



भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

उत्तर क्षेत्रीय विद्युत समिति

Northern Regional Power Committee

**विषय: प्रचालन समन्वय उप-समिति की 220<sup>वीं</sup> बैठक की कार्यसूची।**

**Subject: Agenda of the 220<sup>th</sup> OCC meeting.**

प्रचालन समन्वय उप-समिति की 220<sup>वीं</sup> बैठक दिनांक 19.06.2024 (सुबह 10:00) कुफरी, हिमाचल प्रदेश में होगी। बैठक की मेजबानी अरावली पावर कारपोरेशन लिमिटेड द्वारा की जा रही है। उक्त बैठक की कार्यसूची संलग्न है। कृपया बैठक में भाग लेने की कृपा करें।

यह अनुरोध किया जाता है कि प्रतिभागी (प्रत्येक सदस्य संगठन से एक) एनआरपीसी सचिवालय को अपनी यात्रा का विवरण एक्सेल शीट लिंक पर निर्धारित प्रारूप में 16.06.2024 तक सूचित कर सकते हैं।

The 220<sup>th</sup> meeting of the Operation Co-ordination sub-committee (OCC) will be held on 19.06.2024 (10:00 A.M.) at Kufri, Himachal Pradesh. Meeting is being hosted by Aravali Power Company Private Limited. Agenda for the same is attached. Kindly make it convenient to attend the meeting.

It is requested that participants (**preferably one from each organization**) may intimate NRPC Secretariat, their journey details latest by 15.06.2024 in prescribed format at excel sheet link enclosed in the mail.

Nodal officer(s) for facilitating meeting are as below:

Nam e	Designati on	Contact No	Email
Sh. Amit Hooda	Sr. Manager (EEMG - Commercial)	+91-9416212595	<a href="mailto:amit.hooda01@apcp.l.co.in">amit.hooda01@apcp.l.co.in</a>
Sh. Prashant Jain	AGM (EEMG)	+91-9428815852	<a href="mailto:prashantjain@ntpc.co.in">prashantjain@ntpc.co.in</a>

Signed by Dharmendra  
Kumar Meena

Date: 12-06-2024 17:09:35

(डी. के. मीना)

अधीक्षण अभियंता (प्रचालन)

List of addressee (via mail)			
OCC Members for FY 2024-25			
S. No	OCC Member	Category	E-mail
1	NLDC	National Load Despatch Centre	<b>nomination awaited</b>
2	NRLDC	Northern Regional Load Despatch Centre	<a href="mailto:somara.lakra@grid-india.in">somara.lakra@grid-india.in</a>
3	CTUIL	Central Transmission Utility	<a href="mailto:kashish@powergrid.in">kashish@powergrid.in</a>
4	PGCIL	Central Government owned Transmission Company	<a href="mailto:ravindrangupta@powergrid.in">ravindrangupta@powergrid.in</a>
5	NTPC	Central Generating Company	<a href="mailto:hrastogi@ntpc.co.in">hrastogi@ntpc.co.in</a>
6	BBMB		<a href="mailto:powerc@bbmb.nic.in">powerc@bbmb.nic.in</a>
7	THDC		<a href="mailto:rrsemwal@thdc.co.in">rrsemwal@thdc.co.in</a>
8	SJVN		<a href="mailto:sjvn.cso@sjvn.nic.in">sjvn.cso@sjvn.nic.in</a>
9	NHPC		<a href="mailto:surendramishra@nhpc.nic.in">surendramishra@nhpc.nic.in</a>
10	NPCIL		<a href="mailto:df@npcil.co.in">df@npcil.co.in</a>
11	Delhi SLDC	State Load Despatch Centre	<a href="mailto:gmsldc@delhisldc.org">gmsldc@delhisldc.org</a>
12	Haryana SLDC		<a href="mailto:cesocomml@hvpn.org.in">cesocomml@hvpn.org.in</a>
13	Rajasthan SLDC		<a href="mailto:ce.ld@rvpn.co.in">ce.ld@rvpn.co.in</a>
14	Uttar Pradesh SLDC		<a href="mailto:ceps@upsldc.org">ceps@upsldc.org</a>
15	Uttarakhand SLDC		<a href="mailto:se_sldc@ptcul.org">se_sldc@ptcul.org</a>
16	Punjab SLDC		<a href="mailto:ce-sldc@pstcl.org">ce-sldc@pstcl.org</a>
17	Himachal Pradesh SLDC		<a href="mailto:cehpsldc@gmail.com">cehpsldc@gmail.com</a>
18	DTL	State Transmission Utility	<a href="mailto:bl.gujar@dtl.gov.in">bl.gujar@dtl.gov.in</a>
19	HVPNL		<a href="mailto:cetspkl@hvpn.org.in">cetspkl@hvpn.org.in</a>
20	RRVNL		<a href="mailto:ce.ppm@rvpn.co.in">ce.ppm@rvpn.co.in</a>
21	UPPTCL		<a href="mailto:smart.saxena@gmail.com">smart.saxena@gmail.com</a>
22	PTCUL		<a href="mailto:ce_oandmk@ptcul.org">ce_oandmk@ptcul.org</a>
23	PSTCL		<a href="mailto:ce-tl@pstcl.org">ce-tl@pstcl.org</a>
24	HPPTCL		<a href="mailto:gmpjcts.tcl@hpmail.in">gmpjcts.tcl@hpmail.in</a>
25	IPGCL		<b>nomination awaited</b>
26	HPGCL	<a href="mailto:seom2.rgtpp@hpgcl.org.in">seom2.rgtpp@hpgcl.org.in</a>	
27	RRVUNL	State Generating Company	<a href="mailto:ce.ppmcit@rrvunl.com">ce.ppmcit@rrvunl.com</a>
28	UPRVUNL		<a href="mailto:cgm.to@uprvunl.org">cgm.to@uprvunl.org</a>
29	UJVNL		<a href="mailto:gm_engg_ujvn@yahoo.co.in">gm_engg_ujvn@yahoo.co.in</a>
30	HPPCL		<a href="mailto:gm_generation@hppcl.in">gm_generation@hppcl.in</a>
31	PSPCL	State Generating Company & State owned Distribution Company	<a href="mailto:ce-ppr@pspcl.in">ce-ppr@pspcl.in</a>
32	UHBVN	State owned Distribution Company (alphabetical rotational basis/nominated by state govt.)	<b>nomination awaited</b>
33	Jodhpur Vidyut Vitran Nigam Ltd.		<b>nomination awaited</b>
34	Paschimanchal Vidyut Vitaran		<b>nomination awaited</b>

	Nigam Ltd.		
35	UPCL		<a href="mailto:cgmupcl@yahoo.com">cgmupcl@yahoo.com</a>
36	HPSEB		<a href="mailto:cesysophpsebl@gmail.com">cesysophpsebl@gmail.com</a>
37	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	<a href="mailto:sanjay.bhargava@tatapower.com">sanjay.bhargava@tatapower.com</a>
38	Aravali Power Company Pvt. Ltd		<a href="mailto:amit.hooda01@gmail.com">amit.hooda01@gmail.com</a>
39	Apraave Energy Ltd.,		<a href="mailto:rajneesh.setia@apraava.com">rajneesh.setia@apraava.com</a>
40	Talwandi Sabo Power Ltd.		<a href="mailto:ravinder.thakur@vedanta.co.in">ravinder.thakur@vedanta.co.in</a>
41	Nabha Power Limited		<a href="mailto:Durvesh.Yadav@larsentoubro.com">Durvesh.Yadav@larsentoubro.com</a>
42	Lanco Anpara Power Ltd		<a href="mailto:sudheer.kothapalli@meilanparapower.com">sudheer.kothapalli@meilanparapower.com</a>
43	Rosa Power Supply Company Ltd		<a href="mailto:Suvendu.Dey@relianceada.com">Suvendu.Dey@relianceada.com</a>
44	Lalitpur Power Generation Company Ltd		<a href="mailto:avinashkumar.ltp@lpgcl.com">avinashkumar.ltp@lpgcl.com</a>
45	MEJA Urja Nigam Ltd.		<a href="mailto:rsiuneja@ntpc.co.in">rsiuneja@ntpc.co.in</a>
46	Adani Power Rajasthan Limited		<a href="mailto:manoj.taunk@adani.com">manoj.taunk@adani.com</a>
47	JSW Energy Ltd. (KWHEP)	<a href="mailto:roshan.zipta@jsw.in">roshan.zipta@jsw.in</a>	
48	TATA POWER RENEWABLE	IPP having less than 1000 MW installed capacity (alphabetical rotational basis)	nomination awaited
49	UT of J&K	From each of the Union Territories in the region, a representative nominated by the administration of the Union Territory concerned out of the entities engaged in generation/ transmission/ distribution of electricity in the Union Territory.	<a href="mailto:sojpd@gmail.com">sojpd@gmail.com</a>
50	UT of Ladakh		<a href="mailto:cepladakh@gmail.com">cepladakh@gmail.com</a>
51	UT of Chandigarh		<a href="mailto:elop2-chd@nic.in">elop2-chd@nic.in</a>
52	Noida Power Company limited	Private Distribution Company in region (alphabetical rotational basis)	nomination awaited
53	Fatehgarh Bhadla Transmission Limited	Private transmission licensee (nominated by central govt.)	nomination awaited
54	NTPC Vidyut Vyapar Nigam Ltd.	Electricity Trader (nominated by central govt.)	nomination awaited



**उत्तर क्षेत्रीय विद्युत समिति**  
**NORTHERN REGIONAL POWER COMMITTEE**

**Agenda of the**  
**220<sup>th</sup> meeting of**  
**Operational Co-ordination Sub-Committee**  
**of**  
**Northern Regional Power Committee**

**Date: 19<sup>th</sup> June 2024**

**Time: 10:00 AM**

**Venue: Hotel The Ananda,**  
**Kufri, Himachal Pradesh**



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**खण्ड-क: उ.क्षे.वि.स.****Part-A: NRPC****A.1. Confirmation of Minutes**

219<sup>th</sup> OCC meeting was held on 15.05.2024. Minutes of the meeting were issued vide letter dt. 28.05.2024.

**Decision required from Forum:**

*Forum may approve the minutes of 219<sup>th</sup> OCC meeting.*

**A.2. Status of action taken on decisions of 219<sup>th</sup> OCC meeting of NRPC**

A.2.1. MS, NRPC conveyed that the agenda has been taken to track the status of action taken as per decision of last meeting. Accordingly, issues may be resolved at the earliest.

A.2.2. Concerned utilities submitted the status of action taken and the same has been complied as **Annexure- 0**.

**A.3. Review of Grid operations****A.3.1. Power Supply Position (Provisional) for May 2024**

Anticipated Power Supply Position v/s Actual Power Supply Position (Provisional) of Northern Region during the month of May-2024 is as under:

State / UT	Req. / Avl.	Energy (MU)			Peak (MW)		
		Anticipated	Actual	% Variation	Anticipated	Actual	% Variation
CHANDIGARH	(Avl)	180	210	16.4%	360	432	20.0%
	(Req)	170	210	23.5%	361	432	19.8%
DELHI	(Avl)	4392	4205	-4.3%	7200	8302	15.3%
	(Req)	3800	4208	10.7%	7200	8302	15.3%
HARYANA	(Avl)	7370	6839	-7.2%	12240	12451	1.7%
	(Req)	5859	6839	16.7%	11388	12451	9.3%
HIMACHAL PRADESH	(Avl)	1093	1069	-2.2%	1885	1827	-3.1%
	(Req)	1108	1076	-2.9%	1780	1827	2.6%
J&K and LADAKH	(Avl)	1950	1641	-15.8%	3300	2750	-16.7%
	(Req)	1867	1647	-11.8%	3069	2750	-10.4%
PUNJAB	(Avl)	7220	7246	0.4%	11610	14519	25.1%
	(Req)	6000	7246	20.8%	12557	14519	15.6%
RAJASTHAN	(Avl)	9510	10275	8.0%	18280	17567	-3.9%
	(Req)	9040	10348	14.5%	17000	17567	3.3%
UTTAR PRADESH	(Avl)	14570	17453	19.8%	27500	29727	8.1%
	(Req)	14260	17478	22.6%	27500	29727	8.1%

	)						
UTTARAKHAND	(Avl)	1418	1663	17.3%	2505	2781	11.0%
	(Req)	1442	1666	15.6%	2550	2781	9.1%
NORTHERN REGION	(Avl)	47703	50602	6.1%	80100	86300	7.7%
	(Req)	43545	50718	16.5%	78000	86300	10.6%

As per above, negative / significant variation ( $\geq 5\%$ ) in Actual Power Supply Position (Provisional) vis-à-vis Anticipated figures is observed for the month of May-2024 in terms of Energy Requirement for Chandigarh, Delhi, Haryana, HP, UTs of J&K and Ladakh, Punjab, Rajasthan, UP, and Uttarakhand and in terms of Peak Demand similar variation is noted for Chandigarh, Delhi, Haryana, UTs of J&K and Ladakh, Punjab, 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 2<sup>nd</sup> and 15<sup>th</sup> day of the month respectively for the compliance of Central Electricity Authority (Furnishing of Statistics, Returns and Information) Regulations, 2007.

#### A.4. Maintenance Programme of Generating Units and Transmission Lines

##### A.4.1. Maintenance Programme for Generating Units

The meeting on proposed maintenance programme for Generating Units for the month of July-2024 is scheduled on 14-June-2024 via Video Conferencing

##### A.4.2 Outage Programme for Transmission Elements

The meeting on proposed outage programme of Transmission elements for the month of July-2024 is scheduled on 14-June-2024 via Video conferencing.

#### A.5. Planning of Grid Operation

##### A.5.1. Anticipated Power Supply Position in Northern Region for July 2024

The Anticipated Power Supply Position in Northern Region for July 2024 is as under:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	240	400	No Revision submitted
	Requirement	192	391	
	Surplus / Shortfall	48	9	
	% Surplus / Shortfall	24.8%	2.4%	
DELHI	Availability	4100	7330	No Revision submitted
	Requirement	4166	8160	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Surplus / Shortfall	-66	-830	
	% Surplus / Shortfall	-1.6%	-10.2%	
HARYANA	Availability	7829	13743	04-June-24
	Requirement	7027	14261	
	Surplus / Shortfall	802	-518	
	% Surplus / Shortfall	11.4%	-3.6%	
HIMACHAL PRADESH	Availability	1128	1795	05-June-24
	Requirement	1089	1846	
	Surplus / Shortfall	39	-51	
	% Surplus / Shortfall	3.6%	-2.8%	
J&K LADAKH and	Availability	2180	3300	No Revision submitted
	Requirement	1753	3115	
	Surplus / Shortfall	427	185	
	% Surplus / Shortfall	24.4%	5.9%	
PUNJAB	Availability	7810	12380	No Revision submitted
	Requirement	9283	16265	
	Surplus / Shortfall	-1473	-3885	
	% Surplus / Shortfall	-15.9%	-23.9%	
RAJASTHAN	Availability	9210	17450	No Revision submitted
	Requirement	8931	15504	
	Surplus / Shortfall	279	1946	
	% Surplus / Shortfall	3.1%	12.6%	
UTTAR PRADESH	Availability	18290	30000	10-June-24
	Requirement	17980	30000	
	Surplus / Shortfall	310	0	
	% Surplus / Shortfall	1.7%	0.0%	
UTTARAKHAND	Availability	1498	2469	04-June-24
	Requirement	1519	2500	
	Surplus / Shortfall	-21	-31	
	% Surplus / Shortfall	-1.4%	-1.2%	
NORTHERN REGION	Availability	52284	80100	
	Requirement	51940	83000	
	Surplus / Shortfall	344	-2900	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	% Surplus / Shortfall	0.7%	-3.5%	

SLDCs are requested to update the anticipated power supply position of their respective state / UT for the month of July-2024 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.

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

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

**All utilities are requested to update the status.**

#### A.7. NR Islanding scheme

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

**Members may kindly deliberate.**

#### A.8. Coal Supply Position of Thermal Plants in Northern Region

A.8.1. In 186<sup>th</sup> 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.

A.8.2. Accordingly, coal stock position of generating stations in northern region during current month (till 09<sup>th</sup> June 2024) is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Req'd (Days)	Actual Stock (Days)
ANPARA C TPS	1200	0.90	17	5.3
ANPARA TPS	2630	0.87	17	13.5
BARKHERA TPS	90	0.66	26	57.0
DADRI (NCTPP)	1820	0.67	26	32.9
GH TPS (LEH.MOH.)	920	0.55	26	28.8
GOINDWAL SAHIB TPP	540	0.72	26	23.7
HARDUAGANJ TPS	1265	0.63	26	33.1
INDIRA GANDHI STPP	1500	0.64	26	38.4
KAWAI TPS	1320	0.89	26	19.8
KHAMBARKHERA TPS	90	0.64	26	51.3
KOTA TPS	1240	0.85	26	9.1
KUNDARKI TPS	90	0.63	26	38.0
LALITPUR TPS	1980	0.77	26	22.5
MAHATMA GANDHI TPS	1320	0.79	26	35.1
MAQSOODPUR TPS	90	0.64	26	42.8

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Req'd (Days)	Actual Stock (Days)
MEJA STPP	1320	0.91	26	24.6
OBRA TPS	1094	0.57	26	9.6
PANIPAT TPS	710	0.86	26	41.6
PARICHA TPS	1140	0.71	26	22.1
PRAYAGRAJ TPP	1980	0.83	26	30.7
RAJIV GANDHI TPS	1200	0.61	26	23.7
RAJPURA TPP	1400	0.87	26	24.1
RIHAND STPS	3000	0.93	17	24.2
ROPAR TPS	840	0.65	26	23.2
ROSA TPP Ph-I	1200	0.75	26	24.2
SINGRAULI STPS	2000	0.98	17	13.1
SURATGARH TPS	1500	0.68	26	5.2
TALWANDI SABO TPP	1980	0.71	26	5.4
TANDA TPS	1760	0.77	26	28.3
UNCHAHR TPS	1550	0.66	26	23.3
UTRAULA TPS	90	0.62	26	38.0
YAMUNA NAGAR TPS	600	0.85	26	29.5
CHHABRA-I PH-1 TPP	500	0.82	26	7.3
KALISINDH TPS	1200	0.78	26	10.0
SURATGARH STPS	1320	0.70	26	7.1
CHHABRA-I PH-2 TPP	500	0.86	26	3.6
CHHABRA-II TPP	1320	0.68	26	8.3

#### A.9. Status of availability of ERS towers in Northern Region (Agenda by NRPC Sectt.)

**A.9.1** In the 68<sup>th</sup> meeting of NRPC issues arising due to non-availability of sufficient ERS were discussed and it was decided that ERS availability monitoring shall be taken as rolling/follow-up agenda in OCC meetings for regular monitoring of ERS under different utilities in Northern region.

**A.9.2** Subsequently matter was deliberated in 211<sup>th</sup> OCC meeting wherein NRLDC representative briefed about the Requirement of ERS, recent experience in Northern Region, CEA Regulation on ERS, Govt. Guidelines and Present situation on ERS.

**A.9.3** NRPC Sectt. vide letter dated 26.09.2023 requested all transmission utilities of NR to furnish the length of transmission line (ckt-kms) and number of ERS towers available with them at different voltage levels (e.g. 220 kV, 400 KV 765 KV and + - 500 kV HVDC via email at [seo-nrpc@nic.in](mailto:seo-nrpc@nic.in).

**A.9.4** In this regard, inputs received from utilities are attached as **Annexure-A.III**.

***Transmission utilities of NR to update status.***

**A.10. System Protection Scheme (SPS) for 2X315MVA, 400/220kV ICTs at 400kV GSS Babai (RVPN)**

A.10.1. The cited matter was also deliberated in 217<sup>th</sup> OCC meeting wherein forum asked RVPN to discuss the issues highlighted by NRLDC internally and accordingly submit revised SPS proposal.

A.10.2. Subsequently, RVPN vide letter dated 05.06.2024 has intimated that they have submitted pointwise reply to the queries raised by NRLDC and thereafter has submitted revised SPS for 2X315MVA, 400/220kV ICTs at 400kV GSS Babai. (copy attached as **Annexure-A.IV**)

***Members may kindly deliberate.***

**A.11. Requirement of additional 500 MVA, 400/220/33kV ICT at Samba (PG) Substation to meet increasing load demand of Jammu city (Agenda by JKPTCL)**

A.11.1. JKPTCL vide letter dated 06.06.2024 has informed that presently ICT capacity at 400/220/33kV Samba substation is 945 MVA (3\*315 MVA). Peak loading observed at 400/220/33kV Samba substation is 720 MVA (3\*240 MVA).

