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/106/01/2023/6352-6393 दिनांक: 10.08.2023

विषय: प्रचालन समन्वय उप-समिति की 210वीं बैठक की कार्यसूची।

Subject: Agenda of the 210th OCC meeting.

प्रचालन समन्वय उप-समिति की **210वीं** बैठक का आयोजन वीडियो कॉन्फ्रेंसिंग के माध्यम से दिनांक **16.08.2023** 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 द्वाराप्रदान किया जाएगा।

कृपया बैठक में उपस्थित होने की सुविधा प्रदान करें।

The **210th** meeting of the Operation Co-ordination sub-committee will be conducted through Video Conferencing on **16.08.2023** 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.

10/08/2023

(ओमकिशोर)

कार्यपालक 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
18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26513265 e- mail: seo-nrpc@nic.in Website: www.nrpc.gov.in

1. Confirmation of Minutes

The minutes of the 209th OCC meeting were issued vide letter of even number dated 04.08.2023.

Sub-committee may kindly confirm the Minutes.

2. Review of Grid operations

2.1 Power Supply Position (Provisional) for July 2023

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

State / UT	Req. / Avl.	Energy (MU)			Peak (MW)		
		Anticipated	Actual	% Variation	Anticipated	Actual	% Variation
CHANDIGARH	(Avl)	190	196	3.0%	350	371	6.0%
	(Req)	210	196	-6.8%	430	371	-13.7%
DELHI	(Avl)	5320	3943	-25.9%	8100	7398	-8.7%
	(Req)	4050	3944	-2.6%	8100	7398	-8.7%
HARYANA	(Avl)	5810	6700	15.3%	12555	12227	-2.6%
	(Req)	6799	6706	-1.4%	13457	12227	-9.1%
HIMACHAL PRADESH	(Avl)	1151	1014	-11.8%	1759	1775	0.9%
	(Req)	1115	1018	-8.7%	1784	1775	-0.5%
J&K and LADAKH	(Avl)	2320	1574	-32.1%	3520	2590	-26.4%
	(Req)	1570	1591	1.3%	2820	2707	-4.0%
PUNJAB	(Avl)	8000	8279	3.5%	13978	14831	6.1%
	(Req)	8617	8279	-3.9%	15000	14831	-1.1%
RAJASTHAN	(Avl)	9340	8349	-10.6%	18330	14204	-22.5%
	(Req)	7750	8373	8.0%	13200	14204	7.6%
UTTAR PRADESH	(Avl)	15810	15298	-3.2%	27700	28284	2.1%
	(Req)	15655	15321	-2.1%	26500	28704	8.3%
UTTARAKHAND	(Avl)	1414	1347	-4.7%	2398	2223	-7.3%
	(Req)	1426	1362	-4.5%	2450	2298	-6.2%
NORTHERN REGION	(Avl)	49355	46700	-5.4%	76300	77100	1.0%
	(Req)	47192	46787	-0.9%	74300	77100	3.8%

As per above, negative / significant variation (≥5%) in Actual Power Supply Position(Provisional) vis-à-vis Anticipated figures is observed for the month of July-2023 in terms of Energy Requirement for Chandigarh, Delhi, Haryana, HP, 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 September-2023 is scheduled on 14-August-2023 via Video Conferencing

3.2. Outage Programme for Transmission Elements

The meeting on proposed outage programme of Transmission elements for the month of September-2023 is scheduled on 14-August-2023 via Video conferencing.

4. Planning of Grid Operation

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

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

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	190	350	No Revision submitted
	Requirement	180	410	
	Surplus / Shortfall	10	-60	
	% Surplus / Shortfall	5.6%	-14.6%	
DELHI	Availability	2690	6130	No Revision submitted
	Requirement	3490	7250	
	Surplus / Shortfall	-800	-1120	
	% Surplus / Shortfall	-22.9%	-15.4%	
HARYANA	Availability	6522	11463	08-Aug-23
	Requirement	6522	12865	
	Surplus / Shortfall	0	-1402	
	% Surplus / Shortfall	0.0%	-10.9%	
HIMACHAL PRADESH	Availability	1670	3220	No Revision submitted
	Requirement	1120	1840	
	Surplus / Shortfall	550	1380	
	% Surplus / Shortfall	49.1%	75.0%	
J&K and LADAKH	Availability	1780	3510	No Revision submitted
	Requirement	1560	3290	
	Surplus / Shortfall	220	220	
	% Surplus / Shortfall	14.1%	6.7%	
PUNJAB	Availability	6200	12370	No Revision submitted
	Requirement	8060	14900	
	Surplus / Shortfall	-1860	-2530	
	% Surplus / Shortfall	-23.1%	-17.0%	
RAJASTHAN	Availability	9130	18500	No Revision

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Requirement	9070	16640	submitted
	Surplus / Shortfall	60	1860	
	% Surplus / Shortfall	0.7%	11.2%	
UTTAR PRADESH	Availability	13770	25920	No Revision submitted
	Requirement	13780	28160	
	Surplus / Shortfall	-10	-2240	
	% Surplus / Shortfall	-0.1%	-8.0%	
UTTARAKHAND	Availability	1320	2250	08-Aug-23
	Requirement	1314	2300	
	Surplus / Shortfall	6	-50	
	% Surplus / Shortfall	0.5%	-2.2%	
NORTHERN REGION	Availability	43272	76900	
	Requirement	45096	80500	
	Surplus / Shortfall	-1824	-3600	
	% Surplus / Shortfall	-4.0%	-4.5%	

SLDCs are requested to update the anticipated power supply position of their respective state / UT for the month of September-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. 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.

6. NR Islanding scheme

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

Members may kindly deliberate.

7. Coal Supply Position of Thermal Plants in Northern Region

7.1 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.

7.2 Accordingly, coal stock position of generating stations in northern region during current month (till 07th August 2023) is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
ANPARA C TPS	1200	86.31	14	6.0
ANPARA TPS	2630	80.21	14	26.4
BARKHERA TPS	90	49.04	22	41.4
DADRI (NCTPP)	1820	57.74	22	11.0
GH TPS (LEH.MOH.)	920	53.97	22	33.0

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
GOINDWAL SAHIB TPP	540	55.44	22	4.0
HARDUAGANJ TPS	1265	63.06	22	12.4
INDIRA GANDHI STPP	1500	61.10	22	12.4
KAWAI TPS	1320	53.84	22	26.3
KHAMBARKHERA TPS	90	50.53	22	59.0
KOTA TPS	1240	77.50	22	9.2
KUNDARKI TPS	90	48.98	22	61.3
LALITPUR TPS	1980	64.99	22	26.7
MAHATMA GANDHI TPS	1320	69.17	22	29.3
MAQSOODPUR TPS	90	53.33	22	52.6
MEJA STPP	1320	78.49	22	20.2
OBRA TPS	1094	54.33	22	11.2
PANIPAT TPS	710	74.25	22	49.2
PARICHHA TPS	1140	55.94	22	6.5
PRAYAGRAJ TPP	1980	75.04	22	23.0
RAJIV GANDHI TPS	1200	34.05	22	19.9
RAJPURA TPP	1400	82.47	22	17.7
RIHAND STPS	3000	93.35	14	29.5
ROPAR TPS	840	49.19	22	46.4
ROSA TPP Ph-I	1200	70.60	22	15.6
SINGRAULI STPS	2000	89.26	14	17.7
SURATGARH TPS	1500	65.58	22	4.1
TALWANDI SABO TPP	1980	61.14	22	**2.7**
TANDA TPS	1760	62.24	22	18.0
UNCHAHAR TPS	1550	67.41	22	18.8
UTRAULA TPS	90	46.90	22	61.0
YAMUNA NAGAR TPS	600	67.52	22	27.8
CHHABRA-I PH-1 TPP	500	80.60	22	4.5
KALISINDH TPS	1200	54.18	22	8.2
SURATGARH STPS	1320	59.98	22	5.7
CHHABRA-I PH-2 TPP	500	35.85	22	21.0
CHHABRA-II TPP	1320	33.43	22	4.7

8. In principle approval for Insulator replacement of 500kV HVDC Ballia-Bhiwadi Line under Deemed Availability (Agenda by Powergrid NR-3)

8.1 Powergrid NR-3 has intimated that Presently, insulator cleaning and insulator

replacement with CLR is being carried out at major crossings and polluted stretches in ±500kV HVDC Ballia-Bhiwadi based on previous history.

8.2 With the use of CLR Insulators, chances of tripping/auto re-closer due to deposition of dust, bird excreta etc can be minimized. The same results have been achieved in ±500kV HVDC Rihand-Dadri transmission line.

8.3 To avoid frequent tripping/breakdown, porcelain insulator at all the balance locations are required to be replaced by CLR insulator.

8.4 Detail of balance locations for Insulator replacement work and requirement of shutdown for HVDC BalliaBhiwadi Line is attached as **Annexure-A.III**.

8.5 In view of system improvement and grid stability, Powergrid NR-3 has requested that proposed outage of HVDC Ballia-Bhiwadi Pole-1&2 for approx. 10 days each (one by one) may be considered as deemed available in view of system improvement action at POWERGRID's own cost.

Members may kindly deliberate.

9. Operational Perspective of NEA Multiterminal 800 KV HVDC AGRABNC HVDC Transmission System (Agenda by Powergrid NR-3)

9.1 Powergrid NR-3 vide mail dated 07.08.2023 (copy attached as **Annexure-A.IV**) has mentioned that During the winter season, reduced power levels are available for the HVDC link and for reverse direction, mono pole operation is being carried out as per instruction of NLDC with metallic return mode through the conductor of another pole.

9.2 In the metallic return mode of operation, the voltage level on the metallic return conductor is governed by the resistive voltage drop on the conductor with respect to the ground.

9.3 In the reverse power direction, considering the nominal resistance of 12.01 Ω between Agra and BNC, the voltage on the metallic return conductor shall be in range of 2-4 KV from Agra under NR3 jurisdiction.

9.4 In view of negligible voltage on metallic return conductor during monopole operation, line becomes vulnerable for theft of line materials (spacer, corona ring etc). This condition of conductor (very low voltage) can also be easily identified from ground through corona sound.

9.5 Theft of hundreds of Spacer –damper has been experienced in past which leads damage of conductor fittings and accessories and chance of conductor snapping.

9.6 The minimum power level of each pole is 150 MW and therefore a minimum power of only 300 MW is required for running both the poles of a bipole. Therefore, at 500MW power level, bipolar operation is easily possible.

9.7 Due to running of a bipole as against a monopole at, say 500 MW, there shall be an additional filter bank connection effected by the Reactive Power Controller (RPC) of only the below mentioned MVAr rating at Agra, APD and BNC:

9.8 At Agra, during operation, it is observed that such additional connection of 201 MVAr causes an approximate rise of only 2(two) to 3(three) kV.

9.9 Based on the foregoing analysis, it is required to run NEA HVDC poles in bipole operation only to prevent theft of transmission line fittings and accessories, avoid monetary loss & unnecessary tripping of HVDC lines and to enhance system reliability.

Members may kindly deliberate.

10. Compliance of N-1 contingency of 400 KV Muzaffarnagar - Vishnuprayag – Alaknanda – Muzaffarnagar circuit. (Agenda by AHPCL)

10.1 RVPN vide mail dated 07.08.2023 has intimated that the 400 KV Muzaffarnagar - Vishnuprayag – Alaknanda – Muzaffarnagar Circuit is a twin moose double circuit system evacuating 400 MW Vishnuprayag HEP & 330 MW Srinagar HEP, having ampacity of 2X707 Amp at 40◦C ambient & 75◦C conductor temperature (Refer CEA Manual on Transmission Planning Criteria 2023). This is adequate to evacuate >800 MW (inclusive of 10% overloading of both the projects) during peak monsoon season with some margin as spare.

10.2 The CT capacity at Alaknanda end is rated at 2000/1 Amps & is sufficient to evacuate >800 MW flow through Alaknanda – Muzaffnagar circuit, even if the 400 KV Vishnuprayag – Muzaffnagar direct circuit is non-operational. But, the CT capacity at Vishnuprayag end is rated at 1000/1 Amps and restricts the evacuation to nearly 650 MW, **if the 400 KV Alaknanda - Muzaffarnagar Circuit is non-operational.**

10.3 **This violates the principle of the N-1 contingency of the grid regulations. The cited matter has also been discussed with UP in 2014 (Annexure-A.V) and 2021 (Annexure-A.VI).**

10.4 AHPCL also informed that a complete blackout of both the Srinagar HEP & Vishnuprayag HEP occurred on 04/08/2023, when the situation mentioned in serial no. 2 happened at 0309 Hrs. The 400KV Vishnuprayag - Muzaffarnagar line tripped due to overloading at the same instant the 400KV Alaknanda - Muzaffarnagar line became out of service due to an earth fault in C phase zone 1 from Muzaffarnagar end.

10.5 To rectify the insulator puncture of the 400KV Alaknanda - Muzaffarnagar line due to above incident, a line shutdown was taken on 06/08/2023 from 1000 Hrs to 1400 Hrs resulting in 100 MW combined generation loss of both Vishnuprayag & AHPCL in this peak hydro season, because of the load restrictions of the 400KV Vishnuprayag - Muzaffarnagar line.

10.6 Thus AHPCL has proposed the following:

a. Enhancement of CT capacity at Vishnuprayag end to 2000/1 A.

b. Prompt commissioning of the 400 KV Khandukhal - Kashipur line, which will provide an alternate evacuation path and improve the strength and reliability of the system

Members may kindly deliberate.

11. Modification in existing SPS at Gumma for Naitwar Mori HEP-(Agenda by SJVN)

11.1. SJVN vide mail dated 08.08.2023 has intimated that it is in the process of commissioning of its 66 MW Naitwar Mori HEP by September, 23. In this regard, various activities are under planning stage for its implementation.

11.2. One of such issues is implementation of SPS scheme under the existing scheme of NJHPS, RHPS, Karcham and Sawra Kuddu for integration of Naitwar Mori HEP.

11.3. Modified SPS scheme at Gumma complex is attached as **Annexure-A.VII**.

Members may kindly deliberate.

12. Disabling Auto-reclosure mode of Transmission Line to facilitate Hot line maintenance on real time basis (Agenda by Powergrid NR-3).

12.1. Powergrid NR-3 vide mail dated 08.08.2023 **(**copy attached as **Annexure-A.VIII)** has requested OCC froum to allow HOT LINE maintenance of transmission line without OCC approval on real time as per system requirements by disabling Autoreclosure mode of Transmission Line.

Members may kindly deliberate.

13. Implementation of AGC in UP control area for Intra-state generators (Agenda by PPGCL)

13.1 PPGCL vide letter dated 16.07.2023 **(**copy attached as **Annexure-A.IX)** informed that as per direction of Hon'ble CERC in petition no. 319/RC/2018 ,they have installed AGC communication infrastructure at site (Control room). They have also communicated this to UPSLDC, Lucknow vide letter dated 09.08.2022.

13.2 Further, PPGCL vide letter dated 16.01.2023 requested UPERC to issue necessary guidelines and direct UPSLDC to enable AGC communication infrastructure with NLDC.

13.3 PPGCL has requested support of NRPC to implement AGC and contribute for grid stabilization as per requirement.

Members may kindly deliberate.

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

14. NR Grid Highlights for July 2023

Following are major grid highlights of July 2023:

i) Demand met details of NR

S.No.	Constituents	Max Demand met (in MW)	Date & Time of Max Demand met	Max Consumption (in MUs)	Date of Max Consumption	Average Demand met (in Mus)

1	Chandigarh	371	25.07.23 at 15:00	8	21.07.2023	6
2	Delhi	7398	21.07.23 at 15:10	149	21.07.2023	126
3	H.P.	1775	21.07.23 at 10.00	36	28.07.2023	32
4	Haryana	12227	03.07.23 at 14.45	254	24.07.2023	217
5	J&K	2590	12.07.23 at 12.00	59	13.07.2023	51
6	Punjab	14831	21.07.23 at 10:45	319	21.07.2023	269
7	Rajasthan	14204	05.07.23 at 15:00	301	05.07.2023	269
8	Uttarakhand	2223	21.07.23 at 21:00	50	21.07.2023	44
9	U.P.	28284	24.07.23 at 21:43	577	24.07.2023	494
10	**Northern Region**	**77145**	**21.07.23 at 13:00**	**1728**	**21.07.2023**	**1509**

ii) **Northern Region all-time high value recorded in July'23:**

States	**Max. Demand Met during the day (MW)**		**Energy Consumption (MU)**	
	As per Format28/hourly data Submitted by States (MW)	**As on date**	**As per PSP (Mus)**	**As on date**
Uttar Pradesh	**28284**	**24-07-2023 21:43 hrs**	**577.5**	**24.07.23**

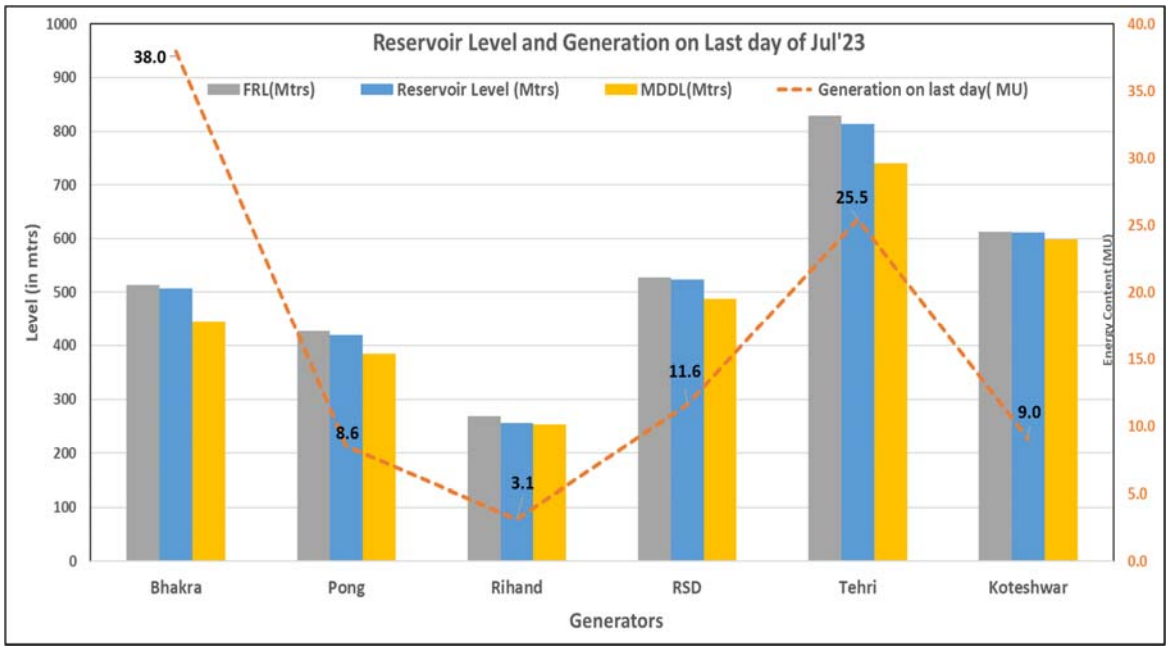
All Time High Record		
Generation	**Value (MU)**	**Achieved on**
Hydro Generation	**440.8**	**30.07.2023**

iii) Frequency profile

Month	**Avg. Freq.**	**Max. Freq.**	**Min. Freq.**	**<49.90 (%**	**49.90 – 50.05**	**>50.05 (%**

	(Hz)	(Hz)	(Hz)	time)	(% time)	time)
July'23	50.01	50.42 on 30.07.23 at 13:01:50 hrs	49.58 on 03.07.23 at 19:43:40 hrs	4.60	**74.96**	20.44
July'22	50.00	50.30 on 14.07.22 at 13:14:10 hrs	49.42 on 18.07.22 at 19:20:00 hrs	7.83	**73.45**	18.72

iv) Reservoir Level and Generation on Last Day of Month



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

15. SPS in Western Rajasthan ISTS RE Complex

In 209 OCC meeting, NRLDC representative shared concerning information about the significant number of grid events (over 30 incidents) involving RE generation loss that occurred between January 2022 and May 2023. The most severe event resulted in a maximum RE generation loss of 7120 MW, which took place on 15th May 2023. Such substantial losses in RE generation pose a serious threat to grid security, as they have the potential to trigger cascade tripping and lead to electricity supply disruptions over wide areas.

To evacuate the mentioned ~12.4 GW of ISGS RE generation, the Northern region relies on 16 number of 765kV lines. These transmission lines play a critical role in transferring the renewable energy from the generating sources to the consumption centers. Ensuring the

reliability and proper functioning of these lines is of utmost importance to maintain grid stability and meet the increasing demand for renewable energy in the region.

NRLDC representative addressed the recent outage of 400kV and above transmission lines due to tower collapses and proposed several measures to enhance the reliability and resilience of the grid, especially in the context of the Rajasthan RE complex. The proposed suggestions are as follows:

1. Review of Wind Zones:
2. Single Circuit Lines in Critical Corridors:
3. n-2 Reliability Criteria for Prone Areas:

However, while these long-term suggestions are being implemented on the field, the NRLDC representative proposed a SPS Scheme logic for the ISTS RE complex to ensure n-1-1/n-2 compliance during events like tower collapse. NRLDC representative also briefed the forum about the basecase assumptions considered while doing the study for SPS requirement. Proposed SPS logic is attached as Annexure-B.I.

CTUIL representative requested NRLDC to share the basecase used for conducting the SPS study. CTUIL wanted to re-verify the study and provide their inputs to ensure its accuracy and effectiveness. NRLDC agreed to share the basecase for review and incorporation of additional insights. CTUIL recommended that designing the SPS logic may be done based on the loading of lines rather than the combined RE generation quantum.

CTUIL and other members may provide their inputs. Members may please discuss.

16. Opening of 400 KV Singrauli(NT)-Anpara(UP) to control fault level

As per the recommendations of the 1st Meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP), 400 kV Singrauli – Anpara has to be opened to control the high fault levels in Anpara – Singrauli – Rihand complex.

Extract from the meeting are shown below:

6.13. After deliberations, following was agreed:

(i) The transmission system for evacuation of power from Singrauli III:

I. LILO of both circuits of Tie line (Vindhyachal Stage-IV to Vindhyachal Stage-V 400kV D/C Twin Moose line) at Singrauli Stage-III- under the scope of NTPC.

II. Reconductoring of Singrauli Stage-III - Vindhyachal stage-IV 400 kV D/C TM line (formed after above proposed LILO) with HTLS conductor - under the scope of NTPC

III. Singrauli-III–Rihand-III 400kV D/c line- under ISTS scope

IV. 2x125 MVAR Bus Reactor at Singrauli-III generation switchyard- under scope of NTPC

(ii) Singrauli- Anpara 400 kV line will be kept normally open (can be closed in emergency conditions) after commissioning of Anpara D –Unnao 765kV line to restrict high short circuit level in Singrauli-Anpara complex.

(iii) The short circuit level in Singrauli will again be studied by CEA and CTU and accordingly, would be discussed in the next NRPCTP meeting.

The above scheme may also be rectified in next NRPCTP meeting.

Recently, a meeting was organized on 10.07.2023 among NLDC, NRLDC & SLDC – UP to discuss on the constraints faced in the operation of HVDC back-to-Back Vindhyanchal in WR to NR direction due to high loading of 400 kV Anpara – Obra. In the meeting it was discussed & agreed that:

- As per the recommendations of the 1st Meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP), 400 kV Singrauli – Anpara will be opened to control the high fault levels in Anpara – Singrauli – Rihand complex. NRLDC & SLDC - UP shall conduct a study to observe the impact of opening 400 kV Singrauli – Anpara on the fault level of the complex.
- Also, the opening of 400 kV Singrauli – Anpara will relieve the loading of 400 kV Anpara – Obra and provide flexibility in the operation of HVDC back-to-Back Vindhyanchal in both directions. The same shall be studied by NRLDC & UP – SLDC to identify operational issues with 400 kV Singrauli – Anpara in open condition. The contingencies/planned outages which may require closing of the line will also be identified.
- For due consultation with all the stakeholders i.e. POWERGRID, NTPC & UP, the matter shall be taken up in the OCC forum before implementation.

NRLDC conducted study to assess the effects resulting from the opening of the 400 KV Singrauli(NT)-Anpara(UP) (PG) transmission line on the system, and to analyze the fault level of the Anpara-Singrauli generation complex, along with the potential contingencies that could occur.

The study results and basecase were shared with UP SLDC on 02.08.2023.

Singrauli	1850 MW
Rihand	1856 MW
Anpara A&B	1546 MW
Anpara C	1100 MW
Anpara D	944 MW
Vindhyanchal BTB	500 MW towards NR
Obra	903 MW
Bara	1760 MW
NR Demand	73200 MW
UP Demand	27000 MW

HVDC Rihand Dadri : 1400 MW towards Dadri
HVDC Balia Bhiwadi : 250 MW towards Bhiwadi

Sl. No	Bus number	Substation	Voltage level	Case: Maximum Generation		After opening 400kV Anpara-Singrauli		Relief
				Fault MVA	Fault current	Fault MVA	Fault current	
1	154056	SINGRL4	400	33.32166	48095.7	22.17586218	32008.1	16087.6
2	154014	ANPARA4	400	37.90139	54705.9	28.11090748	40574.6	14131.3
3	154016	ANPARAC	400	37.11426	53569.8	27.78389629	40102.6	13467.2
4	154015	ANPARA-D	400	33.37294	48169.7	25.77984422	37210	10959.7
5	154057	RIHAND-G	400	22.57143	32579	19.22666463	27751.3	4827.7
6	157000	ANPARAC	765	35.06184	26461.4	32.26407693	24349.9	2111.5
7	157001	ANPARA-D	765	35.23052	26588.7	32.45792719	24496.2	2092.5
8	154018	OBRA4	400	18.54675	26769.9	17.59133154	25390.9	1379
9	157027	OBRA_C_TPS	765	21.62366	16319.5	20.69268716	15616.9	702.6

From the study results, it is clear that the fault level in the Singrauli-Anpara complex has significantly decreased. Maximum relied is observed at Singrauli (16kA), Anpara TPS (14kA), Anpara C (13kA) and Anpara D (11kA)

S.No.	Name of elements	Basecase flow	Case-1: Rihand-Dadri D/C out	Case-2: 765kV AnparaD-ObraC out	Case-3: 765kV AnparaC-Unnao out	D.F. Case-1	D.F. Case-2	D.F. Case-3
1	400kV Rihand-Singrauli ckt 1	-81	403	-79	-78.72	34.57%	0.21%	0.22%
2	400kV Rihand-Singrauli ckt 2	-77	386	-75	-75.26	33.07%	0.21%	0.17%
3	400kV Rihand-Allahabad ckt 1	305	534	302.34	302.09	16.36%	-0.28%	-0.28%
4	400kV Rihand-Allahabad ckt2	305	534	302.34	302.09	16.36%	-0.28%	-0.28%
5	400kV Singrauli-Allahabad ckt 1	438	655	434	433.45	15.50%	-0.42%	-0.44%
6	400kV Singrauli-Allahabad ckt 2	395	591	391.29	390.93	14.00%	-0.39%	-0.39%
7	400kV Singrauli-Allahabad ckt 3	411	616	408	407.51	14.64%	-0.31%	-0.34%
8	400kV Singrauli-Lucknow	444	580.96	457	457.91	9.78%	1.36%	1.35%
9	400kV Singrauli-Fatehpur	454	643.98	457	457.16	13.57%	0.31%	0.31%
10	400kV Anpara-Singrauli	0	0	0	0	0.00%	0.00%	0.00%
11	400kV Anpara-Mau	315	323.35	391.46	401.94	0.60%	8.02%	8.43%
12	400kV Anpara-Sarnath ckt 1	442	444.02	532	544.24	0.14%	9.44%	9.91%
13	400kV Anpara-Sarnath ckt 2	442	444.02	532	544.24	0.14%	9.44%	9.91%
14	400kV Anpara-Anpara_D ckt 1	-10.23	-6.23	-88	-92.89	0.29%	-8.16%	-8.01%
15	400kV Anpara-Anpara_D ckt 2	-10.23	-6.23	-88	-92.89	0.29%	-8.16%	-8.01%
16	400kV Anpara-Anpara_C ckt 1	-26.7	-18.7	-177	-203.62	0.57%	-15.76%	-17.15%
17	400kV Anpara-Anpara_C ckt 2	-26.7	-18.7	-177	-203.62	0.57%	-15.76%	-17.15%
18	400kV Anpara-Obra	362.26	329.17	545	570.28	-2.36%	19.16%	20.17%
19	765 Anpara_D-ObraC	953.64	965.16	0	1465.48	0.82%		49.62%
20	765 Anpara_C-Unnao	1031.57	1044.05	1528.6	0	0.89%	52.12%	
21	HVDC-Rihand Dadri ckt 1	700	0	700	700		0.00%	0.00%
22	HVDC-Rihand Dadri ckt 2	700	0	700	700		0.00%	0.00%
23	HVDC Vindyachal BTB	500	500	500	500	0.00%	0.00%	0.00%

Study was conducted for various contingencies & system was seen to be N-1 Compliant and stable.

Other major findings of the study:

i. The system is compliant w.r.t to N-2 contingency of HVDC Rihand Dadri D/c.
ii. However, Singrauli complex would be N-1 non-compliant w.r.t further tripping of any one ckt of 400kV Singrauli-Allahabad, 400kV Singrauli-Lucknow, 400kV Rihand-Allahabad. By shifting Vindhyachal towards WR (Western Region) with a minimum of 200 MW, the system becomes N-1 compliant
Action: *Therefore, in case of tripping on any one ckt in Singrauli complex power flow in HVDC Vindhyachal may be shifted towards WR with a minimum of 200 MW*

iii. The system is compliant w.r.t to N-1 contingency of 765 kV Anpara_C – Unnao and 765 kV Anpara D – Obra_C. No major contingency was observed
iv. However, if the generation at Obra is below 400 MW before the tripping incident, it would result in an overload on the 400 kV Anpara-Obra line after the tripping of any one of the 765 kV line.
v. In order to maintain N-1 compliance, the safe limit for HVDC Balia-Bhiwadi power transfer should be **300 MW** from Bhiwadi to Balia which was **400 MW** prior to opening of 400 KV Singrauli(NT)-Anpara(UP) (PG).

UP is requested to provide the results of the study carried out on their part. Since the opening of 400kV Singrauli-Anpara for fault level control is decision of NRPCTP meeting, CTUIL is requested to provide their comments.

Members may please discuss.

17. Transmission related issues observed during high demand season

As discussed in previous OCC meetings, 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.

Latest state wise issues are listed below:

Haryana:

TTC: 9100MW
ATC: 8800MW

In 209 OCC meeting, following was discussed:

- NRLDC representative requested HVPN to expedite commissioning of new elements which would help to meet higher demand with minimal transmission related issues.
- HVPN representative stated that 500 MVA ICT at Kurushetra is expected by August 2023.
- Work on 220kV Jajji –Rai D/C line is almost complete. Some relay work is pending at Powergrid end and the work will be completed within 2 weeks.

- Revised timeline for the commissioning of the 220kV Sec 32 Panchkula and 220kV lines to Panchkula (PG) is now set for September 2023 due to ROW issues
- No timeline provided for 400/220kV Deepalpur ICT augmentation works.

HVPN to provide update.

Punjab:

TTC: 9500MW
ATC: 9000MW

In 209 OCC meeting, following was discussed:

- NRLDC representative requested Punjab to expedite commissioning of Dhanansu S/S which would help to meet higher demand with minimal transmission related issues.
- Punjab SLDC was asked to ensure that loading of 400/220kV ICTs is within their N-1 contingency limit during the paddy season.

Punjab SLDC is requested to share provide update regarding 400/220kV Dhanansu S/s.

Delhi:

TTC: 7300MW
ATC: 7000MW

In 209 OCC meeting, following was discussed:

- DTL representative stated that mock testing of SPS at Bawana will be done and report will be submitted before next week.
- ATC/TTC of Delhi control area would be changed as per reassessed figures after mock testing of SPS at Bawana.

DTL to provide update.

Rajasthan:

TTC: 7600MW
ATC: 7000MW

Raj SLDC was requested to share ATC/TTC limits for summer/ monsoon 2023 at the earliest. NRLDC has shared comments on limits and basecase submitted by RVPN

In 209 OCC meeting, following was discussed:

- Rajasthan representative stated they have made the necessary changes and the revised basecase will be shared shortly with NRLDC.

Raj SLDC is requested to share ATC/TTC limits for summer/ monsoon 2023 at the earliest

UP:

TTC: 16100MW
ATC: 15500MW

In 209 OCC meeting, UP SLDC representative informed:

- Plan to manage loading of 400/220kV Mau, Allahabad, Orai, Azamgarh & Sarnath area
- Shared their revised ATC/TTC assessments for monsoon 2023.

At number of substations across different states, loading of major 400/220kV ICTs were observed to be beyond their N-1 contingencies. Plots attached as Annexure-B.II.

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.

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**

All SLDCs are requested to regularly update ATC/TTC limits after mutually agreement between SLDC and NRLDC.

18. Grid operation related issues

a) Draft Outage Planning procedure:

As per Regulation 32(4) of Indian Electricity Grid code (IEGC) 2023, RPCs are required to formulate a common outage planning procedure. To promote consistency and streamlined outage planning procedures, a draft outage planning procedure has been prepared in consultation with all the five RLDCs. This draft proposes to align the provisions and timelines envisaged in the IEGC 2023. Procedure is attached as Annexure-B.III.

Members are requested to go through the procedure and provide comments. Comments may be mailed to "nrldcoutage@grid-india.in".

