao(UP) ckt opened
19:12:54,070	AGRA__PG	400kV	3AGRA12	Circuit Breaker	Open	Main CB at 400kV Agra(PG) end of 400 KV Agra(UP)-Agra (PG) ckt opened
19:12:54,082	AGRA7_UP	400kV	08AGSTH1	Circuit Breaker	disturbe	
19:12:54,083	AGRA7_UP	400kV	07AGRA12	Circuit Breaker	disturbe	
19:12:54,083	AGRA7_UP	400kV	08AGSTH1	Circuit Breaker	Open	Tie CB at 400kV Agra Fatehbad(UP) end of 400 KV Agra(UP)-Agra Fatehbad(UP) ckt-2 opened
19:12:54,084	AGRA7_UP	400kV	07AGRA12	Circuit Breaker	Open	Main CB at 400kV Agra Fatehbad(UP) end of 400 KV Agra(UP)-Agra Fatehbad(UP) ckt-2 opened
19:12:56,108	AGRA1_UP	132kV	72EMDPR	Circuit Breaker	Open	Line CB at 132kV Agra(UP) of 132kV Agra(UP)-Etmadpur ckt opened
19:12:57,294	AGRA1_UP	132kV	73AGRFN	Circuit Breaker	Open	Line CB at 132kV Agra(UP) of 132kV Agra(UP)-Agra Fondry Nagar ckt opened
19:12:57,902	AGRA1_UP	132kV	76AGTAJ	Circuit Breaker	Open	Line CB at 132kV Agra(UP) of 132kV Agra(UP)-Agra Taj ckt opened
19:12:58,497	AGRA1_UP	132kV	74BHIMN	Circuit Breaker	Open	Line CB at 132kV Agra(UP) of 132kV Agra(UP)-Bhimnagari ckt opened
19:12:59,092	AGRA1_UP	220kV	10AGRA22	Circuit Breaker	Open	Line CB at 220kV Agra(UP) of 220kV Agra(UP)-Agra_220 ckt opened
19:12:59,104	AGRA7_UP	400kV	08AGSTH1	Circuit Breaker	disturbe	
19:12:59,104	AGRA7_UP	400kV	07AGRA12	Circuit Breaker	disturbe	
19:12:59,104	AGRA7_UP	400kV	08AGSTH1	Circuit Breaker	Open	Tie CB at 400kV Agra Fatehbad(UP) end of 400 KV Agra(UP)-Agra Fatehbad(UP) ckt-2 opened
19:12:59,104	AGRA7_UP	400kV	07AGRA12	Circuit Breaker	Open	Main CB at 400kV Agra Fatehbad(UP) end of 400 KV Agra(UP)-Agra Fatehbad(UP) ckt-2 opened
19:13:04,000	AGRA1_UP	400kV	09AGRA72	Circuit Breaker	disturbe	
19:13:04,000	AGRA1_UP	400kV	10AGRA2	Circuit Breaker	disturbe	

Status of Bus bar protection				
Constituent Name	**Name of Station**	**Status of Bus bar protection(as reported)**	**Expected date of revival(as reported)**	**Remark**
Uttarakhand	220 KV Substation, Ramnagar, Roorkee	Blocked due to more elements added at 220 KV Voltage level.		
	220 KV Sub Station, SIDCUL, Haridwar			
	220kV Jhajhra, Dehradun	Not commissioned yet		
	400KV Kashipur	Available but Non operational		
	220kv Haldwani	Not Available		
	220kv Pantnagar	Available but Non operational		
	220kV Rishikesh	Available but Non operational		
	220kV Chamba	Not commissioned yet		
Haryana	220kV S/Stn Badshahpur	Not Installed	15.01.2023	
	220kV S/Stn Sec-52A, Gurgaon	Not Installed	31.03.2023	
	220kV S/Stn Sec-1 Manesar	Installed, Non-Operational	31.01.2023	Additional 100MVA, 220/66kV TF T-4 is required to be added in the existing Bus Bar Protection scheme. Further, testing of the scheme is pending and will be done by 31.01.2023.