A.11.2. Further, following new load is expected:

- 364 MW industrial load in New 220/66kV substation Kathua
- 120 MW Load expected in case tripping of 220kV Jammu Salal

A.11.3. In view of the above and keeping in view future demand, JKPTCL has suggested for installation of 01 No. 400/220/33kV, 500 MVA ICT at Samba with commissioning target of 18 months.

A.11.4. Further, JKPTCL has intimated that expected cost for erection of 01 No. 500 MVA ICT and 04 No. Bays (01 No. 400kV and 03 No. 220kV) would be around 58 Crore.

***Members may kindly deliberate.***

**A.12. Construction of 320MVA, 220/66 KV, Grid Sub-Station, Bhaathall Kathua (Agenda by JKPTCL)**

A.12.1. JKPTCL vide letter dated 06.06.2024 has informed that under the industrial policy in UT of J&K, Industrial Estate Bhagthali is being proposed to be set up in Jammu region.

A.12.2. For this, requirement of 320MVA (07x 53.33MVA single phase units), 220/66 KV, Grid Sub-Station along with feeding 220 KV transmission lines to meet the load requirement is proposed.

ICT Capacity – 320 MVA (06 No's x 53.33MVA + 01 No. Spare 53.33MVA)

New Load Expected: 226.29 MW Industrial Load plus provision for 10-20% for future growth.



**A.12.3.** In view of the above and keeping in view future industrial growth at Bhagthali and adjoining areas, JKPTCL has suggested for installation of 320MVA (07 x 53.33MVA single phase units) ,220/66 KV, Grid Sub-station along with 45Kms (approx.) feeding 220 KV D/C Transmission line from Samba (PG) alongwith LILO of existing 220kV Sarna-Hiranagar Transmission Line at Bhagthali (to meet N-I compliance) with the commissioning target of 18 Months.

**A.12.4.** Further, JKPTCL has intimated that expected cost for erection of 320MVA ICTs(06 No's x 53.33MVA + 01 No. Spare 53.33MVA) along with 45Kms (approx.) feeding 220kV D/C Transmission line from Samba (PG) along with LILO of existing 220kV Sarna-Hiranagar Transmission Line (to meet N-1 compliance) would be Rs. 254 Crs. plus Rs. 58 Crs. for creation of the upstream network to be done by M/s Powergrid Corporation of India to meet upcoming load requirement of 226.29MW at Bhagthali and 138.5 MW at existing GSS Ghatti, Kathua which is also to be augmented from 160 MVA to 320MVA.

**Members may kindly deliberate.**

**A.13. Agenda on revised System Protection Scheme (SPS) scheme for Anpara Complex (Agenda by UPSLDC)**

A.13.1. UPSLDC vide letter dated 07.06.2024 has intimated that after commissioning of 2X1000 MVA ICTs at Obra C TPS, SPS for Anpara complex needs to be revised.

A.13.2. UPSLDC has carried out study considering loading scenario for various contingencies in Anpara complex. (Copy of the revised SPS proposed by UPSLDC for Anpara Complex is attached as **Annexure-A.V**)

**Members may kindly deliberate.**

**A.14. N-1 contingency violation in 400/220/33KV 315MVA ICT-I at BBMB Dehar (Agenda by Powergrid NR-2)**

A.14.1 Powergrid NR-2 has intimated that 315 MVA ICT at 400/220KV BBMB Dehar S/s is overloaded. On 315MVA ICT, load remains in the range of 300-315MW.Details of 220KV Feeders connected at BBMB Dehar are:

- 220KV Gangwal-1
- 220KV Gangwal-1
- 220KV Kangoo
- 220/132KV ICT 1
- 220/132KV ICT 1

A.14.2 In view of above and keeping in view present demand, Powergrid NR-2 has proposed the following: -

- Implementation of SPS scheme as temporary relief for Transformer overloading
- Installation of NEW Transformer at BBMB Dehar S/s

**Members may kindly deliberate.**

**A.15. Failure of 400/220/33KV, 315 MVA ICT-1 at Kaithal on dated 11.05.2024 (Agenda by Powergrid NR-2)**

- A.15.1. Powergrid NR-2 has informed that 315 MVA ICT-1 at Kaithal failed while feeding persistent fault in 220KV Lines of HVPNL at 00:51 Hrs of 11.05.2024. Just before the failure, Fault current in 220KV Kaithal (PG)- Kaithal1 Line and 220KV Kaithal(PG)-Neemwala-2 and fed by above transformer was 20KA and 24KA respectively.
- A.15.2. Powergrid NR-2 has mentioned that in past also, the ICTs at Kaithal(PG) have faced circuit faults due to frequent faults in 220KV Lines Network of SEB with fault current in the range of 15-25KA and after each fault, Line is cleared by the owner with the comments that nothing is found abnormal even when fault current is in the range of 20 to 24KA.
- A.15.3. In last one year, above ICT had faced more than 12 dead faults with fault current. Moreover, keeping A/R in auto mode results in 02 jerks to transformer for each fault.
- A.15.4. Powergrid has stated that AMP of ICT was carried out as per schedule and all test results including DGA results were normal before failure.
- A.15.5. Failed ICT is being replaced by POWERGRID at its own cost.
- A.15.6. However, as SEB has contributed to frequent short circuit tests of ICT due to fault in downstream network of SEB, in view of above Powergrid NR-2 has proposed the following:
- Outage of ICT due to above may be considered as deemed available.
  - Root cause analysis for such faults and remedial actions needs to be ensured before issuing charging code for charging of the Line.

***Members may kindly deliberate.***

**A.16. Tapping Tertiary of 765/400/33 kV ICT -2 for Reliable Auxiliary Power Supply to  $\pm$ 500kV HVDC Ballia Sub-Station (Agenda by POWERGRID, NR3)**

- A.16.1. Powergrid NR-3 has submitted that two auxiliary supplies have been provisioned at Ballia for HVDC and HVAC system. One is from tertiary of 200 MVA,400/132 KV ICT and another is UPPTCL feeder at 33 KV Levels.
- A.16.2. 400/132/33 KV, 200 MVA ICT is feeding 02 nos 132 KV Transmission Lines of UPPTCL connected to UPPTCL Sub-Station. In past, approx 673 no. of faults were detected in UPPTCL lines from Aug'23 to Oct'23. Considering large number of faults fed by this Transformer in past, the life of this ICT and its reliability has been seriously affected. After deliberation in 213<sup>th</sup> OCC and 215<sup>th</sup> OCC meeting, UPPTCL has taken corrective measures and fault detection came down upto 200 nos in last 04 months, which is also a big number.
- A.16.3. Powergrid NR-3 has intimated that 33kV auxiliary supply from dedicated UPPCL feeder is also not reliable and sometimes it fails 3-4 times in a month and outage duration in number of cases is more than 12 Hrs. Due to frequent breakdowns of UPPCL supply, the auxiliary Power Supply changeover occurs multiple times and leads more stress on HVDC equipments like CB, Valve cooling pumps and UPS by pass operation which is undesirable.

- A.16.4. Powergrid NR-3 has mentioned that generally, to avoid this situation, HVDC stations have provision for auxiliary supply from tertiary of the two independent ICTs and dedicated feeders from generating plants. Incase of Ballia, same is not available.
- A.16.5. Now, the Tertiary supply from 765kV ICT is necessitated for reliable sources to HVDC and HVAC Auxiliary Power Supply. Same was also discussed in 213th & 215th OCC meeting and a committee was formed to review the need of additional source of Auxiliary Power connectivity from tertiary of 765/400/33 KV ICT-2 for reliable auxiliary supply to HVDC Ballia Sub-Station.
- A.16.6. Accordingly, a meeting on Tapping Tertiary of 765/400/33 kV ICT -2 for Reliable Auxiliary Power Supply to  $\pm 500$ kV HVDC Ballia Sub-Station was held on 29.04.2024 on virtual mode. The meeting was chaired by GM, NRLDC and attended by POWERGRID, CTUIL & UPPTCL representatives.
- A.16.7. Based on the brief discussion held during the meeting dated 29.04.2024 and in light of attached MoM/committee recommendation (copy attached as **Annexure-A.VI**), Powergrid has proposed the following: -

***Additional source of Auxiliary Power connectivity from tertiary of 765/400/33 KV ICT-2 for reliable auxiliary supply to HVDC Ballai Sub-Station with approx cost estimate of Rs.1.25 Cr may be considered under ADD-Cap.***

***Members may kindly deliberate.***

**A.17. Implementation of System Protection Scheme (SPS) to address Overloading of 3x315 MVA ICTs at Allahabad SS (Agenda by POWERGRID, NR3)**

- A.17.1.** During 219th OCC Meeting of NRPC, issue of violation of N-1 contingency of 3X315 MVA ICTs at POWERGRID Allahabad SS and System Protection Scheme proposed by POWERGRID to address the overloading issue of ICTs at PG Allahabad SS till capacity augmentation were discussed.
- A.17.2.** During the meeting, NRLDC representative had suggested that Time delay for SPS activation may be reduced from 60sec to 500ms. OCC forum had also suggested that Time Delay for SPS activation w.r.t. Overcurrent settings of ICT need to be checked by POWERGRID and as per suggestion of UP SLDC, time delay in SPS logic may be explored by POWERGRID.
- A.17.3.** In this regard, Powergrid NR-3 has submitted that in past, it has been observed that Zone#03 faults in 220 kV Lines connected to PG Allahabad are not being cleared by downstream stations and are ultimately being fed by ICTs at Allahabad till 800 ms (Zone#03 trip time for 220 kV Lines). Therefore, the Time Delay for SPS must be greater than 800 ms to avoid spurious operation of SPS in case of feeding of Zone#03 faults by ICTs till Zone#03 tripping time of 800 ms.
- A.17.4.** Further, Powergrid NR-3 has mentioned that as per the Over Current setting for ICTs at PG Allahabad, Pickup setting of IEC Standard Inverse is 150% of Full Load current for Stage 01 Overcurrent Protection. Based on IEC S Inverse characteristics, the Trip Time of ICT Overcurrent protection for various values of fault current is tabulated below.

Fault Current wrt Full Load (FL) Current	Stage 01 OC Trip Time (s)
153% of FL	54.5
160% of FL	17.6
170% of FL	9.3
180% of FL	6.4
190% of FL	4.9
200% of FL	4.1

**A.17.5.** In view of the above, Powergrid NR-3 has submitted that considering above values of Trip Time after Overcurrent pick up, the SPS Time delay has been revised to 5sec. (Copy of the Proposed SPS is attached as **Annexure-A.VII**)

**Members may kindly deliberate.**

**A.18. Implementation of 3-phase Auto-Reclosure for the Phase-to-Phase Tripping of Transmission Lines due to Kite threads. (Agenda by POWERGRID, NR3)**

A.18.1. NR-3 Powergrid has intimated that as per the analysis of the Tripping Incidents of the Phase-to-Phase Tripping of the transmission lines at NR-III Region of POWERGRID, it has been observed that the majority of the Phase-to phase Tripping of the Transmission Lines have occurred due to the presence of foreign material (such as Kite Threads).

A.18.2. List of Transmission Lines in which more than 02 instances/Line of such phase-to-phase tripping have occurred are presented below: -

Sl. No.	Description of the Transmission Line	No. of Phase-to-Phase fault Instances due to Kite thread in which Line held during charging attempt.
1.	400kV Bareilly Moradabad-1 Line	16
2.	400kV Jehta(UP)- Unnao(UP)-1 Line	6
3.	220kV Bareilly(UP)- Sitarganj Line	5
4.	400kV Jehta(UP)- Unnao(UP)-2 Line	3

A.18.3. As per the protection scheme implemented at POWERGRID for Transmission Line Distance Protection, Auto Reclosure is only attempted in case of 1-phase to earth Faults. And if the fault is phase-to-phase/3-phase in nature, 3-phase tripping of the transmission line is issued and AutoReclosure is blocked.

A.18.4. However, in the above-mentioned phase-to-phase tripping instances, Transmission Lines got three-phase tripped (as per the implemented protection scheme) but got charged/held during the charging attempt. During the tripping of the line due to Kite thread, in most of the cases the thread causing the tripping gets burnt during the first tripping instance and subsequently the transmission line holds during the charging attempt.

A.18.5. As a remedial measure, Powergrid NR-3 has proposed that the 3-phase Auto Reclosure for phase-to-phase faults may be implemented in such lines having tripping on account of kite thread so that the number of trippings and outage duration of the transmission line during phase-to-phase fault may be reduced.

A.18.6. Since, Majority of such instances have been occurred in 400kV Bareilly Moradabad-1 Line, therefore the scheme for 3-phase Auto-reclosure on phase-to-phase faults may be implemented in the above line on pilot basis.

A.18.7. Scheme proposed by Powergrid NR-3 for 3-phase auto-reclosure: -

- In the proposed scheme for 3-phase Autoreclosure of Line on Phase-to-phase faults, Line shall auto-reclose on Single-phase to earth faults & Phase to Phase Faults. However, Auto-reclosure should get blocked in case of Three-phase faults and three phase to earth faults.
- To achieve the above through scheme, auto reclosure initiation is to be taken from the pickup signals of Single-phase to earth fault loop and Phase to phase Selection (in case of Rph-Yph fault, Yph-Bph fault and Bph-Rph Fault).
- Further in case actuation of all three phase to earth fault selection loops together or actuation of all phase-to-phase fault loops together, blocking of Autoreclosure is to be configured.

A.18.8. With the implementation of the above proposed scheme, 3-phase Autoreclosure shall be only permitted for phase to earth and phase to phase faults and Autoreclosure shall remain blocked for more severe faults such as 3-phase faults and 3-phase to earth faults to ensure grid stability.

***Members may kindly deliberate.***

**A.19. Restoration of damaged tower No.4 (C-Type) of double circuit line connecting Noida Sector-62 and Sahibabad to DTL 220kV Gazipur S/Stn. [Delhi-UP Corridor]. (Agenda by DTL)**

- A.19.1. DTL has submitted that double circuit line owned by UPPTCL emanating from 220kV DTL Gazipur S/Stn. to 220kV UPPTCL Noida Sector-62 and Sahibabad S/Stn. is passing through Gazipur dumping site. This transmission line is used in case of any emergency for evacuation and supply between Delhi and UP.
- A.19.2. DTL has mentioned that narrow base Tower No.4 has got tilted due to nearby pressure of MCD Delhi, waste and hence, the conductor of the referred section of transmission line had been dismantled. Further, they have also intimated UPPTCL has approached to MCD for reimbursement of cost of repair of this tower.
- A.19.3. Moreover, DTL has also been requested by UPPTCL to follow up this matter with MCD for reimbursement of cost of repair. Accordingly, the matter has taken up many a times with MCD for compensation of amount to be incurred in repairing of the tower line as asked by UPPTCL. However, no response has been received from MCD so far.
- A.19.4. Further, DTL vide letter dt.20.03.2024 (copy attached as **Annexure-A.VIII**) has requested UPPTCL for early restoration of these lines by incurring the expenditure of repair in R&M head of UPPTCL in view of overall interest of the power system of Northern region due to the fact that the expenditure is of the order of lacs of rupees. However, no response from UPPTCL site has been received so far and the transmission lines are still under breakdown since 2022.

A.19.5. DTL has rigorously followed up with MCD as well as the owner of the line i.e. UPPTCL, but no outcome/response have been received so far and hence DTL is requesting forum for further direction to UPPTCL for taking necessary action in this regard.

**Members may kindly deliberate.**

**A.20. Regional Transmission Deviation Charges on Hydro Generation Station during Peak Season and Spillage Condition (Agenda By SJVN)**

- A.20.1. SJVN has submitted that in compliance of provisions of Regulation 45, Hydro generating stations may declare ex-bus Declared Capacity more than 100% MCR less auxiliary power consumption limited to overload capability during high inflow periods. Further that a high inflow period for this purpose shall be notified by the respective RPC.
- A.20.2. During 49th Commercial Sub-committee meeting of NRPC held on 11.03.2024, High Flow Season for Regional Hydro generators of NR for FY 2024-25 has been approved. Accordingly, high inflow season for SJVN's Hydro Generating stations namely Nathpa Jhakri HPS and Rampur HPS has been finalised from 1st June, 2024 to 30th September, 2024.
- A.20.3. Due to unprecedented increase in inflow of River Satluj during the month of May, 24, both the generating stations of SJVN were running on full load including overload capability from 18.05.2024 onwards. As per Regulation 45.8(a) of CERC (IEGC) Regulations, 2023, SJVN has declared DC of both the Generating Stations upto installed capacity including overload capability from 18.05.2024 onwards.
- A.20.4. Regulation 12.1(a) of CERC (Sharing of ISTS charges and losses) Regulations provides that 'For the purpose of calculation of Transmission Deviation for a hydro-generating station by RPC, overload capacity of 10% during peak season shall be taken into account.'
- A.20.5. In view of the aforesaid Regulations, for the purpose of calculation of Transmission Deviation for a hydro-generating station by RPC, SJVN has requested that overload capacity of 10% during peak season as well as spillage conditions may be taken into account and no penalty on this account may be levied on generating stations.

**Members may kindly deliberate.**

**A.21. Submission of protection performance indices to NRPC Secretariat on monthly basis (agenda by NRPC Secretariat)**

**A.21.1.** As per clause 15 (6) of IEGC 2023;

- Users shall submit the following protection performance indices of previous month to their respective RPC and RLDC on monthly basis for 220 kV and above (132 kV and above in NER) system, which shall be reviewed by the RPC:

a) The **Dependability Index** defined as  $D = N_c / N_c + N_f$

b) The **Security Index** defined as  $S = N_c / N_c + N_u$

c) The **Reliability Index** defined as  $R = N_c / N_c + N_i$

where,

$N_c$  is the number of correct operations at internal power system faults,

$N_f$  is the number of failures to operate at internal power system faults,

$N_u$  is the number of unwanted operations,

$N_i$  is the number of incorrect operations and is the sum of  $N_f$  and  $N_u$

- Each user shall also submit the reasons for performance indices less than unity of individual element wise protection system to the respective RPC and action plan for corrective measures. The action plan will be followed up regularly in the respective RPC.

**A.21.2.** It is germane to mention that as per earlier decision, each utility shall submit the Performance indices of previous month by 7th day of next month.

**A.21.3.** Accordingly, the status of the indices reported for the months from April-2024 and May-2024 is attached as **Annexure-A.IX**. Most of the utilities have not been submitting the required data which needs to be sensitized by the concerned.

**A.21.4.** In the submitted indices reports, UPPTCL has not mentioned the reason and corrective actions taken for indices less than unity. UPPTCL may submit the same for the related events in the months of April and May, 2024 and may mention the same at the time of indices reporting in future.

**A.21.5.** Similarly, HVPN has not described the reason and corrective actions taken for indices less than unity for the events of the month May, 2024. Therefore, HVPN may update the same for the May, 2024 month and may mention the same at the time of indices reporting in future.

**A.21.6.** In view of above, it is requested that utilities may submit the performance indices of previous month by 7<sup>th</sup> day of next month element wise along with the reason for indices less than unity and required corrective action.

***Utilities may kindly update status.***

## **A.22. Annual protection audit plan for FY 2024-25 and third party protection audit plan (Agenda by NRPC Secretariat)**

**A.22.1.** As per clause 15 of IEGC 2023;

- All users shall conduct internal audit of their protection systems annually, and any shortcomings identified shall be rectified and informed to their respective RPC. The audit report along with action plan for rectification of deficiencies detected, if any, shall be shared with respective RPC for users connected at 220 kV and above (132 kV and above in NER).
- Annual audit plan for the next financial year shall be submitted by the users to their respective RPC by 31st October. The users shall adhere to the annual audit plan and report compliance of the same to their respective RPC.

**A.22.2.** In view of above, some utilities have submitted their annual audit plans (enclosed as **Annexure-A.X**). In last PSC meeting (held on 29.4.2024), it was requested to submit annual audit plan for FY 2024-25 in next 15 days and comply the same timely. However, most of the utilities have not submitted the same yet.

**A.22.3.** Therefore, other remaining may submit annual audit plan for FY 2024-25 at the earliest. Further, the utilities may submit the protection audit report (for audited S/s as per submitted plan) to NRPC Secretariat and may update the compliance status regularly.