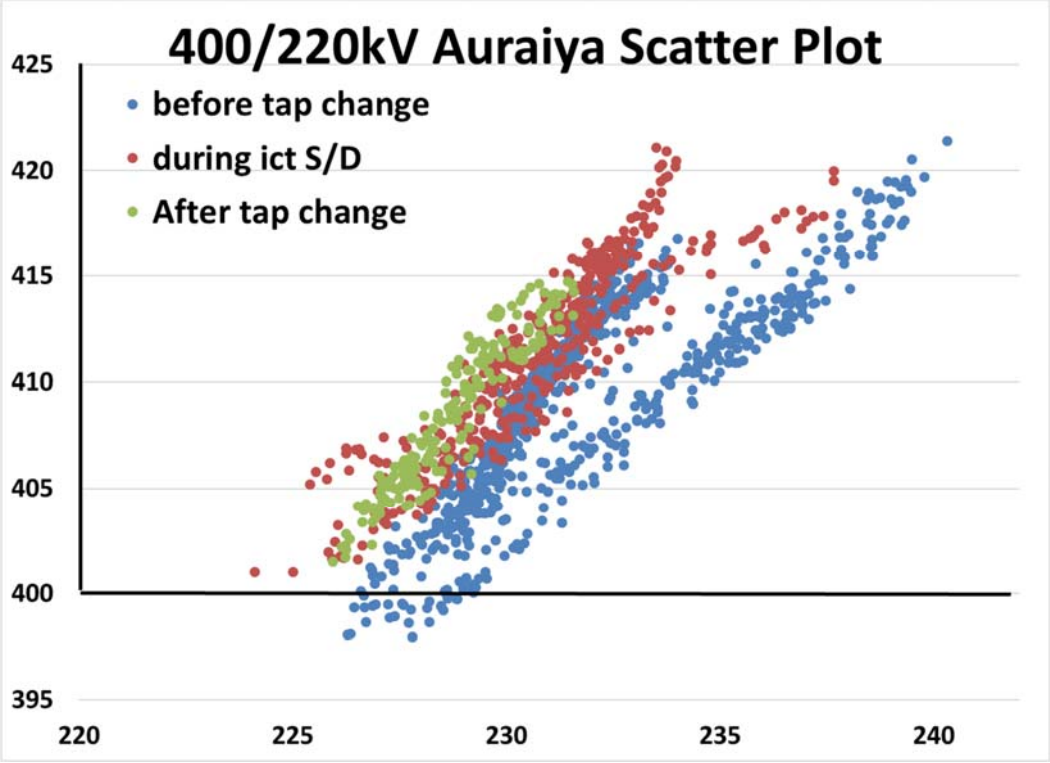
b) High Voltage issue at 220kV Phaphund Railway S/s

Issue of voltage is being observed at 220kV Phaphund Railway feeders which are connected from 220kV Auraiya NTPC. North Central Railway vie their letter (Annexure-B.IV) dated 31.07.2023 have requested for actions to control overvoltage in 220kV ckts. supply from Auraiya S/s to Phaphund Railway GSS.

Generally units at Auraiya are not running, so they are able to provide reactive power support and maintain voltages in the area.

After examining the voltage profile of 400/220kV Auraiya S/s, NRLDC asked NTPC Auraiya to change (reduce) tap position of 400/220kV ICTs by 2 steps vide mail dated 31.07.2023. Subsequently, NTPC team informed that the last testing of both the ICTs was done more than one year ago with the stable tap position i.e. 11. Since the testing at different tap positions is not carried out for a long duration, it is essential to carry out all the tests such as winding resistance/Tan Delta/TTR/Magnetizing etc. before changing the tap position & requested for shutdown for at least three days for each ICT.

Shutdown of 400/220kV ICT 2 at Auraiya was availed from 03.08.2023 to 06.08.2023 for testing and tap change works. It can be seen from the plot below that voltage profile at 220kV improved after tap change of one ICT.



However, on further analysis it can be seen that voltage at 220kV Auraiya is significantly impacted by generation at 220kV Auraiya Gas generating units. Therefore, the issue of voltages reaching 240kV at Auraiya and Phaphund Railway

GSS need to be analysed in detail and corrective actions need to be planned. NTPC, CTUIL and Railway are requested to provide update.

Moreover, NTPC is advised to ensure regular planned maintenance and testing of transformers so that in case of requirement, tap changes may be done immediately without need for ICT shutdown. It is also suggested to carry out tap change for ICT1 also at the earliest to avoid any circulating current flow.

Members may please discuss.

c) Long outage of transmission elements and generating units

Following transmission elements and generating units are under prolonged outage.

Name of element	Owner	Outage time (in hrs) / date	Reason of outage
400/220 KV 315 MVA ICT 2 AT MUNDKA (DV)	Delhi	00.19/20.09.19	Tripped due to fire in ICT.
400/220 KV 315 MVA ICT 1 AT MURADNAGAR_1(UP)	U.P	02:46/13.03.20	Buchholz relay alarm and LBB protection operated. Tripped along with Hapur-Muradnagar line. Transformer tested and found damaged. It is to be replaced with New T/F.
400KV BUS 1 AT VISHNUPRAYAG (JP)	U.P	14.42/02.12.21	Bus bar protection operated at Vishnuprayag. Sparking in Bus Coupler CB.
400/220 KV 240 MVA ICT 3 AT MORADABAD (UP)	U.P	22.38/13.12.21	HYDROGEN GAS IN TRANSFORMER IS ABOVE PERMISSIBLE LIMIT. Permissible limit of H2 gas>100ppm Current level of H2 gas : 3501 ppm
220 KV KISHENPUR (PG)-MIR BAZAR (PDD) (PDD) CKT-1	JKPDD	21.45/19.02.22	Tower No. 170 collapsed near Batote
400KV BUS 1 AT PARBATI_3(NH)	PARBATI-III-NH	15.25/27.02.23	One pole of Bus Coupler CB has got stuck at Parbati-3.
400 KV NOIDA SEC 148-NOIDA SEC 123 (UP) CKT-2	U.P	17.28/08.03.23	LBB operated at Noida Sec 148 end.
UNITS			
250 MW CHHABRA TPS - UNIT 3	Rajasthan	04:03/24.05.2023	due to Station transformer -3 electrical fault

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.

Members may please discuss.

19. Frequent forced outages of transmission elements in the month of July'23:

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

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	220 KV Nara(UP)-Roorkee(UK) (UP) Ckt-1	7	UP/UK
2	220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2	4	Singoli/UK
3	220 KV Saharanpur(PG)-Shamli(UP) (UP) Ckt-1	4	PG/UP
4	400 KV Bareilly-Unnao (UP) Ckt-1	4	UP
5	400 KV Heerapura-Hindaun (RS) Ckt-1	4	Rajasthan
6	220 KV NAPP(NP)-Khurja(UP) (UP) Ckt-1	4	NAPP/UP

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.

20. Multiple element tripping events in Northern region in the month of July '23:

A total of 18 grid events occurred in the month of July'23 of which **09** are of GD-1 category, **05** are of GI-2 Category & **04** 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 delayed clearance of fault observed in event of multiple elements tripping at 220kV Nara(UP) on 26th July, 2023. As per PMU, B-N phase to earth fault with delayed clearance of **1400msec** is observed.

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **10** events out of **18** grid events occurred in the month. The other major events with delayed clearance of faults are as follows:

1. Tripping at 220kV Bawana(DTL) at 12:24hrs on 03rd July, 2023, fault clearance time: 440msec.
2. Multiple elements tripping at 400/220kV Bhadla(RS) at 19:56hrs on 18th July, 2023, fault clearance time: 320msec

3. Multiple elements tripping at 220kV Majri(HP) at 07:07hrs on 26th July, 2023, fault clearance time: 400msec

03 (no.) of the grid events occurred due to maloperation of protection system in July 2023. Those event were as follows:

1. Multiple elements tripping at 400/220kV Bareilly(UP) at 06:39hrs on 01st July, 2023: maloperation of bus bar protection of bus-1.
2. Multiple elements tripping at 400/220kV Mandola(PG) at 20:21hrs on 23rd July, 2023: maloperation of bus bar protection.
3. Tripping of 400kV Bikaner(PG)-Avada line: Maloperation of Z-4 distance protection at Bikaner(PG) end

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.

21. Details of tripping of Inter-Regional lines from Northern Region for July' 23:

A total of 09 inter-regional lines tripping occurred in the month of July'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.

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

The status of receipt of DR/EL and tripping report of utilities for the month of July'2023 is attached at **Annexure-B.VIII**. It is to be noted that as per the IEGC provision under clause 5.2 (r), 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 of POWERGRID, UP & Uttarakhand was satisfactory, reporting status of Punjab & Delhi has improved in July, 2023 compared to the previous month. However, reporting status from Punjab, Delhi, HP, Rajasthan, Haryana & J&K need further 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.

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

In last 25 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 are requested to update about their future plan for PSS tuning and share the reports of PSS tuning/re-tuning and Step Response Test if conducted in their control area.

Members may like to discuss.

24. Frequency response characteristic:

Two FRC based event occurred in the month of **July-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*	NR FRC during the event (%)
1	20-Jul-23	02:28hrs	On 20th July 2023 at 13:53 hrs, as reported, R-N fault occurred on 220kV Bhadla(PG)-MRPL ckt. Breaker at Bhadla(PG) end didn't open and therefore, LBB of MRPL bay at Bhadla(PG) operated. LBB operation led to the triping of RE station connected at 220kV Bus-1B at Bhadla(PG) i.e., MRPL, CSPJL, ACME & MAHOBA. At the same time, drop in RE generation at RE stations connected at other ISTS pooling station in Rajasthan RE complex also occurred on LVRT. As per PMU, total drop in RE generation was approx. 2526MW. Hence, generation loss of 2526MW has been considered for FRC calculation.	50.06	50.01	0.05	46
2	31-Jul-23	10:36hrs	On 31st July, 2023, at 10:36:11 hrs, B-ph jumper at RSUPL end of 220kV Fatehgarh2-RSUPL ckt snapped. As per PMU, B-N & R-N fault is observed in the grid. At the same time, 220kV Fatehgarh2-Nokhra line also tripped on line	50.15	50.04	0.11	19

			over current protection. At the same time, drop in RE generation at RE stations connected at other ISTS pooling station in Rajasthan RE complex also occurred on LVRT. As per PMU, total drop in RE generation was approx. 1625MW. Hence, generation loss of 1620MW has been considered for FRC calculation.				

Status of Data received till date for 20th July, 2023 event:

Status of Field Data received of FRC of Grid event occurred at ISTS RE generation complex in Rajasthan in Northern Region at 13:53 Hrs on 20.07.2023			
Data Received from		Data Not Received from	
Koteshwar HEP	TSPL	Uttarakhand	APCPL Jhajjar
UP	Punjab	Kawai TPS	Rihand NTPC
Dadri NTPC	NJPS	Tehri HEP	Unchhahar NTPC
Haryana	Singrauli NTPC	HP	Delhi
BBMB	Karcham Wangtoo HPS	Rajasthan	NHPC

FRC of ISGS generators:

Generator	20-Jul-23 event	Generator	20-Jul-23 event
Singrauli TPS	9%	Salal HEP	-6%
Rihand-1 TPS	-11%	Tanakpur HEP	-8%
Rihand-2 TPS	-10%	Uri-1 HEP	-3%
Rihand-3 TPS	28%	Uri-2 HEP	0%
Dadri-1 TPS	180%	Dhauliganga HEP	112%
Dadri -2 TPS	189%	Dulhasti HEP	6%
Unchahar TPS	-4%	Sewa-II HEP	37%
Unchahar stg-4 TPS	289%	Parbati-3 HEP	0%
Jhajjar TPS	299%	Jhakri HEP	8%
Dadri GPS	2%	Rampur HEP	0%
Anta GPS	No generation	Tehri HEP	No generation
Auraiya GPS	-11%	Koteswar HEP	0%
Narora APS	12%	Karcham HEP	21%
RAPS-B	-9%	Malana-2 HEP	No generation
RAPS-C	14%	Budhil HEP	6%
Chamera-1 HEP	-2%	Bhakra HEP	-76%
Chamera-2 HEP	No generation	Dehar HEP	-1%
Chamera-3 HEP	-7%	Pong HEP	3%
Bairasiul HEP	0%	Koldam HEP	114%
		AD Hydro HEP	0%

FRC of State generators:

Generator	20-Jul-23 event	Generator	20-Jul-23 event
PUNJAB		UP	
Ropar TPS	2%	Obra TPS	-4%
L.Mohabbat TPS	139%	Harduaganj TPS	5%
Rajpura TPS	19%	Paricha TPS	-2%
T.Sabo TPS	10%	Rosa TPS	94%
Goindwal Sahib TPS	123%	Anpara TPS	-18%
Ranjit Sagar HEP	38%	Anpara C TPS	28%
Anandpur Sahib HEP	2%	Anpara D TPS	49%
HARYANA		Bara TPS	95%
Panipat TPS	0%	Lalitpur TPS	-3%
Khedar TPS	-14%	Meja TPS	-16%
Yamuna Nagar TPS	No generation	Vishnuprayag HEP	0%
CLP Jhajjar TPS	1%	Alaknanda HEP	3%
Faridabad GPS	No generation	Rihand HEP	No generation
RAJASTHAN		Obra HEP	No generation
Kota TPS	7%	UTTARAKHAND	
Suratgarh TPS	3%	Gamma Infra GPS	No generation
Kalisindh TPS	-40%	Shravanti GPS	No generation
Chhabra TPS	No generation	Ramganga HEP	No generation
Chhabra stg-2 TPS	-118%	Chibra HEP	No generation
Kawai TPS	72%	Khodri HEP	No generation
Dholpur GPS	No generation	Chilla HEP	-11%
Mahi-1 HEP	No generation	HP	
Mahi-2 HEP	No generation	Baspa HEP	2%
RPS HEP	0%	Malana HEP	No generation
JS HEP	No generation	Sainj HEP	No generation
DELHI		Larji HEP	No generation
Bawana GPS	-65%	Bhabha HEP	0%
Pragati GPS	-29%	Giri HEP	0%
		J&K	
		Baglihar-1&2 HEP	No generation
		Lower Jhelum HEP	No generation

Status of Data received till date for 31st July, 2023 event:

Status of Field Data received of FRC of Grid event occurred at ISTS RE generation complex in Rajasthan in Northern Region at 10:36 Hrs on 31.07.2023			
Data Received from		Data Not Received from	
NJPS	Haryana	Uttarakhand	APCPL Jhajjar
UP	Kawai TPS	HP	Rihand NTPC
Tehri HEP		Rajasthan	Unchhahar NTPC
		Koteshwar HEP	Delhi
		Punjab	NHPC
		Singrauli NTPC	Dadri NTPC
		Karcham Wangtoo HPS	TSPL
			BBMB

FRC of ISGS generators:

Generator	31-Jul-23 event	Generator	31-Jul-23 event
Singrauli TPS	3%	Salal HEP	-6%
Rihand-1 TPS	2%	Tanakpur HEP	-7%
Rihand-2 TPS	-6%	Uri-1 HEP	29%
Rihand-3 TPS	0%	Uri-2 HEP	0%
Dadri-1 TPS	No generation	Dhauliganga HEP	75%
Dadri -2 TPS	-48%	Dulhasti HEP	4%
Unchahar TPS	7%	Sewa-II HEP	0%
Unchahar stg-4 TPS	-64%	Parbati-3 HEP	0%
Jhajjar TPS	34%	Jhakri HEP	33%
Dadri GPS	No generation	Rampur HEP	35%
Anta GPS	No generation	Tehri HEP	3%
Auraiya GPS	No generation	Koteswar HEP	-6%
Narora APS	6%	Karcham HEP	72%
RAPS-B	-41%	Malana-2 HEP	No generation
RAPS-C	12%	Budhil HEP	-1%
Chamera-1 HEP	-8%	Bhakra HEP	0%
Chamera-2 HEP	-2%	Dehar HEP	-2%
Chamera-3 HEP	3%	Pong HEP	10%
Bairasiul HEP	0%	Koldam HEP	172%
		AD Hydro HEP	0%

FRC of State generators:

Generator	31-Jul-23 event	Generator	31-Jul-23 event
PUNJAB		UP	
Ropar TPS	-14%	Obra TPS	-2%
L.Mohabbat TPS	63%	Harduaganj TPS	61%
Rajpura TPS	22%	Paricha TPS	10%
T.Sabo TPS	-1%	Rosa TPS	9%
Goindwal Sahib TPS	96%	Anpara TPS	-6%
Ranjit Sagar HEP	No generation	Anpara C TPS	7%
Anandpur Sahib HEP	-1%	Anpara D TPS	23%
HARYANA		Bara TPS	3%
Panipat TPS	0%	Lalitpur TPS	66%
Khedar TPS	0%	Meja TPS	2%
Yamuna Nagar TPS	No generation	Vishnuprayag HEP	0%
CLP Jhajjar TPS	25%	Alaknanda HEP	0%
Faridabad GPS	No generation	Rihand HEP	No generation
RAJASTHAN		Obra HEP	-10%
Kota TPS	0%	UTTARAKHAND	
Suratgarh TPS	2%	Gamma Infra GPS	No generation
Kalisindh TPS	0%	Shravanti GPS	No generation
Chhabra TPS	No generation	Ramganga HEP	No generation
Chhabra stg-2 TPS	-123%	Chibra HEP	-2%
Kawai TPS	123%	Khodri HEP	0%
Dholpur GPS	No generation	Chilla HEP	-8%
Mahi-1 HEP	No generation	HP	
Mahi-2 HEP	No generation	Baspa HEP	4%
RPS HEP	0%	Malana HEP	0%
JS HEP	0%	Sainj HEP	No generation
DELHI		Larji HEP	No generation
Bawana GPS	50%	Bhabha HEP	0%
Pragati GPS	1%	Giri HEP	-6%
		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.

25. 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.

Details are yet to be received from J&K.

Constituent wise status of bus bar protection where bus bar protection is either not installed or installed but not operational along with present status as per detail received from constituents is attached as **Annexure-B.X**.

Constituents are requested to share the status of remedial action taken/to be taken regarding commissioning and healthiness of bus bar protection at 220kV & above substations.

Members may like to discuss.

26. Replacement of electromechanical relays with numerical relays:

Clause-5.2(r) of IEGC, clause-15(4) of CEA Grid standards and clause-48(4) of CEA Construction Standards 2022 mandates that *''each line or transformer or reactor or any other bay shall be provided with facility for disturbance recording, event logging and time synchronizing equipment''.*

During analysis of grid incidents/disturbances, it has been found that there are few stations where electromechanical relays are still in use and thus disturbance recorder are not available there which accounts for violation of Clause-5.2(r) of IEGC, clause-15(4) of CEA Grid Standards and clause 48(4) CEA Construction Standards 2022.

In addition, clause-3 in part III (Grid Connectivity Standards applicable to Transmission Line and Sub-Station) of Standards for Connectivity to the Grid, 2007 reads as
''*Two main numerical Distance Protection Schemes shall be provided on all the transmission lines of 220 kV and above for all new sub-stations. For existing sub-stations, this shall be implemented in a reasonable time frame''*

It is known that Disturbance recorder (DR) is essential for analysis of grid incidents/disturbances. Its non-availability eventually affects the proper analysis of grid incidents/disturbances and monitoring of protection system.

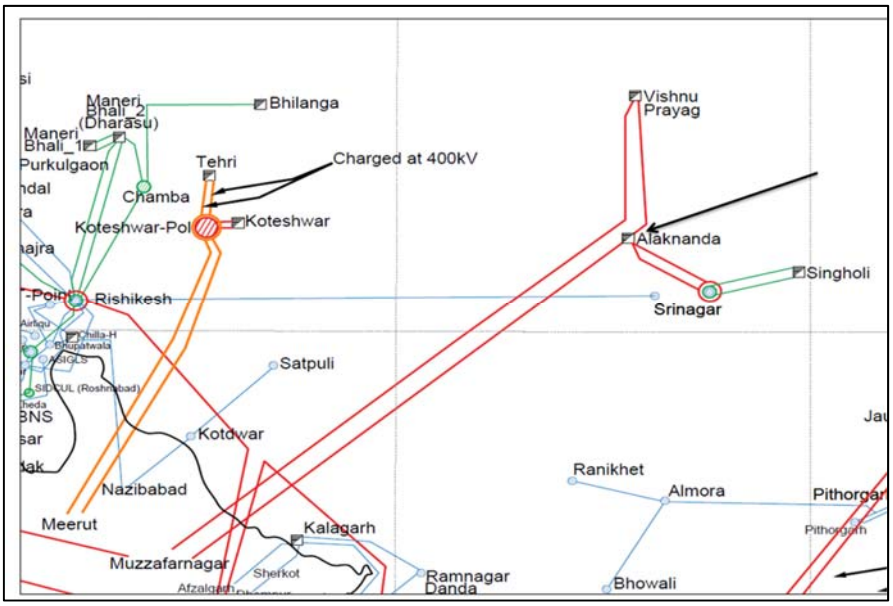
Deliberation on same subject has also been done during 207 OCC. During the meeting, all the constituents/SLDC/STU were requested to review the same in their control area and take expedite actions to replace electromechanical relays with numerical relays.

Constituent wise details of static/electromechanical type protection relays at their respective substations along with its present status per detail received from constituents is attached as **Annexure-B.XI**.

Constituents are requested to share the status of remedial action taken/to be taken regarding replacement of static/electromechanical relay with numerical relays at 220kV & above substations.

Members may like to discuss.

27. SPS on 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) Ckt to ensure the safe evacuation of power of Alaknanda HEP, Vishnuprayag HEP & Singoli Bhatwari HEP:

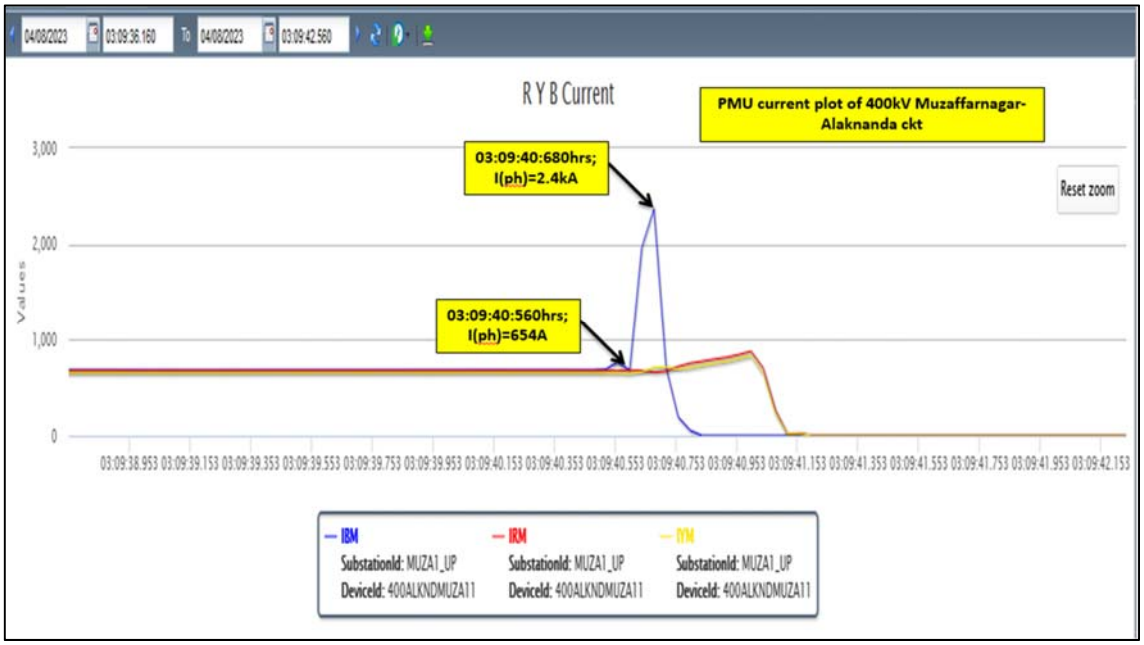


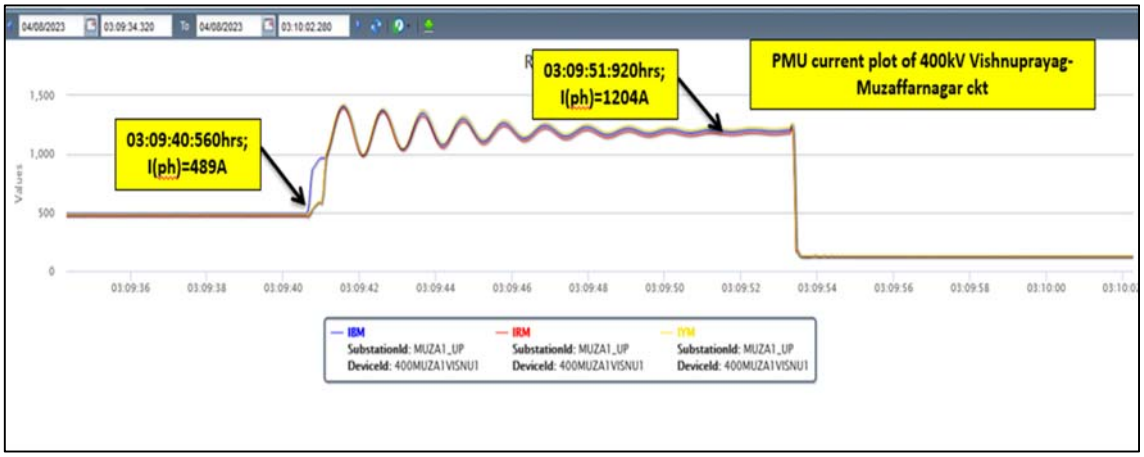
Power of 82.5*4 MW Alaknanda HEP, 100*4MW Vishnuprayag HEP and 33*3MW Singoli Bhatwari HEP evacuates through 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt and 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt. In case of tripping of any one line i.e., 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt or 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt, load will shift to another line and total power flow on remaining line may increase to ~880MW(~1270A). Conductors of all the 400kV lines are of Twin Moose type with thermal rating of approx. 900MW. So, remaining line can evacuates the power 880MW would be in its safe loading limit.

However, line CT at Vishnuprayag end in 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt is of rating 1000/1 and Vishnuprayag has also kept over current protection in the line at their end with pick up setting as 1200A(~831MW at 400kV). So, in case of tripping of 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt load will shift to 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt and in peak hydro period it may go up to ~880MW and line will trip on over current protection operation.

On 04th August, 2023 at 03:10hrs, similar tripping event had occurred. During the event, 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt tripped on B-N fault at

03:10:40 hrs and further after ~13sec, 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt tripped on over current protection operation at Vishnuprayag end. As reported, current in the 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt went up to ~1252A (1204A as per PMU at Muzaffarnagar(UP)). With the tripping of 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt, al the generation of Alaknanda HEP, Vishnuprayag HEP & Singoli Bhatwari HEP lost (total ~880MW.





Similar event had occurred on 20th July 2021 and as a remedial action, NRLDC had suggested to replace the CT with higher rating. However, same 1000/1 line CT is in use and Vishnuprayag has informed that long planning will be required to change the CT as station is of GIS(SF6) type. So, SPS may be planned at Vishnuprayag end to ensure the safe evacuation of power from this hydro power complex during peak season. Tripping of 100*2 MW at Vishnuprayag HEP on line current going above 1150A (~796MW at 400kV) after tripping of 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt may be implemented.

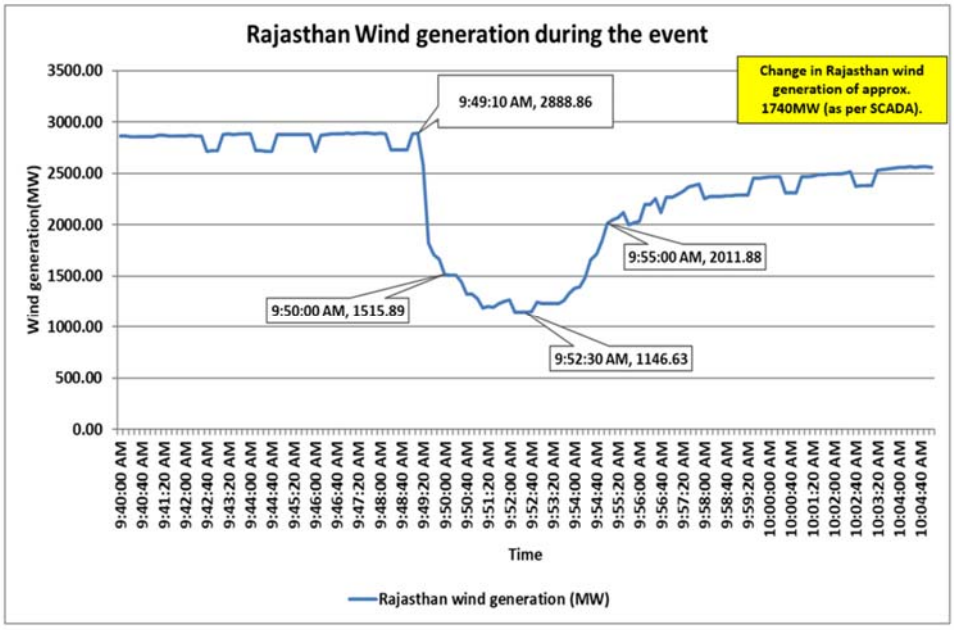
Therefore, Vishnuprayag and UPPTCL are requested to discuss internally the SPS logic (contingency and actions), finalize it and propose in OCC meeting for approval.

Members may like to discuss.

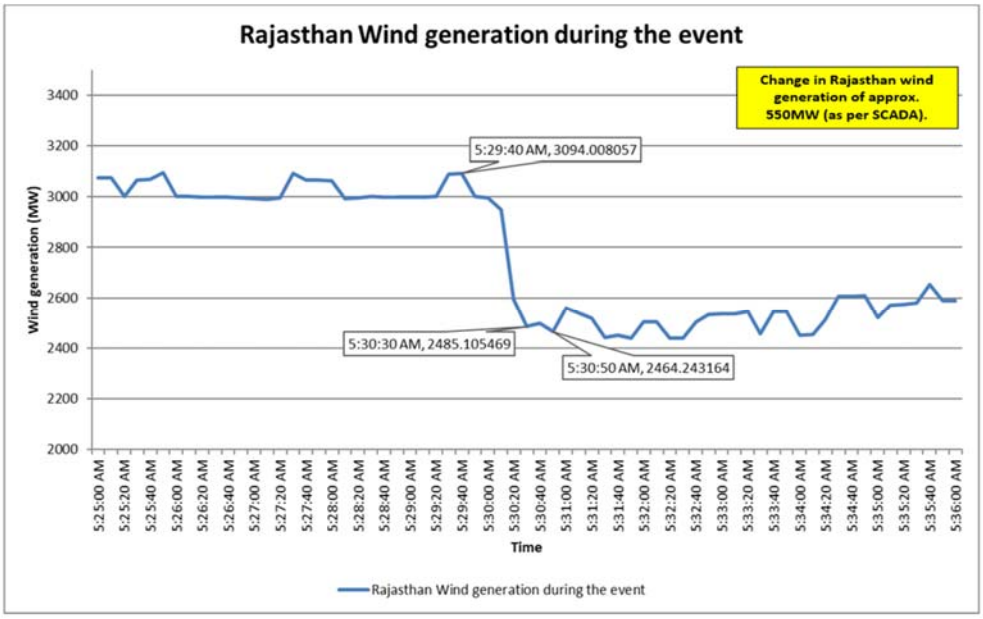
28. Frequent incidents of Wind generation loss in Rajasthan control area:

In recent past frequent event of wind generation loss have reported in Rajasthan control area. Triggering incidents were fault in 220kV & 132kV lines at 220/132kV Amarsagar due to snapping of bus jumper. Brief of the events are as follows:

i) On 06th August at 09:48hrs: Y-phase Main Bus Tandem isolator Jumper Y phase Jumper of 132kV Amarsagar – Ludarva ckt-2 at Amarsagar end. Which further led to the multiple elements tripping at Amarsagar and nearby stations.
Total loss of wind generation of approx. **1750MW**



ii) On 07th August at 05:30hrs: R-phase bus Jumper of 220kV Amarsagar – Phalodi ckt at Amarsagar end. Which further led to the multiple elements tripping at Amarsagar.
Total loss of wind generation of approx. **550MW**



It is evident from the recent trippings due to snapping of conductors that there are issues related to operation and maintenance at 220/132kV Amarsagar S/s. Rajasthan is requested to take necessary remedial actions to avoid such undesired tripping in future. It is further requested to prepare a guidelines to conduct operation and maintenance exercise prior to wind season.