	220kV S/Stn Panchgaon	Not Installed	31.03.2023	The firm i.e., M/s ETA has left the work. Now the leftover work is being carried out departmentally. The matter has been taken up with the firm i.e. M/s Siemens for providing offer regarding commissioning of Bus-bar. Presently, one no. 220kV Busbar and 220kV Bus Coupler is not commissioned. So, the Bus Bar protection will be commissioned with all pending work.
	220kV S/Stn Rewari	Not Installed	31.08.2023	Estimate stands sanctioned. Bus Bar will be commissioned subject to the complete allocation of material.
	220kV S/Stn Narnaul	Not Installed	31.03.2023	Till date, busbar protection was not required as the substation is radially fed. However, a new transmission line viz. 220 kV D/C Deroli Ahir-Narnaul line is under construction on turnkey mode. Thus, the work of providing 220 kV take-in bays(02 no.) alongwith the work of providing the requisite busbar protection stands also awarded to other turnkey contractor
	220kV S/Stn Mohinder Garh	Not Installed	01.06.2023	Estimate stands sanctioned. Bus Bar will be commissioned subject to the complete allocation of material.
	220 KV S/Stn Palwal	Not Installed	30.06.2023	Earlier, the necessity of bus bar protection had not been comprehended, however, expanded transmission network with establishment of new substations/transmission elements in synchronism mode, there was call for introduction of Bus Bar Protection Scheme.
	220 KV S/Stn Rangala Rajpur	Installed but Non-Operational	31.03.2023	Defective. Work order has been issued for restoration of bus bar protection at the substation
	220 kV Unispur	Installed but Non-Operational	Mar-23	Relay Mal-functioning
	220 kV Mund	Installed but Non-Operational	Feb-23	Isolator status Ambigous
	220 kV Nissing	Installed but Non-Operational	May-23	New scheme is being installed at place of old Bus Bar Protection Scheme
	220KV Pehowa	Installed but Non-Operational	BBP will be commissioned within 2 Months after receiving of material	Old & Obsolete, Allocation of New BBP and allied Material awaited.
	220kV Kaithal	Not Installed	fter Allocation of Bus-Bar Protection Panel	
	220 KV Sonepat	Not Installed	220 KV Bus Bar Protection Scheme will be installed within a month after the availability of the necessary material required for	
	220 KV REGC, Sonepat	Not Installed	220 KV Bus Bar Protection Scheme will be installed within a month after the availability of the necessary material required for	

	220KV Jind	Installed but Non-Operational	31.01.2023	Existing Bus bar panel is of old and obsolete design. New Bus Bar protection scheme panel has been drawn from the store. New Panel will be commissioned at earliest.
	220 KV Fatehabad	Installed but Non-Operational		
	220 KV Bhuna	Installed but Non-Operational		
	220 KV Sirsa	Not Installed		
	220 KV Rania	Not Installed	31.03.2023	
	220 KV Bhiwani	Not Installed	kely to be completed in FY 2023- 24.	
	220kV Madanpur	Not Installed		The existing BBP was shifted to 220 kV S/Stn. Salempur. The requirement has been sent to CE/ PDF, vide this office letter no Ch-85/W-312/Vol-Vf dt- 28.12.2022
	220kV Tepla	Installed but Non-Operational		The existing BBP is out being old and obsolete. The requirement replacement of existing BBP has been sent to CE/PM, vide thjs office letter no Ch-85/W-3 12/Vol-VI dt- 28.12.2022
	220kV Rajokheri	Installed but Non-Operational		The substation is being constructed in turnkey, BBP has been installed. Commissioning is yet to be completed by me firm.