**A.22.4.** As per clause 15 of IEGC 2023:

*All users shall also conduct third party protection audit of each sub-station at 220 kV and above (132 kV and above in NER) once in five years **or earlier as advised by the respective RPC.***

**A.22.5.** In view of above, some utilities have submitted their third-party protection audit plans (enclosed as **Annexure-A.XI**) and other remaining may submit the same at the earliest.

**A.22.6.** Further, the utilities may update the status of 3<sup>rd</sup> party protection audit as per the submitted audit plans. Subsequently, the audit reports along with compliance status may be submitted to NRPC Secretariat regularly.

**Utilities may kindly update status.**

## **A.23. Protection philosophy for Power Transformer and Reactor of Northern Region (Agenda by NRPC Secretariat)**

**A.23.1.** 71st NRPC meeting finalized the protection philosophy for Northern Region in line with the decision of 49th Protection Sub-Committee meeting. In addition to that, draft protection philosophy for power transformer and reactor has been added (**Annexure-A.XII**).

**A.23.2.** The detailed discussion on the draft protection philosophy for power transformer and reactor was done in the 50th Protection Sub-Committee meeting (held on 29.04.2024).

**A.23.3.** In the same meeting, the draft could not be finalized and it was suggested utilities to go through the draft and mail the observations/ suggestions within a week to finalize the draft in the next meeting.

**A.23.4.** However, no recommendation has been received at NRPC Secretariat as of now. Therefore, utilities are again requested to submit the recommendations /inputs/suggestions on draft proposed for the settings to NRPC Secretariat at the earliest.

**Utilities may kindly update status.**

**खण्ड-ख: उ.क्षे.भा.प्रे.के.**

**Part-B: NRLDC**

## **B.1. NR Grid Highlights for May 2024**



Major grid highlights of Northern region grid for May 2024 are shown below:

#### 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	432	30.05.24 at 14:00	8.6	30.05.24	6.8
2	Delhi	8302	29.05.24 at 15:36	163.8	31.05.24	135.7
3	Haryana	12336	24.05.24 at 15:00	259.6	31.05.24	220.6
4	H.P.	1827	31.05.24 at 10:00	39.2	30.05.24	34.6
5	J&K	2750	05.05.24 at 21:00	56.6	20.05.24	52.9
6	Punjab	14519	20.05.24 at 15:15	288.6	23.05.24	233.5
7	Rajasthan	17460	30.05.24 at 12:00	379.1	30.05.24	331.6
8	U.P.	29727	31.05.24 at 21:45	642.3	27.05.24	563.1
9	Uttarakhand	2781	29.05.24 at 21:00	60.7	31.05.24	53.8
10	Northern Region	86773	30.05.24 at 14:13	1882.1	29.05.24	1637.0

\*As per SCADA

Northern Region all-time high value recorded in May'24:

States	Max. Demand Met during the day (MW)		Energy Consumption (MU)		Max. Demand Met during the day (MW)		Energy Consumption (MU)	
	As per Format2	As on	As per PSP	As	As per Format2	As	As per	As on

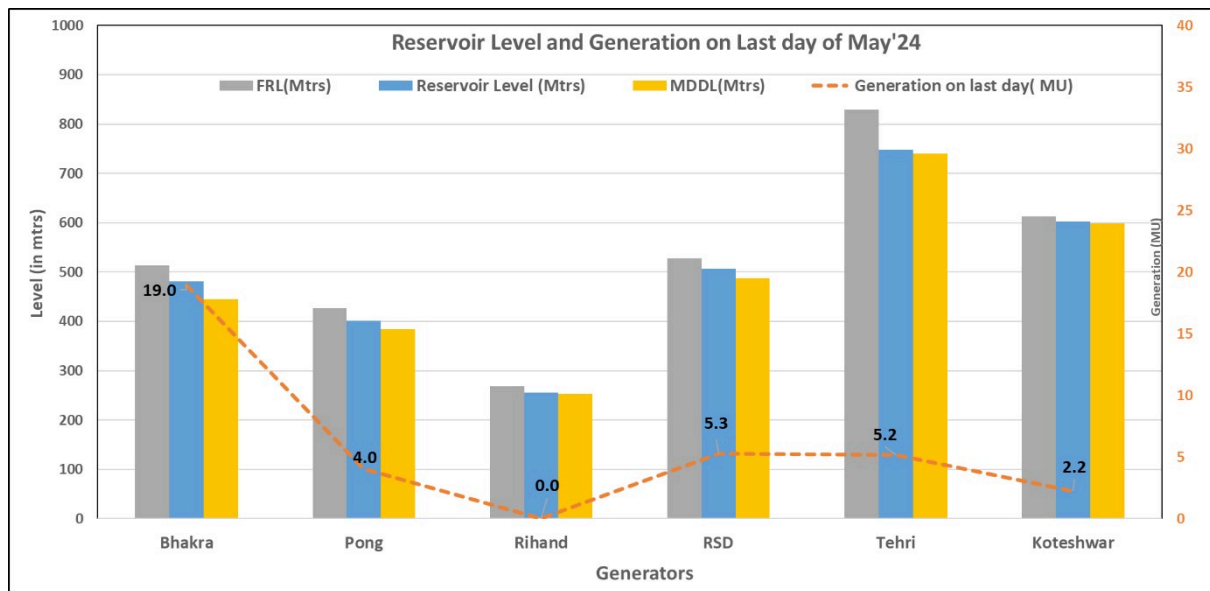
	8/ hourly data Submitted by States (MW)	date	(Mus)	on date	8/ hourly data Submitted by States (MW)	on date	PSP (Mus)	date
Rajasthan	--	--	379.1	30.05.24	--	--	371.6	04.09.23
Delhi	8302	29-05-2024 at 15:36 hrs.	163.8	31.05.24	7695	29-06-2022 at 15:10 hrs.	153.52	28.06.22
Uttarakhand	2781	29-05-2024 at 21:00 hrs.	60.7	31.05.24	2594	14-06-2022 at 21:00 hrs.	56.2	17.06.23
Uttar Pradesh	29727	31-05-2024 at 21:45 hrs.	642.3	27.05.24	28284	24-07-2023 at 21:43 hrs.	580	03.09.23
Chandigarh	432	30-05-2024 at 14:00 hrs.	8.56	30.05.24	426	08-07-2021 at 15:00 hrs.	8.41	08.07.21
Northern Region	86773	30-05-2024 at 14:13 hrs.	1882.1	29.05.24	81048	04-09-2023 at 14:15 hrs.	1792.7	04.09.2023

All Time High Record		
Generation	Value (MU)	Achieved on
Thermal Generation	942.5	30.05.2024

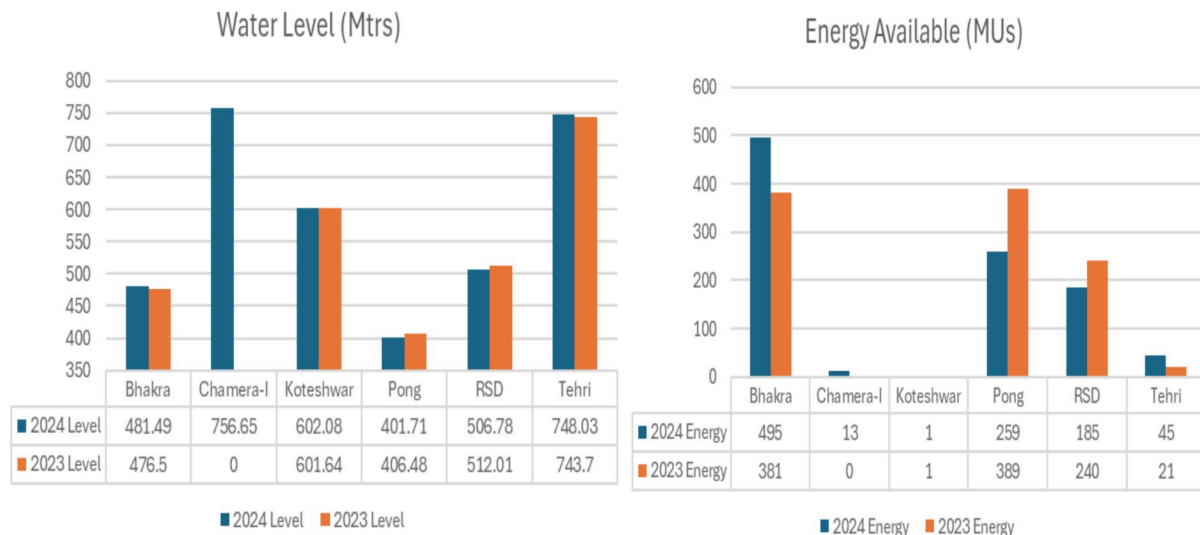
#### Frequency profile

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
May'24	50.01	50.50 (07.05.24 at 18:02:40 hrs)	49.72 (11.05.24 at 00:02:40 hrs)	2.49	80.04	17.47
May'23	49.99	50.43 (18.05.23)	49.48 (15.05.23)	9.8	68.5	21.7

#### Reservoir Level and Generation on Last Day of Month



	Parameters			Present Parameters		LAST YEAR	
RESERVOIR	MDDL (Mts)	FRL (Mts)	Energy Content at FRL	Level (Mts)	Energy (MU)	Level (Mts)	Energy (MU)
Bhakra	445.62	513.59	1,728.8	<b>481.49</b>	495	<b>476.5</b>	381
Chamera-I	748.75	760	753.95	<b>756.65</b>	13	-	-
Koteshwar	598.5	612.5	610.73	<b>602.08</b>	1	<b>601.64</b>	1
Pong	384.05	426.72	1,084	<b>401.71</b>	259	<b>406.48</b>	389
RSD	487.91	527.91	390.3	<b>506.78</b>	185	<b>512.01</b>	240
Tehri	740.04	830	1,164.11	<b>748.03</b>	45	<b>743.7</b>	21



Detailed presentation on grid highlights of May'2024 will be shared by NRLDC in OCC meeting.

## B.2. Sharing of ATC/TTC assessment and basecase with NRLDC

All NR states except Chandigarh UT 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.

CERC vide their order dated 29.09.2023 has granted approval of "Detailed Procedure for Allocation of Transmission Corridor for Scheduling of General Network Access and Temporary General Network Access under Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State Transmission System) Regulations, 2022".

Detailed roles and responsibilities for State Load Dispatch Centers in various timelines of the approved procedure are provided in the table below.

<b>Purpose</b>	<b>S No</b>	<b>Action of Stakeholder</b>	<b>Res ponsi bility</b>	<b>Submi ssion to</b>	<b>Data/ Inform ation Submis sion Time line</b>
<b>1. Revision 0 TTC/ATC Declaration for Month 'M'</b>	1(a)	<i>Submission of node wise Load and generation data along with envisaged</i>	SLDC	RLDC	10 <sup>th</sup> Day of 'M-12' month
		<i>scenarios for assessment of transfer capability</i>			
	<i>Assessment of TTC/ATC of the import/export capability of the state and intra-state system and sharing of updated network simulation models</i>				
	1(b)	<i>Declaration of TTC/ATC of the</i>			26 <sup>th</sup>

		<i>intra- state system by SLDC in consultation with RLDC</i>			<i>Day of 'M-12' month</i>
<b>2. Interconnection Studies for elements to be integrated in the month 'M'</b>	2(a)	<i>Submission of node-wise load and generation data &amp; sharing of network simulation models for intra-state elements coming in the next six months</i>	SLDC	RLDC	<i>8<sup>th</sup> Day of 'M- 6' month</i>
	2(b)	<i>Sharing of inter-connection study results</i>			<i>21<sup>st</sup> Day of 'M-6' month</i>
<b>3. Month Ahead TTC/ATC Declaration &amp; Base case for Operational Studies for Month 'M'</b>	3(a)	<i>Submission of node wise Load and generation data along with envisaged scenarios for assessment of transfer capability</i>	SLDC	RLDC	<i>8<sup>th</sup> Day of 'M- 1' month</i>
		<i>Assessment of TTC/ATC of the intra- state system and sharing of updated network simulation models</i>			
	3(b)	<i>Declaration of TTC/ATC of the intra- state system in consultation with RLDC</i>	SLDC	RLDC	<i>22<sup>nd</sup> Day of 'M-1' month</i>

To encourage participation from SLDCs regarding basecase preparation and ATC/TTC assessment, two workshops have been conducted from Grid-India/NRLDC side. One workshop was conducted 31.08.2023 before the finalization of the procedure and another on 10.01.2024 recently to involve further participation from SLDCs.

Although all SLDCs are now involved in preparation of basecase & ATC/TTC assessment, it is seen that the timelines as per CERC approved procedure are not being followed and number of times basecases are not received from SLDC side.

### **B.2.1 ATC/TTC assessment sharing 11 months in advance**

The procedure mentions that:

“SLDCs in consultation with RLDCs shall declare the import and export TTC, ATC, and TRM of the individual control/bid areas within the region in accordance with Regulation 44 (3) of the Grid Code 2023. RLDCs shall assess the import and export TTC, TRM and ATC for the group of control/bid areas within the region (if required). The computed TTC, TRM and ATC figures shall be published on the website of respective SLDCs and RLDCs, along with the details of the basis of calculations, including assumptions, if any, **at least eleven (11) months in advance**. The specific constraints indicated in the system study shall also be published on the website.”

Accordingly, SLDCs are requested to send the PSSE cases for four scenarios for June'25 i.e. Afternoon Peak, Solar Peak, Evening Peak & Off-Peak hours as given below

S. No.	Scenario	Time of Scenario
1	Off-Peak	06:00 Hrs
2	Afternoon Peak	15:00 Hrs
3	Evening Peak	22:30 Hrs
4	Solar Peak	12:00 Hrs

It is requested that the basecases as well as ATC/TTC assessments may be shared with NRLDC as per CERC approved procedure. Further, the above exercise needs to be carried out regularly monthly.

Basecase & ATC/TTC assessment was yet to be received from all utilities for M-12 scenarios except J&K.

It was discussed in last several OCC meetings & all states were requested to share basecase as well as ATC/TTC assessments for M-11 scenarios on monthly basis with NRLDC as per CERC approved procedure. Accordingly, it is requested to submit the basecase as well as ATC/TTC assessments.

**Members may please discuss.**

### **B.2.2 Sharing of Data and study results for interconnection studies**

As per **Regulation 33 of IEGC 2023**,

*(9) Each SLDC shall undertake a study on the impact of new elements to be commissioned in the intra-state system in the next six (6) months on the TTC and ATC for the State and share the results of the studies with RLDC.*

*(10) Each RLDC shall undertake a study on the impact of new elements to be commissioned in the next six (6) months in (a) the ISTS of the region and (b) the intra-state system on the inter-state system and share the results of the studies with NLDC.*

*(11) NLDC shall undertake study on the impact of new elements to be commissioned in the next six (6) months in (a) inter-regional system, (b) cross-border link and (c) intra-regional system on the inter-regional system.*

In line with above, utilities are requested to share the list of elements/LGB data/interconnection study results etc as per the approved procedure which are expected to be commissioned up to December 2024, before 08.06.2024. Above was also requested vide mails dated 24.05.2024 by NRLDC. This needs to be practised as monthly exercise on regular basis.

It was discussed in last several OCC meetings & all utilities were requested to share list of elements/LGB data/interconnection study results etc as per the approved procedure on monthly basis.

### **B.2.3 TTC/ATC of state control areas for monsoon 2024 (M-1)**

As discussed in previous OCC meetings, most of the NR states except 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.

January 2024 Mails							February 2024 Mails							March 2024 Mails						
ATC/ITC Declaration		Interconnection Studies		ATC/ITC Declaration		Interconnection Studies		ATC/ITC Declaration		Interconnection Studies		ATC/ITC Declaration		Interconnection Studies						
M-1 (Feb-24)		M-11 (Jan-25)		M-6 (July-24)		M-1 (Mar-24)		M-11 (Feb-25)		M-6 (August-24)		M-1 (Apr-24)		M-11 (Mar-25)		M-6 (Sep-24)				
Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases			
Chandigarh	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Delhi	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Haryana	No	No	No	No	No	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes			
Himachal Pradesh	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Jammu and Kashmir	Yes	No	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No			
Ladakh	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Punjab	No	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No	No			
Rajasthan	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Uttar Pradesh	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Uttarakhand	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			

April 2024 Mails							May 2024 Mails							June 2024 Mails						
ATC/ITC Declaration		Interconnection Studies		ATC/ITC Declaration		Interconnection Studies		ATC/ITC Declaration		Interconnection Studies		ATC/ITC Declaration		Interconnection Studies						
M-1 (May-24)		M-11 (Apr-25)		M-6 (Oct-24)		M-1 (June-24)		M-11 (May-25)		M-6 (Nov-24)		M-1 (July-24)		M-11 (June-25)		M-6 (Dec-24)				
Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases			
Chandigarh	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Delhi	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No			
Haryana	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Himachal Pradesh	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Jammu and Kashmir	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes			
Ladakh	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Punjab	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Rajasthan	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Uttarakhand	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			

### B.3. Loading on various Grid Elements

Latest state wise issues are listed below:

TTC & ATC of states, N-1 Non-compliant & N-1 Likely non-compliant ICTs of Northern Region for Summer'24								
Punjab								
SI No.	State	TTC	ATC	Name of Substation	ICTs Capacity (MVA)	N-1 load ing limit (MW )	N-1 load ing limit (MW) with effective SPS	Whether Violation observed
1	Punjab	10000	9500	Rajpura	3*500	1135	1135	Max 1100 MW
2				Nakodar (SPS effective till 600MW)	1*315 + 1*500	450	600	Max 585 MW
3				Ludhiana	1*315+3*500	1450	1450	Max 1340 MW
4				Jalandhar	2*315+1*500	860	860	Max 852 MW
5				Patran	2*500	640	640	Max 570 MW
6				Malerkotla	2*315+1*500	820	820	Max 835 MW
7				Patiala	2*315+2*500	1250	1250	Max 850 MW
8				Moga	1*315+3*500	1440	1440	Max 1080 MW
Haryana								
SI No.	State	TTC	ATC	Name of Substation	ICTs Capacity (MVA)	N-1 load ing limit (MW )	N-1 load ing limit (MW) with effective SPS	Whether Violation observed
1	Haryana	9336	9086	Deepalpur (SPS)	2*315	380	500	Max 540 MW

				effective till 500MW)				
2				Panipat BBMB	3*150+1*500	540	540	Max 710 MW
3				Kabulpur	2*315	440	440	Max 550 MW
4				Dhanonda	3*315	680	680	Max 340 MW
5				Jind	2*500	630	630	Max 200 MW
6				Prithala	2*500	715	715	Max 500 MW
7				220kV Sonapat-Mohana D/C line	2*230	250	250	Max 260 MW
8				Bhiwani (765kV/400kV) ICT-2 & ICT-3	2*1000	1460	1460	Max 1800 MW

### Rajasthan

SI No.	State	TTC	ATC	Name of Substation	ICTs Capacity (MVA)	N-1 loading limit (MW)	N-1 loading limit (MW) with effective SPS	Whether Violation observed
1	Rajasthan	7600	7000	Jodhpur (SPS effective till 450MW)	2*315	420	450	Max 550 MW
2				Bikaner (SPS effective till 445MW)	2*315	410	445	Max 600 MW
3				Ajmer (SPS effective till 455MW)	2*315	415	455	Max 600 MW
4				Merta (SPS effective till 470MW)	2*315	410	470	Max 520 MW
5				Hindaun (SPS effective till 475MW)	2*315	350	475	Max 520 MW
6				Heerapura	3*250+1*315	890	890	Max 950 MW
7				Bhinmal	2*315	360	360	Max 550 MW
8				Bhilwara (SPS effective till 580MW)	1*315+1*500	490	580	Max 500 MW



9				Deedwana	2*315	410	410	Max 580 MW
10				Bassi	2*315+1*500	820	820	Max 950 MW
11				Kotputli	2*315	400	400	Max 380 MW
12				Kankani	1*315+1*500	540	540	Max 750 MW
13				Ratangarh (SPS effective till 750MW)	3*315	730	750	Max 800 MW
14				Neemrana	1*315+1*500	485	485	Max 450MW
15				Suratgarh TPS (SPS effective till 490MW)	2*315	400	490	Max 500 MW
<b>Delhi</b>								
SI No.	State	TTC	ATC	Name of Substation	ICTs Capacity (MVA)	N-1 loading limit (MW)	N-1 loading limit (MW) with effective SPS	Whether Violation observed
1	Delhi	7300	7000	Mundka (SPS effective till 820MW)	3*315	670	820	Max 750 MW
2				Harshvihar	3*315	610	610	Max 620 MW
3				Bawana (400/220 kV) (SPS effective till 420MW)	2*315	320	420	Max 450 MW
4				Maharani bagh	2*315+2*500	1250	1250	Max 1200 MW
5				Mandola	4*500	1550	1550	Max 1500 MW
6				Jhatikara (765kV/400kV) (ICT-I & ICT-II)	2*1500	1810	1810	Max 2300 MW
<b>UP</b>								
SI No.	State	TTC	ATC	Name of Substation	ICTs Capacity (MVA)	N-1 loading limit (MW)	N-1 loading limit (MW) with effective SPS	Whether Violation observed