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:
◎ CHANDIGARH — Sep-2019
◎ DELHI — Jun-2023
◎ HARYANA — May-2023
◎ HP — Jun-2023
◎ J&K and LADAKH — Not Available
◎ PUNJAB — May-2023
◎ RAJASTHAN — Jun-2023
◎ UP — Jun-2023
◎ UTTARAKHAND — May-2023
All States/UTs are requested to update status on monthly basis.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">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:
◎ CHANDIGARH — Not Available
◎ DELHI — Mar-2023
◎ HARYANA — Jun-2023
◎ HP — May-2023
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Jun-2023
◎ RAJASTHAN — Mar-2023
◎ UP — Jun-2023
◎ UTTARAKHAND — Mar-2023
◎ BBMB — Jun-2023
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>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:
◎ CHANDIGARH — Not Available
◎ DELHI — Increased
◎ HARYANA — Increased
◎ HP — Increased
◎ J&K and LADAKH — Not increased
◎ PUNJAB — Increased
◎ RAJASTHAN — Increased
◎ UP — Increased
◎ UTTARAKHAND — Increased
◎ BBMB — Increased
J&K and LADAKH were requested to update</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>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>Status of the information submission (month) from states / utilities is as under:
<table><tr><td>◎</td><td>HARYANA</td><td>Sep-2022</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Jun-2023</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Jun-2023</td></tr><tr><td>◎</td><td>UP</td><td>Jun-2023</td></tr><tr><td>◎</td><td>NTPC</td><td>Feb-2023</td></tr></table>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>Submission of breakup of Energy Consumption by the states</td><td>All states/UTs are requested to submit the requisite data as per the billed data information in the format given as under:
<table><tr><td>Category→</td><td>Consumption by Domestic Loads</td><td>Consumption by Commercial Loads</td><td>Consumption by Agricultural Loads</td><td>Consumption by Industrial Loads</td><td>Traction supply load</td><td>Miscellaneous / Others</td></tr><tr><td><Month></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td><td>Status of the information submission (month) from states / utilities is as under:
<table><tr><td></td><td>State / UT</td><td>Upto</td></tr><tr><td>◎</td><td>CHANDIGARH</td><td>Not Submitted</td></tr><tr><td>◎</td><td>DELHI</td><td>May-23</td></tr><tr><td>◎</td><td>HARYANA</td><td>Apr-23</td></tr><tr><td>◎</td><td>HP</td><td>Jun-23</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not Submitted</td></tr><tr><td>◎</td><td>PUNJAB</td><td>May-23</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Jun-23</td></tr><tr><td>◎</td><td>UP</td><td>Apr-23</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Mar-23</td></tr></table>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 given format</td></tr>
<tr><td>6</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>All states/UTs are requested to submit daily data on MERIT Order Portal timely.</td></tr>
<tr><td>7</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>Status:
<table><tr><td>◎</td><td>DELHI</td><td>Fully implemented</td></tr><tr><td>◎</td><td>HARYANA</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>HP</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Under implementation. Likely completion schedule is 15.08.2023.</td></tr><tr><td>◎</td><td>UP</td><td>Scheme implemented by NPCIL only</td></tr></table></td></tr>
</table>

8	Reactive compensation at 220 kV/ 400 kV level at 15 substations			
	State / Utility	Substation	Reactor	Status
i	POWERGRID	Kurukshetra	500 MVAr TCR	Anticipated commissioning: Jul'23
ii	DTL	Peeragarhi	1x50 MVAr at 220 kV	Anticipated commissioning: 15.08.2023
iii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	2x50 MVAR Reactor at Harsh Vihar has been commissioned on dated 31th March 2023.
iv	DTL	Mundka	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	Bay work completed on 25.03.2023. Reactor part tender is dropped and at present same is under revision.
v	DTL	Bamnauli	2x25 MVAr at 220 kV	Bay work completed on 25.03.2023. Reactor part tender is dropped and at present same is under revision.
vi	DTL	Indraprastha	2x25 MVAr at 220 kV	Bay work completed on 07.11.2023. 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 – 1x125 MVAR Reactor at Dhuri has been commissioned on dated 30th March 2023. 220kV Reactors - 1x25 MVAR Reactor at Dhuri has been commissioned on dated 27th January 2023.
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	1x25 MVAR Reactor at Bikaner has been commissioned on dated 24th June 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.	Jun'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 end of Jun'2023. Updated in 207th 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	31.07.2023	Due to ROW issue work was delayd.Updated in 209th 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.	Dec'23	Issue related to ROW as intimated in 208th 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 GIS	Commissioned: 6 Under Implementation: 4 Total: 10	Utilized: 6 Unutilized: 0 Under Implementation:4	• RK Puram – Tughlakabad (UG Cable) 220kV D/c line – March 2023.	-	DTL to update the status.
				• 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	Sep'23	Updated in 208th OCC by HPPTCL
				• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Giri S/s	-	HPPTCL to update the status.
				• Network to be planned for 2 bays	-	HPPTCL to update the status.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
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: 4 Unutilized: 4	• LILO of both circuits of 220kV D/c Sohna-Rangla Rajpur at Roj Ka Meo line at 400kV Sohna Road	Jan'24	Updated in 208th 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 Aprroved: 2 Total: 10	Utilized: 4 Unutilized: 4 Under Implementation:2	• 220kV D/C line from Prithla to Harfali with LILO of one circuit at 220kV 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 Implementation:2	• 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
				• 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	25.08.2023	• Lucknow -Kanduni, 220 kV D/C line expected energization date Aug'23 updated by UPPTCL in 209th 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.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
22	400/220kV Gorakhpur Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	31.07.2023	• Gorakhpur(PG)- Maharajganj, 220 kV D/C line expected energization date is 31.07.2023 updated by UPPTCL in 209th 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	Dec'23	SCDA System & PLCC work pending at 220 KV S/stn. Rajokheri Updated in 209th 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
26	400/220kV Amritsar S/s	Commissioned:7 Approved in 50th NRPC- 1 no. Total: 8	Utilized: 6 Unutilized: 1 Approved in 50th NRPC- 1 no.	• Amritsar – Patti 220kV S/c line	31.07.2023	Route survey/tender under process. Updated in 209th OCC by PSTCL.
				• 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)	15.08.2023	Route survey/tender under process. Work expected to be completed by 15th August 2023. Updated in 208th 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 Approved: 4 Total: 8	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 2 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.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
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	Commissioned	Saharanpur(PG)-Devband D/c line (Energization date: 20.04.2023) updated by UPPTCL in 207th 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	Work completed but pending for FTC.	Direct circuit from 220 kV Lalton Kalan to Dhandari Kalan to be diverted to 400 kV PGCIL Ludhiana. Work completed but pending for first time charging.Updated in 209th OCC by PSTCL.
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.

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 (18.07.2023)
ANPARA TPS
HARDUAGANJ TPS
OBRA TPS
PARICHHA TPS

PSPCL (18.07.2023)
GGSSTP, Ropar
GH TPS (LEH.MOH.)
RRVUNL (09.07.2023)
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	NAPS IS	UP	Implemented	Yes (08-10-2021)	Yes	Yes	-
2	RAPS IS	Rajasthan	Implemented	16-Aug-21	Yes	Yes	List of officials in-charge, format for generation, islanding scheme sld and relays

Under Implementation/ Newly Proposed/Under Discussion

Sl. No.	Islanding Scheme	SLDC	Status	Details of progress	DPR for PSDF funding	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. Relay Procurement is under progress. Scheme Implementation timeline : September,2023		-		-	-	-	-	-	-	-	-
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.A meeting was taken up with UP on 02.08.2023. Changes are suggested in Study report of CPRI. Final Study report is pending.		-		-	-	-	-	-	-	-	-
3	Jodhpur-Barmer-Rajwest IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022.Preparation of DPR is under finalization. Scheme implementation timeline: October,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: October,2023	-	-		-	-	-	-	-	-	-	-
5	Patiala-Nabha Power Rajpura IS	Punjab	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Implementation timeline: December,2023		-		-	-	-	-	-	-	-	-
6	Pathankot-RSD IS	Punjab	Implemented	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Scheme has been implemented in April 2023 as informed by Punjab in 206th OCC. Testing Reports submitted by Punjab.		-		-	-	-	-	-	-	-	-
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											
9	Delhi IS	Delhi	Under Study	IN PRINCIPLE APPROVED BY OCC FORUM IN 209TH OCC MEETING. FINAL APPROVAL BY NRPC FORUM IS PENDING.											

AGENDA of POWERGRID-NR-III

In principle approval for Insulator replacement of 500kV HVDC Ballia-Bhiwadi Line under Deemed Availability

- Stability of Northern Grid is vital and a major concern for POWERGRID management.
- Fog is a major cause of tripping of lines in Northern Region, which may lead to cascading effect of multiple tripping and major failure.
- HVDC lines have inherent tendency to attract the dust particle. So the pollution deposit is higher on insulators of DC lines as compared to AC Lines and chance of flashover & failure of insulators in DC lines is more in bad weather condition.
- Consequently, number of de-capping of porcelain insulators had occurred in ±500kV HVDC Ballia - Bhiwadi transmission lines in Dec'2022 under foggy weather conditions and large no. of tripping/ Auto-reclose has been reported in last few years.

Name of Line	Count of OUTAGE/Transient					
	2019	**2020**	**2021**	**2022**	**2023**	**TOTAL**
500KV HVDC BALIA-BHIWADI POLE-I	17	32	29	18	39	**135**
500KV HVDC BALIA-BHIWADI POLE-II	34	20	33	28	32	**147**

- Presently, insulator cleaning and insulator replacement with CLR is being carried out at major crossings and polluted stretches in ±500kV HVDC Ballia-Bhiwadi based on previous history.
- With the use of CLR Insulators, chances of tripping/auto re-closer due to deposition of dust, bird excreta etc can be minimized. The same results have been achieved in ±500kV HVDC Rihand-Dadri transmission line.
- To avoid frequent tripping/breakdown, porcelain insulator at all the balance locations are required to be replaced by CLR insulator.

Detail of balance locations for Insulator replacement work and requirement of shutdown for HVDC Ballia-Bhiwadi Line

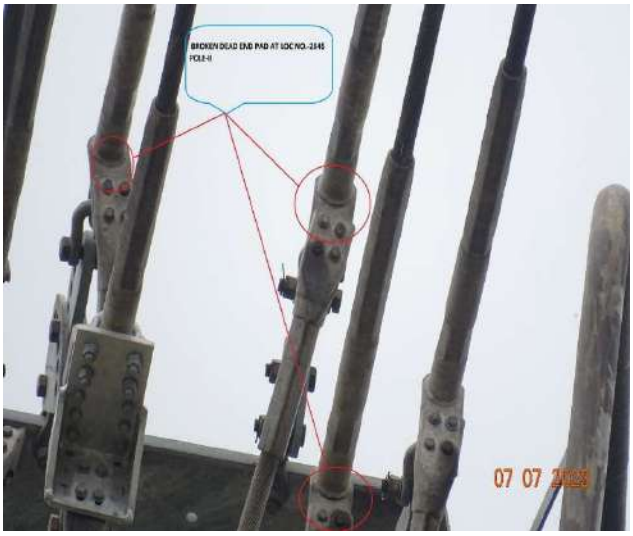
Sl. No	Description	Pole-I		Pole-II	
		No of Susp. towers	**No of tension towers**	**No of Susp. towers**	**No of tension towers**
1	No of towers	1171	429	1171	429
2	No of towers with CLR	176	143	203	183
3	No of towers with porcelain	995	286	968	246
4	No of string to be replaced	995	572	968	492
5	No of Gangs required	20	10	20	10
6	S/D days	10 Days		10 Days	

- Outage of 10 days will be required for each ckt. of HVDC Ballia-Bhiwadi Lines on continuous basis.
- Long outage of HVDC Lines will also hit the availability of region and huge cost to POWERGRID.
- **In view of system improvement and grid stability, proposed outage of HVDC Ballia-Bhiwadi Pole-1&2 for approx. 10 days each (one by one) may be considered as deemed available in view of system improvement action at POWERGRID's own cost.**
- Max. Power order in HVDC Bipole during Sep '22 – Feb'22 = 1200 MW(1500 MW in 3 occasions only), same can be managed with HVDC Monopole operation also.

Operational Perspective of NEA Multiterminal 800 KV HVDC AGRA-BNC HVDC Transmission System

- North-East-Agra (NEA) Multiterminal HVDC transmission system is one of the world's first multiterminal UHVDC transmission link, enabling the transmission of a bulk of clean hydro-electric power of 6000 MW over long distance of 1774 KM.
- During the winter season, reduced power levels are available for the HVDC link and for reverse direction, mono pole operation is being carried out as per instruction of NLDC with metallic return mode through the conductor of another pole.
- In the metallic return mode of operation, the voltage level on the metallic return conductor is governed by the resistive voltage drop on the conductor with respect to the ground.
- In the reverse power direction, Considering the nominal resistance of 12.01 Ω between Agra and BNC, the voltage on the metallic return conductor shall be in range of 2-4 KV from Agra under NR3 jurisdiction.
- In view of negligible voltage on metallic return conductor during monopole operation, line becomes vulnerable for theft of line materials(spacer, corona ring etc). This condition of conductor (very low voltage) can also be easily identified from ground through corona sound.
- Theft of hundreds of Spacer –damper has been experienced in past which leads damage of conductor fittings and accessories and chance of conductor snapping.
- Photographs are submitted here.


07 07 2023


BROKEN DEAD END PAD AT LOC NO.-2146
POLE-II
07 07 2023

- The minimum power level of each pole is 150 MW and therefore a minimum power of only 300 MW is required for running both the poles of a bipole. Therefore, at 500MW power level, bipolar operation is easily possible.
- Due to running of a bipole as against a monopole at, say 500 MW, there shall be an additional filter bank connection effected by the Reactive Power Controller (RPC) of only the below mentioned MVAr rating at Agra, APD and BNC:
- At Agra, during operation, it is observed that such additional connection of 201 MVAr causes an approximate rise of only 2(two) to 3(three) kV.

Based on the foregoing analysis, it is required to run NEA HVDC poles in bipole operation only to prevent theft of transmission line fittings and accessories, avoid monetary loss & unnecessary tripping of HVDC lines and to enhance system reliability

Annexure-A.V

कार्यालय अधीक्षण अभियन्ता
विद्युत 765 एंव 400 केवी पारेषण परिकल्पना मण्डल
उ0प्र0 पावर ट्रान्समिशन कारपोरेशन लि0
शक्ति भवन विस्तार, 10वॉ तल,
14–अशोक मार्ग, लखनऊ– 226 001 (भारत)
E-mail: se765.400kv@gmail.com

OFFICE OF THE SUPERINTENDING ENGINEER
ELECTRICITY 765 & 400 KV TRANSMISSION DESIGN CIRCLE
UP POWER TRANMISSION CORPORATION LTD.
(UP GOVERNMENT UNDERTAKING)
Shakti Bhawan Extn., 10th Floor,
14-Ashok Marg, Lucknow- 226 001 (INDIA)
Tele: (0522) 2218666

No. 406 / ETD8/ VPG-MZN Dated: July 18, 2014

Sub: Record Note of Discussions of Meeting held on 15-07-2014 regarding Construction of LILO of 400kV DC Vishnuprayag-Muzaffarnagar Line at Srinagar HEP

M/s GVK Alaknanda Hydro Power Co. Ltd., Srinagar (Uttarakhand)	M/s JPVL, Vishnupuram, P.O. Joshimath, Dist. Chamoli, (Uttarakhand)	M/s UPRNNL, Viswasarraiya Bhawan Vibhuti Khand, Gomti Nagar, Lucknow

Dear Sirs,

Director (W & P), UPPTCL convened a meeting with M/s Alaknanda Hydro Power Company Ltd., (GVK), M/s UPRNNL and M/s Jaiprakash Power Ventures Ltd., Vishnuprayag on 15-07-2014 to discuss the various issues regarding energization of LILO of second circuit of 400 kV DC Vishnuprayag- Muzaffarnagar line at Srinagar HEP and also of Srinagar HEP.

A copy of Record Note of Discussion of meeting is enclosed herewith for your kind information and neccessory action.

Thanking you,

(Satyendra Kumar)
Superintending Engineer

No. 406 / ETD8/ VPG-MZN Dated: July 18, 2014

1. Director (W&P), UPPTCL, 7th floor Shakti Bhawan, Lucknow.
2. Director (Operation), UPPTCL, 11th floor Shakti Bawan Extn., Lucknow.
3. Chief Engineer (765 kV) TDU, Lucknow
4. Chief Engineer (TW), Pareshan Bhawan, 130-D, Victoria Park, Meerut
5. Chief Engineer (PS), Lucknow
6. Superintending Engineer (C & C), 10th Floor, Shakti Bhawan, Lucknow
7. Superintending Engineer, (T & C), Pareshan Bhawan, 130-D, Victoria Park, Meerut

(Satyendra Kumar)
Superintending Engineer

CC to:

GM (Operations), NRLDC, New Delhi

Record Note of Discussions of meeting held on 15-07-14 regarding Construction of LILO of 400 kV DC Vishnuprayag-Muzaffarnagar line at Srinagar HEP

Director (Works & Project), UPPTCL convened a meeting with M/s Alaknanda Hydro Power Company Ltd., (AHPCL/ GVK) Srinagar and M/s Jaiprakash Power Ventures Ltd. (JPVL), Vishnuprayag on 15-07-2014 to finalise an action plan for energisation of LILO of second circuit of 400 kV DC Vishnuprayag- Muzaffarnagar line at Srinagar HEP at the earliest.

Following officers were present in the meeting held in chambers of Director (W & P), UPPTCL:

UPPTCL

Sri Shatanshu Agrawal, Director (W&P)
Sri Y.N. Gupta, CE (TW), Meerut
Sri A.S. Prasad, (CE 765 kV)
Sri Ram Swarath, CE, SLDC
Sri Ajay Chauhan, SE, ETC, Meerut
Sri Satyendra Kumar SE, E 765&400 kV TDC
Sri Gyan Prakash, SE, Comm. Design
Sri Shri Krishna, SE, T&C Meerut
Sri Mukul Sonkar, SE, EM&TC, Lucknow
Sri S.K. Bhattacharya, SE, SLDC

AHPCL (GVK), Srinagar

Sri R.K Gupta, Head T&C
Sri Santosh Reddy, Proj. Coordinator

JPVL, Vishnuprayag

Sri V.K Puri, Vice President
Sri Suresh Chandra, Director

At the onset of the meeting, SE, Electricity 765 & 400 kV Transmission Design Circle, Lucknow apprised the meeting that the work of construction of LILO of 2nd circuit of 400 kV Vishnuprayag- Muzaffarnagar line at Srinagar HEP has been completed except for the work of tapping the LILO line to the existing line.

Sri R.K Gupta, Head T&C, Alaknanda Hydro Power Co. Ltd., Srinagar intimated that the Srinagar HEP is ready to start generation from Units #1 & #3.

The meeting then proceeded with the discussions regarding prerequisites for commissioning of the LILO Line and the switch yard at Srinagar HEP. Following issues were discussed:

1. Regarding the issues related to **PLCC arrangement for Protection, Data & Speech** between Muzaffarnagar-Srinagar HEP, Muzaffarnagar-Vishnuprayag HEP & Srinagar HEP-Vishnuprayag HEP after LILO of 400 KV Muzaffarnagar-Vishnuprayag HEP Line at Srinagar HEP:

   (i) Srinagar HEP informed that on the basis of guidelines given in Record note of discussions held on dated 3rd& 4th April, 2014 regarding PLCC arrangement, they have carried out all the necessary changes/ arrangements. Commissioning engineer of M/s ABB has also arrived at Muzaffarnagar, Srinagar HEP & Vishnuprayag HEP for commissioning & retuning of PLCC. UPPTCL suggested that it will be better if PLCC cabinets of protection M1, M2 & data of Srinagar HEP for Vishnuprayag line be shifted to Muzaffarnagar & installed for Srinagar line & cabinets from Muzaffarnagar for Srinagar HEP be shifted to Srinagar HEP & installed for Vishnuprayag line, so that new PLCC shall work on Muzaffarnagar-Srinagar line on both sides. Srinagar HEP informed that it is difficult to shift cabinets at this stage. However, on request of UPPTCL Srinagar HEP contacted to M/s ABB engineers and agreed to shift & recommission the cards of the PLCC cabinets from Srinagar HEP of Vishnuprayag line to Muzaffarnagar for Srinagar line & from Muzaffarnagar of Srinagar line to Srinagar HEP for Vishnuprayag

line. UPPTCL informed Srinagar HEP to ensure that shifting & recommissioning of PLCC cabinets shall be completed within proposed shutdown period.

(ii) It was also agreed that ownership of PLCC cabinets installed at the premises of UPPTCL & HEP shall be of respective Units and maintenance will be carried out by the respective unit in future. However, data cabinets provided, installed and under commissioning at Vishnu Prayag HEP & Muzaffarnagar by Srinagar HEP for alternate route shall be owned & maintained by them.

UPPTCL emphasized that commissioning & retuning of cabinets at Muzaffarnagar, Vishnuprayag & Srinagar HEP ends should be carried out properly through ABB. The list of commissioning test required to be done is annexed. Srinagar HEP agreed to the same.

Action to be taken by AHPCL

2. The issue of **"Reverse Power Flow"** in case of tripping of Srinagar- Muzaffarnagar Line was raised by M/s JPVL. They expressed their apprehension that the Circuit-I of Visnuprayag-Muzaffarnagar Line shall get overloaded when both the power houses are generating at full load i.e. Vishnuprayag at 440 (4 x 110) MW and Srinagar at 330 (4 x 82.5) MW. In case of full load (770 MW); the current is likely to exceed 1200 Amps. As on date the CT Ratio of CTs installed at GIS Vishnuprayag is 1000:1 and thus CTs shall be overloaded. Further the line capacity is also limited to 1150 Amps for twin MOOSE conductor (since the line is less than 10 years old and line length between Vishnuprayag to Muzaffarnagar is 284 kms).

It was intimated by M/s AHPCL that only two units (#1 & #3 @ 82.5 MW each) are scheduled to generate power upto December 2014 and thus there shall be no overloading in case of tripping of oneline as power flow shall be limited to 605 MW (440 +165).

It was further intimated by M/s JPVL that from December to April every year, due to reduced water availability, the generation at Vishnuprayag goes down and thus **problem of overloading even with three units of Srinagar running is not likely to be encountered upto April 2015.**

M/s JPVL was asked to get the Capacity of CTs raised to 2000:1 to avoid overloading. However, they expressed their inability to do so immediately, citing high cost of replacement (more than Rs. Two crores) and also that the lead time of procurement for GIS compatible CTs is more than six months.

It was pointed out by UPPTCL (SE, SLDC) that CTs can be overloaded to 20% of their rated capacity as per IS specifications. Also the Bus Bar at Vishnuprayag is rated for 2000 Amps, thus the limiting factor is capacity of CT. M/s JPVL agreed to take the view from their supplier regarding need for upgradation of CTs. They further agreed to get a study conducted for maximum continuous rating of CTs and also check the metering aspects in respect of cores. The report of the study shall be submitted by 15-10-2014.

In case of tripping of Vishnuprayag- Muzaffarnagar Ckt-I, the full load of 770 MW i.e. 440 MW from Vishnuprayag and 330 MW from Srinagar shall then flow through Srinagar Switch yard and Srinagar- Muzaffarnagar section of the line. The CT ratio of CTs installed at Srinagar is 2000:1 and thus Srinagar HEP Bus Bar is not likely to face overloading.

Meanwhile, M/s AHPCL was also asked to get similar study conducted and also examine the feasibility of installing SPS system to prevent overloading in case of tripping of one line. Further deliberations in this regard shall be undertaken after reports of above studies are received.

Action to be taken by AHPCL, Vishnuprayag HEP

3. Regarding SCADA and TELEMETRY, M/s AHPCL intimated that the precommissioning works have been done under supervision of BHEL and work shall be completed by 19-07-14.

4. Regarding **settings for Distance Protection Relays**, it was intimated by M/s AHPCL that settings have been done at Srinagar end. The settings at Muzaffarnagar and Vishnuprayag ends shall be done when the line is taken under shutdown for tapping of LILO. The Protection settings shall be coordinated by CE (TW) and SE (T&C) Meerut. The relevant data shall be provided by M/s AHPCL and M/s JPVL. The final testing shall be conducted after the LILO line is tapped.

Action to be taken by AHPCL, JPVL, CE (TW) & SE (T&C), Meerut

5. For obtaining **shutdown** of 2nd circuit of 400 kV Vishnuprayag- Muzaffarnagar Line, the matter was discussed with NRLDC authorities and it was learnt that no formats are required to be completed for getting shutdown. As such shutdown has been planned from 19-07-2014 and necessary application shall be moved to OCC.

After shutdown is obtained, the tapping of the LILO line shall be completed. Thereafter the settings and complete testing of distance protection system shall be completed by 21-07-2014 as these testing can be done only after the LILO is connected.

M/s AHPCL intimated that Generator Protection and in-house protections are in place. They also intimated that the generating voltage of 13.8 kV with 10% overloading (i.e. up to 14.4 kV) has been achieved and protections checked.

6. Regarding **clearance from Director of Electrical Safety** for energization of substation, it was intimated by M/s AHPCL that necessary applications have been moved and clearances are expected to be received by 19-07-2014.

Regarding line, it was intimated by M/s UPRNNL on phone that electrical safety clearance is likely to be received by 19-07-2014 after visit by inspector.

Action to be taken by AHPCL, UPRNNL

7. The shut down shall be returned and permission to energise the line and Srinagar HEP with s/yard shall be sought after completion of all tests successfully and also after
   - Obtaining of electrical safety clearance for all components,
   - All completed formats are submitted to SLDC and other formalities are completed as per requirement of NRLDC.

   All the formats have been made available to representative of M/s AHPCL in the meeting. The coordination for shutdown shall be done by CE (PS) and CE (TW).

Action to be taken by Srinagar HEP, CE (TW) and CE (PS)

8. CE (PS) intimated regarding the requirement of completion of necessary formats including making available copies of PPA, Connectivity Agreement, Long Term Open Access Approvals, Bulk Power Transfer Agreement, Meter Sealing Certificates for Main, Check and Standby meters. M/s AHPCL agreed to meet CE (PS) for completion of the requirements before 19-07-2014.

Other issues relating to firm/ infirm power, scheduling, COD of units etc. are to be cleared by M/s AHPCL with SLDC.

Action to be taken by Srinagar HEP and CE (PS)

The meeting concluded with Director (W & P) impressing upon the need for all parties to work in coordination for energization of the line and power house at the earliest.

(Satyendra Kumar)
Superintending Engineer

उत्तर प्रदेश राज्य भार प्रेषण केन्द्र
उ0प्र0पॉवर ट्रांसमिशन कारपोरेशन लि0
(उत्तर प्रदेश सरकार का उपक्रम)
यू0पी0एस0एल0डी0सी0 परिसर, विभूति खण्ड–II
गोमतीनगर, लखनऊ–226010
दूरभाष:
ई–मेल : sera@upsldc.org

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

Annexure-A.VI

No: 1921 /CE(PSO)/SE(R&A)/EE-II/Meeting **Dated: -07.08. 2021**

To,

As per distribution list.

(Through E-mail)

Subject:- **Minutes of Meeting held on 27.07.2021 to discuss various issues related to blackouts/simultaneous tripping in UP Control Area for month of July – 2021**

A meeting to discuss various issues related to blackouts/simultaneous tripping in UP Control Area for month of July - 2021 was held on 27.07.2021 vide letter no. 1776/CE(PSO)/SE(R&A)/EE-II/Meeting dated 24.07.2021. Copy of the minutes of meeting is enclosed for further necessary action.

Encl: As above

07/8/21

(Zahir Ahmad)
Chief Engineer (PSO)

No: 1921 /CE(PSO)/SE(R&A)/EE-II/Meeting **Dated: -07.08. 2021**

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

1. Director, UPSLDC, Vibhuti Khand – II, Gomti Nagar, Lucknow.
2. Director (Operation), UPPTCL, 11th Floor, Shakti Bhawan Extn., Lucknow.
3. Chief Engineer (C&S), Vibhuti Khand – II, Gomti Nagar, Lucknow.

(Zahir Ahmad)
Chief Engineer (PSO)

Distribution List

1. Chief Engineer (Trans.West), Pareshan Bhawan, 130D, Hydel Colony, Victoria Park, Meerut – 250001 (cetw@upptcl.org)
2. Chief Engineer (Trans. Central),UPPTCL, Pareshan Bhawan, Vibhuti Khand, Gomti Nagar Lucknow (cetc@upptcl.org)
3. Er. Kavindra Singh, Technical Adviser (UPPTCL), Special Invitee (skavindra@yahoo.co.in)
4. Superintending Engineer (System Control), UPSLDC, Vibhuti Khand – II, Gomti Nagar, Lucknow.
5. Superintending Engineer, (T&C) Circle Pareshan Bhawan, Vibhuti Khand – II, Gomti Nagar, Lucknow.
6. Superintending Engineer, (T&C) Circle, Pareshan Bhawan, Victoria Park, Meerut.
7. Superintending Engineer, Electricity Transmission Circle, Bareilly (seetcbly@upptcl.org)
8. Superintending Engineer, Electricity Transmission Circle, Shahjahanpur (seetcspn@upptcl.org)
9. Superintending Engineer, Electricity Transmission Circle-Greater Noida.(seetcgn@upptcl.org)
10. Superintending Engineer, Electricity Transmission Circle-Ghaziabad. (setgzb@upptcl.org)
11. M/s Alaknanda Hydro Power Company Ltd., Srinagar Hydro Electric project, Koteshwar Colony, Srinagar, Garhwal – 246174 (Uttrakhand).
12. GM (Operation)Jaypee Vishnuprayag Hydro-Electric Plant, (A Division of Jaiprakash Power Ventures Limited)Vishnupuram, Post - Vishnupuram- 246443, District - Chamoli (Uttarakhand).

iv. Executive Engineer T&C, informed that reason for tripping of breaker 405 still not found due to which blackout occurred at 400kV side of 400kV Muradnagar (New). Concerned will check 405 breaker.

v. Chief Engineer (PSO) showed concerned over not involvement of concerned on tripping analysis.

vi. Er. Kavindra Singh advised to review and check the protection scheme, configuration & wiring.

Decision taken:

i. Executive Engineer T&C will investigate the operation of tie breaker (405) and send findings within one week to this office.

ii. Transmission wing will investigate why breaker 401 did not operate and report will be submitted within one week to this office.

iii. Details to be uploaded by concerned on NRLDC tripping portal.

iv. Executive Engineer -II (R&A) informed that if there is any issue in uploading then it may be intimated to UPSLDC to rectify the issue.

4. **Tripping occurred at 400kV Vishnuprayag & Alaknanda s/s on 20.07.21 at 14:39 hrs**

Brief description:

1. 400KV Muzaffarnagar- Alaknanda line tripped on distance protection.

2. Due to this only evacuation path of generation of 400kV Alaknanda & 400kV Vishnuprayag is through 400kV Vishnuprayag – Muzaffarnagar line.

3. As per information received from 400kV Vishnuprayag, 400kV Vishnuprayag – Muzaffarnagar line tripped on overloading.

4. In the absence of evacuation path all the running units at 400kV Alaknanda and 400kV Vishnuprayag tripped.

Issues:

1. Why overcurrent protection was enabled on 400 KV Vishnuprayag- Muzaffarnagar line.

2. Progress on Capacity enhancement of CT of 400 KV Vishnuprayag- Muzaffarnagar at both end.

07/8/21

3. Progress on Capacity enhancement of CT of 400 KV Alaknanda- Muzaffarnagar at both end .

4. Whether AR of 400kV Alaknanda -Muzaffarnagar line operated.

5. Information of the tripping not uploaded on the NRLDC tripping portal.

Discussion on meeting:

i. Concerned from Vishnuprayag informed that setting of CT of 400kV Vishnuprayag- Muzaffarnagar line is 1200Amp. Current reached to 1232 Amp which causes the tripping of 400kV Vishnuprayag-Muzaffarnagar line.

ii. Concern was raised by UPSLDC over the enabling of over current protection on line which is not recommend on any 220kV & above transmission line as per protection philosophy of NRPC.

iii. Protection issue at 400kV Vishnuprayag has also been raised on the basis of previous multiple tripping of 10.03.2021, on which protection at 400kV Vishnuprayag did not operate and 400kV Alaknanda-Vishnuprayag line, 400kV Vishnuprayaga-Muzaffarnagar line tripped on Z-2.

iv. Er. Kavindra Singh advised to review protection setting at 400kV Vishnuprayag s/s by M/s Vishnuprayag.

v. Alaknanda referred a previous MOM through which CT capacity enhancement is to be done at both end of 400kV Vishnuprayag – Muzaffarnagar line and at 400kV Muzaffarnagar end of 400kV Alaknanda – Muzaffarnagar line.

vi. Superintending Engineer (System control), SLDC stated that the power station through which any line connected to 400kV Muzaffarnagar tripped that generating station will back down in view of system security and informed to UPSLDC immediately in case of overloading.

vii. It was informed by concerned that AR operated at 400kV Alaknanda & Muzaffarnage but line tripped due to persistent of fault.

Decision taken:

i. SLDC will collect information of tripping of 400kV Vishnuprayag & 400kV Alaknanda 400kV Muzaffarnagar of last one year and analyse the tripping incident.

ii. 400kV Alaknanda, Vishnuprayag, Muzaffarnagar will share tripping details of last one year.

07/01/21

iii. Alaknanda will share the referred document through which capacity enhancement of CT at 400kV Vishnuprayag & 400kV Alaknanda 400kV Muzaffarnagar was approved.

iv. 400kV Alaknanda, Vishnuprayag will timely update the tripping details on NRLDC portal and share the flags details, DR, EL to each other immediately for tripping analysis.

v. 400kV Vishnuprayag will intimate to SLDC after discussing their O&M regarding disabling over current setting on 400kV Vishnuprayag-Muzaffarnager line within 15 days and also submit their comment in written regarding present status of CT enhancement and whether it can be explored, issues involve and remedy if any.

vi. 400kV Vishnuprayag will inform that at present condition how much over loading above 120% and duration can be allowed on CT of 400kV Vishnuprayag-Muzaffarnager line and details of present settings.

5. <u>Tripping occurred at 220 kV Shahjahnpur s/s on 23.07.21 at 11:47 hrs</u>

Brief description:-

As per the information received from concerned, fault occurred at 220kV Azizpur-Shahjahapur line which was charged only at 220kV Shahjahapur. Concerned informed that relay issued trip command but breaker was not open. Beside this, due to distributed DC no other protection operated at 220kv Shahjahnpur S/S which resulted into tripping of all above mentioned lines from other end except 220kV Rosa- Shahjahapur ckt-I.

Issues:-

1. There was a fault C-N in 220kV Shahjahanpur-Azizpur line. CB of this line at Shahjahanpur did not open and resulting into cascading effect. There are two trip coils TC-1, TC-2, why both trip coils failed to trip.

2. 220 kV Shahjahanpur- Rosa ckt. – I tripped in back direction on M-2 protection. Direction of this need to be checked.

3. Relay did not operate at 220kV Hardoi and ultimately it tripped at 220kV Shahjahanpur PG end. Why distance protection at 220kV Hardoi s/s failed need to be explained.