BBMB	220kV Charkhi Dadri	Installed, under commissioing yet	15.01.2023	Old high impedence Charkhi Dadri (SAS) Bus Bar Protection has been replaced with low impedence Bus Bar Protection during SAS. Testing is under process and will be Commissioned shortly
	220kV Samaypur	Installed but Non-Operational	30.04.2023	Failure of modules
	220kV Barnala	Not Installed		
	220kV Dhulkote	Not Installed		
	220kV Jagadhari	Not Installed		
	220kV Narela	Not Installed		
UP	220kV Parichha	Installed but Non-Operational	30.06.2023	Due to 10 to 15% differential current error, busbar protection was not taken in srvice, an order has been placed to M/s Tirupati Industrial Agency authorized channel partner M/s AB for rectification and of same.
	220kV Partapur	Installed but Non-Operational	Jan-23	Busbar relya configuration problem to be rectified by firm engineer
	220kV Nirpura	Installed but Non-Operational	Jan-23	Bus bar protection has been made out of service by maintenance wing due to defective module for 220kV Baraut line
	220kV IITGNL	Installed but Non-Operational	Expected to be commissioned within 3 month	commissioning work pending
	220kV Rampur	Installed but Non-Operational		01 no. of 220kV feeder (Rampur -CB Ganj) not configured
	220kV Chandausi	Not Installed		Bus bar protection pane l not alloted
	220kV Rampur	Installed but Non-Operational		01 no. of 220kV feeder (Rampur -CB Ganj) not configured
	220kV Sec. - 148, Noida	Installed but Non-Operational	Jan-23	Communication card defective
	220kV sec. 38A, Botanicla Garde	Not Installed		Bus Bar protection panel not alloted
	220kV sec.-62, Noida	Not Installed	Feb-23	
	220kV Dadri	Not Installed	Sep-23	
	400kV S/S Agra	Installed but Non-Operational	2023	Old and out dated
	220kV S/S Bah	Not Installed		
	220kV Sirsaganj	Not Installed		
	220kV S/S Farrukhabad (New)	Not Installed		
	220kV Boner	Not Installed		
	220kV Kasganj (Soron)	Installed but Non-Operational		Error alarm in busbar
	220kV Khair	Installed but Non-Operational		New IIIrd 160MVA T/F is not configured with busbar protection
	220kV Kidwainagar	Installed but Non-Operational		
	220kV Chhata	Installed but Non-Operational		New IIIrd 160MVA T/F is not configured with busbar protection
	Harduaganj	Installed but Non-Operational	31.12.2023	Due to 4 to 7 % differential current error the busbar protection was not taken in srvice. O.E.M M/s Siemens is being pursued to rectify it.
	220kV Lalitpur	Not Installed	23-Apr	Due to non availability of pannel & cable
	220kV Sarnath	Installed but Non-Operational	Approximate 03 months	Old & defective Electorstatic panel (ABB Make)
	220kV Sirathu, Kaushambi	Not Installed	Approximate 03 months	Relay Panel is not availabe

	220kV substation Fatehpur	Installed but Non-Operational	Approximate 03 months	Brekaer status not available
	220kV S/S Raja Talab	Installed but Non-Operational	Approximate 03 months	relay defective
	220kV S/S Bhelupur	Not Installed		Not required due to radial substation
	20kV S/S Harahua	Installed but Non-Operational	Approximate 03 months	Not commissioned
	220kV S/S Sahupuri	Installed but Non-Operational	Approximate 03 months	Defective
	220kV S/S Mirzapur	Installed but Non-Operational	Approximate 03 months	
HP	220kV Chamba	Main-2 non operational	30.04.2023	Relay faulty
	220kV MattaSidh	Installed but Non-Operational		Relay faulty
	220kV kangoo	Installed but Non-Operational		Commissioning awaited from firm
	220kV Nangal	Installed but Non-Operational	Within 06 months	
	220kV Katha Baddi	Installed but Non-Operational	Within 06 months