1	Uttar Pradesh	16500	15900	Azamgarh (SPS effective till 750MW)	2*500	520	750	Max 550 MW
2				Sarnath (SPS effective till 1200MW)	3*315+1*500	1010	1200	Max 900 MW
3				Lucknow (PG)	2*500	680	680	Max 800 MW
4				Allahabad	3*315	760	760	Max 850 MW
5				*Gorakhpur (SPS effective till 570MW)	1*500+1*240	350	570	Max 700 MW
6				Sohawal (PG)	2*315+1*500	770	770	Max 400 MW
7				Agra PG	2*315	440	440	Max 550 MW
8				Nehtur (SPS effective till 480MW)	3*200	420	480	Max 250MW

\*Gorakhpur (UP) is having 1\*500+1\*240+1\*315 MVA ICTs, presently 315MVA ICT is under outage for augmentation from 315MVA to 500MVA, expected revival of ICT is July'24 after which N-1 loading limit will increase

#### Uttarakhand

SI No.	State	TTC	ATC	Name of Substation	ICTs Capacity (MVA)	N-1 loading limit (MW)	N-1 loading limit (MW) with effective SPS	Whether Violation observed
1	Uttarakhand	1700	1600	Kashipur (SPS effective till 450MW)	2*315	400	450	Max 400 MW
2				220kV Roorkee-Roorkee		230	230	Max 240 MW
3				220kV CB Gunj-Pantnagar		230	230	Max 200 MW

#### HP

SI No.	State	TTC	ATC	Name of Substation	ICTs Capacity (MVA)	N-1 loading limit (MW)	N-1 loading limit (MW) with	Whether Violation observed
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SI No.	State	TTC	ATC	Name of Substation	ICTs Capacity (MVA)	N-1 loading limit (MW)	N-1 loading limit (MW) with effective SPS	Whether Violation observed
1	Himachal Pradesh	1680	1580	Nallagarh	3*315	720	720	Max 700 MW
2				Kunihar (220/132 kV)	2*200	240	240	Max 320 MW
3				220kV Nallagarh-Upparnagal Ckt-1 & 2 (sum of both)		425	425	Max 370 MW
4				220kV Hamirpur (PG)-Hamirpur (HP) Ckt-1 & 2 (sum of both)		250	250	Max 200 MW
<b>J&amp;K and Laddakh UT</b>								
1	Jammu & Kashmir	2800	2700	Amargarh	2*315	420	420	Max 350 MW
2				220kV New Wanphoo-Mirbazar Ckt-1 & 2 (sum of both)		230	230	Max 370 MW
3				220kV Wagoora-Pampore Ckt-1 & 2 (sum of both)		235	235	Max 320 MW
*N-1 loading limit is evaluated considering tripping of largest ICT for respective Nodes								
Single 400/220kV, 315MVA ICT at Rajwest Single 400/220kV, 315MVA ICT at Kalisindh Single 400/220kV, 315MVA ICT at Dehar HEP								

The latest ATC/TTC figures available with NRLDC for the month of June 2024 are attached as **Annexure-B.I**. States are requested to go through these figures and provide any comments.

ATC/TTC assessment for summer 2024 received for all constituents.

As discussed in last few OCC meeting, it is requested that,

- All states to share data and base case for M-6 & M-11 timelines as discussed in the agenda.
- SLDCs to take actions to ensure that loading of ICTs and lines under their jurisdiction are below their N-1 contingency limits.
- Maximize internal generation in case of drawl near to the transfer capability limits.
- Forum agreed that in case no assessments for eleven months in advance are shared by SLDC, the existing ATC/TTC assessment could be published on website and considered for the said month.

**Members may please discuss.**

#### B.4. Grid Operation related issues in Northern region

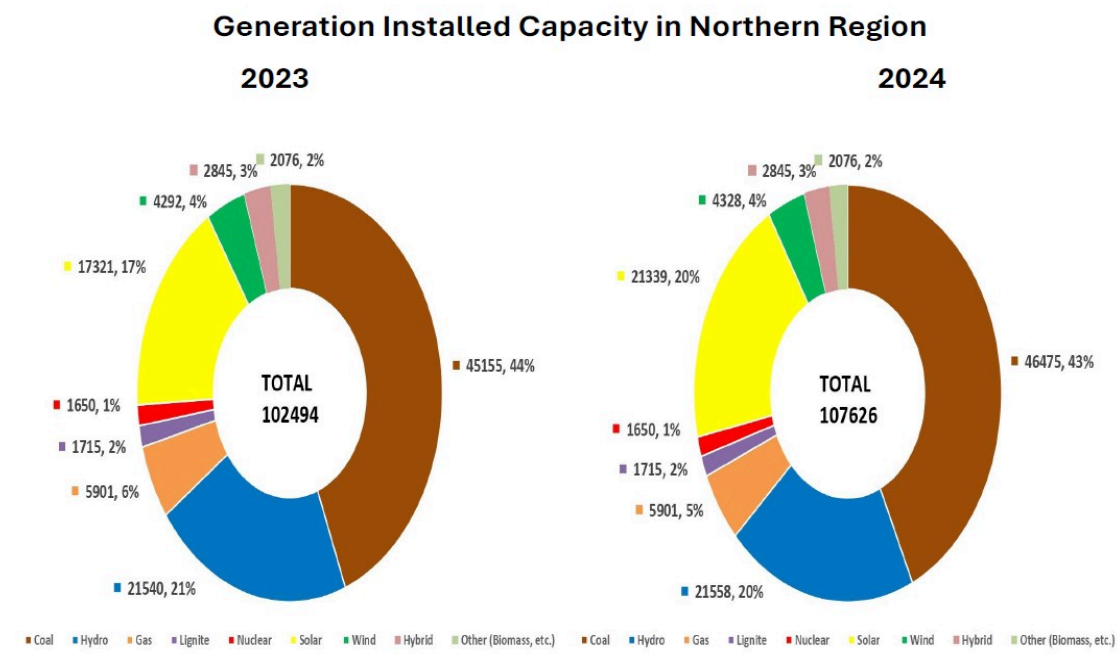
##### a) Update of Important grid element document in line with IEGC:

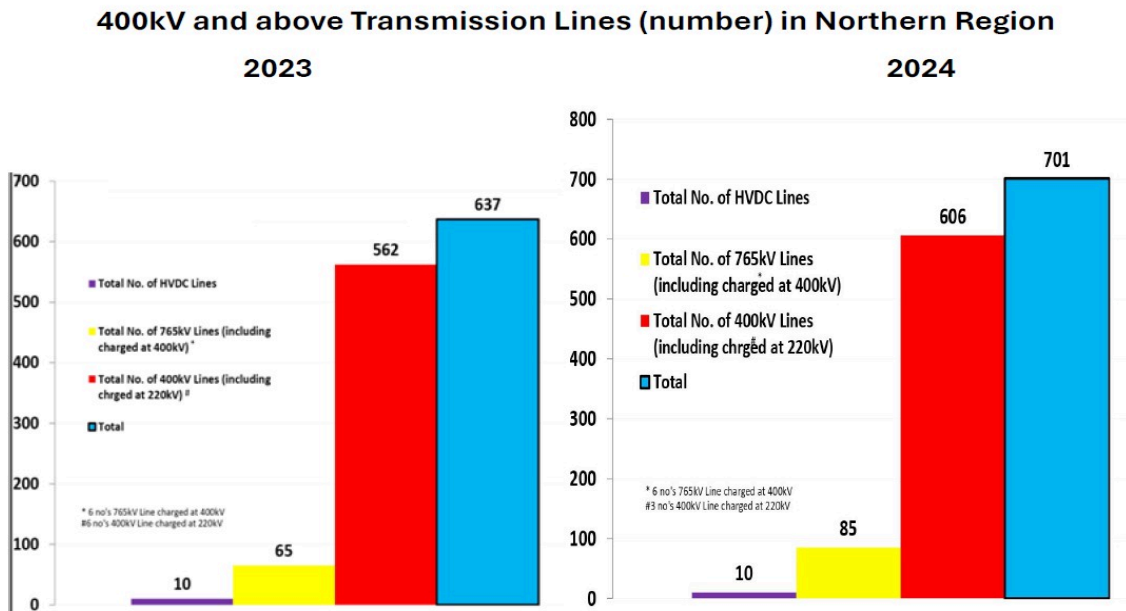
In line with Section 29.2.(b) of IEGC, list of important grid elements in Northern region must be compiled by NRLDC. Such elements shall be opened/closed only on instructions from NRLDC.

The agenda was also discussed in 218, 219 OCC meetings in which all utilities agreed to provide details.

Based on data received from utilities and data available at NRLDC, updated document is available at following link.

<https://nrldc.in/download/important-grid-elements-of-northern-region-may-2024/?wpdmdl=13452&lang=en>





Further, NLDC has circulated a new format with additional data inputs required to bring harmony among all RLDCs. All constituents have been mailed and letter has been sent from GM, NRLDC to provide the data inputs. Till now, only few data inputs have been received. Request all members to kindly provide data for updating of the document.

**Members may kindly note.**

#### **b) Update of Operating Procedure document in line with IEGC:**

In compliance with Regulation 28.4 of Indian Electricity Grid Code-2023, Operating Procedure document would be updated by NRLDC in mid-July 2024. Latest available document is available at

[https://nrlc.in/download/rev1\\_operating-procedure-for-northern-region-2023-24-iegc-2023/?wpdmdl=12993&lang=en](https://nrlc.in/download/rev1_operating-procedure-for-northern-region-2023-24-iegc-2023/?wpdmdl=12993&lang=en)

Utilities are requested to provide their inputs/comments for any suggested changes in the document. It is requested that inputs/comments may be provided by 30th June 2024.

**Members may kindly note.**

#### **c) Uprating of low rating switchgear at 400kV Bamnauli**

Due to LILO of 400kV Jhatikara Bamnauli ckt-1 at Dwarka, loading on 400kV Jhatikara Bamnauli ckt-2 has increased above 1300MW frequently. As per mail received from Delhi, CTs installed at this ckt are quite old and have a capacity of 2000A. This ckt carrying more than 2000A continuously may deteriorate the health of old CTs.

It is important to note that the 400kV Jhatikara-Bamnauli line is a Quad-Bersimis line with a thermal rating of 1900 MW. According to the CEA TPC 2023 guidelines:

"The loading limit for a transmission line shall be its thermal loading limit."

Hence, CTs are acting as limiting factors for loading of transmission line. Delhi SLDC is requested to update the CTs at their end for complete utilization of line.

**Members may please discuss.**

#### **d) Synchronisation issue of 765kV Bhadla2-Ajmer ckt 1 during high solar generation**

EHV lines are generally being manually opened during evening time to control high voltages in the RE complex of Western Rajasthan owing to no solar generation. As a practice, in case of two ckts, the ckts are kept open on alternate basis every day.

Recently, 765kV Bhadla2-Ajmer ckt 1 was opened to control high voltages in the RE complex as routine activity. The line was opened on 30-03-2024 at 18:04. The next day, given the rising trend in solar generation and as per normal practice, code was issued from NRLDC control room to charge the line at 08:39 on 31-03-2024. However, it was observed that there was delay in charging of line from POWERGRID side and the line was charged at 11:10 hrs, when the solar generation had already increased and oscillations to the tune of 15-20kV were being observed in the grid.

On enquiry, it was informed that there was some issue at Bhadla-2 end and the angular difference between 765kV Ajmer and Bhadla-2 substations was higher than 15degrees. Logic has been implemented in Bay Control Unit that in case angular difference between two adjacent substations is higher than 15 degrees, then line cannot be closed. This led to a delay in charging of important line in the RE complex.

It is to be noted that the angular difference considered as 15 degrees, is on the lower side in case of N-1 contingency. CEA manual on transmission planning criteria also specifies that angular difference of upto 30 degrees may be allowed in case of N-1 contingency.

Further, reservations have also been observed on loading limit of 765kV lines in RE complex. In the mail it is mentioned that the safe loading limit of line is as per SIL i.e. 2200MW. This is different from the understanding at NRLDC level. It is understood that the transmission lines could be loaded to their thermal limits in case of N-1 contingency for short duration. The thermal limit for 765kV lines comes out as nearly 4200MW, however, considering high power flow and issues related to angular differences, limit of 3500MW is being considered while performing simulation studies. The issue was recently observed while studies were being done for shutdown of 765kV Bikaner-Moga D/C line for NHA related works.

Following was discussed in 218 OCC meeting,

- CTUIL representative stated that limit of 30 degrees is being considered as per CEA planning criteria. Further, in the criteria it is mentioned that stability studies may be done in case angular separation is higher than 20 degrees which is also generally not required in case line length is not too much. Further, during planning stage, limit of 3400-3500MW is being considered for long 765kV EHVAC lines as the angular separation becomes high when loading crosses 3500MW in case of long lines although thermal limit is 4200MW. Further, in case the line length is more than 300km, generally inter-regional lines, the lines can be loaded upto 3100-3200MW during N-1 contingency.
- POWERGRID representative informed that the set angular difference is being revised at substations after communication was received from NRLDC side. At some substations, the limit shall be changed in consultation with OEM and it is pending for 765kV Bhadla2-Ajmer D/C which would be changed after S/S OEM i.e. GE visit.
- OCC forum agreed that:

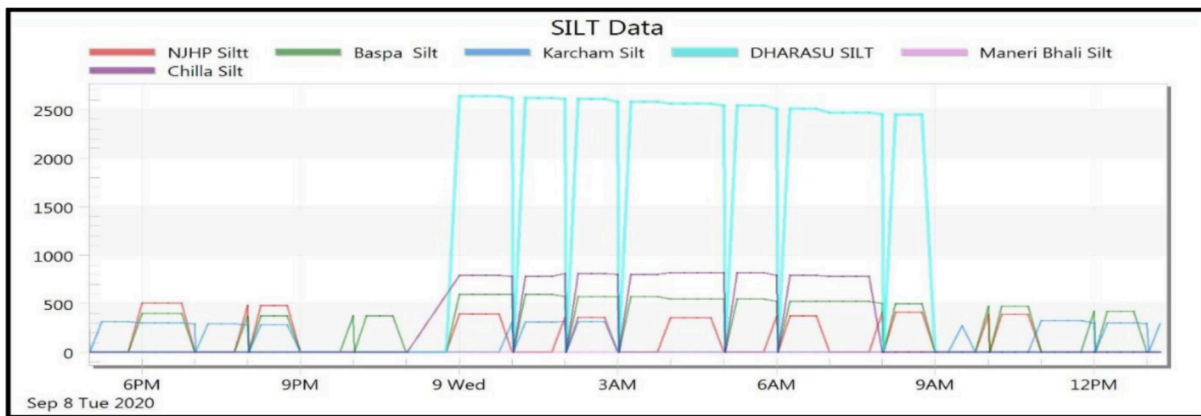
- Maximum loading limit of 765kV lines to be considered as 3500MW for simulation studies as well as real-time grid operation
- All transmission licensees to check and make sure that limit of at least 30 degrees is provided in BCU logic to avoid any issues during charging of line due to such angle limit in real-time grid operation

***In 219 OCC meeting, POWERGRID representative stated that angular difference setting revision is pending at Fatehgarh-II and Chittorgarh (RVPN) Substations. Apart from this, setting has been increased at all other substations of POWERGRID NR-1.***

***Accordingly, all transmission licensees are requested to confirm whether limit of at least 30 degrees has been provided in BCU logic.***

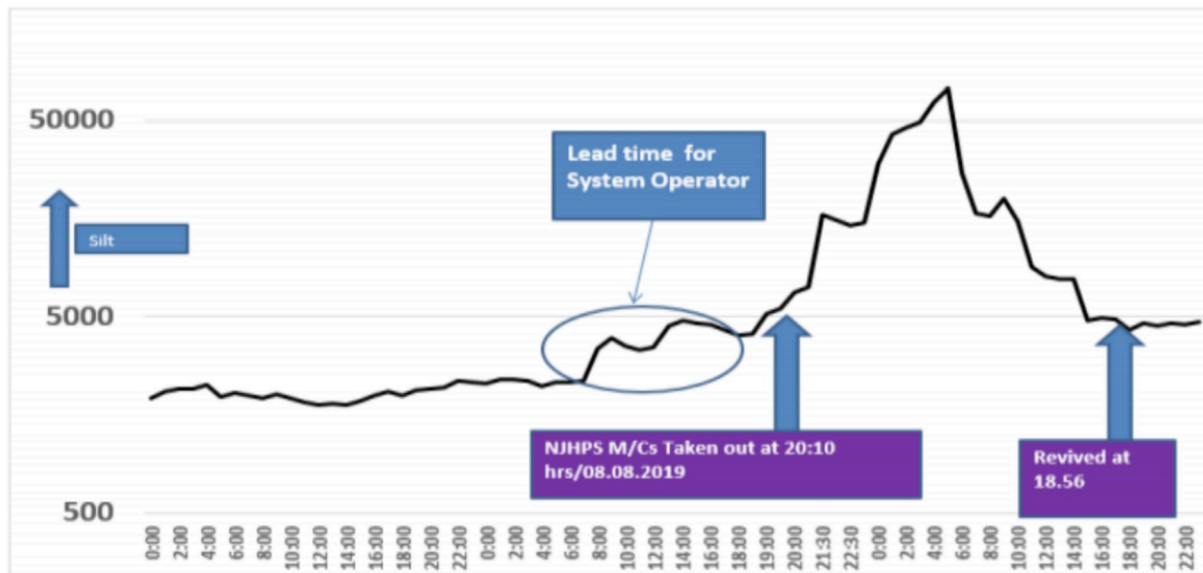
#### **e) Near Real Time Silt Monitoring of hydro stations**

Availability of near real time silt measurement data to NRLDC/ SLDCs will be helpful for real time system operation in view of frequent hydro generation outage due to silt. PPM numbers are being punched directly from the site/control room at NRLDC server providing silt measurement at NRLDC control room. During previous years also, for Nathpa Jhakri, Baspa, Karcham and other small HEPs of Uttarakhand, trends of silt data were made available at NRLDC & being monitored by system operators in real-time.



Sample available data of silt shown below suggests that there is some lead-time (varying from few hours to several hours) available with system operators to accommodate outage of hydro generators on account of high silt level.





All hydro stations are requested to take actions to provide this near-real time silt measurement to control centers (RLDCs/SLDCs) as this would help them gain some lead-time for better tackling of hydro generator outage on silt.

**Members may please discuss.**

#### f) Non-satisfactory operation of SPS in Rajasthan control area

It is being noticed that several SPS are implemented in Rajasthan control area due to N-1 violations at multiple locations. During discussion at OCC forum, it is expected that implemented SPS shall provide relief in case of any N-1 contingency of 400/220kV RVPN substations. Such SPS have been implemented at following substations: Jodhpur, Bikaner, Ajmer, Merta, Hindaun, Bhilwara, Ratangarh, Suratgarh.