Agenda for 210th OCC dated 16.08.2023

Modification in existing SPS at Gumma for Naitwar Mori HEP: -

1. The transmission system (interim arrangement) for evacuation of power from 60 MW Naitwar Mori HEP (NMHEP) of SJVNL had been finalized in the 3rd NRPC(TP) meeting held on 19.02.2021 ***(Figure 1).***

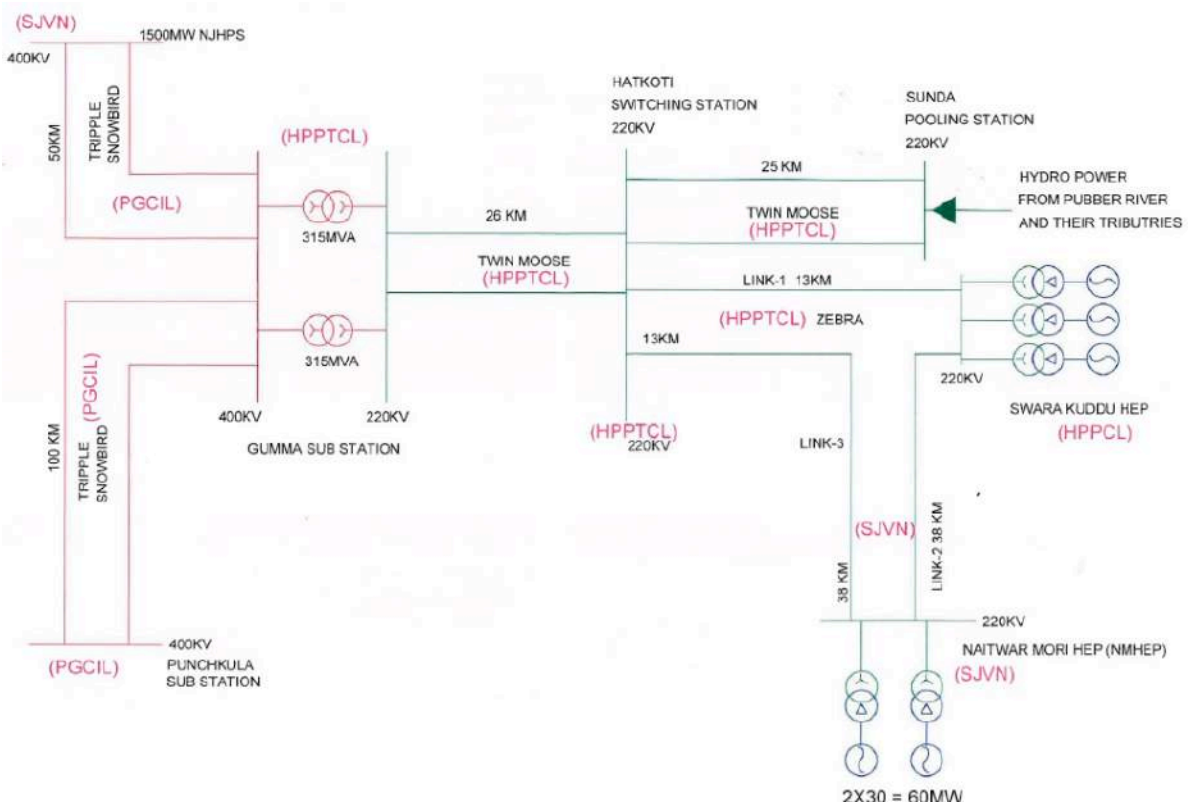


Figure1: The power evacuation system for Naitwar Mori HEP

2. For reliable evacuation of power of NJHPS, Rampur, Baspa, KWHPS and Swara-Kuddu, a SPS is already in operation.
3. As per 3rd NRPC (TP) decision, Power Evacuation of 60 MW NMHEP shall be routed through STU network (HPPTCL) in Gumma Complex, accordingly, it becomes a part of above SPS scheme.
4. Further, due to injection of power of NMHEP in above network, modification in above SPS for reliable evacuation of power of NJHPS, Rampur, Baspa, KWHPS, Sawra-Kuddu and Naitwar Mori HPS was approved by OCC in 197th Meeting.
5. Naitwar Mori HEP and its dedicated transmission line is in advance stage of Testing & commissioning. Now, in order to achieve the approved SPS, Modification in exiting SPS is inevitable and it involves installation of One (01) DTPC (New) at

Gumma Substation and Naitwar Mori HEP respectively. Hard wiring between existing DTPC at Gumma shall be made to New DTPC. Further, the mapping/routing of SPS signal between Gumma SDH Panel and Naitwar Mori SDH is also required.

6. A shutdown on SPS at Gumma *(only for Swara-Kuddu Leg)* shall be needed for carrying out of above modification. Other leg of SPS of NJHPS, Rampur, Baspa, KWHPS shall be functional during above modification work.
7. Modification shall be implemented in the presence of Representative of HPPTCL (DGM Protection HPPTCL and PIU Gumma).
8. After the installation and local testing of modified SPPS between Gumma, Swara-Kuddu and Naitwar Mori HEP, Mock testing may be planned and witness by (HPPTCL/HPSLDC/NRLDC as the case may be) before stating injection of Naitwar-Mori HEP.
9. SJVN has also planned the Physical connection work in respect of Stringing of LILO and replacement of OPGW & re-splicing from 01.09.23 to 03.09.23 (12 hrs. daily basis). Shut Down approval in this regard is taken up with HPPTCL.
10. Accordingly, Shutdown of SPS at Gumma may be accorded on 03.09.2023 **(Tentatively).** Shifting (Pre-pone or Post pone) of shut down date (if any) may be intimated suitably and NRLDC may be empowered for permission in this regards.

ADDITIONAL AGENDA OF POWERGRID-NR-III

Disabling Auto-reclosure mode of Transmission Line to facilitate Hot line maintenance on real time basis

- Stability of Northern Grid is vital and a major concern for POWERGRID management.
- As part of POWERGRID, Preventive and Periodic maintenance of ICTs, Reactors and Transmission line of various voltages level of EHVAC, 500KV HVDC and 800kV HVDC lines are being monitored and patrolled on regular intervals as per standard procedures and guidelines.
- Normally findings of Ground/Emergency patrolling, thermo-vision scanning - defects like flashover on Insulator/ conductor, Jumper B&Ns missing, Hot spot in Jumper, Damage of disc insulators/ conductors, Hardware like Spacer, VD ,CC ring missing etc are being noticed. Such type of shutdown nature faults requires early rectification to avoid unwanted tripping/breakdown and further fault extending.
- In view of maintaining system availability of Transmission lines in line with MOU targets, POWERGRID adopting various latest technologies to ensure defect free transmission line and timely rectification of critical/shutdown nature defects by HOT LINE MAINTENANCE techniques with trained personnel.
- As per Safety norms of Hot line maintenance works, Auto reclosure of transmission line shall be kept in 'Auto reclosure – Non auto mode' position for the line at both ends in which HOT LINE maintenance work is to be carried out.

In view of the above facts and to utilize the facilities / technologies available for timely restoration / pro-active measures and ensuring system availability, it is requested to allow HOT LINE maintenance of transmission line without OCC approval on real time as per system requirements by disabling Auto-reclosure mode of Transmission Line.

PRAYAGRAJ POWER GENERATION COMPANY LTD.

Annexure-A.IX

No. PPGCL/ C&R/ FY-24/026

Date: 16.07.2023

To
The Member Secretary
Northern Region Power Committee
18-A, Shaheed Jeet Singh Marg,
New Delhi.

Subject – To extend support in implementation of Automatic Generation Control (AGC) in UP control area for Intra-state Generators.

Dear Sir,

Prayagraj Power Generation Company Limited (PPGCL) is an IPP, operating 3 units of 660 MW each (with Supercritical technology) installed and commissioned at Tehsil-Bara, in Prayagraj (U.P.). Its 90% of installed capacity is tied-up with UPPCL (UP- DISCOMs) and balance 10% is available for merchant sale as per Mega Power policy of Ministry of Power. The complete plant operation is being managed by The Tata Power Company Limited, since acquisition of this plant from its erstwhile owner on 4th Dec'2019.

We express our heartiest gratitude to NRPC for extending support to improve reliability of equipment and Grid in Northern operating area. The committee provided a lot of support to PPGCL during commissioning of ICT-2 at PPGCL by facilitating line shut-down timely and during the approval of SPS for Bara Thermal Power Station post ICT-2 commissioning. PPGCL is in the process of implementing the same in co-ordination with UPSLDC.

Please refer the petition 319/RC/2018 vide which, Hon'ble CERC has directed all ISGS stations with installed capacity of 200 MW or above and all hydro stations having capacity exceeding 25 MW excluding the Run-of-the River Hydro Projects irrespective of size of the generating station (whose tariff is determined or adopted by CERC) to install equipment at the unit control rooms for transferring the required data for AGC as per the requirement to be notified by NLDC as a step towards national grid stabilization.

As an improvement initiative and to adopt prudent operation practice, PPGCL one of the largest IPP (1980 MW) of Uttar Pradesh state has already installed AGC communication infrastructure at site (Control room). This was communicated to UPSLDC, Lucknow vide letter dated 09.08.2022 and PPGCL has taken-up the matter with UPSLDC, NLDC and POSOCO for their guidance in the technical aspects. Subsequently, UPSLDC arranged a workshop jointly with POSOCO/NRLDC on 4th Aug'2022 inviting all the GENCOs of UP control area to sensitise and enlighten them about AGC concept.

CERC vide its Suo-moto order also directed Grid operators to develop infra-structures for enabling Intra-state Generator to participate in AGC system and contribute in stabilizing grid. PPGCL being a section (63) case-2, competitive bid project, whose tariff was adopted by UPERC. PPGCL therefore has requested UPERC for extending support. As a representative body for Northern region, we would request NRPC to resolve the issue through co-ordination among various stakeholders and facilitate all capable Generators in its control area.

Prayagraj Power Generation Company Limited
Registered Office : Shatabdi Bhawan, B 12 & 13, Sector 4, Gautam Budh Nagar, Noida, Uttar Pradesh - 201301
Phone: + 91-120-6102000/6102208 CIN: U40101UP2007PLC032835
Plant Address : P.O. - Lohgara, Tehsil - Bara, Prayagraj (Allahabad), Uttar Pradesh - 212107
Phone: + 91-7525006400/ 8528846666, Web:-ppgcl.co.in, Email:-ppgcl@ppgcl.co.in

PPGCL
PRAYAGRAJ POWER GENERATION COMPANY LTD.

As mentioned above, PPGCL is fully prepared after installation of all necessary communication equipment at its all three units since Oct'2022.

PPGCL humbly seek your directions to implement AGC and contribute for grid stabilization as per requirement in conjunction with many other stations of the country.

Regards

For Prayagraj Power Generation Company Limited
Bara, Distt. Prayagraj (U.P.)

Encl. – As above.

C.C. – 1. The Secretary UPERC
2. The Director UPSLDC
3. The Chief Engineer (C&S)

Prayagraj Power Generation Company Limited
Registered Office : Shatabdi Bhawan, B 12 & 13, Sector 4, Gautam Budh Nagar, Noida, Uttar Pradesh - 201301
Phone: + 91-120-6102000/6102208 CIN: U40101UP2007PLC032835
Plant Address : P.O. - Lohgara, Tehsil - Bara, Prayagraj (Allahabad), Uttar Pradesh - 212107
Phone: + 91-7525006400/ 8528846666, Web:-ppgcl.co.in, Email:-ppgcl@ppgcl.co.in

PPGCL
PRAYAGRAJ POWER GENERATION COMPANY LTD.

No. PPGCL/ C&R/ 183 16.01.2023

To
The Secretary
Uttar Pradesh Electricity Regulatory Commission
Vibhuti Khand, Gomti Nagar
Lucknow.

Subject – Guidelines to implement Automatic Generation Control (AGC) in UP control area.

Dear Sir,

Prayagraj Power Generation Company Limited (PPGCL) is an IPP, operating three units of 660 MW each with Supercritical technology installed and commissioned at Bara, Distt. Prayagraj (U.P.). Its 90% of installed capacity is tied-up with UPPCL (UP- DISCOMs) and balance 10% is available for merchant sale under Mega Power policy of Ministry of Power. All plant operations are being managed by Tata Power Company Limited since acquiring this plant from its erstwhile owner in Dec'2019.

Please refer the petition 319/RC/2018 vide which, Hon'ble CERC has directed all ISGS stations with installed capacity of 200 MW or above and all hydro stations having capacity exceeding 25 MW excluding the Run-of-the River Hydro Projects irrespective of size of the generating station (whose tariff is determined or adopted by CERC) to install equipment at the unit control rooms for transferring the required data for AGC as per the requirement to be notified by NLDC as a step towards national grid stabilization.

Further to above, an Expert Group review of Indian Electricity Grid Code, Jan 2020 (draft IEGC 2020, which is yet to be notified) has suggested for the implementation of AGC at intra-state level also. Hon'ble CERC vide its notification no. RA-14026(11)/3/2019-CERC notified CERC (Ancillary Services) Regulations, 2022 (Annex-1) for generating stations operating under Section (62) tariff regime.

As an improvement initiative and to adopt prudent operation practice, PPGCL one of the largest IPP in Uttar Pradesh has already installed AGC communication infrastructure in its control room and the same was communicated to UPSLDC, Lucknow vide letter dated 09.08.2022(Annex -2). Also, PPGCL has taken-up the matter with UPSLDC, NLDC and POSOCO for their guidance in the technical aspects. To take PPGCL initiative forward, UPSLDC has arranged a workshop jointly with POSOCO/NRLDC on 4th Aug'2022 inviting all the stakeholders of UP Control area - GENCOs to sensitise and enlighten them about AGC concept (Annex.3). Further actions by the UPSLDC for implementing and enabling Generating stations is awaited.

PPGCL being a section (63) case-2, competitive bid project, whose tariff was adopted through UPERC, POSOCO has asked PPGCL to request UPERC for extending support. Hence, we request herewith to issue necessary guidelines and direct UPSLDC to enable AGC communication infrastructure with NLDC. As mentioned above, PPGCL is fully prepared with installation of all necessary communication equipment at its all three units.

Prayagraj Power Generation Company Limited
Registered Office : Shatabdi Bhawan, B 12 & 13, Sector 4, Gautam Budh Nagar, Noida, Uttar Pradesh - 201301
Phone: + 91-120-6102000/6102208 CIN: U40101UP2007PLC032835
Plant Address : P.O. - Lohgara, Tehsil - Bara, Prayagraj (Allahabad), Uttar Pradesh - 212107
Phone: + 91-7525006400/ 8528846666, Web:-ppgcl.co.in, Email:-ppgcl@ppgcl.co.in

Once implemented, UPERC will be the first state regulatory body and PPGCL will likely to be the first Intra-state IPP to incorporate AGC thereby setting a benchmark for other Intra-state Generators endeavouring towards National grid stabilization.

PPGCL humbly seek your directions to implement AGC and contribute for grid stabilization as per requirement in conjunction with many other stations of the country.

Regards

For Prayagraj Power Generation Company Limited
Bara, Distt. Prayagraj (U.P.)

Encl. – As above.

PRAYAGRAJ POWER GENERATION COMPANY LTD.

PPGCL/C&R / 135

Aug 9th, 2022

To

The Director
State Load Dispatch Center,
Vibhuti Khand-II, SLDC Compound, Gomti Nagar
Lucknow (U.P.)

Sub: To facilitate connectivity with NRLDC for AGC installation at 3*660 MW, PPGCL, Bara

Ref: 1. Mail dated 01.10.2021 addressed to POSOCO (copy attached)

2. Mail dated 22.07.2022 addressed to POSOCO (copy attached)

Dear Sir,

We would like to thank UPSLDC for organizing a work-shop jointly with POSOCO/NRLDC on 4th August'2022 to familiarize UP-Intra-state/IPPs about AGC requirement and its necessity in maintaining Grid frequency. We discussed about PPGCL preparation during meeting on 20th July'22 in your office and in earlier discussions too.

We would further like to inform that PPGCL is ready to commission AGC in all its three units and start participating in SRAS (Secondary Reserve Ancillary Service) after data connectivity is made available by UPSLDC.

NRLDC team assured during the work-shop that they would provide all technical support as may be required by UPSLDC/PPGCL. As discussed later, we would be grateful if UPSLDC could complete necessary steps at the earliest and facilitate PPGCL units AGC compliant to support Grid requirement.

Look forward your support and assuring best of our services always.

Thanking you

Yours faithfully

SBhargava

Head: Commercial & Regulatory

PPGCL, Bara, Prayagraj

Encl. – As above.

Copy to –

1. The Managing Director, UPPTCL, 7th Floor Shakti Bhavan, Lucknow (U.P).
2. The Director: Operations, UPPTCL, 8th Floor Shakti Bhavan Extn., Lucknow (U.P.)
3. Mr. R.K. Porwal, CGM- NRLDC, New Delhi
4. The C.E.O. PPGCL, Bara, Prayagraj (U.P.)

Bhargava Sanjay

From: Superintending Engineer (R&A) <sera@upsldc.org>
Sent: 03 August 2022 16:40
To: shrivastava.vivek@lancogroup.com; Sujeet Kumar; ee.emcd3.660hdgj@uprvunl.org; ee.emcd4.660hdgj@uprvunl.org; ee.emcd16.660hdgj@uprvunl.org; Vinodkumar Ramgopal Agrawal; amdavadihz.ltp@lpgcl.com; Shivamm.ltp@lpgcl.com; rajeevk.ltp@lpgcl.com; vipuljagjeet@gmail.com; Vikash Kumar Sharma; aupadhyay@lpgcl.com; mkpokharna.ltp@lpgcl.com; anand.ltp@lpgcl.com; dhirendras.ltp@lpgcl.com; nileshb.ltp@lpgcl.com; munnas.ltp@lpgcl.com; vmanivannan.ltp@lpgcl.com; rmkumar.ltp@lpgcl.com; gopinaths.ltp@lpgcl.com; subhranshum.ltp@lpgcl.com; ranjeets.ltp@lpgcl.com; mkchaurasia.ltp@lpgcl.com; spaul.ltp@lpgcl.com; ee.emd_4/parichha@uprvunl.org; ee.cid_2.parichha@uprvunl.org; archanagaur@uprvunl.com; toeratul@gmail.com; mohit.saxena@uprvunl.org; dvvnlanil@gmail.com; manish.kum.srivastava@relianceada.com; chanchal.k.kumar@relianceada.com; chandan.a.banerjee@relianceada.com; chandan.jain@relianceada.com; Anil Kumar अनिल कुमार; tapasmondal@ntpc.co.in; vaibhav@ntpc.co.in; Bhargava Sanjay; Bhatta Himadri; Patel Peeush
Subject: Fwd: Regarding workshop on AGC (Automatic Generation Control) on 4 August 2022

[EXTERNAL sender, Exercise caution..!]

---------- Forwarded message ---------
From: **Alok Kumar (आलोक कुमार)** <alok.kumar@posoco.in>
Date: Wed, Aug 3, 2022 at 4:22 PM
Subject: Re: Regarding workshop on AGC (Automatic Generation Control) on 4 August 2022
To: Superintending Engineer (R&A) <sera@upsldc.org>
Cc: Director (SLDC) <directorsldc@upsldc.org>, Superintending Engineer (SC) <sesc@upsldc.org>, eemis <eemis@upsldc.org>

AGC Workshop for UP SLDC
Hosted by NLDC WEBEX
https://nldcposoco.webex.com/nldcposoco/j.php?MTID=m3e5b2f67014aeeb902585ddd50612077
Thursday, Aug 4, 2022 10:30 am | 3 hours 45 minutes | (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Meeting number: 2513 317 5851
Password: cTfgBu4kw34 (28342845 from video systems)

Join by video system
Dial 25133175851@nldcposoco.webex.com
You can also dial 210.4.202.4 and enter your meeting number.

Regards

Alok

Bhargava Sanjay

From: Bhargava Sanjay
Sent: 01 October 2021 23:05
To: Phanisankar Chilukuri (फणिशंकर चिलुकूरि); agcnrldc@posoco.in
Cc: Singh Brajesh; R K Porwal (आर के पोरवाल); Vivek Pandey (विवेक पांडे); Ashok Kumar (अशोक कुमार); Anmol Sharma (अनमोल शर्मा); Mongam Harish Dora (मोंगम हरीश डोरा)
Subject: RE: Enabling PPGCL AGC compliant.

Thank you very much for your prompt response. As per regulations, we'll surely take-up with USPLDC/UPERC.

Regards,
Sanjay Bhargava
Head - Commercial & Regulatory, PPGCL
Prayagraj Power Generation Company Ltd., P.O. Lohgara, Tehsil: Bara, Prayagraj (Allahabad), Uttar Pradesh – 212107
Tel: 022 6717 1911 Mobile: 9212139731

From: Phanisankar Chilukuri (फणिशंकर चिलुकूरि) <pchilukuri@posoco.in>
Sent: 01 October 2021 10:00
To: Bhargava Sanjay <sanjay.bhargava@tatapower.com>; agcnrldc@posoco.in
Cc: Singh Brajesh <brajesh.singh@tatapower.com>; R K Porwal (आर के पोरवाल) <rk.porwal@posoco.in>; Vivek Pandey (विवेक पांडे) <vivek.pandey@posoco.in>; Ashok Kumar (अशोक कुमार) <ashokkr@posoco.in>; Anmol Sharma (अनमोल शर्मा) <anmolsharma@posoco.in>; Mongam Harish Dora (मोंगम हरीश डोरा) <mongam@posoco.in>
Subject: Re: Enabling PPGCL AGC compliant.

[EXTERNAL sender, Exercise caution..!]

Sir,

Presently, the AGC is being implemented as per directions of Hon'ble CERC in petition 319/RC/2018. Regarding applicability to power plants, this order https://cercind.gov.in/2019/orders/319-RC-2018.pdf mentions as below:
"All thermal ISGS stations with installed capacity of 200 MW and above and all hydro stations having capacity exceeding 25 MW excluding the Run-of-River Hydro Projects irrespective of size of the generating station and whose tariff is determined or adopted by CERC are directed to install equipment at the unit control rooms for transferring the required data for AGC as per the requirement to be notified by NLDC"

Further to above, May also like to go through the Report of the Expert Group to review of Indian Electricity Grid Code, Jan 2020 (draft IEGC 2020, which has not been notified yet) which has suggested for the implementation of AGC at intra-state level also.
https://cercind.gov.in/2020/reports/Final%20Report%20dated%2014.1.2020.pdf

Therefore, as PPGCL is a state control area generator, please take up with SLDC UP and UPERC for implementing AGC in UP state control area.

Thanks and Regards,
Phanisankar Chilukuri
Manager, National Load Despatch Centre
Power System Operation Corporation Limited
SM-IEEE, M-IEEE PES, M-CIGRE
PH NO. +918527908282
pchilukuri@posoco.in

From: Bhargava Sanjay <sanjay.bhargava@tatapower.com>
Sent: Thursday, September 30, 2021 12:53:43 PM
To: agcnrldc@posoco.in; Phanisankar Chilukuri (फणिशंकर चिलुकूरि)
Cc: Singh Brajesh
Subject: Enabling PPGCL AGC compliant.

Kind attention: Mr. Phanisankar

Dear Sir

PPGCL is an IPP operating three units of 660 MW each with Supercritical technology and commissioned during 2016-2017. Its 90% capacity is tied-up with UPPCL and 10% is available for merchant sale under Mega Power policy of Ministry of Power. All plant operations are being managed by Tata Power Company Limited since acquiring this plant from its erstwhile owner in Dec'2019.

In line with Tata Power other stations namely MPL and CGPL, we intend to implement AGC at all its three units at Prayagraj.

We seek your guidance and support to implement AGC at PPGCL station at the earliest.

Solicit your support please.

Regards,
Sanjay Bhargava
Head - Commercial & Regulatory, PPGCL
Prayagraj Power Generation Company Ltd., P.O. Lohgara, Tehsil: Bara, Prayagraj (Allahabad), Uttar Pradesh – 212107
Tel: 022 6717 xxxx Mobile: 9212139731/9425371971

TATA
TATA POWER
Lighting up Lives!

Annexure-B.I

Assessment of Generation backdown of n-2 SPS requirement for 765kV lines of Rajasthan RE pocket

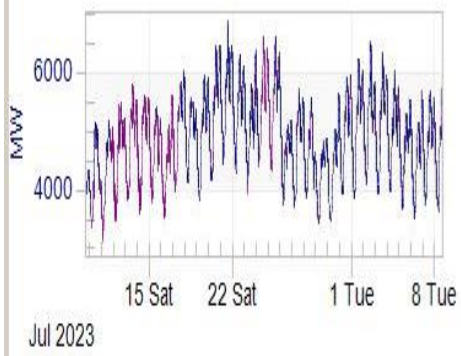
Basecase assumption

400kV Bhadla(RS)-Bikaner(RS) D/C	in service
400kV Bikaner(PG)-Bikaner_2(PG) D/C	in service
STATCOM -1 and 2 @ Bhadla_2	in service
STATCOM-1 @ Bikaner_2	in service
All 400kV lines presently out in Rajasthan	in service
Rajasthan demand	15500 MW
Raj Solar	3400 MW
Raj Wind	1500 MW

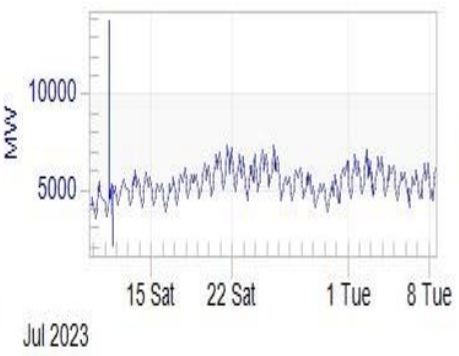
Result :

Contingency / Line Loading	Loading of 765kV Fatehgarh2-Bhadla2 D/C > 2000 MW and < 2200 MW	[Loading of 765 kV Fatehgarh2-Bhadla D/C > 1350 and < 1450] or [Loading of 765kV Fatehgarh2_Bhadla2 D/C > 2200 And < 2400]	[Loading of 765 kV Fatehgarh_2-Bhadla D/C > 1450] or [Loading of 765kV Fatehgarh2_Bhadla2 D/C > 2400] or [Loading of 765kV Bhadla2-Ajmer D/C > 3200]
765kV Fatehgarh2-Bhadla D/C	no SPS required	200 MW generation backdown at Fatehgarh-1/2	500 MW backing at Fatehgarh-1/2
765kV Fatehgarh2-Bhadla2 D/C	100 MW backing at Fatehgarh_1	500 MW backing at Fatehgarh-1/2	800 MW backing at Fatehgarh-1/2
765kV Bhadla-Bikaner D/C	no SPS required	no SPS required	no SPS required
765kV Bhadla2-Bikaner D/C	no SPS required	no SPS required	no SPS required
765kV Bhadla2-Ajmer D/C	no SPS required	400 MW backing at Bhadla_2 (due to overloading of Jodhpur-Kankroli/ Bhadla-Jodhpur)	500 MW backing at Bhadla_2 (due to overloading of Jodhpur-Kankroli/ Bhadla-Jodhpur)
765kV Bikaner- Moga D/C	no SPS required	no SPS required	no SPS required
765kV Bikaner- Khetri D/C	no SPS required	no SPS required	no SPS required

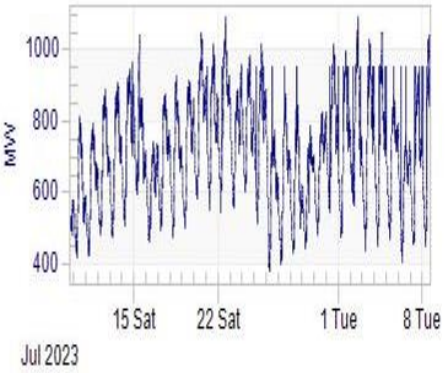
Delhi Import



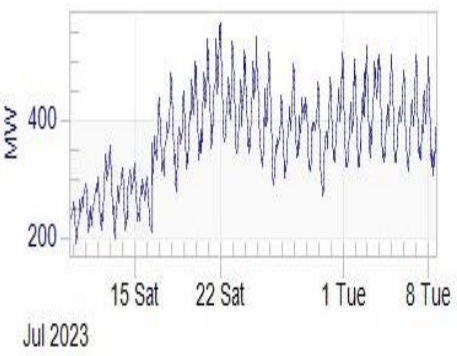
Delhi load



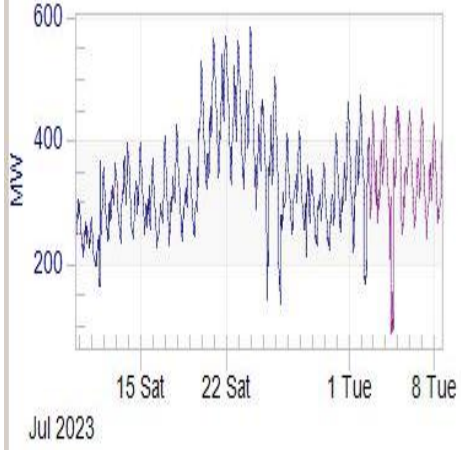
Maharanibagh ICT loading



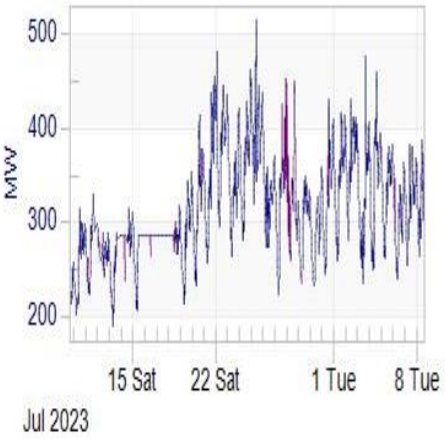
Harshvihar ICT loading



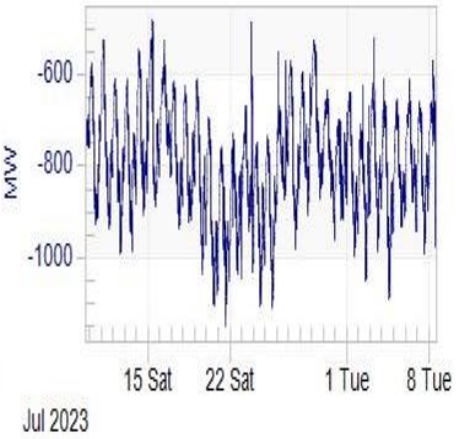
Bamnoli ICT loading



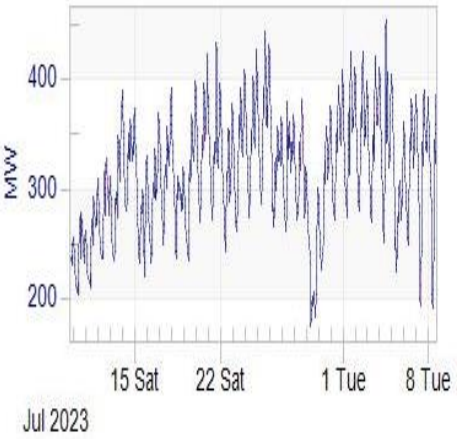
Mundka ICT loading

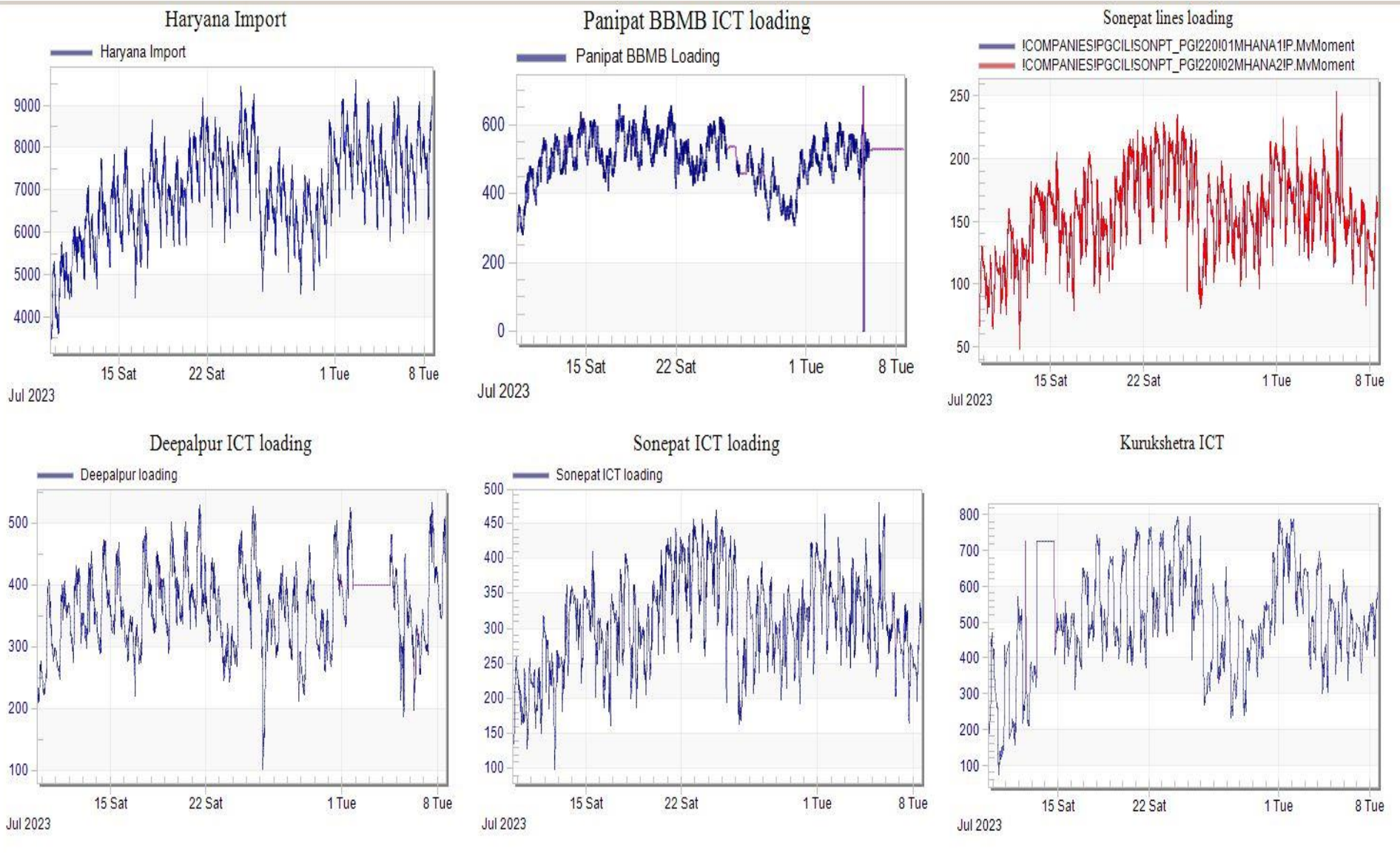


Mandola ICT loading

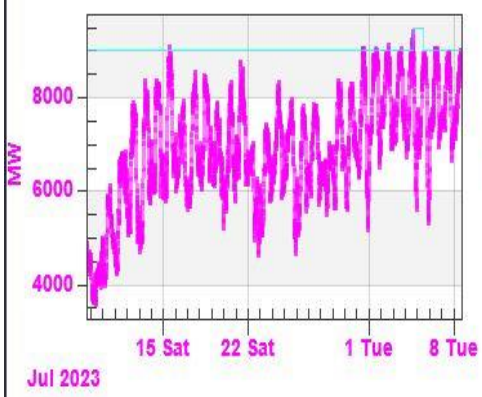


Bawana ICT loading

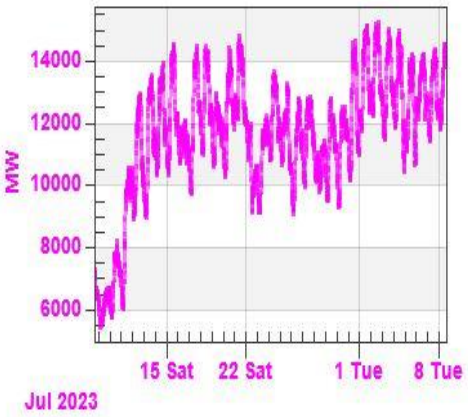



Haryana Import
Haryana Import
9000
8000
7000
6000
5000
4000
15 Sat
22 Sat
1 Tue
8 Tue
Jul 2023
Panipat BBMB ICT loading
Panipat BBMB Loading
600
400
200
0
15 Sat
22 Sat
1 Tue
8 Tue
Jul 2023
Sonepat lines loading
!COMPANIES!PGCIL!SONPT_PGI220!01MHANA1!P.MvMoment
!COMPANIES!PGCIL!SONPT_PGI220!02MHANA2!P.MvMoment
250
200
150
100
50
15 Sat
22 Sat
1 Tue
8 Tue
Jul 2023
Deepalpur ICT loading
Deepalpur loading
500
400
300
200
100
15 Sat
22 Sat
1 Tue
8 Tue
Jul 2023
Sonepat ICT loading
Sonepat ICT loading
500
450
400
350
300
250
200
150
100
15 Sat
22 Sat
1 Tue
8 Tue
Jul 2023
Kurukshetra ICT
800
700
600
500
400
300
200
100
15 Sat
22 Sat
1 Tue
8 Tue
Jul 2023