Name of Substation	ICTs Capacity (MVA)	N-1 loading limit (MW)	N-1 loading limit (MW) with effective SPS
Jodhpur (SPS effective till 450MW)	2*315	420	450
Bikaner (SPS effective till 445MW)	2*315	410	445
Ajmer (SPS effective till 455MW)	2*315	415	455
Merta (SPS effective till 470MW)	2*315	410	470
Hindaun (SPS effective till 475MW)	2*315	350	475
Bhilwara (SPS effective till 580MW)	1*315+1*500	490	580



580MW)			
Ratangarh (SPS effective till 750MW)	3*315	730	750
Suratgarh TPS (SPS effective till 490MW)	2*315	400	490

- As reported by SLDC-Rajasthan, on 28-05-2024 at 05:36 hrs, 400/220 KV 315 MVA ICT-2 At Bikaner (RS) tripped due to Winding Temperature High and 400/220 KV 315 MVA ICT-1 At Bikaner (RS) tripped due to overcurrent, A-phase, Ia: - 539.9 A, resulting in load loss of around 630 MW. Preliminary report has been attached as **Annexure-B.II**. SPS was unable to provide required relief (point 10.v) resulting in both ICTs getting tripped.
- As reported by SLDC-Rajasthan, on 28-05-2024 at 10:43 hrs. 400/220 KV 315 MVA ICT 1 tripped due to over current and 400/220 KV 315 MVA ICT 2 AT BIKANER(RS) tripped due to overloading, resulting in the disconnection of the entire 220 kV network in Bikaner S/s. A dip in demand of around 504 MW was observed as per SCADA. Preliminary report has been attached as **Annexure-B.III**. SPS was again unable to provide required relief (point 10.vi) resulting in both ICTs getting tripped. Also, SCADA data for ICT load at this time was frozen.



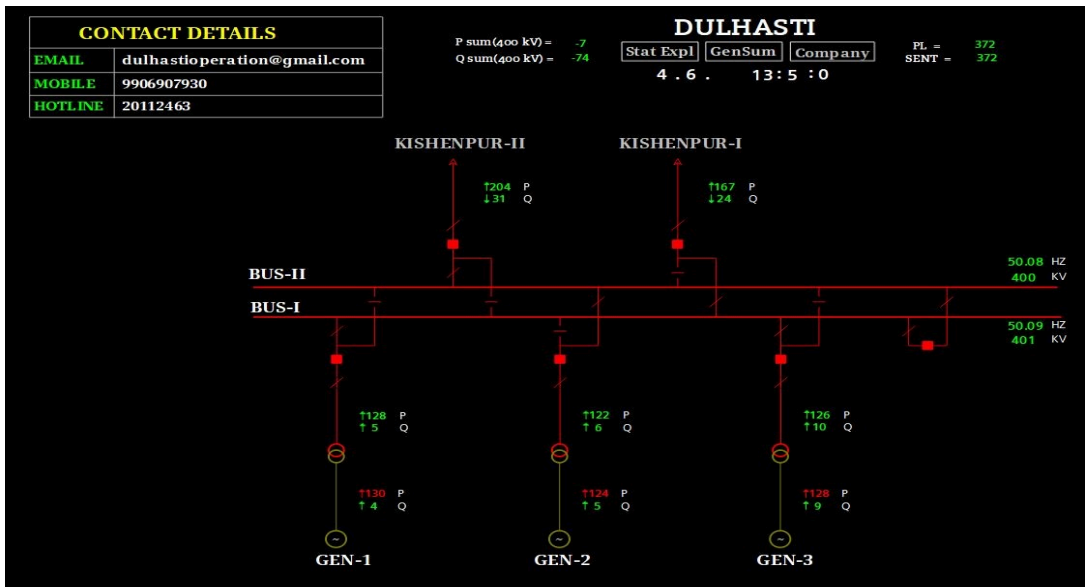
During these tripping, 220kV line which was supposed to be tripped during SPS operation was already under outage, SLDC needs to take special precautions while allowing shutdown of the feeders selected for SPS operation.

**Members may please discuss.**

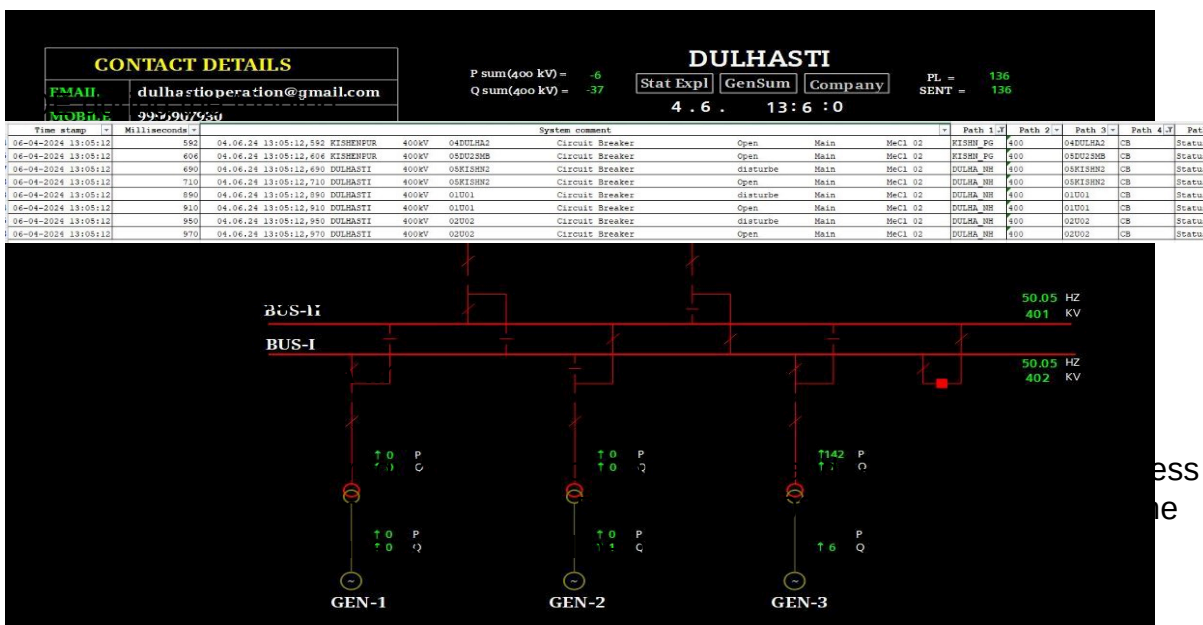
#### i) Generation loss at Dulhasti

As reported by Dulhasti, on 04-06-2024 at 13:05, 400 KV DULHASTI(NH)-KISHENPUR(PG) (PG) CKT-2 tripped on R-Y fault, at the same time 130 MW DULHASTI HPS - UNIT 1 & 2 also tripped. As per SCADA around 255 MW of Generation loss observed. Unit 1&2 revived at 13:31 hrs and 13:25 hrs respectively. **Since Ckt-1 was still in service NHPC-Dulhasti can provide any reasons why the generation loss was observed.**

SLD of Dulhasti before tripping



SLD of Dulhasti after tripping



“18.1. On the date, these regulations come into force,  
 (a) GNA for a (i) State including intra-State entity(ies) and (ii) other drawee entities, shall be the average of ‘A’ for the financial years 2018- 19, 2019-20 and 2020-21: where, ‘A’ = {0.5 X maximum ISTS drawal in a time block during the year} + {0.5 X [average of (maximum ISTS drawal in a time block in a day) during the year]}  
 (b) GNA computed as per clause (a) of this Regulation is given at Annexure-I to these regulations”

**Unquote**

The GNA limits of the states as on 30.04.24 are as follows:

State	Region	Total GNA granted in MW
Chandigarh	NR	342
Delhi	NR	4810
Haryana	NR	5418
Haryana-Adani Power (Mundra)	NR	1495
Himachal Pradesh	NR	1130
Jammu & Kashmir	NR	1977
Punjab	NR	5497
Rajasthan	NR	5755
Uttar Pradesh	NR	10513
Uttarakhand	NR	1402
Railways-NR-ISTS-UP	NR	130
PG-HVDC-NR	NR	8

It is also pertinent to mention that as per clause-45(14) of IEGC-23, a drawee entity shall be allowed to schedule drawl only up to its effective GNA quantum and T-GNA quantum, as applicable, in accordance with the GNA Regulations. The relevant clause is mentioned below:

**Quote**

*“(14) A generating station or ESS or a drawee entity shall be allowed to schedule injection or drawal only up to its effective GNA quantum and T-GNA quantum, as applicable, in accordance with the GNA Regulations.”*

**Unquote**

However, it has been observed that the total requisitions placed by SLDCs against GNA contracts are exceeding the GNA limits of the respective states thus leading to curtailment on account of GNA violations.

Keeping in view of the above, all the SLDCs are requested to ensure that the requisitions placed against GNA contracts do not exceed the GNA limit.

In the past one-month schedules of multiple states have been curtailed frequently following the priority: -

1. Gas based plants
2. Thermal plants
3. Hydro (storage)
4. Hydro (ROR with pondage)
5. Hydro (ROR)

***Members may please discuss.***

**B.5. Frequent tripping of transmission elements in the month of May'24:**

The following transmission elements were frequently tripping during the month of May'24:

S. NO	Element Name	No. of forced	Utility/SLDC
-------	--------------	---------------	--------------

.		outage s	
1	220 KV Amberi(RS)-Kankroli(PG) (RS) Ckt-1	4	POWERGRID/ Rajasthan
2	220 KV Baghpat(PG)-Shamli(UP) (UP) Ckt-1	7	POWERGRID/UP
3	220 KV Debari(RS)-RAPS_A(NP) (RS) Ckt-1	4	RAPP/Rajasthan
4	220 KV Duni(RS)-Kota(PG) (RS) Ckt-1	5	POWERGRID/ Rajasthan
5	220 KV Kaul (HV)-Kurukshetra(PG) (HVPNL) Ckt-2	5	POWERGRID/ Haryana
6	220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-2	5	BBMB/Delhi
7	220 KV Panipat-Kurukshetra (BB) Ckt-1	5	BBMB
8	400 KV Bamnoli(DV)-Tughlakabad(PG) (DTL) Ckt-2	4	POWERGRID/Delhi

The complete details are attached at **Annexure-B.IV.**

It may be noted that frequent tripping of such elements affects 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.**

#### **B.6. Multiple element tripping events in Northern region in the month of May '24:**

A total of **49** grid events occurred in the month of May'24 of which **24** are of GD-1 category, **08** are of GI-1 Category and **17** are of GI-2 Category. The tripping report of all the events have been issued from NRLDC. A list of all these events is attached at **Annexure-B.V.**

Maximum delayed clearance of fault observed in event of multiple elements tripping at 220kV Sultanpur(Punjab) on 07<sup>th</sup> May, 2024 (As per PMU at Amritsar(PG), R-N phase to earth fault converted to 3-phase fault with delayed fault clearing time of 2120ms is observed.).

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **20** events out of **49** grid events occurred in the month. In 11 (no.) of grid events, there was no fault in the grid.

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

**As per IEGC clause 37.2 (c), Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) shall be submitted within 24 hrs of the event and as per IEGC clause 37.2 (e), the user shall submit a detailed report in the case of grid disturbance or grid incidence within one (1) week of the occurrence of event to RLDC and RPC.**

DR/EL of the following grid events not received till date:

- a) 220kV GGSTPS(PS) on 05<sup>th</sup> May'24
- b) 220kV Pong(BBMB) on 06<sup>th</sup> & 12<sup>th</sup> May'24
- c) 400kV Singrauli(NTPC) on 09<sup>th</sup> May'24
- d) 400/220kV Bhiwadi(PG) on 13<sup>th</sup> May'24 (Partial data received)
- e) 220kV IIP Harrawala(Utt) on 15<sup>th</sup> May'24
- f) 220kV Jamalpur(BBMB) on 19<sup>th</sup> May'24
- g) 220kV Baghapurana(PS) on 21<sup>st</sup> May'24
- h) 220kV Kanpur Naubasta(UP) on 23<sup>rd</sup> May'24
- i) 220kV Pragati GPS on 25<sup>th</sup> May'24
- j) 220/132kV Heerapura(RS) on 27<sup>th</sup> May'24
- k) 400kV Jhajjar(APCPL) on 27<sup>th</sup> May'24
- l) 400/132kV Masoli(UP) on 29<sup>th</sup> May'24
- m) 220kV Pinjore(HR) on 31<sup>st</sup> May'24 (Partial data received)

Detail report of majority of the grid events not received yet.

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.***

## **B.7. Review and uniformity of df/dt (ROCOF) protection philosophy in Northern Region**

Multiple incidents of load shedding on df/dt (ROCOF) protection operation have been reported during recent past. Major operations were reported from Punjab control area. Delhi, Rajasthan & UP have also reported load shedding on df/dt operation during some of the incidents. Incidents during which df/dt operation have reported are as follows:

- a) 25<sup>th</sup> May 2024 at 12:46hrs: 172MW in UP; 82MW in Delhi; 1375MW in Punjab and 140MW in Rajasthan (as reported by SLDCs)
- b) 27<sup>th</sup> May 2024 at 14:36hrs: 540MW in Haryana; 280MW in Delhi; 140MW in UP, 100MW in Uttarakhand (as per SCADA data at NRLDC, SLDCs have not confirmed yet)
- c) 01<sup>st</sup> June 2024 at 13:26hrs: 440MW in Punjab and 100MW in UP (as per SCADA data at NRLDC, SLDC-Punjab have confirmed)
- d) 01<sup>st</sup> June 2024 at 13:44hrs: 120MW in Haryana; 270MW In Delhi; 580MW in Punjab and 220MW in UP (as per SCADA data at NRLDC, SLDC-Punjab & UP have confirmed)
- e) 03<sup>rd</sup> June 2024 at 05:28hrs: Punjab have reported load shed of ~300MW of df/dt operation
- f) 04<sup>th</sup> June 2024 at 12:35hrs: 400MW in Punjab (as per SCADA data at NRLDC, SLDC-Punjab have confirmed)
- g) 09<sup>th</sup> June 2024 at 11:21hrs: 450MW in Punjab (as per SCADA data at NRLDC, SLDC-Punjab have confirmed)

In view of frequent incidents of tripping of distribution feeders on df/dt operation, analysis and review of df/dt operation is necessary. Communication has already been sent to SLDCs via mail to provide list of feeders tripped on df/dt during said incidents,

DR(.dat/.cfg) files of tripped feeders and adopted df/dt relay setting (average cycle considered and time delay).

Punjab & UP have shared the list of feeders tripped on df/dt operation. df/dt Relay setting file of a zone is received from Punjab & Delhi.

SLDCs are requested to share the adopted philosophy of df/dt protection and confirm whether uniform philosophy has been adopted throughout the state or not. Kindly share the details at the earliest so that analysis and review of df/dt operation and its philosophy may be done.

***Members may like to discuss.***

#### **B.8. Details of tripping of Inter-Regional lines from Northern Region for May' 24:**

A total of 15 inter-regional lines tripping occurred in the month of May'24. The list is attached at **Annexure-B.VI**. 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 37.2(c) 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.

***Members may like to discuss.***

#### **B.9. Status of submission of DR/EL and tripping report of utilities for the month of May'24.**

The status of receipt of DR/EL and tripping report of utilities for the month of May'24 is attached at **Annexure-B.VII**. It is to be noted that as per the IEGC provision under clause 37.2 (c), tripping report along with DR/EL must 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.

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 37.2(c) 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.

**Members may like to discuss.**

**B.10. Frequency response characteristic:**

The FRC based event occurred in the month of **May-2024**. Description of the event is as given below:

Table:

S. No.	Event Date	Time (In hrs.)	Event Description	Starting Frequency (in Hz)	Nadir Frequency (in Hz)	End Frequency (in Hz)	$\Delta f$	NR FRP during the event
1	02-May-24	14:40 hrs	On 02nd May, 2024, at 14:41 hrs(solar hours), dip in NR solar generation of around 1840 MW (~180MW in Rajasthan) (as per SCADA) was observed. As per SCADA data dip in following RE Plants are observed: 1. At Fatehgarh2: RSUPL, AHEJ2L, RSWPL, RSBPL, Devikot Solar 2. At Bikaner 765: Azzure 43 PSS, Azzure 43 RSS 3. At Bhadla2: Amp Energy 4. At Bhadla: SB Energy (Surya Urja), TPREL, Azure Maple. Therefore, generation loss of 1840MW has been considered for FRC computation.	50.024	49.874	49.983	-0.04	1.17
2	10-May-24	19:35 hrs	On 10th May, 2024, at 19:35 hrs(non-solar hours), 400 kV Khedar- Kirori Ckt-1 &2 tripped on directional earth fault protection. 400 KV Khedar – Fatehabad	49.98				

			loading increased to 860 MW and later at 19:35 hrs both the units-1 & 2 at Khedar (RGTPS) tripped. As per SCADA, around 1071 MW of Generation loss observed at Khedar. Therefore, generation loss of 1071MW has been considered for FRC computation.	6	49.905	49.941	-0.04	2.24
3	28-May-24	17:59hrs	As reported, at 17:59 hrs on 28th May 2024, due to failure of 125 MVA Transformer -2 Bay Bus-1 isolator chamber (GIS), Bus Bar Protection operated at 220kV Gorai EHV station. It led to tripping of 220kV Gorai – Versova Line, 220kV Gorai – Ghodbundar Line, 220kV Gorai – MSETCL Borivali Line 1, 220kV Gorai – MSETCL Borivali Line 2, 125 MVA Transformer-1 and 125 MVA Transformer-2. Maharashtra SLDC have mentioned a load drop of 1045 MW for Mumbai area only. Further, the load drop calculated based on the drop in ICT loadings of nearby 400kV substations in	50.09	50.244	50.140	0.05	2.43



			Maharashtra is 1587 MW. Therefore load loss of 1587MW has been considered for FRC computation.					
--	--	--	--	--	--	--	--	--

As per IEGC 2023 Clause 30.10.(n), "Each control area shall assess its frequency response characteristics and share the assessment with the concerned RLDC along with high resolution data of at least 1 (one) second for regional entity generating stations and energy storage systems and 10 (ten) seconds for the state control area."

As per sub-clause (a(v)) of clause (9) of IEGC 2023 Annexure-2, "All the SLDCs shall work out FRC for all the intra-state entities (for events indicated by the Regional Load Despatch Centres) based on the HDR available at their respective SLDCs and submit the same to respective RLDC within six (6) working days after the event. (Format as per Table-B)."

As per sub-clause (a(vi)) of clause (9) of IEGC 2023 Annexure-2, "All regional entity generating stations shall also assess the FRC for their respective stations and submit the same to respective RLDC within six (6) working days. (Format as per Table-B). The high-resolution data (1 second or better resolution) of active power generation and frequency shall also be shared with RLDC."