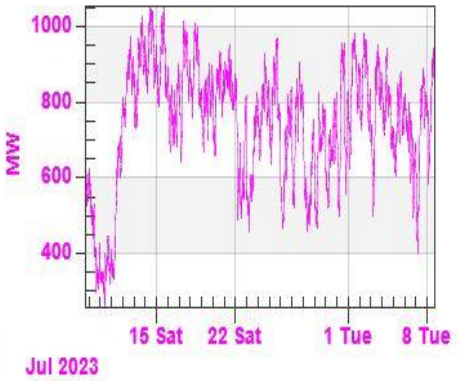
Punjab Import



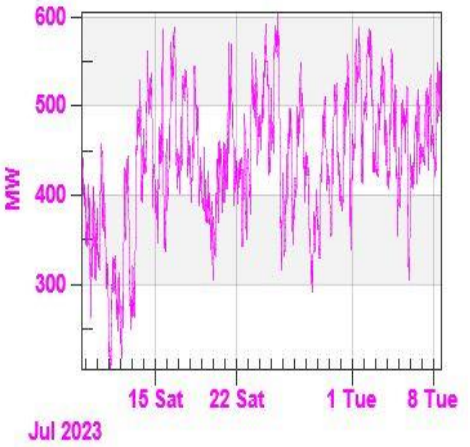
Punjab load



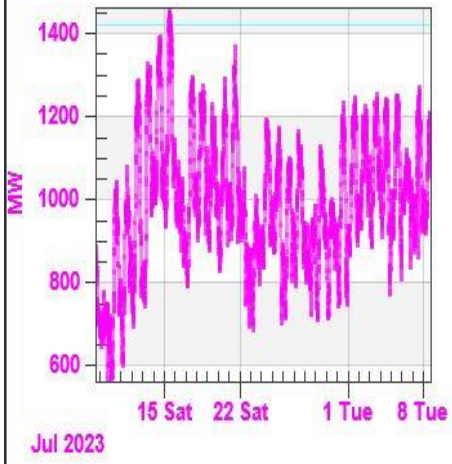
Rajpura ICT load



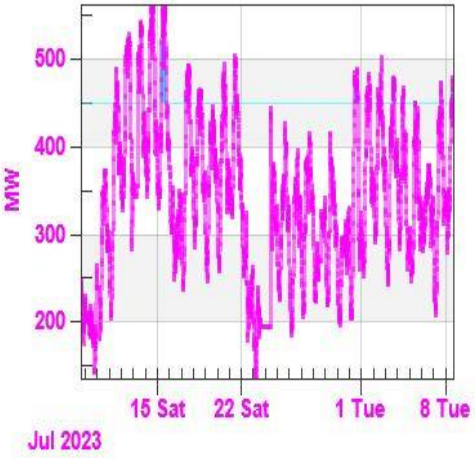
Patiala ICT load



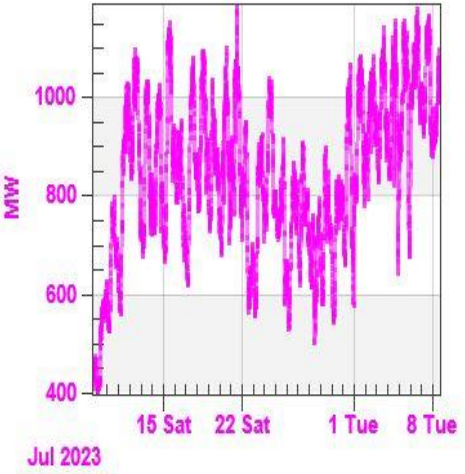
Ludhiana ICT load



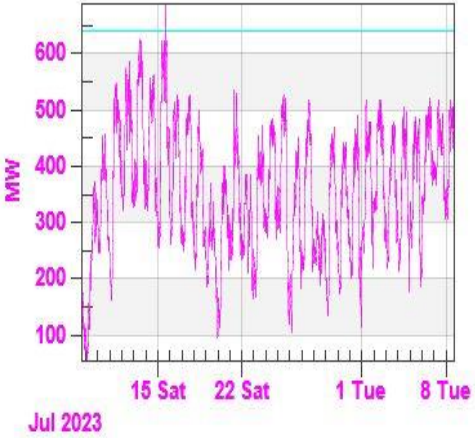
Nakodar ICT load



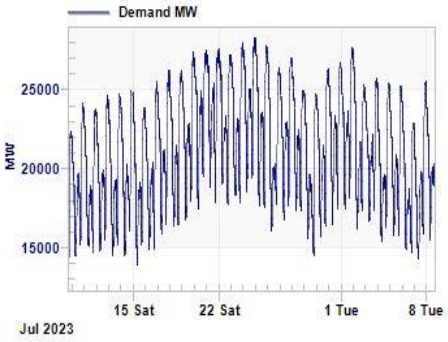
Moga ICT load



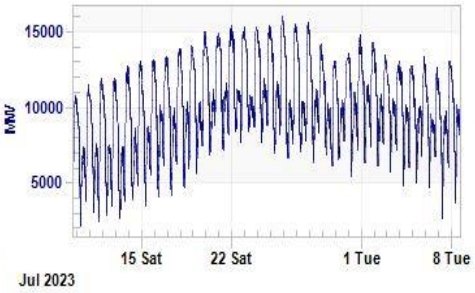
Patran ICT load



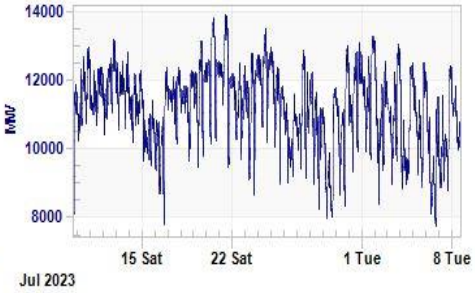
UP Demand



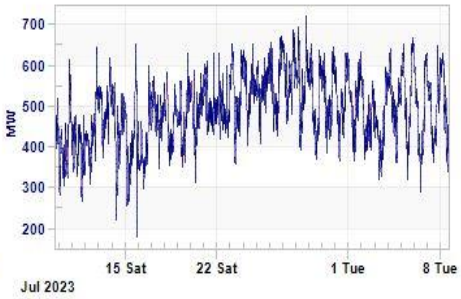
UP Import



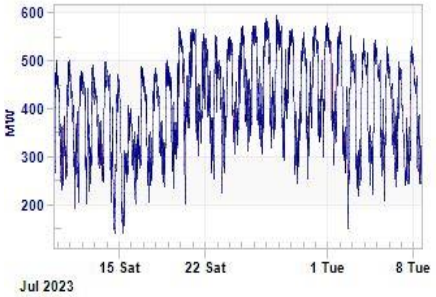
UP own generation



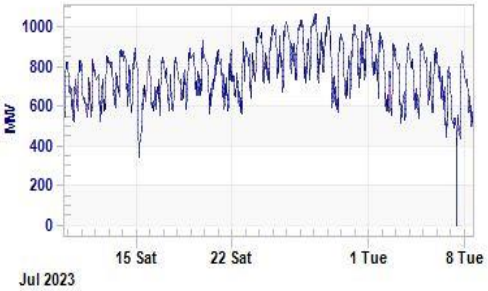
Obra ICT loading



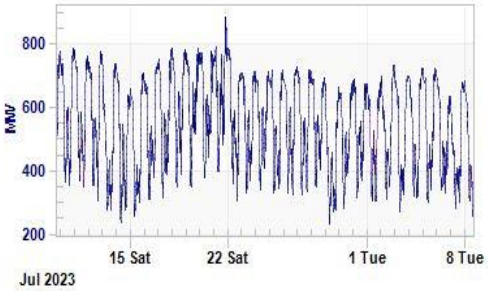
Azamgarh ICT loading



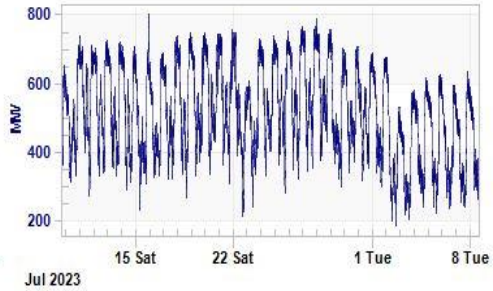
Sarnath ICT loading



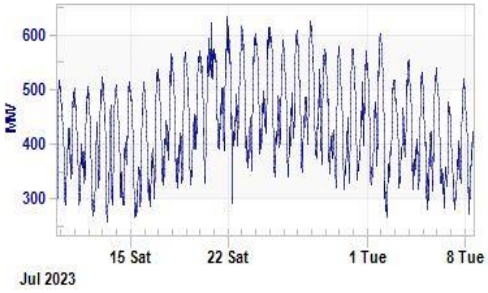
Gorakhpur UP ICT loading



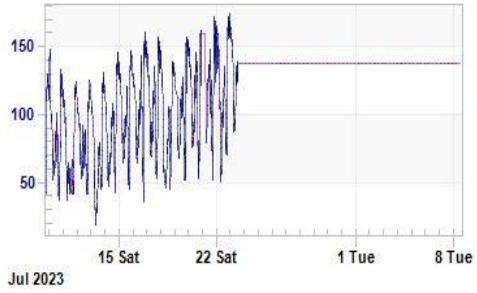
Allahabad ICT loading



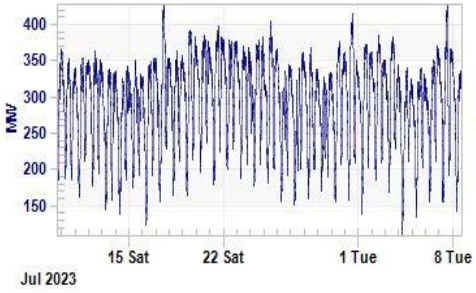
Lucknow(PG) ICT loading



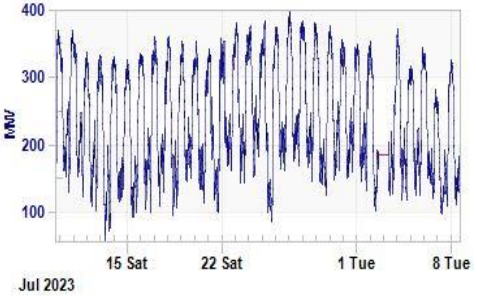
Nehtaur ICT loading



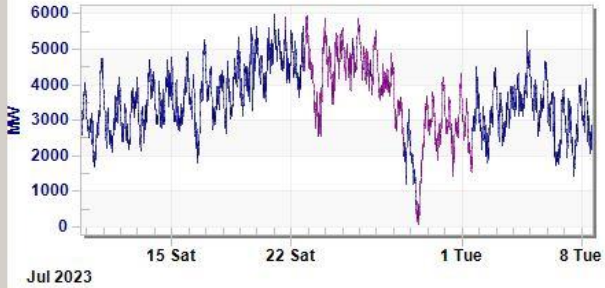
Agra(PG) ICT loading



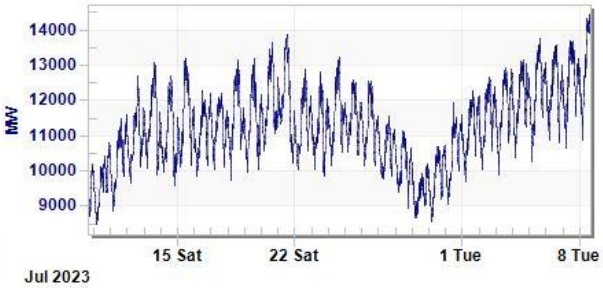
Sohawal ICT loading



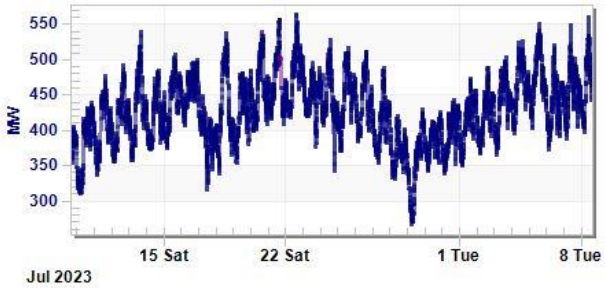
Rajasthan import



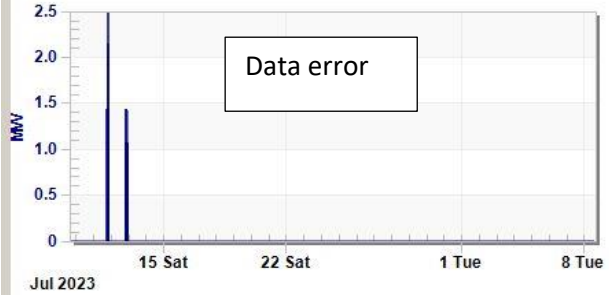
Rajasthan Load



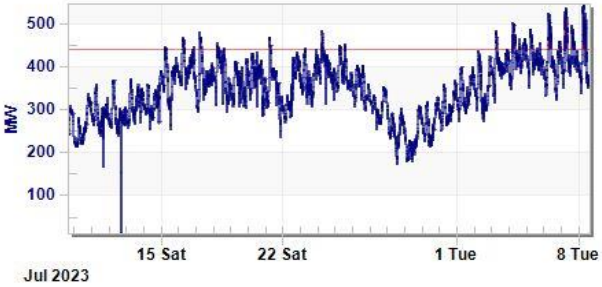
Ajmer ICT loading



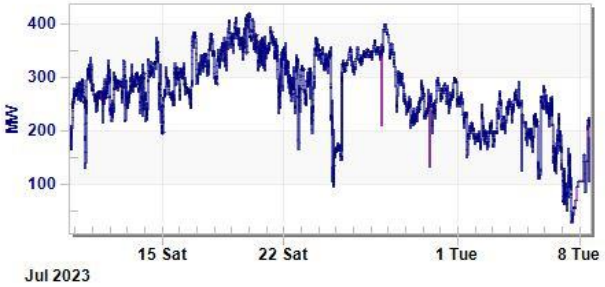
Jodhpur ICT loading



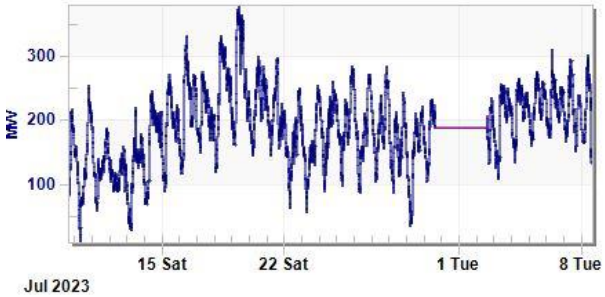
Merta ICT loading



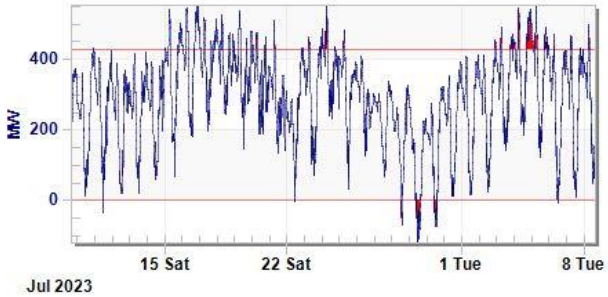
Chittorgarh ICT loading



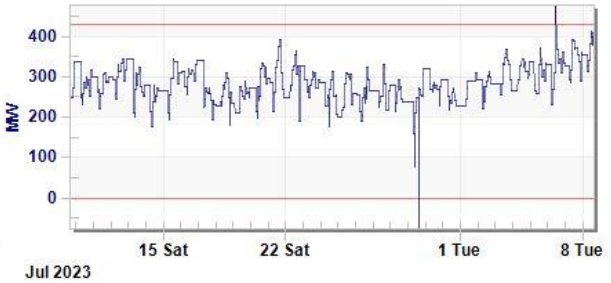
Bhinmal ICT loading



Bikaner ICT loading



Bhilwara ICT loading



Grid Controller of India Limited

Procedure

For

Grid Elements Outage Planning

July 2023

Contents

1. Background

1.1. This procedure is in accordance with *clause 32 (4) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023*.

1.2. The procedure lays down the guidelines for proposal of grid element outages by indenting agency and facilitation of coordinated planned and emergency outages.

2. Introduction

Reliable operation of the All India grid is important from the view point of Quality Of Service (QoS) to the customers and other stakeholders. Proper coordination of transmission element outages in the system is one of the key aspects to ensuring reliability. Outages in the transmission network could either be on account of planned maintenance activities or construction related activities or any emergency conditions arising in the field. Proper coordination of transmission element outage is important mainly due to the following factors:

a) Reliability of operation of the All India grid
b) Certainty to the electricity markets.
c) Proper crew resource mobilization at the work sites to ensure that outage time is minimized.
d) Proper coordination of works by different entities to ensure that outage time is optimised.

Outage Coordination has been one of the important functions of Regional Power Committees (RPCs), State Load Despatch Centres (SLDCs), Regional Load Despatch Centres (RLDCs) and National Load Despatch Centre (NLDC) and is the first stage of operational planning. As per Indian Electricity Grid Code (IEGC), the responsibility to undertake planning of outage of transmission system has been assigned to RPCs. The outages of the inter-state transmission lines and intra state elements which are important for the region are being coordinated by RLDCs. In the cases where the outages may have an impact across two or more regions, coordination is in consultation with NLDC.

3. Objective

At present, following outage categories are being followed

I. ***Planned Outage Category:*** Planned outages are being discussed in respective Operation Coordination Committee (OCC) meeting of RPCs on monthly basis and availed based on the actual grid conditions.

II. ***Post OCC Category:*** Under exceptional cases such as construction activities or urgent nature of works, outage shall be proposed by indenting agency for maximum of two days after the OCC meeting and outage proposal shall be put up to respective RPC-OCC members.

III. ***Emergency Category:*** For attending emergency nature of works, asset owner shall send the proposal directly to RLDC control room and shutdown may be facilitated based on the actual grid conditions.

The approval of planned/Post OCC as well as emergency outages in the transmission network level in real time is being coordinated by RLDCs and NLDC based on system conditions . The procedure aims to streamline the process of outage coordination between SLDCs, RLDCs, NLDC, RPCs, owners of transmission assets and transmission element outage Indenting Agencies. As outage planning is an important part of operational planning, multi-layered checks would help in ensuring reliability of the power system. These checks need to be at the following levels:

- ✓ Due diligence between the agencies involved in the transmission asset maintenance through bilateral discussion.
- ✓ Study sub-committee of RPCs.
- ✓ Operation Co-ordination sub-Committee of RPCs

- ✓ Off-line simulations and planning at SLDCs/RLDCs/NLDC level
- ✓ Real time check at SLDCs/RLDCs/NLDC level

4. Scope

The procedure is applicable to RPCs, RLDCs, NLDC, SLDCs, STUs, load serving entities and indenting agency. It would be applicable once the annual outage plan is finalized by 31st December of each year for the next financial year by the RPCs as per the IEGC.

5. Applicability

The procedure is applicable to important grid elements including bays published by RLDCs/NLDC. This procedure shall also be applicable to other grid elements for the proposed outage period more than 2 days.

6. Procedure for discussing outages in OCC meeting

6.1. ***Indenting Agency:*** The agency which gives the requisition for outage of any transmission element shall be called Indenting Agency. Any of the following may request for outage of any transmission elements:

6.1.1. Transmission Licensees / State Transmission Utilities
6.1.2. Generating Companies
6.1.3.RLDC/NLDC for defence mechanism testing / blackstart mock drills

6.2. Indenting Agency shall submit the proposed shutdown for the next calendar month latest by 05th day of the current month to the RPC Secretariat as per ***Format I.*** Indenting agency/RPC shall also ensure to send the list of Inter regional shutdown and intra-regional lines affecting the transfer capability of any inter regional corridor to NPC/concerned RPCs by 5th day of current month as per ***Format I.***

6.3. In case of shutdown of inter-regional lines and intra-regional lines affecting the transfer capability of any inter regional corridor, the Indenting agency shall submit the shutdown proposal in both the concerned RPCs. To facilitate this broad list of such lines is indicated at ***Annexure-II*** which will be reviewed and updated by NLDC from time to time. The indenting agency may do an internal screening of its outage plan centrally to avoid multiple outages in the same corridor simultaneously. Bilateral discussion between the agencies involved may also be done to minimize outage duration before submitting the outage plan to RPCs.

6.4. RPC Secretariat shall compile all the received proposals and put up the same on its website by 7th day of the month as per ***Format II.***

6.5. System Study sub-committee of RPCs shall study the impact of these outages and based on its recommendations, RPC shall discuss proposed outages in the OCC meeting and prepare a list of

approved transmission outages with the precautions to be taken. RPCs would attempt to schedule all their OCC meetings (i.e., Outage Coordination meeting) between 10th to 15th day of the month so that sufficient time is available both to the Study Committee before the OCC meetings as well as for RLDCs/NLDC (mainly to take care of further changes in the network topology and/or in load generation) after the OCC meeting.

6.6. While approving the shutdowns it shall be ensured that outages in the same corridor shall not be approved simultaneously. It also need to be ensured that all other concerned entities should also complete their work during the shutdown period so as multiple shutdown of same element for work by multiple agencies are avoided. The multiple outages of the transmission element for the same work during the year may also be avoided.

6.7. RPC shall send the list of approved transmission outages to all Indenting agencies/SLDCs/RLDCs/NLDC within 7 days of the OCC meeting and preferably latest by 22nd of the month as per ***Format III.*** The same shall also be displayed on RPC websites.

6.8. Any shutdown proposal which requires approval of more than one RPCs shall be considered approved only if it is approved in all the RPCs.

6.9. All testing related to SPS /HVDC / Mock drill for black start operation (including toggling of SPS) shall be approved in all concerned RPC's and shall be requested as per outage planning procedure.

7. Procedure for proposing Post OCC Category outages

Under exceptional cases such as construction activities or urgent nature of works, outage shall be proposed by indenting agency to respective RPC on D-5 basis. Indenting agency shall propose the outage to concerned RPCs in case of inter-regional (IR)/intra-regional transmission elements affecting IR TTC/ATC on D-5 basis. RPCs would also consult respective SLDCs/RLDC/NLDC before approval on D-4. Only after approval from respective RPCs, shutdown will be considered by RLDC/NLDC. Outage facilitation priority may be given to OCC approved outages. Indenting Agency shall submit the proposed shutdown as per ***Format I.***

8. Procedure for proposing Emergency Category outages

All outages which are not approved in the OCC meeting / Post OCC category, however having impact on human and equipment safety shall be considered under Emergency Outage category. Indenting Agency shall submit the proposed shutdown as per **Format IV.**

9. Approving Load Despatch Centre and Consenting Load Despatch Centre

9.1. **Approving Load Despatch Centre:** The Load Despatch Centre responsible for approving any transmission outage shall be called Approving Load Despatch Centre.

9.2. **Consenting Load Despatch Centre:** The Load Despatch centre whose consent is required by Approving Load Despatch Centre for approving any outage shall be called Consenting Load Despatch Centre. Once the RPCs approve the monthly outage plan and Post OCC category outages, the responsibility of approval of outages shall be as under:

S No	Type of Outage	Consenting Load Despatch Centre	Approving Load Despatch Centre
1	765 kV or above Lines	Concerned RLDCs	NLDC
2	Inter-Regional Lines	Concerned RLDCs	NLDC
3	HVDCs	Concerned RLDCs	NLDC
4	International Interconnections	Concerned RLDCs	NLDC
5	Intra-Regional Lines affecting transfer capability of any inter regional corridor	Concerned RLDCs	NLDC
6	Intra-Regional Lines which does not affect transfer capability of any inter regional corridor and included in the list of important elements of RLDCs (excluding lines covered under S No.1,3,4 and 5)	SLDCs	RLDCs
7	All other lines (excluding S No. 1,2,3,4,5,6)	SLDCs	SLDC
8	Lines having impact on major generating station(having major shareholders in other regions) and chicken neck area	NLDC	RLDCs

10. Procedure for approval of outage on D-3 basis

Planned Outages which have been approved in the OCC meeting or under Post OCC category of a region shall be considered for approval by RLDCs/NLDC on D-3 basis. If an outage is to be availed on say 10th of the month, the indenting agency would punch the readiness in Web portal / forward such requests to the concerned RLDC from 10:00 hrs/06th to 10:00 hrs/07th of the month. In case the request for transmission element outage is not received within the timeline prescribed above, it will be assumed that the indenting agency is not availing the outage.

10.1. In case the owner is not availing the OCC or Post OCC approved outage, the same shall be punched in Web portal / intimated to the respective RLDC from 10:00 hrs of D-4 to 10:00 hrs of D-3.

10.2. Planned Outages which are approved in OCC meeting or Post OCC outages shall only be considered for approval on D-3 basis and priority shall be given to OCC approved outages.

10.3. For all testing or operation related to automatic voltage regulators (AVRs), Power System Stabilizers (PSSs), Power Plant Controllers (PPC), RGMO, etc. indenting agency would send request to concerned RLDC through Web portal /google sheet / through mail from 10:00 hrs of D-4 to 10:00 hrs of D-3.

10.4. **Approval of Outage where Approving Authority is NLDC**

10.4.1. RLDCs shall forward the request for shutdown along with their consent and observations/contingency plan in web portal to NLDC by 10:00hours of D-2 day. Other concerned RLDCs would forward their observations/consent/reservations by 18:00 hours of D-2

10.4.2. NLDC shall approve the outage along with the clear precautions/measures to be taken during the shutdown and inform all concerned RLDCs.

10.4.3. The proposed outages shall be reviewed on day ahead basis depending upon the system conditions and the outages shall be approved/refused latest by 12:00 Hrs of D-1 day through web portal.

10.4.4. In case the outage is approved precautions/measures to be taken during the shutdown shall be stated. In case of refusal, reasons for the same shall be stated by the RLDCs/NLDC.

Sl No	Activity	Day & Time
1	Request of shutdown from Indenting agency to concerned RLDC.	10:00 hrs/D-4 to 10:00 hrs/D-3
2	Forwarding request of shutdown requiring NLDC approval from RLDC to other concerned RLDCs and NLDC (along with the recommendations and study result)	10:00 hrs/D-3 to 10:00hrs/D-2
3	Comments of other RLDCs or NLDC	18:00hrs/D-2
4	Approval or Rejection of Request	12:00hrs/D-1

10.5. Approval of Outage where Approving Authority is RLDC

10.5.1. In case the indenting agency is a state entity, the request for transmission element outage shall be submitted to respective state load despatch centre (SLDC). SLDC shall forward the request for shutdown along with their consent and observations in web portal to RLDC.

10.5.2. In all other cases, the request for transmission element outage shall be submitted to respective RLDC.

10.5.3. RLDC shall study the impact of proposed outages and approve / refuse the outage latest by 12:00 Hrs of D-1 day. A copy of the approval / refusal shall also be sent to NLDC (for 400 kV and above lines) through web portal/email.

10.5.4. In case the outage is approved precautions/measures to be taken during the shutdown shall be stated. In case of refusal, reasons for the same shall be stated by the SLDCs/RLDC

10.5.5. Outages in the same corridor shall not be approved simultaneously and shall be rescheduled. Proposal to be updated in web portal by utility from 10:00 hrs/D-4 to 10:00 hrs/D-3 of rescheduled date within approved month only.

10.6. Approval of Outage where Approving Authority is SLDC

10.6.1. SLDC shall study the impact of proposed outages on the system and approve the outage latest by 12:00 Hrs of D-1 day. A copy of the approval / refusal list shall also be sent to RLDC through E-mail.

10.6.2. Outages in the same corridor shall not be approved simultaneously and shall be rescheduled accordingly.

10.7. In case of any system constraint or any other reason, approving authority may decline the proposed outage by giving the reasons for the same and tentative dates for the shutdown.

10.8. In case, any approved outage is not availed in real time, the same may not be allowed again in that month except the shutdown is not availed due to bad Weather conditions. In such a scenario, indenting agency shall be required to submit a fresh proposal in the next OCC meeting.

10.9. A list of all approved outages for the next day must be available in the RLDCs/NLDC control room by 12:00 hours with a copy of the study results and actions to be taken, if any. This would be studied by the night shift engineers so that the outage can be facilitated the next day morning.

11. Approval for non-important grid elements (Outage period less than 2 days)

Indenting agency shall punch the request in Web portal / through E-mail from 10:00 hrs/D-4 to 10:00 hrs/D-3 to RLDCs for availing the outage of non-important grid elements published by RLDCs. Outage facilitation

priority may be given to OCC/Post OCC approved outages. Indenting Agency shall submit the proposed shutdown as per ***Format I.***

12. Approval of Emergency Outages

12.1. All outages which are not approved in the OCC meeting but having impact on human and equipment safety shall be considered under Emergency Outage category.

12.2. The request for emergency outage shall be submitted along with the details like nature of emergency, proof of emergency, relevant photograph, impacts due to emergency situation, reasons and associated facts for not considering in the outage planning process.

12.3. Emergency outages shall be allowed subject to system conditions and its severity. In this case, if required, planned outage may be deferred, if possible.

12.4. Emergency outages shall be allowed immediately or within the short possible time, based on the severity of the emergency and system condition on instance to instance basis.

13. Availing Outages in real time

13.1. The agencies involved shall ensure availing of outages as per the approved schedule time.

13.2. On the day of outage, the outage availing agency shall seek the code for availing outage from respective RLDC(s) /NLDC (wherever applicable). The agencies involved shall endeavour to avail the outage within 15 minutes of availing the code but not later than 30 minutes. In case, due to any contingency, the outage could not be availed within 15 minutes but not later than 30 minutes, a fresh code needs to be obtained by all concerned agencies stating the reason there of Record of scheduled and actual time of outage and restoration shall be maintained at RLDCs/NLDC.

13.3. As any deviation in the outage from the schedule can affect other planned outages as well as affect reliability and electricity markets, indenting agency must strictly adhere to the shutdown timings.

13.4. The status of transmission elements planned vs. availed by the indenting agency shall be prepared by RLDCs and same to be discussed in ensuing OCC for better planning or coordination by requesting agencies. A suggestive format is enclosed as ***Format V***

14. Normalization of Outages

14.1. All effort shall be made by the Indenting agency to normalise the shut down within approved time period so that the transmission element is normalised within the approved time period.

14.2. On completion of the outage work, the outage availing agency shall seek the code for normalisation of elements from respective RLDC(s)/NLDC (wherever applicable). The agencies involved shall endeavour to normalise the outage within 15 minutes of availing the code but not later than 30 minutes. In case, due to any contingency, the normalisation could not be done within 15 minutes but not later than 30 minutes, a fresh code needs to be obtained by all concerned agencies stating the reason thereof.

14.3. In case of extension of a shutdown, the Indenting agency would furnish the reasons of extension, and expected normalisation time to concerned RLDC/SLDC at least one hour before the scheduled normalisation time.

14.4. In case shutdown is extended beyond one day, then utility should approach to respective OCC forum for consent/approval with proper reason and justification of delay with a copy to RLDCs/NLDC. Extension of shutdown will be allowed only after obtaining consent from respective OCC forum.

14.5. Under such circumstances SLDCs/RLDCs/NLDC shall review the impact of such delay on the shutdown already approved transmission system and would reserve the right to review for according/cancellation of the shutdown.

14.6. In case of repeated delay in normalisation of outages by any agency, the same shall be reported by SLDCs/RLDCs/NLDC to RPCs.

15. Revision of Procedure

15.1. The procedure shall be reviewed and revised by NLDC after stakeholder consultation and with intimation to the Commission.

15.2. Under exigencies, the procedure shall be reviewed and revised by NLDC with intimation to the Commission. Stakeholder consultation shall follow subsequently.

List of Annexures:

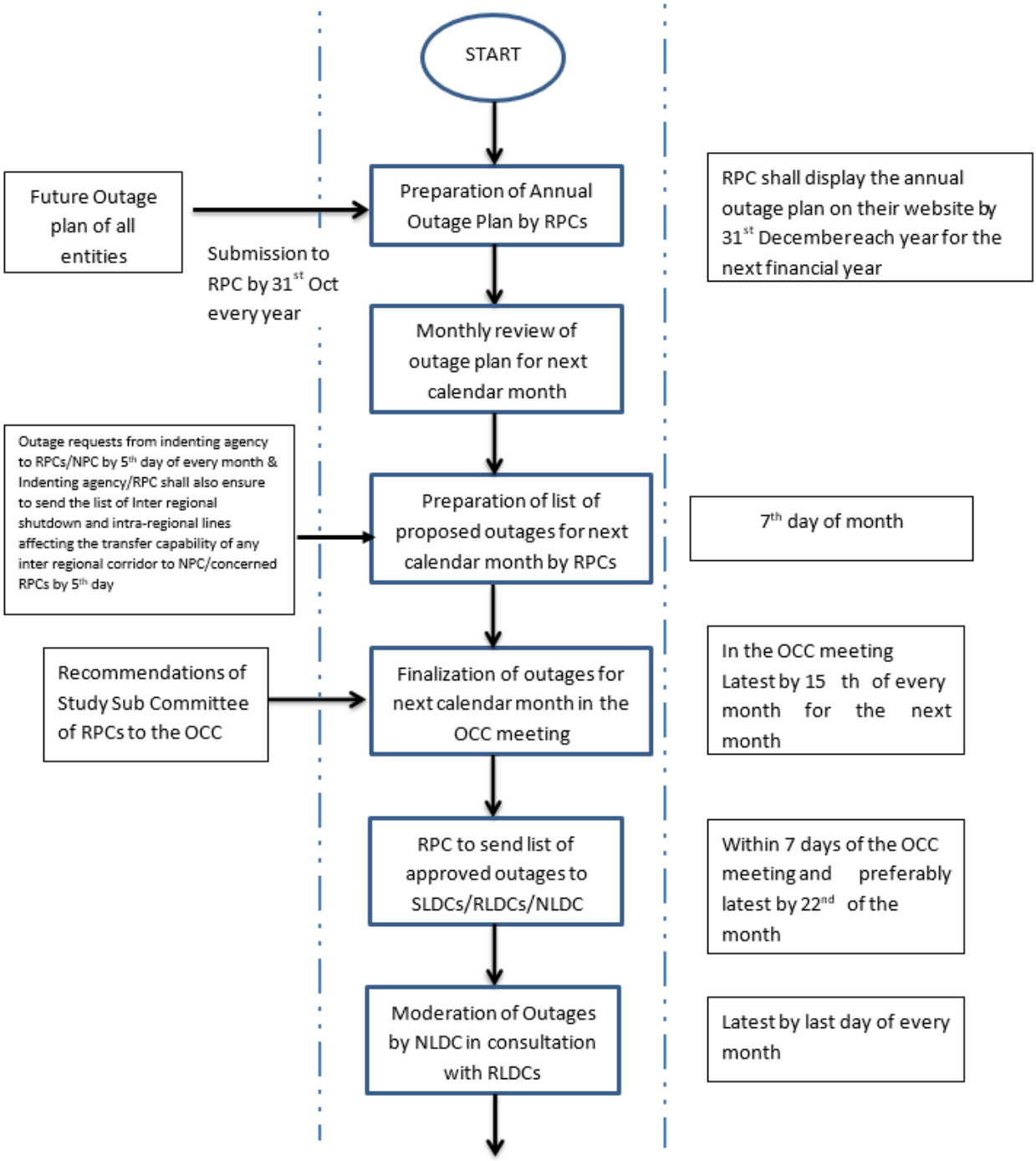
Sl No.	Annexure No	Title
1	Annexure I	Flow Chart of Transmission Outage Planning
2	Annexure II	Important Elements of NLDC

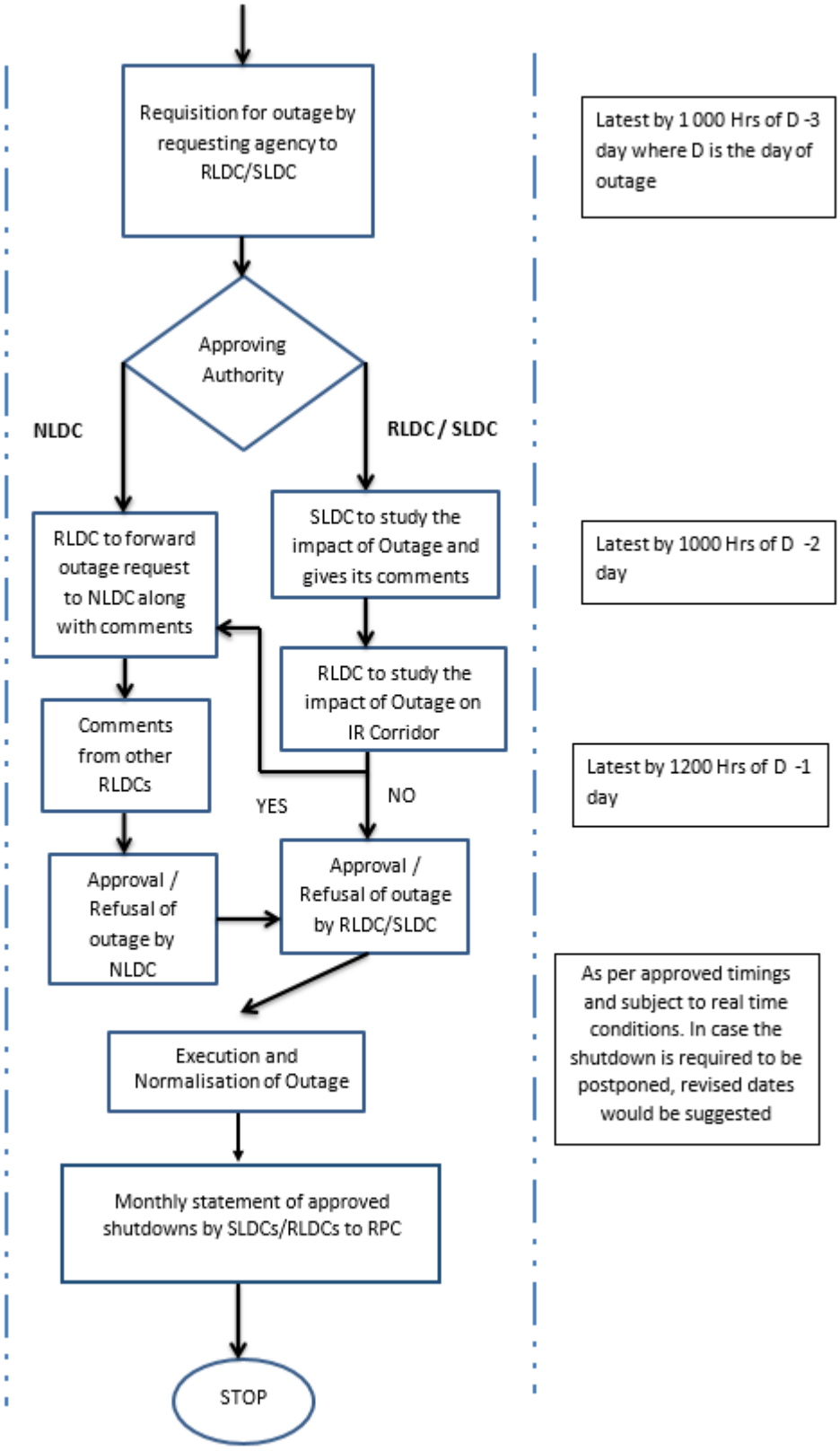
List of Formats:

Sl No.	Format	Title	From (Agency)	To (Agency)
1	Format I	Request for Transmission Element Outage	Indenting Agency	RPC
2	Format II	List of monthly proposed shutdowns of Transmission elements	RPC	Website
3	Format III	List of monthly approved shutdowns of Transmission elements	RPC	NLDC/RLDC/SLDC/All Indenting agencies
4	Format IV	Request for emergency outage	Indenting Agency	RLDC
5	Format V	Status of transmission elements planned vs. availed	RLDC	RPC

Annexure I

Flow Chart: Transmission Elements Outage Planning




Requisition for outage by requesting agency to RLDC/SLDC
Latest by 1000 Hrs of D -3 day where D is the day of outage
Approving Authority
NLDC
RLDC / SLDC
RLDC to forward outage request to NLDC along with comments
SLDC to study the impact of Outage and gives its comments
Latest by 1000 Hrs of D -2 day
RLDC to study the impact of Outage on IR Corridor
Comments from other RLDCs
YES
NO
Latest by 1200 Hrs of D -1 day
Approval / Refusal of outage by NLDC
Approval / Refusal of outage by RLDC/SLDC
As per approved timings and subject to real time conditions. In case the shutdown is required to be postponed, revised dates would be suggested
Execution and Normalisation of Outage
Monthly statement of approved shutdowns by SLDCs/RLDCs to RPC
STOP

Annexure II

NEW Grid to SR:

S No	Element Name	TTC/ATC Impact	
1	HVDC Talcher-Kolar Single Pole	ER-SR	NA
2	Talcher-Kolar Bipole	ER-SR	NA
3	HVDC Raigarh - Pugalur Monopole	NA	WR-SR
4	HVDC Raigarh - Pugalur Bipole	NA	WR-SR
5	HVDC Raigarh - Pugalur Bipole 1 & 2	NA	WR-SR
6	Gazuwaka Block- 1 (Flow on other block increased to 500 MW)	ER-SR	NA
7	Gazuwaka Block -1 & 2	ER-SR	WR-SR
8	Bhadrawati Block - 1	ER-SR	WR-SR
9	Bhadrawati Block -1 & 2	ER-SR	WR-SR
10	765 kV Wardha- Nizamabad S/C	NA	WR-SR
11	765 kV Wardha- Nizamabad D/C	NA	WR-SR
12	765 kV Srikakulam- Vemagiri S/C	ER-SR	NA
13	765 kV Srikakulam- Vemagiri D/C	ER-SR	WR-SR
14	765 kV Raichur-Solapur S/C	NA	WR-SR
15	765 kV Raichur-Solapur D/C	ER-SR	WR-SR
16	765 kV Nizamabad - Maheshwaram S/C	ER-SR	WR-SR
17	765 kV Nizamabad - Maheshwaram D/C	ER-SR	WR-SR
18	765 kV Angul-Srikakulam S/C	ER-SR	WR-SR
19	765 kV Angul-Srikakulam D/C	ER-SR	WR-SR
20	400 kV Jeypore - G'waka S/C	ER-SR	WR-SR

21	400 kV Jeypore - Bolangir S/C	ER-SR	WR-SR
22	400 kV Jeypore - Indravati S/C	ER-SR	WR-SR
23	400 kV Indravati - Rengali S/C	ER-SR	WR-SR
24	400/220 kV 315MVA Jeypore ICT	ER-SR	WR-SR
25	220 KV Jeypore-Jeynagar S/C	ER-SR	WR-SR
26	765 kV Aurangabad- Solapur S/C	NA	WR-SR
27	765 kV Aurangabad- Solapur D/C	NA	WR-SR
28	765 kV Aurangabad- Pagdhe S/C	NA	WR-SR
29	765 kV Aurangabad-Pune S/C	NA	WR-SR
30	765 kV Vemagiri- Chilkaluripeta S/C	ER-SR	NA
31	765 kV Vemagiri- Chilkaluripeta D/C	ER-SR	NA
32	765 kV Gadarwara- Warora S/C	NA	NA
33	765 kV Gadarwara- Warora D/C	NA	NA
34	765 kV Warora- Rajnandgaon S/C	NA	NA
35	765 kV Warora- Rajnandgaon D/C	NA	WR-SR
36	765 kV Durg-Rajnandgaon S/C	NA	NA
37	765 kV Durg-Rajnandgaon D/C	NA	NA
38	765 kV Warora-New Parli S/C	NA	WR-SR
39	765 kV Warora-New Parli D/C	NA	WR-SR
40	765 kV New Parli-Solapur S/C	NA	WR-SR

41	765 kV New Parli-Solapur D/C	NA	WR-SR
42	765 kV Seoni-Bilaspur S/C	NA	NA
43	765 kV Seoni-Bilaspur D/C	NA	NA
44	765 kV Seoni-Wardha S/C	NA	NA
45	765 kV Seoni-Wardha D/C	NA	NA
46	765 kV Durg-Wardha D/C	NA	NA
47	765 kV Wardha- Aurangabad D/C	ER-SR	WR-SR
48	765/400 kV single ICT at Nizamabad	ER-SR	WR-SR
49	765/400 kV single ICT at Maheshwaram	ER-SR	WR-SR
50	765/400 kV single ICT at Srikakulam	ER-SR	NA
51	765/400 kV single ICT at Vemagiri	NA	WR-SR

SR to WR:

S No	Element Name	TTC/ATC Impact
1	HVDC Raigarh - Pugalur Monopole	SR-WR
2	HVDC Raigarh - Pugalur Bipole	SR-WR
3	HVDC Raigarh - Pugalur Bipole 1 & 2	SR-WR
4	Gazuwaka Block- 1	SR-WR
5	Gazuwaka Block -1 & 2	SR-WR
6	Bhadrawati Block - 1	SR-WR
7	Bhadrawati Block -1 & 2	SR-WR
8	765 kV Raichur- Solapur S/C	SR-WR
9	765 kV Raichur- Solapur D/C	SR-WR
10	765 kV Aurangabad- Solapur S/C	SR-WR
11	765 kV Aurangabad- Solapur D/C	SR-WR
12	765 kV Aurangabad- Pagdhe S/C	SR-WR
13	765 KV Pune- Solapur	SR-WR

14	765 kV Aurangabad- Pune S/C	SR-WR
15	765 kV Warora- Rajnandgaon S/C	SR-WR
16	765 kV Warora- Rajnandgaon D/C	SR-WR
17	765 kV Warora- New Parli S/C	SR-WR
18	765 kV Warora- New Parli D/C	SR-WR
19	765 kV Seoni- Bilaspur D/C	SR-WR
20	765 kV Wardha- Aurangabad D/C	SR-WR
21	400 KV Kolhapur(MS)-Kolhapur(PG- S/C	SR-WR

NR to WR:

S No	Element Name	TTC/ATC Impact
1	Mundra Mahindragarh single pole	NR-WR
2	Mundra Mahindragarh Bipole	NR-WR
3	400 kV Kankroli - Zerda	NR-WR
4	one circuit of 765 kV Chhitorgarh - Banaskantha D/C	NR-WR
5	one circuit of 765 kV Chhitorgarh - Ajmer D/C	NR-WR
6	400 kV Kankroli - Jodhpur	NR-WR
7	HVDC Balia- Bhiwadi Monopole	NR-WR
8	One Circuit of Bikaner - Khetri D/C	NR-WR
9	One Circuit of Bhadla II - Ajmer D/C	NR-WR
10	One Circuit of RAPP-C - Shujalpur D/C	NR-WR
11	One Circuit of 400 kV Banaskatha - Veloda D/C	NR-WR
12	HVDC Vindhyanchal HVDC Monopole (NR - WR)	NR-WR
13	765 kV Dhule - Vadodara S/C	NR-WR
14	765 kV Indore - Vadodara S/C	NR-WR
15	one 765/400 kV, 1500 MVA ICT at Banaskantha	NR-WR

WR to NR and ER-NR:

S No	Element Name	TTC/ATC Impact	
1	Mundra Mahindragarh single pole	NA	ER-NR
2	Mundra Mahindragarh Bipole	WR-NR	ER-NR
3	Champa Kurukshetra single pole	WR-NR	ER-NR
4	Champa Kurukshetra bipole	WR-NR	ER-NR
5	Champa Kurukshetra Pole 1, 2 & 3	WR-NR	ER-NR
6	Champa Kurukshetra Pole 1, 2, 3 & 4	WR-NR	ER-NR
7	APD - Agra Pole single pole	NA	ER-NR
8	765 kV Vindhyachal - Varanasi S/C	WR-NR	ER-NR
9	765 kV Agra - Jhatikara S/C	NA	ER-NR
10	765 kV Aligarh-Jhatikara S/C	NA	ER-NR
11	765 kV Phagi - Gwalior S/C	NA	ER-NR
12	765 kV Agra - Gwalior S/C	WR-NR	ER-NR
13	765 kV Agra - Fatehpur S/C	NA	ER-NR
14	765 kV Phagi-Bhiwani S/C	NA	ER-NR
15	765 kV Phagi-Ajmer S/C	NA	ER-NR
16	765 kV Anpara C-Unnao Line	NA	ER-NR
17	765 kV Gwalior - Orai S/C	NA	ER-NR
18	765 kV Aligarh - Orai S/C	WR-NR	ER-NR
19	765 kV Satna-Orai Line	WR-NR	ER-NR
20	765 kV Satna-Gwalior Line	WR-NR	ER-NR
21	765 kV Satna-Bina S/C	NA	ER-NR
22	765 kV Aligarh-Greater Noida S/C	NA	ER-NR
23	765 kV Fatehabad-Greater Noida S/C	NA	ER-NR
24	765 kV Chhitorgarh - Banaskantha S/C	NA	ER-NR
25	765 kV Chhitorgarh - Ajmer S/C	NA	ER-NR

26	765 kV Bhadla - Bikaner S/C	NA	ER-NR
27	765 kV Bhadla II - Ajmer S/C	NA	ER-NR
28	765 kV Jabalpur - Orai S/C	NA	ER-NR
29	765 kV Agra - Aligarh S/C	NA	ER-NR
30	765 kV Gaya - Varanasi S/C	NA	ER-NR
31	765 kV Gaya - Balia S/C	NA	ER-NR
32	765 kV Jabalpur - Vindhyachal S/C	NA	ER-NR
33	400 kV Gaya-Chandwa-S/c	NA	ER-NR
34	400 kV Gaya-Chandwa-D/c	NA	ER-NR
35	400 kV Ranchi-Chandwa S/C	NA	ER-NR
36	400 kV Ranchi-Chandwa-D/c	NA	ER-NR
37	765 kV Vindhyachal - Varanasi D/C	WR-NR	ER-NR
38	765 kV Vindhyachal - Jabalpur D/C	WR-NR	ER-NR
39	765 kV Agra - Gwalior D/C	WR-NR	ER-NR
40	765 kV Agra - Fatehpur D/C	NA	ER-NR
41	765 kV Phagi - Gwalior D/C	WR-NR	ER-NR
42	765 kV Phagi-Bhiwani D/C	NA	ER-NR
43	765 kV Phagi-Ajmer D/C	NA	ER-NR
44	765 kV Aligarh - Orai-D/c	WR-NR	ER-NR
45	765 kV Chhitorgarh - Banaskantha D/C	NA	ER-NR
46	765 kV Chhitorgarh - Ajmer D/C	NA	ER-NR
47	765 kV Bhadla - Bikaner D/C	NA	ER-NR
48	765 kV Bhadla - Ajmer D/C	NA	ER-NR
49	one 765/400 kV, 1500 MVA ICT at Vindhyachal	NA	ER-NR
50	one 765/400 kV, 1500 MVA ICT at Satna	NA	ER-NR
51	one 765/400 kV, 1500 MVA ICT at Varanasi	NA	ER-NR
52	one 765/400 kV, 1500 MVA ICT at Agra	NA	ER-NR
53	one 765/400 kV, 1000 MVA ICT at Orai	NA	ER-NR
54	one 765/400 kV, 1500 MVA ICT at Phagi	NA	ER-NR

Format I: Request For Transmission Element Outage by indenting agency to RPC

Format I: Request For Transmission Element Outage by Indenting agency to RPC												
Indenting Agency						For the month				Date		
S No	Request Type	OCC Number	Name of Requesting Agency	Element Name	Daily/ Continuous	Reason	From Date	From Time	To Date	To Time	Remarks	Tag
1	PLANNED/ Post OCC	OCC_XXX			C							Outage
2	PLANNED/ Post OCC	OCC_XXX			D							Outage
3	PLANNED/ Post OCC	OCC_XXX			C							Online
4	PLANNED/ Post OCC	OCC_XXX			D							Online
6	PLANNED/ Post OCC	OCC_XXX			C							AR in non-auto
7	PLANNED/ Post OCC	OCC_XXX			D							AR in non-auto
.												

Format II: List of Received Proposals for Transmission Element Outage from Different Agencies

Format II: List of Received Proposals for Transmission Element Outage from Different Agencies												
Name of RPC						For the month				Date		
S No	Request Type	OCC Number	Name of Requesting Agency	Element Name	Daily/ Continuous	Reason	From Date	From Time	To Date	To Time	Remarks	Tag
1	PLANNED /Post OCC	OCC_XXX			C							Outage
2	PLANNED /Post OCC	OCC_XXX			D							Outage
3	PLANNED /Post OCC	OCC_XXX			C							Online
4	PLANNED /Post OCC	OCC_XXX			D							Online
6	PLANNED /Post OCC	OCC_XXX			C							AR in non-auto
7	PLANNED /Post OCC	OCC_XXX			D							AR in non-auto
.												

Format III: List of OCC approved shutdowns of Transmission Elements

Format III: List of OCC approved shutdowns of Transmission Elements														
Name of RPC						For the month				Date				
Request Id	Request Type	OCC Number	Name of Requesting Agency	Element Name	Owner	Daily/ Continuous	Reason	From Date	From Time	To Date	To Time	RLDC/NLDC Remarks	RPC Status	RPC Remarks
													Approved	
													Deferred	
													Approved	
													Deferred	

Format IV: Request for Transmission Element Outage by Indenting Agency to RLDC/SLDC

Request for emergency shutdown of elements to be submitted by requesting utility		
1	Element Name	
2	Reason	
3	Proposed Shutdown start Date and time	
4	Proposed Shutdown end Date and time	
5	Daily basis or continuous basis	
6	Proof of emergency (Attachment to be added along with outage proposal)	
7	Any other element/bay is under out in outage proposed stations	
8	Quantum of load or area affected during the outage	
9	Previous maintenance work carried out date	
10	Name and Designation of the officer responsible for site work	
11	Site contact number/responsible officer contact number	
12	Utility Remarks	
13	SLDC Remarks/Consent	

Format V: Monthly Shutdown Report for Transmission Elements by RLDCs

S No.	Name of Constituent	No. of outages planned in OCC	No. of planned outages in Post OCC	Total planned outages	Number of final outages approved	Number of actual outages availed	Availed vs Planned (%)	Availed Vs Approved (%)
		(a)	(b)	(c) = (a+b)	(d)	(e)	(f) = (e/c)	(g) = (e/d)
1	Constituen-1							
2	Constituen-2							
3								
4								
. . .								
	XXX Region							

Annexure-B.IV

NORTH CENTRAL RAILWAY

ग्रिड-इंडिया/GRID-INDIA
/NRLDC
08 AUG 2023
प्राप्त किया/RECEIVED
नई दिल्ली/NEW DELHI

Electrical (TRD)
DRM Office
Prayagraj
Email: srdeetrdald123@gmail.com

No. 230-Elect/TRD/PRYJ/TSS-GSS/1030

Date: 31.07.2023

Control Officer
Grid Controller of India Limited
Northern Regional Load Dispatch Centre
18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai
New Delhi-110016
E-mail :- nrldcso@grid-india.in

Sub: To control over voltage power supply from NTPC/Phaphund (Auraiya) to RailwayGSS at Phaphund.
Ref: This office letter no. 230-Elect/TRD/PRYJ/TSS-GSS/781 dated 05.06.2023

On 29.07.2023, 220 kV circuit-I supply to Phaphund Railway GSS got interrupted from NTPC/Phaphund, Auraiya at 06:01 hrs due to overvoltage (242 kV). Supply got resumed at 06:41 hrs. Before this, on 27.05.2023 also 220 kV supply had got interrupted.

Over voltage from NTPC Auraiya has become a frequent event at 220/132 kV Phaphund Railway GSS since last few months. Overflux alarm appears almost daily, even multiple times some days. On 30.07.2023, 5 instances of over flux appeared. NRLDC is being informed telephonically on every tripping.

Vide this office letter under reference, NRLDC was requested to take corrective action to control over voltage. However, problem is still to be resolved.

Trippings on over voltage lead to punctuality loss of mail/express trains on main line busy New Delhi-Howrah route. Frequent over voltage deteriorates health of power transfor... associated equipments.

It is again requested to take corrective action in thi...

(...ivek Kumar Singh)
...r. Divisional Electrical Engineer
(Traction Distribution)
North Central Railway
Prayagraj

CGM/...

Copy to: Dy.GM/Operation/NTPC,Auraiya, Post-Dibiyapur, Dist- Auraiya-206244 for necessary action.

Sr No	Element Name	Outage Date	Outage Time	Reason
1	220 KV Nara(UP)-Roorkee(UK) (UP) Ckt-1	06-Jul-23	14:59	Phase to earth fault Y-N. As per PMU, Y-N fault occured, no auto-reclosing is observed.
		07-Jul-23	19:35	Phase to Ground Fault R-N. As per PMU, R-N fault occured, no auto-reclosing is observed.
		10-Jul-23	15:25	Phase to earth fault Y-N. As per PMU, B-N fault occured, no auto-reclosing is observed.
		11-Jul-23	16:15	Phase to earth fault R-N. As per PMU, no fault is observed.
		12-Jul-23	08:21	Phase to Phase Fault Y-B. As per PMU, B-N fault occured, no auto-reclosing is observed.
		26-Jul-23	05:30	Earth fault. As per PMU, R-N fault occurred and delayed clearance of 1400ms with no auto-reclosing observed.
		28-Jul-23	07:13	Phase to Ground Fault R-N. As per PMU, R-N fault occured, no auto-reclosing is observed.
2	220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2	03-Jul-23	12:26	Phase to Ground Fault R-N. As per PMU, R-N fault occured, no auto-reclosing is observed.
		12-Jul-23	16:40	Phase to earth fault Y-N. As per PMU, Y-N fault followed by R-B fault is observed.
		14-Jul-23	02:48	Bus Bar Protection Operated. As per PMU, 3-phase to ground fault followed by Y-N phase to ground fault is observed with fault clearing time of 80 ms
		21-Jul-23	00:44	Phase to earth fault Y-N. As per PMU, Y-N fault occured, no auto-reclosing is observed.
3	220 KV Saharanpur(PG)-Shamli(UP) (UP) Ckt-1	02-Jul-23	16:25	Phase to earth fault B-N. As per PMU, B-N fault occured, no auto-reclosing is observed.
		28-Jul-23	02:20	Earth fault. As per PMU, B-N fault occurred and delayed clearance of 400ms with no auto-reclosing observed.
		28-Jul-23	11:27	Snapping of Earth wire. As per PMU, no fault is observed.
		30-Jul-23	12:02	Phase to earth fault Y-N. As per PMU, Y-N fault occured, no auto-reclosing is observed.
4	400 KV Bareilly-Unnao (UP) Ckt-1	01-Jul-23	06:39	Bus Bar Protection Operated. As per PMU, no fault is observed.
		22-Jul-23	12:15	Phase to earth fault B-N. As per PMU, B-N fault occured, successful autoreclsoing at Unnao end and unsuccessful A/R at Bareilly end is observed. Fault was of transient nature.
		28-Jul-23	10:23	Phase to earth fault R-N. As per PMU, R-N fault and unsuccessful auto-reclosing observed at both ends. Fault was of transient nature.
		28-Jul-23	20:43	Phase to earth fault Y-N. As per PMU, Y-N fault occured, successful autoreclsoing at Unnao end and unsuccessful A/R at Bareilly end is observed. Fault was of transient nature.
5	400 KV Heerapura-Hindaun (RS) Ckt-1	01-Jul-23	06:39	DT received at Hindaun.
		22-Jul-23	12:15	DT received at Hindaun.
		28-Jul-23	10:23	DT received at Hindaun end. CB not tripped at Heerapura end.
		28-Jul-23	20:43	PLCC maloperation
6	220 KV NAPP(NP)-Khurja(UP) (UP) Ckt-1	15-Jul-23	10:20	Phase to earth fault B-N. As per PMU, B-N fault occured, no auto-reclosing is observed.
		19-Jul-23	18:57	Phase to earth fault B-N. As per PMU, B-N fault occured, no auto-reclosing is observed.
		26-Jul-23	08:53	Phase to earth fault Y-N. As per PMU, B-N fault occured, no auto-reclosing is observed.
		28-Jul-23	04:20	Bus Bar Protection Operated. As per PMU, no fault is observed.