#### Status of details received from constituents is:

FRC computation and data submission status				
S. No	Control Area	Event Date		
		02-05-2024	10-05-2024	28-05-2024
1	Punjab	Not Received	Not Received	Not Received
2	Haryana	Not Received	Not Received	Not Received
3	Rajasthan	Not Received	Not Received	Not Received
4	Delhi	Not Received	Not Received	Not Received
5	Uttar Pradesh	Received	Received	Received
6	Uttarakhand	Not Received	Not Received	Not Received
7	Chandigarh*	NA	NA	NA
8	Himachal Pradesh	Received	Received	Not Received
9	J&K(UT) and Ladakh(UT)	Not Received	Not Received	Not Received
10	Dadri -1 (TH)	Not Received	Not Received	Not Received
11	Dadri -2 (TH)	Not Received	Not Received	Not Received
12	Jhajjar (TH)	Not Received	Not Received	Not Received
13	Rihand-1 (TH)	Received	Received	Not Received
14	Rihand-2 (TH)	Received	Received	Not Received
15	Rihand-3 (TH)	Received	Received	Not Received
16	Shree Cement (TH)	Not Received	Not Received	Not Received
17	Singrauli (TH)	Not Received	Not Received	Received
18	Tanda-2 (TH)	Not Received	Not Received	Received
19	Unchahar stg-4 (TH)	Not Received	Not Received	Received
20	Unchahar (TH)	Not Received	Not Received	Received
21	Anta (G)	Not Received	Not Received	Not Received
22	Auraiya (G)	Not Received	Not Received	Not Received
23	Dadri (G)	Not Received	Not Received	Not Received

24	AD Hydro (H)	No Gen	Received	Received
25	Bairasiul (H)	Not Received	Not Received	Not Received
26	Bhakra (H)	Received	Received	Not Received
27	Budhil (H)	No Gen	Not Received	Not Received
28	Chamera-1 (H)	Not Received	Not Received	Not Received
29	Chamera-2 (H)	No Gen	Not Received	Not Received
30	Chamera-3 (H)	No Gen	Not Received	Not Received
31	Dehar (H)	Received	Received	Not Received
32	Dhauliganga (H)	No Gen	Not Received	Not Received
33	Dulhasti (H)	Not Received	Not Received	Not Received
34	Karcham (H)	Not Received	Received	Received
35	Kishanganga	Not Received	Not Received	Not Received
36	Koldam (H)	No Gen	Not Received	Received
37	Koteshwar (H)	No Gen	Received	No Gen
38	Malana-2 (H)	NA	NA	NA
39	Nathpa Jhakri (H)	No Gen	Received	Received
40	Parbati-2 (H)	No Gen	No Gen	No Gen
41	Parbati-3 (H)	No Gen	Not Received	Not Received
42	Pong (H)	Received	Received	Not Received
43	Rampur (H)	No Gen	Not Received	Not Received
44	Sainj (H)	No Gen	Not Received	Not Received
45	Salal (H)	Not Received	Not Received	No Gen
46	Sewa-II (H)	Not Received	Not Received	Not Received
47	Singoli Bhatwari (H)	No Gen	Not Received	Not Received
48	Sorang (H)	Not Received	Not Received	Not Received
49	Tanakpur (H)	Not Received	Not Received	Not Received
50	Tehri (H)	No Gen	Received	Received
51	Uri-1 (H)	Not Received	Not Received	Not Received
52	Uri-2 (H)	Not Received	Not Received	Not Received

FRC/FRP as per SCADA data at NRLDC is as follows:

Frequency response Performance				
S. No	Control Area	Event Date		
		02-05-2024	10-05-2024	28-05-2024
1	Punjab	0.83	5.58	1.84
2	Haryana	-0.31	3.93	0.89
3	Rajasthan	-9.56	-0.41	0.34
4	Delhi	-6.53	0.34	7.52
5	Uttar Pradesh	0.62	1.04	1.92
6	Uttarakhand	-1.29	-3.10	1.12
7	Chandigarh*	NA	NA	NA
8	Himachal Pradesh	2.33	3.87	-11.31
9	J&K(UT) and Ladakh(UT)	-0.29	-0.20	4.10
10	Dadri -1 (TH)	4.46	10.96	9.68
11	Dadri -2 (TH)	-23.97	-13.11	11.26
12	Jhajjar (TH)	0.00	-3.04	0.00

13	Rihand-1 (TH)	-1.82	8.96	17.74
14	Rihand-2 (TH)	3.04	-0.24	11.51
15	Rihand-3 (TH)	7.54	-2.51	0.58
16	Shree Cement (TH)	-1.87	-2.64	2.43
17	Singrauli (TH)	1.41	1.63	4.88
18	Tanda-2 (TH)	2.65	-13.46	18.65
19	Unchahar stg-4 (TH)	-0.04	-3.46	14.93
20	Unchahar (TH)	-0.43	1.80	0.17
21	Anta (G)	0.54	-0.32	-0.83
22	Auraiya (G)	0.70	0.52	8.31
23	Dadri (G)	-0.93	4.75	16.57
24	AD Hydro (H)	No Gen	0.00	0.00
25	Bairasiul (H)	0.18	-0.03	0.08
26	Bhakra (H)	0.07	-0.26	1.47
27	Budhil (H)	No Gen	0.49	0.00
28	Chamera-1 (H)	4.23	2.62	1.03
29	Chamera-2 (H)	No Gen	-0.09	8.62
30	Chamera-3 (H)	No Gen	3.74	3.21
31	Dehar (H)	-0.24	1.58	1.65
32	Dhauliganga (H)	No Gen	-3.06	30.92
33	Dulhasti (H)	0.00	0.00	-4.53
34	Karcham (H)	0.00	7.38	41.15
35	Kishenganga	0.00	0.34	0.00
36	Koldam (H)	No Gen	28.61	21.64
37	Koteshwar (H)	No Gen	0.00	No Gen
38	Malana-2 (H)	NA	NA	NA
39	Nathpa Jhakri (H)	No Gen	-2.77	20.55
40	Parbati-2 (H)	No Gen	No Gen	No Gen
41	Parbati-3 (H)	No Gen	0.00	8.15
42	Pong (H)	-0.24	-2.82	0.32
43	Rampur (H)	No Gen	-13.60	10.41
44	Sainj (H)	No Gen	0.00	0.00
45	Salal (H)	0.47	1.08	No Gen
46	Sewa-II (H)	0.00	11.06	0.00
47	Singoli Bhatwari (H)	No Gen	0.21	0.19
48	Sorang (H)	0.33	-3.83	0.25
49	Tanakpur (H)	0.10	3.92	3.09
50	Tehri (H)	No Gen	2.82	20.07
51	Uri-1 (H)	0.18	-0.16	3.44
52	Uri-2 (H)	2.21	-3.13	-2.88

Members are requested to analyse the frequency response of their respective control area and share the FRC/FRP analysis of generating stations along with unit wise 01 sec data of for the aforementioned event.

ISGS were requested to confirm whether FGMO as per IEGC 2023 has been implemented at their respective stations or not. Updated sheet on the basis of details received is as follows:

Sl. No.	Entity	Capacity(MW)	Governor Mode (FGMO as per IEGC 2023) Yes or No	Drop setting (%)	Remarks (if any)
1	Dadri-1 (TH)	4*200			
2	Dadri -2 (TH)	2*490			
3	Jhajjar (TH)	3*500			
4	Rihand-1 (TH)	2*500	Yes	5.0	Under Implementation
5	Rihand-2 (TH)	2*500	Yes	5.0	Under Implementation
6	Rihand-3 (TH)	2*500	Yes	5.0	Under Implementation
7	Shree Cement (TH)	( 2 * 150 )			
8	Singrauli (TH)	2*500+5*200			
9	Tanda-2 (TH)	2*660			
10	Unchahar stg-4 (TH)	1*500			
11	Unchahar (TH)	2*210			
12	Anta (G)	( 1 * 153.2 + 3 * 88.71 )			
13	Auraiya (G)	( 2 * 109.3 + 4 * 111.19 )			
14	Dadri (G)	( 2 * 154.51 + 4 * 130.19 )			
15	AD Hydro (H)	( 2 * 96 )	YES	4.0	-
16	Bairasiul (H)	( 3 * 60 )	Yes	4.0	
17	Bhakra (H)	( 5 * 126 + 5 * 157 )			
18	Budhil (H)	( 2 * 35 )			
19	Chamera-1 (H)	( 3 * 180 )	Yes	5.0	
20	Chamera-2 (H)	( 3 * 100 )	Yes	5.0	
21	Chamera-3 (H)	( 3 * 77 )	Yes	4.0	
22	Dehar (H)	( 6 * 165 )			
23	Dhauliganga (H)	( 4 * 70 )	Yes	5.0	
24	Dulhasti (H)	( 3 * 130 )	Yes	5.0	
25	Karcham (H)	( 4 * 261.25 )	Yes	5.0	
26	Kishenganga	( 3 * 110 )	Yes	4.0	
27	Koldam (H)	( 4 * 200 )	Yes	4.0	
28	Koteswar (H)	( 4 * 100 )	Yes	4.0	
29	Malana-2 (H)	( 2 * 50 )			
30	Nathpa Jhakri (H)	( 6 * 250 )	Yes	5.5	
31	Parbati-2 (H)	( 4 * 200 )			
32	Parbati-3 (H)	( 4 * 130 )	Yes	4.0	

33	Pong (H)	( 6 * 66 )			
34	Rampur (H)	( 6 * 68.67 )			
35	Sainj (H)	( 2 * 50 )			
36	Salal (H)	( 6 * 115 )	Yes	3.0	
37	Sewa-II (H)	( 3 * 40 )	Yes	4.0	
38	Singoli Bhatwari (H)	( 3 * 33 )			
39	Sorang (H)	( 2 * 50 )			
40	Tanakpur (H)	( 1 * 31.42 + 2 * 31.4 )	Yes	4.0	
41	Tehri (H)	( 4 * 250 )	Yes	4.0	
42	Uri-1 (H)	( 4 * 120 )	Yes	6.0	
43	Uri-2 (H)	( 4 * 60 )	Yes	5.0	

Constituents are requested to share the details at the earliest.

**Members may like to discuss.**

#### **B.11. Mock trial run and testing of black start facilities at generating stations in Northern Region**

As per Indian Electricity Grid Code (IEGC) clause 34.3

*“ Detailed procedures for restoration post partial and total blackout of each user system within a region shall be prepared by the concerned user in coordination with the concerned SLDC, RLDC or NLDC, as the case may be. The concerned user shall review the procedure every year and update the same. The user shall carry out a mock trial run of the procedure for different sub-systems including black-start of generating units along with grid forming capability of inverter based generating station and VSC based HVDC black-start support at least once a year under intimation to the concerned SLDC and RLDC. Diesel generator sets and other standalone auxiliary supply source to be used for black start shall be tested on a weekly basis and the user shall send the test reports to the concerned SLDC, RLDC and NLDC on a quarterly basis”.*

Hydro and gas-based plants are capable of self-black-start. Conducting periodic mock black start exercises are extremely important to ensure the healthiness of black start facilities and also to build awareness as well as confidence among the system operators.

In view of above, regional entity generating stations shall conduct the dead bus charging of their units on rotation basis as per availability of schedule under intimation to the NRLDC. Testing of Diesel generator sets and other standalone auxiliary supply source to be used for black start shall also be done on a weekly basis. SLDC shall also ensure the same in their respective control area. This will ensure the healthiness of blackstart facility at generating stations. Further, NRLDC shall coordinate with the ISGS and states to conduct the mock black start exercise of subsystems.

Therefore, regional entity generating stations and SLDCs are requested to share the annual schedule plan for conducting dead bus charging / mock black start exercise of generating stations / sub-systems during 2024-25 in the format attached as **Annexure-B.VIII**. Constituents are also requested to share the test report of diesel generators / auxiliary supply on a quarterly basis. In this regard, a communication has already been sent to constituents through NRLDC letter dated 24.04.2024.

**Details received from AD Hydro HEP, Tehri HEP, Karcham Wangtoo HEP, Koteswar HEP, SJVN, Budhil, Chamera-III, Auraiya GPS, Singoli Bhatwari HEP, Koldam HEP, Dadri GPS, Delhi, Punjab and Uttarakhand.**

***Members are requested to share the tentative schedule of mock black start exercise of generating stations in their respective control area. SLDCs are also requested to share the tentative schedule plan of mock black start exercise of generating stations in their respective control area and share the report of the same.***

***Members may like to discuss.***

#### **B.12. Mock testing of System Protection Schemes (SPS) in Northern Region**

There are 53 numbers of System Protection Scheme (SPS) approved in Northern Region out of which 05 number of SPS are under implementation stage. These SPS are implemented at major generation complexes, important evacuating transmission lines and ICTs which are N-1 non complaint. Details of SPS in Northern Region is available on NRLDC website at link <https://nrlc.in/download/nr-sps-2024/?wpdmdl=13255&lang=en> .

SPS is designed to detect abnormal system conditions and take predetermined, corrective action to preserve system integrity and provide acceptable system performance. Therefore, correct operation of SPS as per designed logic is important to serve its purpose. To ensure this, mock testing of SPS needs to be conducted at a regular period. Clause 16.2 of IEGC 2023 also mandates the mock testing of SPS for reviewing SPS parameters & functions, at least once a year.

In view of the above, concerned constituents / utility are requested to share the tentative schedule plan for conducting mock testing of SPS in their respective control area during 2024-25 in format attached as **Annexure-B.IX**. In this regard, a communication has already been sent to constituents through NRLDC letter dated 01.05.2024.

**Details only received from Uttarakhand & UP.**

***Members are requested to share the tentative schedule of mock testing of SPS implemented on their control area and share the report of the same.***

***Members may like to discuss.***

#### **B.13. Availability and Standardization of recording instrument (Disturbance recorder and Station Event Logger):**

As per IEGC clause 17

- 1) *All users shall keep the recording instruments (disturbance recorder and event logger) in proper working condition.*
- 2) *The disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals.*

*IEGC clause 37.2 (c) also mandates the submission of Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) within 24 hrs of the event.*

Data of recording instruments (DR/EL) are very helpful in grid event analysis and also is being used in availability verification of transmission lines. Complete and conclusive analysis of any grid event is not possible without these recording instruments and thus their standardisation is very important.

Therefore, availability of disturbance recorder with standardisation, time sync and correct nomenclature and station event logger need to be ensured by users at the station of their respective control area.

In view of the above, all the constituents are requested share the details w.r.t. availability and standardization of disturbance recorder and event logger at the station of their respective control area in format attached as **Annexure-B.X**.

**Details only received from Haryana & UP.**

***Members are requested to share the share the details w.r.t. availability and standardization of disturbance recorder and event logger at the station of their respective control area.***

***Members may like to discuss.***

Status of action taken on decision in 219<sup>th</sup> OCC meeting of NRPC

S.N.	Agenda	Decision of 219 <sup>th</sup> OCC meeting of NRPC	Status of action taken
1	A.9 System Protection Scheme (SPS) to address Overloading of 3x315 MVA ICTs at Allahabad SS (Agenda by Powergrid NR-3)	Forum agreed that although no major issues are observed in SPS, time delay for SPS activation w.r.t. overcurrent settings of ICT need to be checked by POWERGRID. Further, as per suggestion of UP SLDC time delay in SPS logic may be explored by POWERGRID. Accordingly, the scheme may be deliberated in next OCC meeting.	POWERGRID has submitted agenda.
2	A.10 Commissioning work of Tehri PSP and its impact on operation of Tehri HPP and Koteshwar HEP (agenda by THDCIL)	Forum accorded in-principal approval for the said work subject to clearance from Ministry of Power	Shutdown taken by THDC from 02th June (06:00 hrs.) for 35 days.
3	A.11 Review of System Protection Scheme (SPS) at 400kV substation Obra and Nehtaur. (Agenda by UPSLDC)	Forum agreed with proposed revision in SPS. Further, with regard to NRLDC comments on implemented logic which decides priority in Nehtaur SPS and time delay to be kept, agenda may be brought by UPSLDC in next OCC meeting.	UPSLDC may update.
4	A.12 Request to consider Off-load 400 kV Bus Split arrangement at	Forum was of view that a committee of members from NRLDC, CTU, DTL, HVPN and UPPTCL may be	Committee visited Maharaniabagh station on 12.06.2024.



Status of action taken on decision in 219<sup>th</sup> OCC meeting of NRPC

	400/220 kV Maharanibagh Substation (Agenda by Powergrid NR-1)	constituted under chairmanship of Superintending Engineer (Operation), NRPC that would visit 400/220 kV Maharanibagh Substation and submit its report before the next OCC meeting regarding the need to consider the Off-load 400 kV Bus Split arrangement at 400/220 kV Maharanibagh Substation.	
5	A.13 Low voltage at RVPN's 220 kV GSSs in the vicinity of 400 kV GSS Bhinmal (PG) - (Agenda by RVPN)	Forum was of view that since ICT-3 at Bhinmal is expected, there would be slight improvement in voltage profile of Bhinmal. Further, as agreed earlier Rajasthan SLDC may discuss with DISCOM to shift some load of Bhinmal area to night time. In case the issue is still not resolved after load shifting, the matter may be further deliberated.  Meanwhile, Rajasthan may share studies done at their end with NRLDC.	RVPN to update status.

**Follow up issues from previous OCC meetings**

Annexure-A. I

1	Down Stream network by State utilities from ISTS Station	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.	List of downstream networks is enclosed in <b>Annexure-A. I. I.</b>																																								
2	Progress of installing new capacitors and repair of defective capacitors	Information regarding installation of new capacitors and repair of defective capacitors is to be submitted to NRPC Secretariat.	<p>Data upto following months, received from various states / UTs:</p> <table border="1"> <tr><td>⊙ CHANDIGARH</td><td>Sep-2019</td></tr> <tr><td>⊙ DELHI</td><td>May-2024</td></tr> <tr><td>⊙ HARYANA</td><td>Mar-2024</td></tr> <tr><td>⊙ HP</td><td>Feb-2024</td></tr> <tr><td>⊙ J&amp;K and LADAKH</td><td>Not Available</td></tr> <tr><td>⊙ PUNJAB</td><td>Mar-2023</td></tr> <tr><td>⊙ RAJASTHAN</td><td>Apr-2024</td></tr> <tr><td>⊙ UP</td><td>May-2024</td></tr> <tr><td>⊙ UTTARAKHAND</td><td>May-2024</td></tr> </table> <p>All States/UTs are requested to update status on monthly basis.</p>	⊙ CHANDIGARH	Sep-2019	⊙ DELHI	May-2024	⊙ HARYANA	Mar-2024	⊙ HP	Feb-2024	⊙ J&K and LADAKH	Not Available	⊙ PUNJAB	Mar-2023	⊙ RAJASTHAN	Apr-2024	⊙ UP	May-2024	⊙ UTTARAKHAND	May-2024																						
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3	Healthiness of defence mechanism: Self-certification	<p>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” .</p> <p>In compliance of NPC decision, NR states/constituents agreed to raise the AUFR settings by 0.2 Hz in 47th TCC/49th NRPC meetings.</p>	<p>Data upto following months, received from various states / UTs:</p> <table border="1"> <tr><td>⊙ CHANDIGARH</td><td>Not Available</td></tr> <tr><td>⊙ DELHI</td><td>Dec-2023</td></tr> <tr><td>⊙ HARYANA</td><td>Mar-2024</td></tr> <tr><td>⊙ HP</td><td>Apr-2024</td></tr> <tr><td>⊙ J&amp;K and LADAKH</td><td>Not Available</td></tr> <tr><td>⊙ PUNJAB</td><td>Dec-2023</td></tr> <tr><td>⊙ RAJASTHAN</td><td>Mar-2024</td></tr> <tr><td>⊙ UP</td><td>Mar-2024</td></tr> <tr><td>⊙ UTTARAKHAND</td><td>Mar-2024</td></tr> <tr><td>⊙ BBMB</td><td>Mar-2024</td></tr> </table> <p>All States/UTs are requested to update status for healthiness of UFRs on monthly basis for islanding schemes and on quarterly basis for the rest .</p> <p>Status:</p> <table border="1"> <tr><td>⊙ CHANDIGARH</td><td>Not Available</td></tr> <tr><td>⊙ DELHI</td><td>Increased</td></tr> <tr><td>⊙ HARYANA</td><td>Increased</td></tr> <tr><td>⊙ HP</td><td>Increased</td></tr> <tr><td>⊙ J&amp;K and LADAKH</td><td>Increased</td></tr> <tr><td>⊙ PUNJAB</td><td>Increased</td></tr> <tr><td>⊙ RAJASTHAN</td><td>Increased</td></tr> <tr><td>⊙ UP</td><td>Increased</td></tr> <tr><td>⊙ UTTARAKHAND</td><td>Increased</td></tr> <tr><td>⊙ BBMB</td><td>Increased</td></tr> </table>	⊙ CHANDIGARH	Not Available	⊙ DELHI	Dec-2023	⊙ HARYANA	Mar-2024	⊙ HP	Apr-2024	⊙ J&K and LADAKH	Not Available	⊙ PUNJAB	Dec-2023	⊙ RAJASTHAN	Mar-2024	⊙ UP	Mar-2024	⊙ UTTARAKHAND	Mar-2024	⊙ BBMB	Mar-2024	⊙ CHANDIGARH	Not Available	⊙ DELHI	Increased	⊙ HARYANA	Increased	⊙ HP	Increased	⊙ J&K and LADAKH	Increased	⊙ PUNJAB	Increased	⊙ RAJASTHAN	Increased	⊙ UP	Increased	⊙ UTTARAKHAND	Increased	⊙ BBMB	Increased
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4	<p>Status of FGD installation vis-à-vis installation plan at identified TPS</p>	<p>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.</p> <p>Further, progress of FGD installation work on monthly basis is monitored in OCC meetings.</p>	<p>Status of the information submission (month) from states / utilities is as under:</p> <table border="1"> <tr><td>⊙ HARYANA</td><td>Sep-2023</td></tr> <tr><td>⊙ PUNJAB</td><td>Mar-2024</td></tr> <tr><td>⊙ RAJASTHAN</td><td>Jul-2023</td></tr> <tr><td>⊙ UP</td><td>Jan-2024</td></tr> <tr><td>⊙ NTPC</td><td>Feb-2023</td></tr> </table> <p>FGD status details are enclosed as <b>Annexure-A. I. II.</b></p> <p>All States/utilities are requested to update status of FGD installation progress on monthly basis.</p>	⊙ HARYANA	Sep-2023	⊙ PUNJAB	Mar-2024	⊙ RAJASTHAN	Jul-2023	⊙ UP	Jan-2024	⊙ NTPC	Feb-2023																								
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5	<p>Submission of breakup of Energy Consumption by the states</p>	<p>All states/UTs are requested to submit the requisite data as per the billed data information in the format given as under:</p> <table border="1"> <thead> <tr> <th>Category→</th> <th>Consumption by Domestic Loads</th> <th>Consumption by Commercial Loads</th> <th>Consumption by Agricultural Loads</th> <th>Consumption by Industrial Loads</th> <th>Traction supply load</th> <th>Miscellaneous / Others</th> </tr> </thead> <tbody> <tr> <td>&lt;Month&gt;</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Category→	Consumption by Domestic Loads	Consumption by Commercial Loads	Consumption by Agricultural Loads	Consumption by Industrial Loads	Traction supply load	Miscellaneous / Others	<Month>							<p>Status of the information submission (month) from states / utilities is as under:</p> <table border="1"> <thead> <tr> <th>State / UT</th> <th>Upto</th> </tr> </thead> <tbody> <tr><td>⊙ CHANDIGARH</td><td>Not Submitted</td></tr> <tr><td>⊙ DELHI</td><td>Apr-24</td></tr> <tr><td>⊙ HARYANA</td><td>Mar-24</td></tr> <tr><td>⊙ HP</td><td>Apr-24</td></tr> <tr><td>⊙ J&amp;K and LADAKH</td><td>Not Submitted</td></tr> <tr><td>⊙ PUNJAB</td><td>Feb-24</td></tr> <tr><td>⊙ RAJASTHAN</td><td>Apr-24</td></tr> <tr><td>⊙ UP</td><td>Mar-24</td></tr> <tr><td>⊙ UTTARAKHAND</td><td>Feb-24</td></tr> </tbody> </table> <p>J&amp;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</p>	State / UT	Upto	⊙ CHANDIGARH	Not Submitted	⊙ DELHI	Apr-24	⊙ HARYANA	Mar-24	⊙ HP	Apr-24	⊙ J&K and LADAKH	Not Submitted	⊙ PUNJAB	Feb-24	⊙ RAJASTHAN	Apr-24	⊙ UP	Mar-24	⊙ UTTARAKHAND	Feb-24
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6	<p>Information about variable charges of all generating units in the Region</p>	<p>The variable charges detail for different generating units are available on the MERIT Order Portal.</p>	<p>All states/UTs are requested to submit daily data on MERIT Order Portal timely.</p>																																		
7	<p>Status of Automatic Demand Management System in NR states/UT's</p>	<p>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:</p>	<p>The status of ADMS implementation in NR is enclosed in Annexure-A. I. II.</p> <table border="1"> <tr><td>⊙ DELHI</td><td>Scheme Implemented but operated in manual mode.</td></tr> <tr><td>⊙ HARYANA</td><td>Scheme not implemented</td></tr> <tr><td>⊙ HP</td><td>Scheme not implemented</td></tr> <tr><td>⊙ PUNJAB</td><td>Scheme not implemented</td></tr> <tr><td>⊙ RAJASTHAN</td><td>Under implementation.</td></tr> <tr><td>⊙ UP</td><td>Scheme implemented by NPCIL only</td></tr> <tr><td>⊙ UTTARAKHAND</td><td>Scheme not implemented</td></tr> </table>	⊙ DELHI	Scheme Implemented but operated in manual mode.	⊙ HARYANA	Scheme not implemented	⊙ HP	Scheme not implemented	⊙ PUNJAB	Scheme not implemented	⊙ RAJASTHAN	Under implementation.	⊙ UP	Scheme implemented by NPCIL only	⊙ UTTARAKHAND	Scheme not implemented																				
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8	Reactive compensation at 220 kV/ 400 kV level at 15 substations			
	State / Utility	Substation	Reactor	Status
i	POWERGRID	Kurukshetra	500 MVar TCR	500 MVar TCR at Kurukshetra has been commissioned on dated 15th December 2023
ii	DTL	Peeragarhi	1x50 MVar at 220 kV	1x50 MVar Reactor at Peeragarhi has been commissioned on dated 18.09.2023
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	SLDC informed that PTCUL has intimated that bid extension has been done till 30.05.2024.
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 Kanoor Electricals Ltd. Schedule time is 18 months. Out of 13 Nos. of reactors, 07 Nos. have been commissioned and rest are under progress. Tentative charging plan is to be intimated by Rajasthan SLDC.
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 Kanoor Electricals Ltd. Schedule time is 18 months. 01 No. of 125 MVAR reactor is under testing which is expected to done by end of May 2024. Tentative charging plan is to be

1. Down Stream network by State utilities from ISTS Station:						Annexure-A-I.I
Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
1	400/220kV, 3x315 MVA Samba	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays.	Mar'24	02 No. of bays shall be utilized for LILO-II of 220kV Jatwal-Bishnah Transmission Line, the work of which is delayed due to severe ROW problem at Location No. 1 near Grid Substation Jatwal where the Land owner is not allowing erection of Tower. The Deputy Commissioner Samba has been approached for intervention and facilitating the erection of Tower. He is persuading the Land owner to get the work completed. Updated in 210th 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	Mar'25	02 No. of bays are to be utilized for connecting 220kV New Wanpoh-Alusteng D/c Line. RoW issues persisting; At present new-wanpoh-mirbazar 5km and harwan-alstung 16km have been completed, expected date of completion is Mar 2025 subject to availability of funds and resolving of RoW issues), Updated in 214th 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: 7	• 220 kV D/C Shahajahanpur (PG) - Gola line	Commissioned	Energization date: 26.10.2023 updated by UPPTCL in 215th OCC
				• 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	• 220 kV Hamirpur-Dehan D/c line	Commissioned	HPPTCL has commissioned the Planned 220kV Dehan-Hamirpur TL utilizing 2 No. 220kV Bays. Commissioned 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
				• 220 kV D/C line Bhiwani (PG) – Bhiwani (HVPNL) line	Commissioned	Updated in 202nd OCC by HVPNL

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
9	Bhiwani 400/220kV S/s	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line.	Dec'24	Issue related to ROW as intimated in 218th OCC by HVPNL. <b>Status:</b> Work was stalled since 29.07.2021 due to ROW issues and farmers agitation and further restarted on 9.10.2023 with the help of district administration. Now, work was again stalled since 30.11.2023 due to severe ROW issues. Expected to be completed by 31.12.2024. Foundation 209/212. Erection 193/212. Stinging 37.8/50.3 km
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	Oct'25	Line work awarded to M/s R S Infra Projects Pvt. Ltd. Noida, Uttar Pradesh on dated 09.03.2024. Work of route plan and route alignment has been started by the firm as intimated in 218th 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.	Commissioned	Updated in 216th OCC by DTL
				• Masjid Mor – Tughlakabad 220kV D/c line.	Commissioned	Updated in 216th OCC by DTL
12	400/220kV Kala Amb GIS (TBCB)	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 2 Under Implementation:2	• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s	May'24	Work completed and FTC is pending.Updated in 219th 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	-	Tendering process is yet to be started.Updated in 219th OCC by HPPTCL
				• Network to be planned for 2 bays	-	HPPTCL to update the status.
13	400/220kV Kadarpur Sub-station	Commissioned: 8 Total: 8	Utilized: 0 Unutilized: 8	• D/C line Kadarpur - Sec-56 Gurugram.	May'24	Initial proposal of LILO of 220kV Pali-Sector 56 Line and Pali-Sector 52 line was descoped due to forest issue. Proposl to evacuate power from 220kV D/C Pali-Sector 56 line to Sector 56 and 52 with bunching of lines is under consideration.. Updated in 218th OCC by HVPNL
				• S/C line Kadarpur - Sec-52 Gurugram	May'24	Initial proposal of LILO of 220kV Pali-Sector 56 Line and Pali-Sector 52 line was descoped due to forest issue. Proposl to evacuate power from 220kV D/C Pali-Sector 56 line to Sector 56 and 52 with bunching of lines is under consideration.. Updated in 218th OCC by HVPNL
				• S/C line Kadarpur - Pali	May'24	Initial proposal of LILO of 220kV Pali-Sector 56 Line and Pali-Sector 52 line was descoped due to forest issue. Proposl to evacuate power from 220kV D/C Pali-Sector 56 line to Sector 56 and 52 with bunching of lines is under consideration.. Updated in 218th OCC by HVPNL
				• LILO of both circuits of 220kV D/c Sohna-Rangla Rajpur at Roj Ka Meo line at 400kV Sohna Road	Dec'24	Updated in 216th OCC by HVPNL

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
14	400/220kV Sohna Road Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• 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. <b>Status:-</b> 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 Approved: 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	Mar'25	Contract awarded on 8.08.23 to M/s Skipper with completion in March 25.Updated in 218th 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	30.09.2024	Issue related to ROW and Pending crossing approval from Northern Railways and DFCCIL. as intimated in 218th OCC by HVPNL.
				• Prithla - Sector 89 Faridabad 220kV D/c line	Jul'25	Work awarded to M/s Man Structural Pvt Ltd. JV M/s Aquarian Enterprises on 09.01.2024. Contractual date: 06.05.2025 and Tentative date of completion :06.05.2025 Route has been approved and further work is in progress.Updated in 218th OCC by HVPNL
16	400/220kV Sonapat 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 Sonapat	Mar'24	Updated in 216th OCC by HVPNL. <b>Status:</b> Work was held up due to ROW at T.L. No. 7,8,11,12 & 13 by the farmers of Jajji villagers during July'23 and now the matter has been resolve and work under progress from 01.08.2023. The erection work of T.no. 1 is pending due to non availability of shut down at 220KV Mohana-Smk line and 220KV Jajji-Mohana line. • PLCC protection coupler and Forest approval is also pending.
				• Sonapat - HSIISC Rai 220kV D/c line	Mar'24	Updated in 218th OCC by HVPNL. <b>Status:</b> Provision PTCC clearance received on 21.02.2024. The interstate connectivity aggrement has also been completed on 19.04.2024. Integration of telemetry data is pending, which is under process. FTC documents also submitted on Portal.



Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
				• Sonepat - Kharkhoda Pocket A 220kV D/c line	08.03.2025	Updated in 212th OCC by HVPNL. <b>Status:</b> Work order has been issued to M/s R.S Infra on dated 09.08.2023 by O/o CE/PD&C, Panchkula for construction of line. Both bays are under construction and erection of electrical equipment is under progress. Tentative date of completion of both bays at PGCIL end is end of July 2024.
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 is under progres. Stub Setting: 14/2017. Permission for Highway is awaited from concerned department as updated in 218th OCC by RVPNL.
18	400/220kV Kotputli Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Kotputli - Pathreda 220kV D/c line	-	Date of bid opening has been extended up to 30.04.2024 as updated in 218th OCC by RVPNL.
19	400/220kV Jalandhar 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 commissioned 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	Commissioned	• Lucknow -Kanduni, 220 kV D/C line work energized on 05.10.2023. Updated in 212th OCC by UPPTCL.  • No planning for 2 no. of bays upated by UPPTCL in 196th OCC. The same has been communicated to Powergrid.
22	400/220kV Gorakhpur Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	Commissioned	• Gorakhpur(PG)- Maharajganj, 220 kV D/C line energized on 27.09.2023 updated by UPPTCL in 212th 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	Sep'24	Line charged from Rajokheri end on 09.02.2020. The work of construction was awarded to M/s IKE ltd but due to non completion of work firm is blacklisted, Now the pending work of SCADA , Telemetry and Data Integration is being carried out departmentally through OEM M/s ZIV . After completion of these statutory requirement of NRLDC the load will be taken from the Abdullapur. Tentative date of completion of work will be 30.09.2024. Updated in 218th OCC by HVPNL
		Commissioned: 8		• Panchkula – Pinjore 220kV D/c line	Commissioned	Updated in 218th OCC by HVPNL
		Under tender:2 Total: 10	Utilized: 2	• Panchkula – Sector-32 220kV D/c line	May'24	All Line work stands completed, The integration work with SLDC, Panipat at 220kV Sector-32, Panchkula end is in progress. Updated in 218th OCC by HVPNL
	400/220kV Panchkula		Utilized: 4			

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
25	400/220kV Panchkula Sub-station	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: 4 Under Implementation:2	• 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 Under Implementation:2	• Amritsar – Patti 220kV S/c line	May'24	Work is completed, agreement is expected to be signed by May 2024. Updated in 218th 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)	May'24	Work is completed, agreement is expected to be signed by May 2024. Updated in 218th 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	Mar'25	Updated in 205th OCC by HVPNL. <b>Status:</b> Under Tendering process
				• Bahadurgarh - METL 220kV D/c line (Deposit work of M/s METL)	Mar'25	Updated in 216th OCC by HVPNL. <b>Status:</b> Tendering under progress.
				• Bahadurgarh - Kharkhoda Pocket B 220kV D/c line	08.03.2025	Updated in 218th OCC by HVPNL. <b>Status:</b> Work order has been issued to M/s R.S Infra on dated 09.08.2023 by O/o CE/PD&C, Panchkula for construction of line. The Survey work has been completed.
29	400/220kV Jaipur (South) S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• LILO of 220 kV S/C Dausa – Sawai Madhopur line at 400 kV GSS Jaipur South (PG)	06.10.2025	Work order has been issued on 06.10.2023, work under progress as updated by RVPNL in 215th 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 - Bahaich 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	• 220 kV D/C Kankroli(PG) - Nathdwara line	Jul'24	Price bid opened on 29.01.2024, tender dropped due to price variation. Retendering would be done after general election as updated by RVPN in 218th OCC.
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 Panchgaon (PGCIL)-Panchgaon Ckt-II, charged on dated 05.09.2022 & 20.10.2022 respectively. The 2nos bays may be utilised by HVPNL in future.
33	400/220kV, Saharanpur	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	Commissioned	Saharanpur(PG)-Devband D/c line (Energization date: 20.04.2023) updated by UPPTCL in 207th OCC

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
34	400/220kV, Wagoora	Commissioned: 10 Total: 10	Utilized: 6 Unutilized: 4	• Network to be planned for 4 bays	-	PDD, J&K to update the status.
35	400/220kV, Ludhiana	Commissioned: 9 Total: 9	Utilized: 8 Unutilized: 1	• Network to be planned for 1 bay	May'24	Direct circuit from 220 kV Lalton Kalan to Dhandari Kalan to be diverted to 400 kV PGCIL Ludhiana. Work completed , final agrrement is expected to be signed by May'24. Updated in 218th 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	Commissioned	Stringing of 2nd Circuit of Chamera Pool-Karian Tansmission line has been completed & terminal bay at 400/220 kV chamera pooling substation (PGCIL) is commissioned on 20.01.2024. Updated in 217th 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.

## Status of ADMS implementation in NR:

Sl. No.	State / UT	Status	Remarks
1	DELHI	Scheme Implemented but operated in manual mode.	A committee has been constituted under the chairmanship of GM, SLDC Delhi to formulate the logic for implementation of ADMS. Delhi SLDC informed that two meetings have been held by the committee and based on the deliberation in those meetings, SoP has been formed by the committee.
2	HARYANA	Scheme not implemented	An internal Committee of HVPNL officers has been constituted for preparation of the Detailed Project Report and Tender Documents for implementation of ADMS. The DPR is under preparation.
3	HP	Scheme not implemented	HP SLDC mentioned that HPSEB had intimated that initially 142 Nos. of feeders were identified for operation under ADMS functionality but most of these feeders were from same sub-station. Therefore, now they have increased the no. of sub-station and identified the non-critical feeders. Load relief to be given through these feeders is under finalization. The revised feeder list would be shared by HPSEBL with the SLDC upon finalization of same.
4	PUNJAB	Scheme not implemented	i. A committee comprising of following officers of PSPCL & PSTCL has been constituted to finalize the logic regarding implementation of Automatic Demand Management System in Punjab Control Area. A meeting in this regard was held on dated 26-02-2024 at PSLDC Complex, Patiala. The committee deliberated various loading scenarios and proposed the following logic for the management of demand: 1. If the frequency sustains below 49.90 Hz for duration of 3 minutes, the Automatic Demand Management System will initiate a 50% reduction in the Over Drawl. 2. In case the frequency falls further below 49.85 Hz, the Over Drawl will be reduced to zero.
5	RAJASTHAN	Under implementation. Likely completion schedule is 31.03.2024	RVPN informed that the issue of cyber security of link between SATNAM centre and SLDC control room is still pending. Final testing is rescheduled for 02.07.2024.
6	UP	Scheme implemented by NPCIL only	i. A meeting regarding ADMS was held on 15.01.2023 with the UPPCL under the chairmanship of MD UPPTCL ii. A committee formed for identification of load at 33 kV level under the chairmanship of Director (Distribution), UPPCL. iii. Another committee under the chairmanship of Director UPSLDC shall identify the technical and operational requirement for ADMS implementation iv. The software at the SLDC end for ADMS shall be available with ULDC phase –III SCADA system which is under implementation and likely to be commissioned by March 2025. v. In order to operate identified 33 kV feeders under ADMS scheme, integration of 132 kV substations with SCADA system is under implementation in the Reliable Communication Scheme and expected date of completion of the scheme is October 2024.
7	UTTARAKHAND	Scheme not implemented	i. UPCL has prepared a system architecture in which all the non-monitored sub-stations have been selected and 11kV feeders have been considered for ADMS operation. For the scheme, discom has also done group-wise selection of feeders and quantum of MW relief to be given for automatic demand response at 11kV level has also been decided. UPCL has awarded the tender for implementation of the aforementioned scheme to M/s Metergy Pvt.Ltd. ii. As per the status report submitted by M/s Metergy Pvt.Ltd, the survey work of 30 nos. incomer sites have been completed and order has been placed by UPCL for hardware equipments.

# 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)**

GGSSSTP, 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)

<b>Adani Power Ltd.</b>	KAWAI TPS U#1 (Target: 31-12-2024), KAWAI TPS U#2 (Target: 31-12-2024)
<b>APCPL</b>	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)
<b>GVK Power Ltd.</b>	GOINDWAL SAHIB U#1 (Target: 30-04-2020), GOINDWAL SAHIB U#2 (Target: 29-02-2020)
<b>HGPCL</b>	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)

<b>L&amp;T Power Development Ltd (Nabha)</b>	Nabha TPP (Rajpura TPP) U#1 (Target: 30-04-2021), Nabha TPP (Rajpura TPP) U#2 (Target: 28-02-2021)
<b>Lalitpur Power Gen. Company Ltd.</b>	LALITPUR TPS U#1 (Target: 31-12-2026), LALITPUR TPS U#2 (Target: 30-09-2026), LALITPUR TPS U#3 (Target: 30-06-2026)
<b>Lanco Anpara Power Ltd.</b>	ANPARA C TPS U#1 (Target: 31-12-2023), ANPARA C TPS U#2 (Target: 31-12-2023)
<b>Prayagraj Power Generation Company Ltd.</b>	PRAYAGRAJ TPP U#1 (Target: 31-12-2024), PRAYAGRAJ TPP U#2 (Target: 31-12-2024), PRAYAGRAJ TPP U#3 (Target: 31-12-2024)
<b>PSPCL</b>	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)

<b>Rosa Power Supply Company</b>	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)
<b>RRVUNL</b>	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)
<b>Talwandi Sabo Power Ltd.</b>	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)
<b>UPRVUNL</b>	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)