Annexure-B.VI

Grid Event summary for July 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		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)	
1	GI-2	1) 400KV Bus 1 at Bareilly(UP) 2) 400/220 kV 315 MVA ICT 3 at Bareilly(UP) 3) 400 KV Bareilly-Unnao (UP) Ckt-1 4) 400 KV Bareilly(UP)-Bareilly(PG) (PG) Ckt-1 5) 80 MVAR Bus Reactor No 1 at 400KV Bareilly(UP)	Uttar Pradesh	UPPTCL, PGCIL	1-Jul-23	06:39	1-Jul-23	10:34	03:55	i) 400/220kV Bareilly(UP) has double main transfer bus scheme at both 400kV & 220kV level. During antecedent condition, 400/220 kV 315 MVA ICT 3 at Bareilly(UP), 400 KV Bareilly-Unnao (UP) Ckt-1, 400 KV Bareilly(UP)-Bareilly(PG) (PG) Ckt-1 and 80 MVAR Bus Reactor No 1 at 400KV Bareilly(UP) were connected to 400KV Bus 1 at Bareilly(UP) and rest of the elements were connected to Bus 2. ii) As reported, at 06:39 hrs on 01st July, 2023, 400KV Bus 1 at Bareilly(UP) tripped due to bus bar protection mal-operation and hence all the elements connected to Bus 1 also tripped and Bus 1 became dead. iii) As per PMU at 400kV Bareilly(PG), no fault is observed in the system. iv) As per SCADA, no change in demand is observed in UP control area. After tripping load shifted to remaining 400/220/33 kV 315 MVA ICT 1 & 2 at Bareilly(UP).	0	0	0	0	0.000	0.000	45312	52864	NA
2	Gi-1	1) 220/66kV 80/100MVA ICT-1 at Uperlanangal(HP) 2) 220/66kV 80/100MVA ICT-2 at Uperlanangal(HP)	Himachal Pradesh	HPPTCL	1-Jul-23	16:08	1-Jul-23	16:14	00:06	i) 220/66kV Uperlanangal (HP) has double main bus scheme at both 220kV & 66kV level. During antecedent condition, power was flowing through 220/66kV 80/100MVA ICT-1 & 2 at Uperlanangal(HP) to the feeders connected at 66kV level of Uperlanangal (HP). ii) As reported, at 16:08 hrs on 01.07.2023, 220/66kV 80/100MVA ICT-1 at Uperlanangal(HP) tripped on R-Phase overcurrent earth fault (Ir=~1.12kA) on fault in 66kV feeder. Due to this, 220/66kV 80/100MVA ICT-2 at Uperlanangal(HP) also tripped due to overloading. This resulted in further unloading of feeders connected at 66kV level and load loss at Uperlanangal (HP). iii) As per PMU at 400kV Nallagarh(PG), no fault is observed in the system. HP has been communicated to share the DR/EL for confirmation of fault nature and location. iv) As per SCADA, change in demand of approx. 150MW is observed in HP control area. v) As reported by SLDC-HP, similar events are observed at 23:08hrs on 24.06.2023, 23:46hrs on 26.06.2023, 07:08hrs on 27.06.2023, 04:26hrs and 09:29hrs on 28.06.2023 where 66KV Ambuja and Sanerh feeder relay operated and as fault did not clear by opening of these two feeders, further tripping of 220/66kV 80/100MVA ICT-1 & 2 at Uperlanangal(HP) occured. P&T team visited at site on 28.06.2023. All settings were checked and found okay, but reason for tripping was not found. P & T Team again visited at site on 02.07.2023 after tripping on 01.07.2023 and testing and assessment of fault is in progress.	0	0.015	0	150	0.000	0.236	54276	63555	NA
3	GI-1	1) 220 kV Bawana – Shalimarbagh (DTL) Ckt-1	Delhi	DTL	3-Jul-23	12:24	3-Jul-23	12:32	00:08	i) During antecedent condition, 220kV Bawana –Shalimarbagh Ckt.-I, 220kV Shalimarbagh – Wazirpur Ckt. I & II, 220kV Shalimarbagh – DMRC Ckt. –I, 220kV Shalimarbagh – SGTN Ckt. I&II and 220kV Shalimarbagh – Rohini-I Ckt –I were connected to 220kV Bus-1 at Shalimarbagh(DTL) and 220kV Bawana –Shalimarbagh Ckt.-II, 220kV Shalimarbagh – DMRC Ckt. –II, 220/33kV 100MVA Pr. Tr. –I, 220/66kV 100MVA Pr. Tr. –II, 220/33kV 100MVA Pr. Tr.-III, 220kV Shalimarbagh – DMRC Ckt. –II were connected to 220kV Bus-2 at Shalimarbagh(DTL). 220kV Bus Coupler at Shalimar Bagh was in off position. ii) As reported, at 12:24 hrs, 220 kV Bawana – Shalimarbagh (DTL) Ckt-1 tripped on R-B-N double phase to ground fault. PLCC communication was not healthy during the incident and hence line tripped from Bawana end only. There are two relays installed at Bawana end for protection of 220 kV Bawana – Shalimarbagh (DTL) Ckt-1: distance relay (Main-I) and differential relay (Main-II). Distance relay operated during this event at Bawana end, but DR of the same is not available because of memory overwrite. iii) As per DR of differential relay installed at Bawana end of 220 kV Bawana – Shalimarbagh (DTL) Ckt-1, line tripped on R-B-N double phase to ground fault (fault sensed in zone-2) with fault current of 9.96kA and 1.35kA in R and B phase respectively and fault clearing time of 432ms. iv) As per PMU at Bawana(DTL), R-B-N double phase to earth fault is observed with delayed fault clearing time of 440 ms. v) As per SCADA, load loss of approx. 245MW is observed in Delhi control area is observed. vi) As reported, load on Shalimarbagh was restored by charging 220 KV Shalimarbagh-Rohini Ckt-1 at 12:32 hrs.	0	0.033	0	245	0.000	0.349	62300	70281	440
4	GI-2	1) 220KV Bus 1 at Chamba(PG) 2) 220KV Bus 2 at Chamba(PG) 3) 220 KV Chamera_3(NH)-Chamba(PG) (PG) Ckt-1 4) 220 KV Chamera_3(NH)-Chamba(PG) (PG) Ckt-2 5) 400/220 kV 315 MVA ICT 1 at Chamba(PG) 6) 400/220 kV 315 MVA ICT 2 at Chamba(PG) 7) 220 KV Chamba(PG)-Karian(HP) (HPSEB) Ckt-1	Himachal Pradesh	HPPTCL, PGCIL, NHPC	9-Jul-23	10:28	9-Jul-23	16:35	06:07	i) During antecedent condition, 77MW unit-1,2&3 all were under shutdown due to high silt (~9000PPM) condition since around 23:33 hrs of 08th July 2023. ii) As reported, due to heavy discharge in the river, land slide occurred and led to the collapsing of tower no. 1 from Chamera-III end at 10:28 hrs. Collapsing of tower no.1 further resulted into collapsing of gantry of 220 KV Chamera_3(NH)-Chamba(PG) (PG) Ckt-1 & 2 at Chamera_3 end. Collapsing of gantry led to the damage of 02 nos CVT, 03 nos. of lightening arrestors & 01 no Wave trap at Chamera_3(NH) end. iii) As reported, at the time, bus bar protection of 220kV Bus-1&2 at Chamba(PG) operated which led to the tripping of all the elements connected at 220kV side of Chamba(PG). Details of faults at Chamba(PG) end are yet to be received. iv) As per PMU, B-N fault with delayed clearance in 560msec followed by Y-N fault which cleared within 100msec is observed. v) As per SCADA, no change in demand and load is observed.	0	0	0	0	0.000	0.000	43993	47878	560
5	GD-1	1) 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 2) 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2 3) 400/220 kV 315 MVA ICT 1 at Srinagar(UK) 4) 400/220 kV 315 MVA ICT 2 at Srinagar(UK) 5) 33MW Unit-1 at Singoli Bhatwari HEP 6) 33MW Unit-2 at Singoli Bhatwari HEP 7) 33MW Unit-3 at Singoli Bhatwari HEP	Uttarakhand	PTCUL, Singoli(LTUHP)	14-Jul-23	02:48	14-Jul-23	05:16	02:28	i) During antecedent condition, 33MW Unit-1, 2 and 3 at Singoli Bhatwari HEP were generating approx. 36MW each respectively. ii) As reported, at 12:24 hrs, station transformer (33KV/0.4KV) which is connected on tertiary winding of 400/220 kV 315 MVA ICT 2 at Srinagar(UK) damaged with heavy blast and hence ICT 2 tripped on differential protection operation. iii) The station T/F was placed under the 220KV Bus 1 at Srinagar(UK). Due to blast in station T/F, heavy arc developed and T/F oil spread on 220 KV Bus 1. Therefore, bus fault created and bus bar protection operated at 220KV Bus 1 at Srinagar(UK). iv) During the same time, 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 & 2 and 400/220 kV 315 MVA ICT 1 at Srinagar(UK) also tripped. v) The power generated by 33MW Unit-1, 2 and 3 at Singoli Bhatwari HEP were evacuating though 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 & 2. Hence, due to tripping of both 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 & 2, 33MW Unit-1, 2 and 3 at Singoli Bhatwari HEP tripped due to loss of evacuation path and blackout occurred at 220kV Singoli Bhatwari HEP. vi) As per DR of 400/220 kV 315 MVA ICT 2 at Srinagar(UK), ICT tripped on differential protection operation (3 phase to ground fault is observed). vii) As per DR of 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (end) (PTCUL) Ckt-1 & 2, lines tripped on Y-N phase to ground fault (fault sensed in zone-4 indicating bus fault) with fault current of 510 A in Y phase. viii) As per DR of 400/220 kV 315 MVA ICT 1 at Srinagar(UK), Y-N phase to ground fault is observed with fault current of 2.33kA and 4.62kA in respectively HV and LV side of Y-phase of the ICT. ix) As per PMU at Roorkee(PG), 3-phase to ground fault followed by Y-N phase to ground fault is observed with fault clearing time of 80 ms. x) As per SCADA, load loss of approx. 35MW is observed in Uttarakhand control area and generation loss of approx. 108MW at Singoli Bhatwari HEP are observed.	0.266	0.087	108	35	0.232	0.058	46478	60431	80
6	GI-2	1) 400 KV Bhadla(RS)-Bhadla(PG) (PG) Ckt-1 2) 400 KV Bhadla(RS)-Bhadla(PG) (PG) Ckt-2 3) 400 KV Bhadla-Ramgarh (RS) Ckt-1 4) 400 KV Bhadla-Ramgarh (RS) Ckt-2	Rajasthan	RVPNL, POWERGRID	18-Jul-23	19:56	18-Jul-23	22:37	02:41	i) 400/220kV Bhadla(Raj) has one and half breaker scheme at 400kV side and double main & transfer bus scheme at 220kV side. ii) During antecedent condition, 400/220 kV 500 MVA ICT 1&3 at Bhadla(RS) were carrying ~141MW each and 400/220 kV 500 MVA ICT 2 at Bhadla(RS) was not in service. iii) As reported, at 19:56hrs, R-N phase to earth fault occurred on 400 KV Bhadla(RS)-Bhadla(PG) (PG) Ckt-2. Fault was in Z-1 from Bhadla(RS) end and in Z-2 from Bhadla(PG) end. iv) On this fault, Main-1 relay (distance protection) at Bhadla(RS) of 400 KV Bhadla(RS)-Bhadla(PG) (PG) Ckt-2 didn't operate due to issue in DC supply and Main-2 relay (differential protection) at Bhadla(RS) also didn't operate due to issue in signal communication. (Rajasthan has been communicated to resolve the issues in Main protection of the line at the earliest) v) Distance protection at Bhadla(PG) end of 400 KV Bhadla(RS)-Bhadla(PG) (PG) Ckt-2 sensed the fault in Z-2. However line tripped in ~250msec on directional earth fault O/C protection operation. As reported, TMS setting of the O/C relay was sensitive and same has been corrected to ensure its proper operation. vi) Distance protection of adjacent 400kV lines at Bhadla(RS) sensed the fault in Z-4 from Bhadla(RS) end. 400 KV Bhadla(RS)-Bhadla(PG) (PG) Ckt-1 tripped from Bhadla(RS) end in Z-4 with ~160msec delay and 400 KV Bhadla-Ramgarh (RS) Ckt-1 & 2 tripped from Ramgarh end in Z-2 with ~300msec delay (Z-4 time delay of these lines at Bhadla(RS) was 450msec). Rajasthan has been communicated to review the time delay setting of distance protection relay and keep them in line with the NR protection philosophy. vii) As fault was also fed by 220kV side through ICTs, it cleared with the tripping of 220kV Bus sectionalizer on O/C E/F with ~200msec delay. viii) 220kV Bus-1(B) was remain intact. ix) As per PMU at Bhadla(PG), R-N fault with the delayed clearance in ~320msec is observed. x) As per SCADA, no change in load in Rajasthan control area is observed.	0	0	0	0	0.000	0.000	58065	69404	320
7	GD-1	1) 220 KV Bhadla(PG) - Bus 3 2) 220 KV Bhadla(PG)-ACME Solar(ACM) (ACME) Ckt-1 3) 220 KV Bhadla(PG)-Mahoba Solar(Adani) (Adani) Ckt-1 4) 220 KV Bhadla(PG)-CS_Jodhpur SL_BHD_PG (Cleansolar_Jodhpur) (Cleansolar_Jodhpur) Ckt-1 5) 220 KV Bhadla(PG)-Mahindra SL_BHD_PG (MAHINDRA) (MAHINDRA) Ckt-1 6) 400/220 kV 500 MVA ICT 5 at Bhadla(PG)	Rajasthan	POWERGRID, MRPL, CSPJL, ACME, MAHOBA	20-Jul-23	13:53	20-Jul-23	15:29	01:36	i) On 20th July 2023 at 13:53 hrs, as reported, R-N phase to earth fault occurred on 220kV Bhadla(PG)- MRPL ckt, R-ph jumper snapped at tower location no. 56 ii) On this fault, CB at Bhadla(PG) end of the MRPL line (connected at 220kV Bus-1B) didn't open and therefore, LBB of MRPL bay at Bhadla(PG) operated. iii) LBB operation led to the tripping of 400/220kV 500 MVA ICT 5 at Bhadla(PG) and 220kV lines to RE stations i.e., MRPL, CSPJL, ACME & MAHOBA connected at 220kV Bus-1B at Bhadla(PG). iv) As per PMU at Bhadla(PG), R-N phase to earth fault with delayed clearance in 320msec is observed. v) At the same time, drop in RE generation at RE stations connected at other ISTS pooling station in Rajasthan RE complex also occurred on LVRT. vi) As per PMU, total drop in RE generation was approx. 2526MW. Out of total ~2526MW approx. 770MW lost due to tripping of RE stations on LBB protection operation as mentioned above and rest ~1750MW RE generation was due to partial/delayed recovery of RE generation after LVRT. Out of this ~1750MW RE generation, ~850MW RE generation recovered within 02 min of the event.	0	0	2526	0	4.140	0.000	61013	74741	300
8	GD-1	1) 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 2) 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2 3) 33MW Unit-1 at Singoli Bhatwari HEP 4) 33MW Unit-2 at Singoli Bhatwari HEP 5) 33MW Unit-3 at Singoli Bhatwari HEP	Uttarakhand	PTCUL, SINGOLI	21-Jul-23	00:44	21-Jul-23	01:50	01:06	i) During antecedent condition, 33MW Unit-1, 2 and 3 at Singoli Bhatwari HEP were generating approx. 36MW each respectively. ii) As reported, at 00:44 hrs, 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 & 2 tripped from both ends on Y-N phase to earth fault. Both the circuits are on same tower. iii) As per DR of Singoli Bhatwari end, fault occurred on both the lines. Fault was in Z-1 (~54km) from Singoli Bhatwari end. A/R started in both the lines however, in ckt-1 it didn't complete due to DT received from Srinagar after ~50msec end and in ckt-2 line tripped after ~300msec on under voltage stage-2 operation. iv) As per DR of Srinagar end, fault occurred on both the lines. Fault was in Z-2 (~67km) from Srinagar(UK) end and fault current was around ~1.5kA. Carrier received from Singoli Bhatwari end however, A/R didn't operate and three phase tripping occurred instantaneously. v) Due to tripping of both 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 & 2, 33MW Unit-1, 2 and 3 at Singoli Bhatwari HEP tripped due to loss of evacuation path. vi) As per PMU at Roorkee(PG), Y-N phase to ground fault with no A/R operation and cleared within 100 ms is observed vii) As per SCADA, load loss of approx. 30MW is observed in Uttarakhand control area and generation loss of approx. 108MW at Singoli Bhatwari HEP are observed.	0.119	0.033	108	30	0.200	0.040	54019	74608	80
9	GD-1	1) 220KV Bus 1 at Mandola(PG) 2) 220KV Bus 2 at Mandola(PG) 3) 220 KV Mandola(PG)-Gopalpur(DTL) (DTL) Ckt-1 4) 220 KV Mandola(PG)-Gopalpur(DTL) (DTL) Ckt-2 5) 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1 6) 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-2 7) 400/220 kV 500 MVA ICT 2 at Mandola(PG) 8) 400/220 kV 500 MVA ICT 4 at Mandola(PG) 9) 125MVAr bus reactor-1 at 220kV side	Delhi	DTL, POWERGRID	23-Jul-23	20:21	23-Jul-23	20:25	00:04	i) 220kV side of 400/220kV Mandola(PG) has double main & transfer bus scheme and 220/66/33kV Gopalpur(DTL) & 220/66kV Narela has double main bus scheme. ii) During antecedent condition, 400/220kV 500MVA ICT-4, 220kV feeders i.e., Gopalpur ckt-1 & Narela ckt-2 were connected at 220kV bus-1 at Mandola(PG) and 400/220kV 500MVA ICT-2, 125MVAr bus reactor-1, 220kV feeders i.e., Gopalpur ckt-12 & Narela ckt-1 were connected at 220kV Bus-2 at Mandola(PG). ICT-2&4 were carrying approx. 215MW each, 220kV Narela D/C were carrying approx. 72MW each and 220kV Gopalpur ckt-1 & 2 were carrying approx. 87MW & 153MW respectively as per SCADA data. iii) Load of 220kV Gopalpur S/s and 220kV Subzi Mandi S/s was connected through 220kV Mandola-Gopalpur Ckt. I&II and load of 220kV Narela S/s was connected through 220kV Mandola – Narela Ckt. I&II. iv) As reported, at 20:21 hrs, dropper jumper of CT at 220kV side of 400/220 KV 500 MVA ICT-4 at Mandola(PG) snapped which led to the differential current in ICT-4. v) As per PMU at Mandola(PG) & DR of 220kV feeders at Mandola(PG), there was no fault in system. However, bus bar protection at 220kV side operated and elements connected to 220kV Bus-1&2 tripped. 220kV Bus-3&4 and elements connected to them were remained intact. vi) As there was no fault in system, operation of bus bar protection was due to maloperation of bus bar relay. As reported, bus bar relay at 220kV side is ALSTOM FAC34 (conventional electromechanical relay) and thus DR of the same is also not available. vii) As reported, new bus bar panel has been procured and commissioing work of new bus bar protection is in process. viii) Due to tripping of 220 KV Mandola(PG)-Gopalpur(DTL) (DTL) Ckt-1 & ckt-2 supply to 220/66/33kV Gopalpur(DTL) S/s lost and load of Gopalpur S/s (~157MW) and Sabji Mandi S/s (~37MW) affected. And due to tripping of 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1&2 load of 220kV Narela (~120MW) affected. ix) As reported, load of 220kV Narela S/s was restored at 20:24 hrs through 220kV DSIDC Bawana-Narela ckt-1&2 and load of 220kV Gopalpur & 220kV Sabji mandi was restored at 20:26 hrs through 220kV Wazirabad-Gopalpur ckt-1&2.	0	0.021	0	314	0.000	0.443	51817	70881	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		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)	
10	GD-1	1) 220 KV Bhiwadi(PG)-Bhiwadi(RS) (RS) Ckt-1 2) 220 KV Bhiwadi(PG)-Bhiwadi(RS) (RS) Ckt-2 3) 220/132kV 160MVA ICT-1 at Bhiwadi(RS) 4) 220/132kV 160MVA ICT-2 at Bhiwadi(RS) 5) 220/132kV 100MVA ICT-3 at Bhiwadi(RS)	Rajasthan	RVPNL, POWERGRID	24-Jul-23	03:29	24-Jul-23	09:48	06:19	i) 220/132kV Bhiwadi(RS) has double main bus scheme at 220kV side. ii) As reported, at 03:29hrs, 220/132kV 160MVA ICT-1 at Bhiwadi(RS) caught fire which created internal fault in the ICT and due to this LBB operated. Rajasthan has been asked to share the reason of LBB operation. iii) During this time, 220 KV Bhiwadi(PG)-Bhiwadi(RS) (RS) Ckt-1 & 2 and 220/132kV 160MVA ICT-2 & 3 at Bhiwadi(RS) tripped which resulted in complete blackout of 220/132kV Bhiwadi(RS) S/s. Rajasthan has been asked to share the reason of tripping of all the elements at Bhiwadi(RS). iv) As reported by SLDC Rajasthan, 220 KV Bhiwadi(PG)-Bhiwadi(RS) (RS) Ckt-1 tripped from 220KV Bhiwadi(RS) end only. Line was manually tripped from PGCIL end. 220 KV Bhiwadi(PG)-Bhiwadi(RS) (RS) Ckt-2 tripped from both ends. v) As per DR of Bhiwadi(PG) of 220 KV Bhiwadi(PG)-Bhiwadi(RS) (RS) Ckt-2, Y-N fault at distance of ~7.7km (Z-2) & fault current of 13.68kA is observed. vi) As per PMU at Bhiwadi(PG), two consecutive Y-N phase to earth faults with the delayed clearance of 360msec are observed. vii) As per SCADA, change in demand of approx. 205MW in Rajasthan control area is observed.	0	1.295	0	205	0.000	0.305	49195	67222	360
11	GI-2	1) 400/220 kV 500 MVA ICT 2 at Bahadurgarh(PG) 2) 220KV Bus 1 at Bahadurgarh(PG) 3) 220KV Bus 2 at Bahadurgarh(PG) 4) 220 KV Bahadurgarh(PG)-Nuna Majra(HV) (HVPNL) Ckt-1 5) 220 KV Bahadurgarh(PG)-Nuna Majra(HV) (HVPNL) Ckt-2 6) 400/220 kV 315 MVA ICT 1 at Bahadurgarh(PG)	Haryana	POWERGRID, HVPNL	25-Jul-23	14:44	25-Jul-23	18:00	03:16	i) 220kV side of 400/220kV Bahadurgarh(PG) has double main & transfer bus scheme. ii) As reported, at 14:22 hrs, sparking was observed in Y-phase isolator of 400/220 kV 315 MVA ICT 2 at Bahadurgarh(PG) and ICT 2 tripped. POWERGRID has been communicated to share the exact detail of protection operation. iii) Further at 14:44 hrs, bus bar protection operated at 220KV Bus 1 & 2 at Bahadurgarh(PG) and 400/220 kV 315 MVA ICT 1 at Bahadurgarh(PG) along with 220 KV Bahadurgarh(PG)-Nuna Majra(HV) (HVPNL) Ckt-1 & 2 tripped. POWERGRID has been communicated to share the exact nature and location of fault. iv) As per DR of 220 KV Bahadurgarh(PG) Nuna Majra(HV) (HVPNL) Ckt-2 of POWERGRID end, line tripped on B-N phase to earth fault in Z-2. v) As per PMU at Bahadurgarh(PG), B-N phase to earth fault with delayed fault clearance time of 240 ms is observed. vi) As per SCADA, change in demand of approx. 190MW in Haryana control area.	0	0.021	0	190	0.000	0.258	54660	73753	240
12	GD-1	1) 400 KV Avaada Pooling SL_BKN_PG (AEPL)-Bikaner(PG) (AEPL) Ckt	Rajasthan	POWERGRID, AEPL	26-Jul-23	09:23	26-Jul-23	11:58	02:35	i) Total MW generation of Avaada Sunce, Avaada RJHN and Avaada Sustainable are pooled at 400kV Avaada pooling and total generation is evacuated through 400 KV Avaada Pooling SL_BKN_PG (AEPL)-Bikaner(PG) (AEPL) Ckt. ii) As reported, at 09:23hrs, 400 KV Avaada Pooling SL_BKN_PG (AEPL)-Bikaner(PG) (AEPL) Ckt tripped on Z-4 distance protection operation at Bikaner end. iii) As per PMU at Avaada(IP), no fault is observed in the system. iv) As reported, relay co-ordination and PT/CVT wiring at both the ends were checked and revalidated. CVT wiring mis-contact was found at Avada line main-1 relay at Bikaner end and the same was rectified during shutdown 31st July 2023 night hours. v) As per PMU, generation loss of approx. 450MW at Avaada Pooling(IP) is observed.	1.163	0	450	0	0.866	0.000	51973	59547	NA
13	GD-1	1) 400/220 kV 315 MVA ICT 1 at Gr.Noida(UPC) 2) 400/220 kV 315 MVA ICT 2 at Gr.Noida(UPC) 3) 400KV Bus 1 at Gr.Noida(UPC) 4) 400 KV Dadri(NT)-Gr.Noida(UPC) (PG) Ckt-1 5) 400 KV Gr.Noida(UPC)-Nawada(HV) (PG) Ckt-1 6) 400 KV Gr.Noida_2(UPC)-Gr.Noida(UPC) (UP) Ckt-1 7) 400/220 kV 500 MVA ICT 5 at Gr.Noida(UPC) 8) 400 KV Gr.Noida_2(UPC)-Gr.Noida(UPC) (UP) Ckt-2 9) 400/220 kV 500 MVA ICT 6 at Gr.Noida(UPC) 10) 400KV Bus 2 at Gr.Noida(UPC)	Uttar Pradesh	UPPTCL, POWERGRID, NTPC	26-Jul-23	04:46	26-Jul-23	06:32	01:46	i) 400kV side of 400/220/132kV Gr.Noida(UP) has double main & transfer bus scheme. ii) During antecedent condition, power was flowing from 400kV side to 220kV side through 400/220 kV 315 MVA ICT 1 & 2 and 400/220 kV 500 MVA ICT 5 & 6 at Gr.Noida(UPC). iii) As reported, at 04:46 hrs, B-ph conductor of 400KV Bus 1 at Gr.Noida(UPC) broke and fell on Y-ph bay of 400 KV Dadri(NT)-Gr.Noida(UPC) (PG) Ckt-1 which created Y-B phase to phase fault at Bus 1. Due to this bus bar protection operated and elements on Bus 1 tripped. iv) It is further reported that due to delayed operation of bus coupler CB, elements on Bus 2 also tripped during the same time. Eventually 400/220/132kV Gr.Noida(UP) S/s became dead. v) As per DR, 400 KV Dadri(NT)-Gr.Noida(UPC) (DR end) (PG) Ckt-1 tripped on Y-B phase to phase fault with fault currents of 16.57kA and 15.56kA respectively in Y and B phase; fault sensed in zone-4. vi) As per PMU at Agra(PG), Y-B phase to phase fault with delayed fault clearance time of 440 ms is observed. vii) As per SCADA, change in demand of approx. 430MW in UP control area.	0	0.76	0	430	0.000	0.712	46861	60382	440
14	GI-1	1) 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-1 2) 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-2	Himachal Pradesh	PTCUL, HPPTCL	26-Jul-23	07:07	26-Jul-23	09:11	02:04	i) 220/132kV Majri (HP) has double main bus scheme at both 220kV & 132kV level. During antecedent condition, active power flowing through 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-1 & 2 was 72MW each respectively. ii) As reported, at 07:07 hrs, 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-1 tripped on Y-B phase to phase fault. As per DR of Khodri end, Y-B phase to phase fault in Z-2 with fault current of 3.42kA each respectively in Y and B phase and fault clearance time of 384ms is observed. iii) During the same time, 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-2 also tripped due to over-current protection operation (Iy=~1.959kA and Ib=~1.785kA) from Majri end. Line tripped from Majri end only and remained charged from Khodri end. iv) As per PMU at Shahranpur(PG), Y-B phase to phase fault with delayed fault clearance time of 400ms is observed in the system. v) As per SCADA, change in demand of approx. 125MW is observed in HP control area.	0	0.258	0	125	0.000	0.229	47116	54598	400
15	GD-1	1) 220kV Nara(UP)-Roorkee(UK) (UP) Ckt 2) 220 KV Meerut(PG)-Nara(UP) (PG) Ckt 3) 220kV Nara(UP)-Jansath(UP) Ckt 4) 220kV Nara(UP)-Muzaffarnagar(UP) Ckt 5) 220/132kV 160MVA ICT-1 at Nara(UP)	Uttar Pradesh	UPPTCL, PTCUL, POWERGRID	26-Jul-23	05:30	26-Jul-23	06:40	01:10	i) 220kV side of 220/132kV Muzaffarnagar2(Nara)(UP) has main and transfer bus scheme. ii) As reported, at 05:30 hrs, 220kV Nara(UP)-Roorkee(UK) (UP) Ckt tripped from Roorkee end only on R-N fault. iii) This fault was sensed by Nara(UP) end in Z-1 with fault current of approx. 4.8 kA and fault distance of 31.9 km. However, relay at Nara(UP) failed to initiate tripping command. iv) Due to this, 220 KV Meerut(PG)-Nara(UP) (PG) Ckt (fault current 3.517kA as per DR), 220kV Nara(UP)-Jansath(UP) Ckt (fault distance 82.9km from Nara) and 220kV Nara(UP)-Muzaffarnagar(UP) Ckt (fault current 2.63kA from Nara) tripped from remote end. Fault was sensed in zone-3 (as per DR). v) During this time, 220/132kV 160MVA ICT-1 at Nara(UP) also tripped due to over-current earth fault protection operation. vi) With the tripping of all the aforementioned elements, feeding source to Nara(UP) S/s lost and 220/132kV Muzaffarnagar2(Nara)(UP) S/s became dead. vii) As per SCADA SOE, 220kV Muzaffarnagar(UP)-Jansath(UP) Ckt also tripped during the same time (reason yet to be shared). viii) As per PMU at Roorkee(PG), R-N phase to earth fault with delayed fault clearance time of 1400 ms is observed. ix) As reported by SLDC-UP, change in demand of approx. 105MW occured in UP control area.	0	0.122	0	105	0.000	0.179	47234	58819	1400
16	GI-1	1) 220 KV Wagoora(PG)-Pampore(PDD) (PG) Ckt-1 2) 220 KV Wagoora(PG)-Pampore(PDD) (PG) Ckt-2	Jammu and Kashmir	PDD JK, POWERGRID	26-Jul-23	14:19	26-Jul-23	15:00	00:41	i) As reported, at 14:19 hrs, 220 KV Wagoora(PG)-Pampore(PDD) (PG) Ckt-1 tripped on R-N phase to earth fault with fault current of 1.18kA and fault distance of 57.4km from Wagoora(PG) end, fault was sensed in Zone-3 from Wagoora(PG). ii) At the same time, 220 KV Wagoora(PG)-Pampore(PDD) (PG) Ckt-2 also tripped from Pampore end only on over current protection operation. iii) As per PMU, R-Y phase to phase fault with delayed fault clearance time of 960ms is observed in system. iv) As per SCADA, load loss of approx. 135MW occurred in J&K control area.	0	0.092	0	135	0.000	0.208	55367	64808	960
17	GI-2	1) 220 kV Maharanibagh-Lodhi Road (DTL) Ckt-1 2) 220 kV Maharanibagh-Lodhi Road (DTL) Ckt-2	Delhi	DTL	29-Jul-23	12:26	29-Jul-23	12:50	00:24	i) 400/220kV Maharanibagh(DTL) has double main bus scheme at both 400kV and 220kV level. 220 kV Maharanibagh-Lodhi road (DTL) Ckt-1&2 were feeding the load of 220kV Lodhi Road S/s. ii) As reported, at 12:26 hrs, 220 kV Maharanibagh-Lodhi road (DTL) Ckt-2 tripped due to Y-ph LA burst at Maharanibagh end. Fault sensed in zone-1 at Maharanibagh end. iii) Further, 220 kV Maharanibagh-Lodhi (DTL) Ckt-1 also tripped during the same time (reason yet to be shared) (86B operated at Lodhi road end). iv) As per PMU at Ballabhgarh(PG), Y-N phase to earth fault is observed with fault clearing time of 80 ms. v) As per SCADA, load loss of approx. 200MW is observed in Delhi control area.	0	0.028	0	70	0.000	0.116	52986	60558	80
18	GD-1	1) 220 KV Renew SolarUrja SL_FGARH_PG (RSUPL)-Fatehgarh_II(PG) (Renew Solar Urja (RSUPL)) Ckt-1	Rajasthan	POWERGRID, RSUPL	31-Jul-23	10:36	31-Jul-23	22:39	12:03	i) On 31st July, 2023, at 10:36:11:200 hrs, B-ph jumper at RSUPL end of 220kV Fatehgarh2-RSUPL ckt snapped at tower location no. 10 at distance ~18km from RSUPL end. ii) On this fault, As per DR of both the ends, line successfully auto reclosed from both ends. However after approx. 750msec of A/R operation, line tripped from RSUPL end on under voltage protection. RSUPL has been communicated to disable the under voltage protection in line at the earliest. iii) At 10:36:11:280 hrs, R-N fault occurred on 220kV Fatehgarh2-RJ3PL ckt. As per DR of both the ends, line successfully autoreclosed from both the ends. iv) As per PMU at Bikaner(PG), B-N phase to earth fault followed by R-N phase to earth fault which cleared within 80msec is observed. v) At the same time, drop in RE generation at RE stations connected at other ISTS pooling station in Rajasthan RE complex also occurred on LVRT (triggered due to B-N & R-N fault in the system). vi) During same time, 220kV Bhadla2(PG)-Nokhra ckt also tripped on SOTF over current protection at Nokhra end(as per DR). It was maloperation of protection due to incorrect SORF protection logic. Nokhra has been communicated to correct the logic of SOTF protection. vii) As per PMU, total loss in RE generation was approx. 1620MW. Out of total ~1620MW approx. 500MW lost due to tripping of RSUPL(260MW) & Nokhra(240MW) RE station as mentioned above and rest ~1120MW RE generation was due to partial/delayed recovery of RE generation after LVRT. Out of this 1120MW RE generation, ~400MW RE generation recovered within 01 min of the event.			1620	0	2.639	0.000	61385	68548	80

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 Varanasi-Biharshariff (PG) Ckt-1	POWERGRID	1-Jul-23	02:22		Phase to earth fault Y-N	NA	NA	YES	YES			As per PMU & DR, Y-N fault with unsuccessful A/R is observed on permanent fault.
2	220 KV Auraiya(NT)-Mehgaon(MP) (MPSEB) Ckt-1	POWERGRID	5-Jul-23	06:03		Phase to earth fault B-N	NA	NA	NO	YES			As per PMU & DR, B-N fault with no A/R at Auraiya end is observed.
3	220 KV Auraiya(NT)-Mehgaon(MP) (MPSEB) Ckt-1	POWERGRID	6-Jul-23	17:52		Phase to earth fault R-N	NA	NA	YES	YES			As per PMU & DR, R-N fault with no A/R at Auraiya end is observed.
4	400 KV Varanasi-Biharshariff (PG) Ckt-2	POWERGRID	7-Jul-23	16:29		Earth fault	NA	NA	YES	YES			As per PMU, no fault is observed in system.
5	800 KV HVDC Kurukshetra(PG) Pole-2	POWERGRID	14-Jul-23	19:10		Mal function of Control Card which in turn triggered Pole-2 DC Differential Protection at Champa end.	NA	NA	NO	NO			As per PMU, fluctuation in voltage is observed.
6	500 KV HVDC Mahindergarh(APL)-Adani Mundra(APL) (ATIL) Ckt-2	APL	19-Jul-23	16:54		DC line earth fault.	NA	NA	YES	NA			As per EL, tripping occurred due to DC line fault.
7	132 KV Rihand(UP)-Garwa(JS) (UP) Ckt-1	UPPTCL	26-Jul-23	01:30		Bus Bar Protection Operated	NA	NA	YES	NO			As per PMU, no fault is observed.
8	132 KV Rihand(UP)-Nagar Untari(JS) (UP) Ckt-1	UPPTCL	26-Jul-23	01:30		Bus Bar Protection Operated	NA	NA	YES	NO			As per PMU, no fault is observed.
9	132 KV Rihand(UP)-Garwa(JS) (UP) Ckt-1	UPPTCL	29-Jul-23	12:05		Phase to earth fault R-N	NA	NA	YES	YES			As per DR summary of Rihand end, R-N fault at distance ~57.4km(56.3%, Z-1) from Rihand end is observed.

 # 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

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

Time Period: 1st July 2023 - 31st July 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	ABC RENEWABLE_RJ01	1	1	100	1	0	100	1	0	100	1	0	100	
2	ACME	1	0	0	0	0	0	0	1	0	1	0	100	DR, EL & Tripping report need to be submitted
3	ACME_HEERGARH	1	1	100	1	0	100	1	0	100	1	0	100	
4	AD HYDRO	1	0	0	0	0	0	0	0	0	0	0	0	Details received
5	ADANI	2	1	50	1	0	50	1	0	50	1	0	50	
6	ANTA-NT	3	1	33	1	0	33	1	0	33	1	0	33	
7	APL	1	1	100	1	0	100	1	0	100	1	0	100	
8	APMPL	1	1	100	1	0	100	1	0	100	1	0	100	
9	ASEPL	2	1	50	1	0	50	1	1	100	1	0	50	
10	AURAIYA-NT	4	1	25	1	0	25	1	0	25	1	0	25	DR, EL & Tripping report need to be submitted
11	BAIRASUIL-NH	1	1	100	1	0	100	1	0	100	1	0	100	
12	BBMB	51	6	12	9	16	26	10	18	30	7	1	14	
13	CHAMERA-III-NH	3	3	100	3	0	100	3	0	100	3	0	100	
14	CLEANSOLAR_JODHPUR	1	1	100	1	0	100	1	0	100	1	0	100	
15	CPCC1	76	1	1	4	7	6	4	7	6	4	0	5	
16	CPCC2	39	0	0	1	11	4	1	10	3	2	0	5	Details received
17	CPCC3	26	0	0	2	5	10	0	6	0	0	1	0	
18	DADRIGAS-NT	1	1	100	1	0	100	1	0	100	1	0	100	
19	DADRI-NT	5	1	20	1	0	20	1	0	20	1	0	20	
20	DHAULIGANGA-NH	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report need to be submitted
21	DULHASTI-NH	1	1	100	1	0	100	1	0	100	1	0	100	
22	FARIDABAD-NT	1	1	100	1	0	100	1	0	100	1	0	100	
23	INDIGRID	3	0	0	0	2	0	0	1	0	0	3	0	Details received
24	JHAJJAR	2	1	50	1	1	100	1	1	100	1	1	100	
25	KARCHAM	3	3	100	3	0	100	3	0	100	3	0	100	DR, EL & Tripping report need to be submitted
26	KOLDAM-NT	1	1	100	1	0	100	1	0	100	1	0	100	
27	MAHINDRA	1	1	100	1	0	100	1	0	100	1	0	100	
28	NAPP	7	1	14	0	3	0	0	3	0	0	0	0	Details received
29	RAMPUR	1	1	100	0	0	0	0	0	0	1	0	100	DR, EL & Tripping report need to be submitted
30	RAPPB	2	0	0	0	0	0	0	0	0	0	0	0	

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

Time Period: 1st July 2023 - 31st July 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		%	
31	RAPPC	2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	Details received
32	RENEW SOLARURJA (RSUPL)	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	
33	RENEW SUN WAVES(RSWPL)	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	DR, EL & Tripping report need to be submitted
34	RIHAND-NT	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
35	RSEJ3PL	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	Details received
36	SAURYA	1	0	**0**	0	1	**0**	0	1	**0**	0	1	**0**	
37	SEWA-2-NH	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	DR, EL & Tripping report need to be submitted
38	SINGOLI	7	5	**71**	1	0	**14**	4	0	**57**	7	0	**100**	
39	SINGRAULI-NT	3	0	**0**	3	0	**100**	3	0	**100**	3	0	**100**	
40	SLDC-CHD	3	3	**100**	3	0	**100**	3	0	**100**	3	0	**100**	
41	SLDC-DV	28	2	**7**	11	7	**52**	10	5	**43**	9	0	**32**	
42	SLDC-HP	15	0	**0**	11	0	**73**	6	0	**40**	0	0	**0**	Details received
43	SLDC-HR	18	5	**28**	6	7	**55**	6	6	**50**	6	2	**38**	DR, EL & Tripping report need to be submitted
44	SLDC-JK	12	1	**8**	1	11	**100**	1	11	**100**	1	7	**20**	
45	SLDC-PS	22	1	**5**	10	3	**53**	10	3	**53**	10	0	**45**	
46	SLDC-RS	78	5	**6**	13	0	**17**	13	0	**17**	44	0	**56**	
47	SLDC-UK	27	1	**4**	1	12	**7**	2	9	**11**	1	1	**4**	
48	SLDC-UP	122	11	**9**	14	25	**14**	14	30	**15**	12	2	**10**	
49	STERLITE	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
50	TANAKPUR-NH	4	4	**100**	4	0	**100**	4	0	**100**	4	0	**100**	
51	URI-II-NH	3	3	**100**	3	0	**100**	3	0	**100**	3	0	**100**	
Total in NR Region		**594**	**78**	**13**	**125**	**111**	**26**	**122**	**113**	**25**	**146**	**19**	**25**	

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	
	NATHPA-JHAKRI HPS(Unit6 #250)	14.05.2017	14.05.2017	NO	Excitation system upgraded in 2013	
	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	--	
	PANIPAT TPS(unit2# 250)	15.01.2018	15.01.2018	YES	--	
	DCRTPP (YAMUNA NAGAR)(unit1#300)	19-12-2018	19-12-2018	YES	(Report attached)	
	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	--	
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	
	Rihand (Unit2#500)	02-07-2016	02-07-2016	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit3#500)	15-08-2015	15-08-2015	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit4#500)	25-05-2017	25-05-2017	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit4#500)	11-12-2014	11-12-2014	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit5#500)	11-12-2014	11-12-2014	YES	Next test will be done during re-commissioning of unit after O/H	
	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	--	
	SINGRAULI STPS(Unit7#500)	15.07.2018	15.07.2018	NO	--	

	UNCHAHAR I(2 * 210)	29-03-2016	29-03-2016	YES	--	
	UNCHAHAR II TPS(unit1# 210)	13-07-2019	13-07-2019	YES	--	
	UNCHAHAR II TPS(unit2# 210)	10-08-2018	10-08-2018	YES	--	
	UNCHAHAR UNIT6#500	-	31.03.2017	YES	--	
	KOLDAM HPS(4 * 200)	01-07-2015	01-07-2015	YES	--	
	DADRI GPS(2 * 154.51) (ST-Steam Turbine)	-	18-11-2015	YES	Next test will be done during re-commissioning of unit after O/H	
	DADRI GPS(2 * 154.51) (GT-Steam Turbine)	2017-18	2017 & 2018	YES	Next test will be done during re-commissioning of unit after O/H	
	ANTA GPS GT-1 (88.71)(GT- Gas Turbine)	10-10-2021	10-10-2021	YES		
	ANTA GPS GT-2 (88.71)(GT- Gas Turbine)	10-10-2021	10-10-2021	YES		
	ANTA GPS GT-3 (88.71)(GT- Gas Turbine)	08-08-2014	08-08-2014	YES	Next test will be done when Station will get opprtunity to have shcedule to run on full load.	
	ANTA GPS(1 * 153.2)(ST- Steam Turbine)	08-08-2014	08-08-2014	YES	Next test will be done when Station will get opprtunity to have shcedule to run on full load.	
5	**Aravali Power Company Private Ltd**					
	ISTPP (JHAJJAR)(3 * 500)	-	25-08-2015	YES	--	
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 units	
	CHAMERA III HPS(Unit1#77)	29-10-2015	07-01-2012	YES	--	
	CHAMERA III HPS(Unit2,3#77)	29-10-2015	19-06-2012	YES	--	
	PARBATI III HEP (Unit1# 130)	21-01-2016	21-01-2016	YES	Have been done recetly. The report on PSS turning shall be submitted seperately.	
	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	--	
	URI-II HPS(4 * 60)	Mar-14	Mar-14		2021-22	
	SALAL HPS (Unit-3,4,5,6 # 115)	16-12-2014	16-12-2014	YES	--	
	KISHANGANGA(3 * 110)	18-05-20 18	18-05-20 18	YES	--	
	BAIRASIUL HPS(3 * 60)	30-07-2015	30-07-2016	YES	--	
	SEWA-II HPS(3 * 40)	09-07-2016	09-07-2016	YES	--	
	PARBATI III HEP(4 * 130)	16-12-2016	16-12-2016	YES	--	
	TANAKPUR HPS(Unit1# 31.42)	09-01-2015	09-01-2015	YES	--	
	TANAKPUR HPS(Unit2,3#31.4)	24-05-2014	24-05-2014	YES	--	
	DHAULIGANGA HPS(Unit1 ,2# 70)	04-05-2014	17-04-2018	YES	--	
	DHAULIGANGA HPS(Unit3,4# 70)	26-06-2014	17-04-2018	YES	--	
7	**PUNJAB**					
	RAJPURA(NPL) TPS(2 * 700)	22-04-2014	22-04-2014	YES	--	
8	**Rajasthan**					
	KAWAI TPS(Unt1# 660)	03-02-2023	03-02-2023	YES	--	
	KAWAI TPS(Unt2# 660)	03-02-2023	03-02-2023	YES	--	
	CHHABRA TPS(Unit 1#250)	28-02-2023	28-02-2023	NO	--	
	CHHABRA TPS(Unit 2,3,4#250)	28-02-2023	28-02-2023	NO	--	
	CHHABRA TPS(Unit5# 660)	10-02-2016	10-02-2016	YES	--	
	CHHABRA TPS(Unit6# 660)	7/28/2018	7/28/2018	YES	--	
	KALISINDH TPS(Unit1# 600)	03-02-2023	03-02-2023	YES	--	
	KALISINDH TPS(Unit2# 600)	03-02-2023	03-02-2023	YES	--	
	KOTA TPS(Unit1#110)	PSS tuning and step response test of Unit#1,2,3,4,6&7 conducted sucessfully during 02.03.22 to 04.03.22		YES		
	KOTA TPS(Unit2#110)				--	
	KOTA TPS(Unit3#195)				--	
	KOTA TPS(Unit4#195)				--	
	KOTA TPS(Unit6#110)				--	
	KOTA TPS(Unit7#110)				--	
	SURATGARH TPS (Unit5#250)	14-03-2022	14-03-2022	Yes	--	
	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	--	
	RAJWEST (IPP) LTPS(Unit2# 135)	14-07-2016	14-07-2016	No	--	
	RAJWEST (IPP) LTPS(Unit3# 135)	03-01-2014	03-01-2014	No	--	
	RAJWEST (IPP) LTPS(Unit4# 135)	03-11-2015	03-11-2015	No	--	
	RAJWEST (IPP) LTPS(Unit5# 135)	21-09-2014	21-09-2014	No	--	
	RAJWEST (IPP) LTPS(Unit6# 135)	14-08-2014	14-08-2014	No	--	
	RAJWEST (IPP) LTPS(Unit7# 135)	20-02-2016	20-02-2016	No	--	
	RAJWEST (IPP) LTPS(Unit8# 135)	11-06-2014	11-06-2014	No		
9	**UTTAR PRADESH**					
	ANPARA-C TPS(Unit1# 600)	22-08-2015	22-08-2015	Yes	--	

	ANPARA-C TPS(Unit2# 600)	08-03-2016	08-03-2016	Yes	--	
	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	--	
	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		
	Anpara-B (Unit5#500)	17.08.2014	Dec., 2019	Yes	--	
	Anpara-D(Unit6#500)	15.11.2016	15.11.2016	No	--	
	Anpara-D (Unit7#500)	15.04.2017	15.04.2017	No	--	
	Obra-B(Unit9#200)	22.03.2016	22.03.2016	Yes	Report enclosed.	
	Obra-B(Unit10#200)	28.06.2016	20.06.2016	Yes	Report enclosed.	
	Obra-B (Unit11#200)	21.01.2017	21.01.2017	Yes	Report enclosed.	
	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	--	
	Parichha-B (Unit4#210)	08.01.2016	08.01.2016	Yes	--	
	Parichha-C (Unit5#250)	08.02.2020	08.02.2020	No	--	
	Parichha-C(Unit3#250)	09.01.2016	09.01.2016	No	--	
	Harduaganj (Unit8#250)	20.08.2015	20.08.2015	No	--	
	Harduaganj (Unit3#250)	13.04.2016	13.04.2016	No	--	
	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	--	
	ALAKNANDA HEP(Unit2# 82.5)	12.072017	12.072017	No	--	
	ALAKNANDA HEP(Unit3# 82.5)	12.072017	12.072017	No	--	
	ALAKNANDA HEP(Unit4# 82.5)	12.072017	12.072017	No	--	
	MEJA TPS(Unit1#660)	16.10.2018	05.09.2017	yes	--	
	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)	
	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)	
	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	--	
	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	--	
	BHAKRA HPS(Unit7#157)	18.02.2017	18.02.2017	No	--	
	DEHAR HPS(Unit#1 165)	08.08.2017	08.08.2017	No	--	
	DEHAR HPS(Unit#2 165)	08.08.2018	08.08.2018	No	--	
	DEHAR HPS(Unit#3 165)	08.08.2019	08.08.2019	No	--	
	DEHAR HPS(Unit#4 165)	02.07.2017	02.07.2017	No	--	
	DEHAR HPS(Unit#5 165)	08.08.2019	08.08.2019	No	--	
	DEHAR HPS(Unit#6 165)	02.07.2017	02.07.2017	No	--	
	PONG HPS(6 * 66)	--	--	--	PSS not provided.RM&U agenda under considration.	

Status of Bus bar protection				
Constituent Name	**Name of Station**	**Status of Bus bar protection(as reported)**	**Expected date of revival(as reported)**	**Present Status**
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 (220kV side)	Available but Non operational	31 December 2023	Work is under Tendering process.
	220kv Haldwani	Not Available	31 December 2024	It has been Taken in Budget for FY 2023-24.
	220kv Pantnagar	Available but Non operational	31 December 2023	Proposal has been made and submitted for
	220kV Rishikesh	Available but Non operational	31 December 2024	It has been Taken in Budget for FY 2023-24.
	220kV Chamba	Not commissioned yet	31 December 2024	It has been Taken in Budget for FY 2023-24.
Haryana	220kV S/Stn Badshahpur	Not Installed	15.01.2023	**Commissioned on 20.02.2023**
	220kV S/Stn Sec-52A, Gurgaon	Not Installed	31.07.2023	Panel has been installed. Commissioning pending due to non- availability of shutdown.
	220kV S/Stn Sec-1 Manesar	Installed, Non-Operational		**Commissioned on 26.02.2023**
	220kV S/Stn Panchgaon	Not Installed	31.08.2023	Work order has been placed to Siemens.
	220kV S/Stn Rewari	Not Installed	31.03.2024	Material is not allocated so far. Installation will be carried out after allocation of material.
	220kV S/Stn Narnaul	Not Installed	30.09.2023	Panel has been installed. Work in progress on turnkey basis. Isolators of 220 kV TF have to be replaced thereafter the work shall be completed.
	220kV S/Stn Mohinder Garh	Not Installed	31.08.2023	Panel has been installed. Commissioning is pending.
	220 KV S/Stn Palwal	Not Installed	31.08.2023	Panel has been installed. Commissioning is pending.
	220 KV S/Stn Rangala Rajpur	Installed but Non-Operational	31.08.2023	Relay/wiring issue is to be addressed by the Firm Engineer.
	220 kV Unispur	Installed but Non-Operational	Mar-24	5 Nos. Peripheral relay of bus bar protection are defective.
	220 kV Mund	Installed but Non-Operational		Bus bar protection is operational at 220KV Mund.
	220 kV Nissing	Installed but Non-Operational	Mar-24	Existing Bus bar panel is of old and obsolete design. New Bus Bar protection scheme panel has been drawn from the store, Commissioning pending.
	220KV Pehowa	Installed but Non-Operational	Mar-24	Old & Obsolete, Allocation of New BBP and allied material awaited.
	220kV Kaithal	Not Installed	Mar-24	Control Cable for Bus-Bar Protection Scheme has been drawn from DD Stores, 220kV Bus-Bar Protection panel awaited.
	220 KV Sonepat	Not Installed	Mar-24	Allocation of Busbar Protection panel is awaited.
	220 KV REGC, Sonepat	Not Installed	Jul-23	Busbar protection panel has been drawn from DD store and erection work is under progress.
	220KV Jind	Installed but Non-Operational	30.06.2023	New panel has been installed and commissioning is pending.
	220 KV Fatehabad	Installed but Non-Operational	Jul-23	Visit of Firm Engineer M/s Schneider is awaited for commissioning.
	220 KV Bhuna	Installed but Non-Operational	Dec-23	Repairing is pending on the part of firm M/s Siemens.
	220 KV Sirsa	Not Installed		Not required being radial.
	220 KV Rania	Not Installed	31.03.2024	Material is not allocated so far. Installation will be carried out after allocation of material.
	220 KV Bhiwani	Not Installed	31.03.2024	Material is not allocated so far. Installation will be carried out after allocation of material.

	220kV Madanpur	Not Installed	31.03.2024	Material is not allocated so far. Installation will be carried out after allocation of material.
	220kV Tepla	Installed but Non-Operational	31.03.2024	The existing BBP is out being old and obsolete and needs replacement for which material allocation is awaited.
	220kV Rajokheri	Installed but Non-Operational	31.10.2024	The S/Stn. Is being constructed on turnkey, BBP has been installed. Commissioning is yet to be completed by the firm.
BBMB	220kV Charkhi Dadri	Installed, under commissioing yet	15.01.2023	**commissioned on 31.01.2023**
	220kV Samaypur	Installed but Non-Operational	30.04.2023	
	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	
	220kV Partapur	Installed but Non-Operational	Jan-23	
	220kV Bareilly (400/220kV Bareilly)	Installed but Non-Operational	Dec-23	Old panel capacity exhausted. New relay
	220kV Pilibhit	Not Installed	Dec-23	New Relay panel supplied & need to be
	220kV Amariya	Installed but Non-Operational	Dec-23	Wiring not completed
	220kV Sultanpur	Installed but Non-Operational		Isolator contact status are not received due
	220kV New Tanda	Not Installed		Busbar protection panel available on
	220kV Shahjhanpur	Installed but Non-Operational		NC/No switch status of bus isolator were
	220kV Ajijpur	Installed but Non-Operational		1. HV side 220kV CT of 160MVA T/F-I & II has
	220kV Nirpura	Installed but Non-Operational	Jan-23	
	220kV IITGNL	Installed but Non-Operational	Mar-23	
	220kV Rampur	Installed but Non-Operational		
	220kV Barahua	Installed but Non-Operational		As Per Ex-En Transmission Approvel is Pending at HQ Level As Per Ex-En
	220kV Bansi	Not Installed	to be declared by transmission wing	Relay Commissioning is yet to be done
	220 KV S/S Azamgarh-2(Bargahan)	Installed but Non-Operational		
	220kV Chandausi	Not Installed	to be declared by transmission wing	Relay Commissioning is yet to be done
	220kV Rampur	Installed but Non-Operational	Jul-23	Main relay of bus bar protection is not working.
	220kV Sec. - 148, Noida	Installed but Non-Operational	Jan-23	
	220kV sec. 38A, Botanicla Garden	Not Installed	Jul-23	Bus Bar protection panel not alloted
	220kV sec.-62, Noida	Not Installed	Aug-23	Relay and wiring Work Pending
	220kV Dadri	Not Installed	Sep-23	Relay and wiring Work Pending
	400kV S/S Agra	Installed but Non-Operational		**Operational on 30.06.2023**
	220kV S/S Bah	Not Installed		
	220kV Sirsaganj	Not Installed		
	220kV S/S Farrukhabad (New)	Not Installed		WAITING FOR NELUMBO SERVICE ENG.
	220kV Boner	Not Installed		SINGLE BUS
	220kV Kasganj (Soron)	Installed but Non-Operational		
	220kV Khair	Installed but Non-Operational		
	220kV Kidwainagar	Installed but Non-Operational		
	220kV Chhata	Installed but Non-Operational		
	220kV Harduaganj	Installed but Non-Operational	31.12.2023	
	220kV Lalitpur	Not Installed	23-Apr	INSTALLATION IS NOT DONE DUE TO UNAVAILABLE OF CABLES. CABLE REQUEST HAS BEEN SENT TO LUCKONW HQ.
	220kV Sarnath	Installed but Non-Operational	Nov-23	
	220kV Sirathu, Kaushambi	Not Installed	Mar-23	
	220kV substation Fatehpur	Installed but Non-Operational	Mar-23	
	220kV S/S Bhelupur	Not Installed	Mar-23	
	220kV Hardoi Road, Lucknow	Installed but Non-Operational	30.09.2023	Relay configuration is required for addtitional
	220kV CG City, Lucknow	Installed but Non-Operational	31.08.2023	Configurational error
	220kV Barabanki	Installed but Non-Operational	30.09.2023	Relay configuration is required for addtitional
	220kV Kursi Road, Lucknow	Installed but Non-Operational	30.09.2023	1- 87BB Auxilliary busbar relay at 160MVA T/F
	220kV BKT, Lucknow	Installed but Non-Operational	31.08.2023	Mian bus bar relay defective
	220kV Gomti Nagar, Lucknow	Installed but Non-Operational		Mal opoerating
	400 KV Substation Sarnath	Installed but Non-Operational		Now operational
	220kV S/S Raja Talab	Installed but Non-Operational	15.11.2023	RELAY DEFECTIVE
	20kV S/S Harahua	Installed but Non-Operational	31.11.2023	NOT COMMISSIONED
	220kV S/S Sahupuri	Installed but Non-Operational	Requirement for panel has	Defective
	220kV S/S Mirzapur	Not Installed	3 Month	-
HP	220kV Chamba	Main-2 non operational	Sep-23	relay has been sent to OEM for repair
	220kV MattaSidh	Installed but Non-Operational		ABB has started the review work and within 02 months all the bus bar protection will be made operational
	220kV kangoo	Installed but Non-Operational		
	220kV Nangal	Installed but Non-Operational		
	220kV Katha Baddi	Installed but Non-Operational		
Punjab	220 KV S/S Kotlisurat Malhi	Not Installed		within next 06 months (by Dec 2023) bus bar protection will be commissioned at these 09 substations
	220 KV S/S Maur	Not Installed		
	220 KV S/S Science city	Not Installed		
	220 KV S/S Banga	Not Installed		
	220 KV S/S Hoshiarpur	Not Installed		
	220 KV S/S Goraya	Not Installed		
	220 KV S/S Badhni kalan	Not Installed		

220 KV S/S Bhari	Not Installed	
220 KV S/S Bhawanigarh	Not Installed	

Status of protection relay type				
Constituent Name	**Name of Station**	**Element Name**	**Present Status**	**Remark**
Uttarakhand	220kV Rishikesh	SIDCUL line	Main-II is not installed	
		Chamba line		
		Dharasu line-2		
	220kV Chamba	Rishikesh line		
HP	220kV MattaSidh	220kV transformer bank-1 & 2	Static relay	
Rajasthan	220 kV GSS Sanganer	220 kV HEERAPURA	Static	
	220 kV GSS Phulera	220 KV HEERAPURA	Static	
		220 kV Makrana	Static	
	220 KV GSS CHOMU	220 kV Heerapura	Static	
		220 kV Reengus Line	Static	
	220 kV GSS Kukas	220 kV Manoharpur Line	Static	
		220 kV Alwar Line	Static	
	220kV GSS Dausa	220 kV SawaiMadhopur Line	Static	
		220 kV Bassi-I Line	Static	
		220 kV Bassi-II Line	Static	
		220 kV Alwar Line	Static	
		220 kV Mandawar Line	Static	
	220KV BHARATPUR GSS	220 KV DHOLPUR	Static	
	220 KV GSS SAKATPURA	220 kV ANTA(NTPC)	Static	
	220 KV DAHRA	220 kV BARAN	Static	
		220 kV SAKATPURA	Static	
	220KV GSS MODAK	220 kV RANPUR	Static	
		220 kV Jhalawar	Static	
	220 KV GSS JHALAWAR	220 kV Modak	Static	
	220KV GSS HINDAUN	220KV Sikrai Line	Static	relay defective
	220KV GSS DHOLPUR	220 kV DCPP	Static	
	220 KV GSS Reengus	220 KV Laxmangarh	Static	
	220 KV GSS Nagour	220KV NOKHA	Static	
		220KV KUCHERA	Static	
	220KV GSS Kankroli	220 KV PGCIL-I	Static	
	220 KV GSS SIROHI	220 KV (400) KV PGCIL Bhinmal	Static	
	220 KV GSS SIROHI	220 KV Jalore	Static	
	220 KV GSS BHINMAL	220 KV (400) KV PGCIL Bhinmal-I	Static	
	220 KV GSS BALI	220kV Sirohi	Static	
	220 KV GSS Suratgarh	220 KV STPS-I	Static	
		220 KV STPS-II	Static	
		220 KV Hanumangarh Line	Static	
	220 KV GSS Sri Ganganagar	220 KV Hanumangarh Line	Static	
	220 KV GSS Hanumangarh	220 KV Suratgarh	Static	
	220KV GSS Ratangarh	220KV Rawatsar	Static	
	220KV GSS Ratangarh	220KV Halasar	Static	
	220KV GSS Ratangarh	220KV InterConnector-I	Static	
	220KV GSS Ratangarh	220KV InterConnector-II	Static	
	220KV GSS Sujangarh	220KV Ratangarh	Static	
	220 KV GSS Bikaner	220 KV Badnu Line	Static	
	220 KV GSS Bikaner	220 KV Interconnector-I Line	Static	
	220 KV GSS Bikaner	220 KV Spare Line	Static	
	220kV Madanpur	220/66kV 100 MVA PTF T-1	Electromechanical	Working properly, need to be replace with numerical relay
		220/66kV 100 MVA PTF T-1 A	Electromechanical	Working properly, need to be replace with numerical relay
		220kV Bus-Coupler	Backup relay -Numerical all other relays are Electromechanical	Working properly, need to be replace with numerical relay
		220/66kV 100 MVA PTF T-1 A	Electromechanical Execept Differential relay (Numerical)	Working properly, need to be replace with numerical relay
	220 KV S/Stn Shahbad	100 MVA 220/66 KV T/F T-1	Electrostatic	Working properly, need to be replace with numerical relay
		220 KV Bus Coupler	Electrostatic	Working properly, need to be replace with numerical relay
		Incomer of 220/66 KV T/F T-1	Electrostatic	Working properly, need to be replace with numerical relay
		Incomer of 220/66 KV T/F T-2	Electrostatic	Working properly, need to be replace with numerical relay
	220 KV S/STnTepla	220KV Bus Coupler	Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -DCRTPP Ckt-1	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -DCRTPP Ckt-2	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -Shahbad Ckt-1	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -Shahbad Ckt-2	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay

Haryana	220KV S/Stn Jorian	220KV Jorian -Abdullapur Ckt-1	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -Abdullapur Ckt-2	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220/66, 160MVA T/F T-1	Defferntial Relay = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220/66, 100MVA T/F T-2	All Electromechanical	Working properly, need to be replace with numerical relay
		220/66, 100MVA T/F T-3	Defferntial & REF Relay = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
	220 kv Salempur	220 KV BAKANA–SALEMPUR CKT-I	All electromechanical type,except DPR relays	Working properly, need to be replace with numerical relay
		220 KV BAKANA–SALEMPUR CKT-II	All electromechanical type,except DPR relays	Working properly, need to be replace with numerical relay
		220 KV SALEMPUR-NISSING CKT-I	All electromechanical type,except DPR relays	Working properly, need to be replace with numerical relay
		220 KV SALEMPUR-NISSING CKT-II	All electromechanical type,except DPR relays	Working properly, need to be replace with numerical relay
		220 KV BUS-COUPLER	All electromechanical type	Working properly, need to be replace with numerical relay
		220/66 KV 100MVA T/F T-I	All electromechanical type,except Differential relays	Working properly, need to be replace with numerical relay
		220/66 KV 100MVA T/F T-2	All electromechanical type,except Differential relays	Working properly, need to be replace with numerical relay
	TS Division Karnal	220kV Nissing-PTPS Ckt-I	All electromechanical type,except DPR relays	
		100 MVA 220/132kV T-8	All electromechanical type,except Differential relay	Differential relay replcaed with Numerical type
		220 kV Bus-coupler	All electromechanical type	C&R panel will be replaced soon
		220 KV DCRTPP–UNISPUR CKT-I	All electromechanical type,except DPR relays	
		220 KV DCRTPP–UNISPUR CKT-II	All electromechanical type,except DPR relays	
		220 KV KARNAL–UNISPUR LINE	All electromechanical type,except DPR relays	
		220/132 KV 100 MVA T/F T-1	All electromechanical type,except R.E.F & Differential relay	
		220/132 KV 100 MVA T/F T-2	All electromechanical type,except R.E.F & Differential relay	
		220/132 KV 160 MVA T/F T-4	All electromechanical type,except R.E.F & Differential relay	
	220kV S/Stn Palla	100MVA 220/66kV T-1	REF & backup Electromechnical	
		100MVA 220/66kV T-2	REF & backup Electromechnical	
		100MVA 220/66kV T-7	Diff & Backup lectromechnical and REF static	
		220kV Palla - Sector 78	backup Electromechnical	
		220kV Palla - FGPP ckt-II	backup Electromechnical	
	220 kV S/Stn. Pali	100 MVA 220/66 kV T-1	REF & backup Electromechnical	
		100 MVA 220/66 kV T-3	REF & backup Electromechnical	
		220 kV Pali-BBMB Samaypur Ckt 1	backup Electromechnical	
		220 kV Pali-BBMB Samaypur Ckt 2	backup Electromechnical	
		220 kV Pali-Sector 46 Ckt 1	backup Electromechnical	
		220 kV Pali-Sector 46 Ckt 2	backup Electromechnical	
		220 kV Pali-Sector 65 Ckt 1	backup Electromechnical	
		220 kV Pali-Badshahpur Ckt 2	backup Electromechnical	
		220 kV Pali-Sector 56 Ckt 1	backup Electromechnical	
		220 kV Pali-Sector 56 Ckt 2	backup Electromechnical	
	220kV S/Stn Palwal	220/66kV 160MVA T-1 T/F	REF & backup Electromechnical	
		220/66kV 100MVA T-2 T/F	Diff, REF & Backup Electromechnical	
		220kV Prithala Palwal Ckt I	backup Electromechnical	
		220kV Prithala Palwal Ckt II	backup Electromechnical	
	220kv S/Stn. Sector 52A GGM	Sec 56-Sec 52A ckt 1	NUMERICAL RELAY qty 02 and electromechanical qty 01 (backup)	LINE IS PROVIDED WITH 2 MAIN NUMERICAL DPR AND 01 ELECTROMECHANICAL FOR BACKUP
		Sec 56-Sec 52A ckt 2	NUMERICAL RELAY qty 02 and electromechanical qty 01 (backup)	LINE IS PROVIDED WITH 2 MAIN NUMERICAL DPR AND 01 ELECTROMECHANICAL FOR BACKUP
		Sec 72-Sec 52A	NUMERICAL RELAY qty 02 and electromechanical qty 01 (backup)	LINE IS PROVIDED WITH 2 MAIN NUMERICAL DPR AND 01 ELECTROMECHANICAL FOR BACKUP
		Sec 57-Sec 52A	NUMERICAL RELAY qty 02 and electromechanical qty 01 (backup)	LINE IS PROVIDED WITH 2 MAIN NUMERICAL DPR AND 01 ELECTROMECHANICAL FOR BACKUP
	220KV S/Stn. Sonepat		(Diff.-3 , REF-3, O/C/E/F-4 , Electromechnical Relays	The electromechanical differential and DPR are not available in the store. However, the same shall be replaced after availability in the store.
	220kV Rohtak		(REF-2, O/C/E/F-12) Electromechnical Relays	
	400 KV S/S Moradabad	400 KV MORADABAD - RAMPUR LINE	LBB- ABB(RAICA) / STATIC	UNDER PGCIL
		400 KV MORADABAD - KASHIPUR LINE	LBB- English Electric(CTIG) / Electromechnical	
		400 KV, TRANSFER BUS	LBB- English Electric(CTIG) / Electromechnical	
		400 KV, BUS COUPLER	LBB- English Electric(CTIG) / Electromechnical	
	220kV S/S BARAUT	220/132kV 200MVA TRANSFORMER-1	REF Protection - Electromechanical	
	220kV S/S BAGHPAT	220/132kV 160MVA TRANSORMER-1	Backup (L.V. Side) - Electromechanical	Electromechanical (Back-up) relay commissioned on 05/03/2023 on LV side of 160MVA T/F-I as temporary measure as Numerical Back-up (Make-ZIV) relay failed to issue tripping command during testing.
	220 kV KHURJA	220/132Kv 200MVA Transformer-I	REF-Static	
	220 kV DEBAI	220/132Kv 100MVA Transformer-I	Numerical	LV BackUp relay is faulty

UP	220 kV Jahangirabad	220/132Kv 160MVA Transformer-I	REF-Static	
	400KV S/S MURAD NAGAR	220KV LONI LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV FARID NAGAR LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV INTER CONNECTOR-I MURAD NAGAR LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV INTER CONNECTOR-II MURAD NAGAR LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV SAHIBABAD LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV PRATAP VIHAR LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV TBC	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		400KV TBC	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		400KV ALIGARH LINE	LBB RELAY IS ELECTROMECHANICAL.	
		400KV ATOUR LINE	LBB RELAY IS ELECTROMECHANICAL.	
	220KV S/S MURAD NAGAR	220KV BUS COUPLER	O/C RELAY IS ELECTROMECHANICAL	
	400KV S/S Gorakhpur	400KV TBC	Electromechanical	
		220KV TBC	Electromechanical	
	220KV S/S Barahua	220KV PGCIL	Back up relay electromechenical	
	220KV S/S Basti	220 KV Basti Tanda line	67N(2TJM12)(Electromechanical)	
		63MVA Transformer-II	HV Side directional o/c&e/f(Electromechanical)	
	400 KV SS Kasara,Mau	200MVA, 400/132KV ICT-1st	REF & Over flux relay Electromechanical	
		200MVA, 400/132KV ICT-2nd	REF & Over flux relay Electromechanical	
	220 KV SS Substation Hafizpur Azamgarh	160 MVA ICT -1	Electromechanical(EE Make)	Tendering is under process
	220kV Khara		Electromechanical	process of replacing electrochemical relay with numerical relay has been started, it will be completed within 2-3 months.
	400kV S/S Sultanpur	240 MVA ICT-II	Non Numerical	
		50 MVAR Obra Line Reactor	Non Numerical	
	220kV S/S Sultanpur	220kV B/C	Non Numerical	
		160 MVA T/F-I	Non Numerical	
NPCIL	220kV RAPPC	220KV Anta line	Backup relay: Static relay(RAPDK3)	Procurement of Numerical relay is in progress for replacement of Static relay (Backup protection).
	220kV NAPP	NAPP-SAMBHAL		Main-2 distance protection is under procurement. ECD- June2024
		NAPP-SIBHOLI		Main-2 distance protection is under procurement. ECD- June2024
		NAPP-DIBAI		Main-2 distance protection is under procurement. ECD- June2024
		NAPP-KHURJA		Main-2 distance protection is under procurement. ECD- June2024
		NAPP-ATRAULI		