## Status of availability of ERS towers in NR

Sl. No.	Transmission Utility	Voltage Level (220kV/400kV/765kV/ 500 kV HVDC etc.)	Length of the transmission lines owned by the Utility (Ckt. Kms.)	Number of ERS Sets ( towers) available (Nos.)	ERS Set ( towers) required as per the Govt. norms.	Location	Remarks
1	PTCUL	400kV	418.394	NIL	1		DPR Under preparation.
		220kV	1045.135	NIL	1		DPR Under preparation.
2	Powergrid NR-1	220 KV	1842.88	NIL	1		
		400 KV	11074.26	12 Towers	3	All 400kV ERS at Ballabgarh	make-Lindsey
		765 KV	4721.85	15 Towers	1	All 765kV ERS at Meerut	Make-SBB
		500 KV HVDC	653.88	NIL	1		
		800 KV HVDC	416.58	NIL	1		
3	Powergrid NR-2	66 KV	37.56	Nil	1		ERS tower available for 400KV rating can be used in place of lower as well as higher voltage Towers. In case used for 765KV Line, No of towers can be erected will reduce due to increase in Tower Height.
		132 KV	262.7	Nil	1		
		220 KV	2152	Nil	1		
		400 KV	8097.3	02 Set (32 Towers)	2	Kishenpur & Jalandhar	
		765 KV	337.5	Nil	1		
4	Powergrid NR-3	800KV HVDC	2205	NIL	1		400KV ERS will be also be used in other voltage level lines
		500KV HVDC	2566	NIL	1		
		765KV	4396	NIL	1		
		400KV	12254	26 Towers	3	Kanpur	
		220KV	1541	NIL	1		
132KV	207	NIL	1				
5	PARBATI KOLDAM TRANSMISSION COMPANY LIMITED	400kV	457	NIL	1		Procurement under process.
6	PATRAN TRANSMISSION COMPANY LTD	400kV	0.4	NIL	1	It is kept in Bhopal and on need basis is moved across region	Not available, will tie up based on the requirements in future. However the parent company IndiGrid owns one set of ERS for all five regions.
7	NRSS-XXIX TRANSMISSION LTD	400kV	853	NIL	1		
8	GURGAON PALWAL TRANSMISSION LTD	400kV	272	NIL	1		
9	RAPP Transmission Company Limited.	400kV	402	NIL	1		
10	NRSS XXXVI Transmission Limited	400kV	301.924	NIL	1		Element I - Operational comprising of 3 kms. Element II - Work Under Progress comprising of 221.924 kms. Element II - Work Under Progress comprising of 77 kms.
11	HPPTCL	220 kV	659	NIL	1		
		400 kV	75.7	NIL	1		
12	RVPN	132 kV	18969.958	1	4	01 No. ERS available at 220 kV GSS Heerapura, Jaipur	ERS proposed : 01 Set at 400 kV GSS, Jodhpur. 01 set at 400 kV GSS Bikaner
		220 kV	16227.979		3		
		400 kV	6899.386		2		
		765 kV	425.498		1		
13	DTL	220kV	915.498	NIL	1	400kV Barnauli Sub station	ERS tower available for 400KV rating can also be used for lower voltage lines as well
		400kV	249.19	02 Sets (32 towers)	1		

Sl. No.	Transmission Utility	Voltage Level (220kV/400kV/765kV/ 500 kV HVDC etc.)	Length of the transmission lines owned by the Utility (Ckt. Kms.)	Number of ERS Sets ( towers) available (Nos.)	ERS Set ( towers) required as per the Govt. norms.	Location	Remarks
14	JKPTCL			10			JKPTCL, Kashmir:10 procured (out of which 3 on loan to JKPTCL, Jammu)
15	HVPN						HVPN does not have ERS Set. Technical Specifications have been finalized
16	PSTCL	400 kV 220 kV	1666.43 7921.991	2	2		
17	UPPTCL 1- Meerut	132KV	27508.321	24 Nos(15 Running+9 Angle)		400 kV S/s Gr. Noida	ERS will be also be used in other voltage level lines.
		220KV	14973.453				
		400KV	6922.828				
	UPPTCL 2-Prayagraj	765KV	839.37	24 Towers		220 kv S/s phulpur	ERS will also be used in other voltage lines.
		400KV	1804.257				
		220KV	2578.932				
		132KV	4714.768				
18	POWERLINK						
19	POWERGRID HIMACHAL TRANSMISSION LTD						
20	Powergrid Ajmer Phagi Transmission Limited						
21	Powergrid Fatehgarh Transmission Limited						
22	POWERGRID KALA AMB TRANSMISSION LTD						
23	Powergrid Unchahar Transmission Ltd						
24	Powergrid Khetri Transmission Limited						
25	POWERGRID VARANASI TRANSMISSION SYSTEM LTD						
26	ADANI TRANSMISSION INDIA LIMITED		2090	1 Set (12 towers)	1 set (12 towers)	Sami (Gujarat)	Make-Lindsey ERS set available for 400KV & 500KV rating can be used for lower as well as higher voltage Towers. In case used for 765KV Line, No of towers can reduce due to increase in Tower Height & nos of conductors.
27	BIKANER KHETRI TRANSMISSION LIMITED	482					
28	FATEHGARH BHADLA TRANSMISSION LIMITED	500 kV HVDC 400 kV HVAC 291					
29	NRSS-XXXI(B) TRANSMISSION LTD	400 kV	577.74	Not Available	Not Available		In the advance stage of process of finalising arrangement for providing ERS on need basis with other transmission utility (M/s INDIGRID).
30	ARAVALI POWER COMPANY PVT LTD	765 kv HVAC					

\*The transmission Utility with line length less than 500 ckt kms (of 400 KV lines) may be given option either to procure ERS or have agreement with other transmission utilities for providing ERS on mutually agreed terms, when need arises. (As per MoP directions)





## RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED

[Corporate Identity Number (CIN):U40109RJ2000SGC016485]

(Regd. Office: Vidyut Bhawan, Jan Path, Jyoti Nagar, Jaipur - 302 005)

OFFICE OF THE SUPERINTENDING ENGINEER (PROJECT & PLANNING)

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e-mail: [se\\_pp@rvpn.co.in](mailto:se_pp@rvpn.co.in); website: [www.rvpn.co.in](http://www.rvpn.co.in)

No. RVPN/SE(P&P)/XEN(PP&D)/AE-2/ F./D 94 Jaipur, Dt. 5/6/24

The Member Secretary (NRPC),  
Shaheed Jeet Singh Marg,  
Katwaria Sarai, New Delhi-110016.

Sub: Regarding inclusion of agenda on Proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai in 220<sup>th</sup> OCC Meeting to be held on dated 19.06.24.

Dear Sir,

On the above captioned subject, it is submitted that in the 217<sup>th</sup> OCC Meeting held on dated 15.03.2024, the proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai was deliberated and Member Secretary, NRPC has desired from RVPN to discuss the issues highlighted by NRLDC on proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai.

The pointwise reply in reference to queries raised by NRPC was submitted to NRLDC vide this office letter dated 16.04.24 with request to consider the reply to accord necessary approval in next 218<sup>th</sup> OCC Meeting held on dated 18.04.24. Further, the above reply on proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai was neither included in agenda nor was discussed in the 218<sup>th</sup> OCC Meeting held on dated 18.04.24 and 219<sup>th</sup> OCC Meeting held on dated 15.05.24.

Therefore, in view of above, kindly find enclosed the pointwise reply submitted to NRLDC on proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai and also the Proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai (earlier submitted for approval in the 217<sup>th</sup> OCC Meeting held on dated 15.03.2024) for deliberation & decision in next OCC Meeting to be held on dated 19.06.24.

Encl: As above

(S.C. Meena)  
Chief Engineer (PP&D)

Copy to the following for information and necessary action please-

1. The General Manager (NRLDC), Grid Controller of India Ltd., 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016.
2. The Addl. Chief Engineer (LD/Communications/MPT&S), RVPN, Jaipur/Ajmer.
3. The Chief Engineer, Power System Planning & Appraisal-I Division, CEA, Sewa Bhawan, RK Puram-I, New Delhi-110066.
4. The Superintending Engineer (Automation/P&P/SO&LD/Protection Engineering/T&C), RVPN, Jaipur/Babai
5. The Superintending Engineer (Operation), NRPC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016.
6. The System Operator-2, NRLDC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016

Encl: As above

RajKaj Ref  
7604720

Document certified by SURESH CHAND MEENA <mh4371@gmail.com>.

  
Digitally Signed by SURESH CHAND MEENA  
Designation: Chief Engineer  
Date :30-05-2024 03:49:14



I/34717/2024



सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

उत्तर क्षेत्रीय विद्युत समिति

Northern Regional Power Committee

**विषय:** उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 217<sup>वीं</sup> बैठक का कार्यवृत्त।

**Subject:** Minutes of the 217<sup>th</sup> OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 217<sup>वीं</sup> बैठक दिनांक 15.03.2024 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट <http://164.100.60.165> पर उपलब्ध है। यदि कार्यवृत्त पर कोई टिप्पणी हो तो कार्यवृत्त जारी करने के एक सप्ताह के अन्दर इस कार्यालय को भेजें।

The 217<sup>th</sup> meeting of the Operation Co-ordination Sub-Committee (OCC) of NRPC was held on 15.03.2024. The Minutes of this meeting has been uploaded on the NRPC website: <http://164.100.60.165>. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक: यथोपरि।

Signed by D. K. Meena

Date: 27-03-2024 18:55:37

Reason: Approved

(डी. के. मीना)

अधीक्षण अभियंता (प्रचालन)

सेवा में,

उ.क्षे.वि.स. के प्रचालन समन्वय उप-समिति के सभी सदस्य



forum that a meeting was convened by NRPC Sectt. with HPSEB and HPSLDC wherein HPSEB representative informed that the proposal for procurement of UFR is submitted to Chief Engineer (System Planning) for approval on 29th December 2023. However, approval is still awaited from higher management of HPSEB. HPSLDC representative added that the infrastructure required for the implementation of the scheme is in place and only the purchasing and installation of UFRs is pending. In the OCC meeting, MS, NRPC stated that the implementation of scheme should be expedited and asked HPSLDC to follow up with HPSEB on the said matter.

A.6.6. With regard to Shimla-Solan Islanding scheme representative from HPSEB intimated forum that GE officials may visit Bhabha HEP by 20th March 2024 and will then inform the changes, if required in the control system of the Unit. MS, NRPC requested HPSLDC to follow up with HPSEB and GE for early resolution of the issue.

#### **A.7. Coal Supply Position of Thermal Plants in Northern Region**

A.7.1. In the meeting, NRPC representative apprised forum about the coal stock position of generating stations in northern region during current month (till 10<sup>th</sup> March 2024).

A.7.2. Average coal stock position of generating stations in northern region, having critical stock, during first ten days of March 2024 is NIL.

#### **A.8. Status of availability of ERS towers in Northern Region (Agenda by NRPC Sectt.)**

A.8.1. In the meeting, EE(O) NRPC apprised forum updated inputs received from utilities are attached as **Annexure-A.II**.

A.8.2. MS, NRPC asked transmission utilities of NR that have not submitted the status of ERS set/towers available with them to submit the requisite information before next OCC meeting.

#### **Decision of the OCC forum**

- *Forum asked the transmission utilities of NR that have not submitted the status of ERS set/towers available with them to submit the requisite information before next OCC meeting.*

#### **A.9. Proposed SPS for 2X315 MVA, 400/220kV ICTs at 400kV GSS Babai (Agenda by RVPN)**

A.9.1. In the meeting, EE(O) NRPC apprised that RVPN has proposed a SPS for 2X315 MVA, 400/220kV ICTs at GSS Babai.



1/34/17/2024

- A.9.2. Further, Representative of RVPN informed that there are 2x315MVA, 400/220 kV ICTs at 400 kV GSS Babai. Since percentage impedance (%) for both the ICT is approx. same, load sharing on both the ICTs is almost equal and each ICT is loaded near to 180 MVA. Auxiliary supply of the 400 kV GSS Babai is taken from tertiary winding of 315MVA, 400/220 kV ICT-I at Babai and second source is taken from 132 kV GSS Babai.
- A.9.3. Further, he presented detailed SPS to the forum (Copy attached as Annexure-A.IV of agenda).
- A.9.4. NRLDC representative highlighted following points w.r.t. proposed SPS logic:
- SPS requirement is observed as there is N-1 non-compliance
  - Proposed SPS logic seems ok in general
  - RVPN to confirm whether load loss would be there in proposed logic. If load is to be shed, whether it is of critical nature.
  - Time delay of 1.4sec may be checked. Testing may be carried out to check time taken for signal to travel from Babai to remote tripping stations. The time recorded may be mentioned in the proposed SPS logic itself.
  - Confirm whether ICT augmentation is planned at 400kV GSS Babai.
- A.9.5. RVPN representative informed that new 315MVA ICT is proposed at 400kV GSS Babai which is under approval.
- A.9.6. MS, NRPC asked RVPN to discuss the issues highlighted by NRLDC internally and accordingly revised SPS proposal shall be put for discussion in next OCC meeting.
- A.10. Early restoration of NAPP-Khurja 220kV Transmission line from Khurja end & review of NAPS islanding scheme (Agenda by NAPS)**
- A.10.1. In the meeting, EE (O), NRPC apprised that NAPS vide letter dated 22.02.2024 (copy attached as Annexure-A.V of agenda) has intimated that NAPS-Khurja 220 KV transmission line is out of service from 15.02.2024 due to fire at Khurja substation. Further, it would take approx. 6 months time to normalize the system and connect back to the grid.
- A.10.2. Moreover, this line is a part of NAPS islanding scheme. NAPS makes island with Debai, Khurja and Simbholi substation when both units of NAPS are in operating condition. Total island load is in the range of 150-280 MWe. At present both NAPS-1&2 are in operating condition.
- A.10.3. In this regard, NAPS has requested for review of existing NAPS islanding scheme in view of long outage of NAPS Khurja 220kV Transmission line and Khurja substation from grid.



**RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LTD**

[Corporate Identity Number CIN: U40109RJ2000SGC016485]

(AN ISO 9001:2015 CERTIFIED COMPANY)

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**OFFICE OF THE SUPERINTENDING ENGINEER (Automation, N/M & SP)**

Rom No.323, VidyutBhawan, Janpath, Jyoti Nagar, Jaipur (Tel.No. 2740752 / Fax No. 2740794)

Email: se.pp@rvpn.co.in, website: www.http://emergy.rajasthan.gov.in/rvpnl

No. RVPN/ SE(AUTOMATION)/ XEN(PP&amp;D)/ AE-2(P&amp;P)/ D. 162 Jaipur Date 26/02/2024

The General Manager (NRLDC)  
Grid Controller of India Limited,  
18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai  
New Delhi-110016.

Sub:- Proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai.

On the above captioned subject, please find attached the proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai with request to please include in the next meeting of OCC for discussion and necessary approval of the OCC forum. This SPS has been finalized after detailed deliberations with the officers of RVPN and Rajasthan SLDC in a meeting held on dated 09.02.2024.

Encl: As above

(S.C. Meena)  
Chief Engineer (PP&D)

Copy to the following for information and necessary action please-

1. The Member Secretary (NRPC), 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016.
2. The Addl. Chief Engineer (LD/Communications/MPT&S), RVPN, Jaipur/Ajmer.
3. The Chief Engineer, Power System Planning & Appraisal-I Division, CEA, Sewa Bhawan, RK Puram-I, New Delhi-110066.
4. The Superintending Engineer (Automation/P&P/SO&LD/Protection Engineering/T&C) RVPN, Jaipur/Babai
5. The Superintending Engineer (Operation), NRPC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016.
6. The System Operator-2, NRLDC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016

Encl: As above

Chief Engineer (PP&amp;D)

Signature Not Verified

Rajka/RM  
578710E

Digitally signed by Suresh Chand Meena  
Designation : Chief Engineer  
Date: 2024.02.24 16:13:04 IST  
Reason: Approved



## Proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai

### 1. Details of Installed ICTs and Transmission Lines

- There are 2x315MVA, 400/220 kV ICTs at 400 kV GSS Babai. Percentage impedance (%) for the ICT-I is 11.83% and for ICT-III is 11.78% at normal tap 9. Both ICTs are of same rating and make.
- 400 kV GSS Babai is connected to the 400 kV GSS Sikar (PGCIL), and 400 kV GSS Neemrana (PGCIL) through 400 kV S/C lines. This GSS is also connected to Bhiwani through 400 kV D/C line.
- 400 kV GSS Babai is connected to 220 kV GSS Reengus, 220 kV GSS Khetri and 220 kV GSS Niwana through 220 kV lines.
- Load sharing on both the ICTs is almost equal and each ICT is loaded near to 180 MVA.
- Power map of transmission system at 400 kV GSS Babai and nearby region is shown in Figure 1.

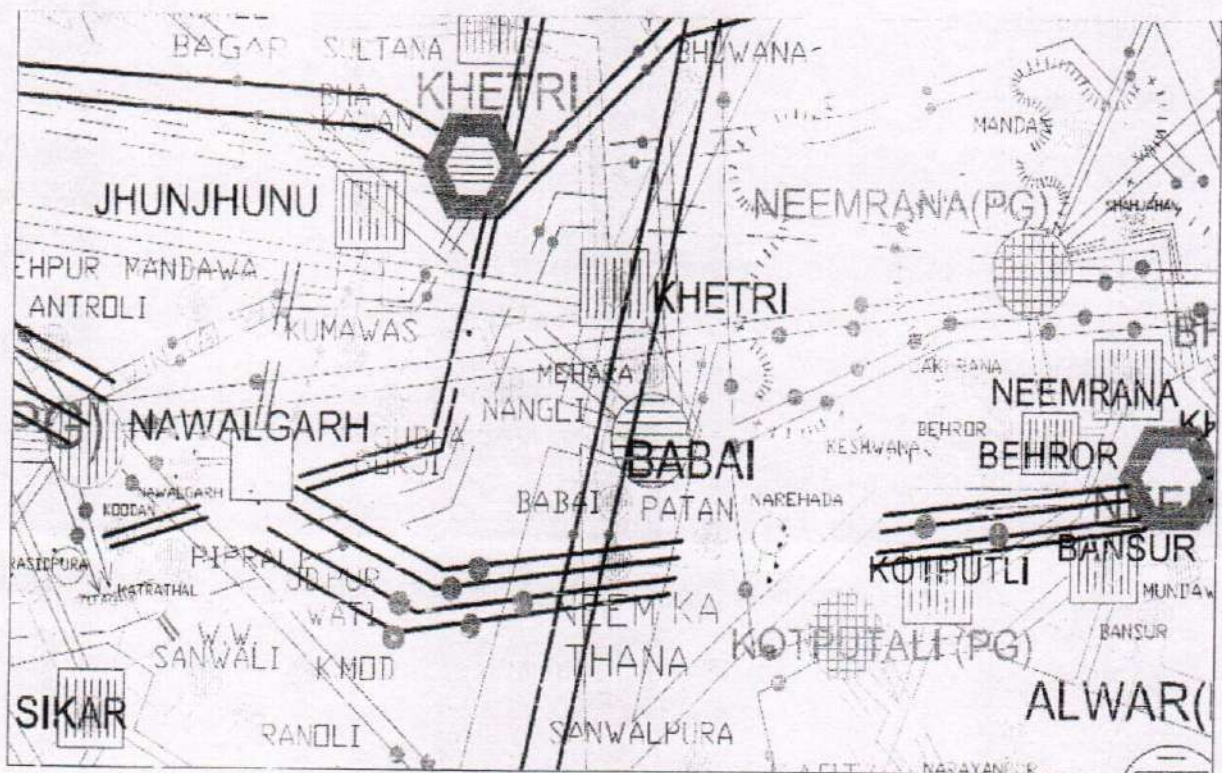


Fig. 1 Power map of Babai region

### 2. Load Details on ICTs and Transmission Lines Associated with 400 kV GSS Babai

- Peak Loads recorded on the Transformers and transmission lines associated with 400 kV GSS Babai, 220 kV GSS Niwana, 220 kV GSS Khetri and 132 kV GSS Babai are detailed in Table 1.



Table 1: Load Details on ICTs and Transmission Lines Associated with 400 kV GSS Babai

S. No.	Name of 220 kV line/ILTs	Peak Load (MVA)	Average Load (MVA)	SPS Group	Remark
1	315 MVA, 400/220 KV ICT-I	298	180		
2	315 MVA, 400/220 KV ICT-III	297	174.9		
3	400 kV S/C Babai-Neemrana line	466	-		
4	400 kV S/C Babai-Sikar line	599	-		
5	160 MVA, 220/132 KV Transformer at Babai	128	-		
6	220 kV Babai-Khetri line Ckt-I	232.13	148.01		Load on 220 kV GSS Khetri is high as 220 kV GSS Jhunjhunu and 220 kV GSS Chirawa are also fed from 220 kV GSS Khetri.
7	220 kV Babai-Khetri line Ckt-II	215.16	157.04		
8	220 kV Babai-DFCC Line Ckt-I	41	7.12		
9	220 kV Babai-DFCC Line Ckt-II	3.41	1.63		
10	220 kV S/C Babai-Niwana line	242	87.46	SPS Group-1	Load of Niwana will be reflected on the 400 kV GSS Heerapura where loading on ICTs is critical. The tripping of additional load at 220 kV GS Niwana is required. Load curtailment 87.46MW.
11	220 kV S/C Niwana-Heerapura line	207.66	161.45		
12	160 MVA, 220/132kV Transformer-I at Niwana	141.97	113.1		
13	160 MVA, 220/132kV Transformer-II at Niwana	141.97	113.16		
14	132 kV S/C Niwana-Govindgarh Line-I	75.91	60.01	SPS Group-1	132 kV GSS Govindgarh and 132 kV GSS Kaladera are fed from these lines in radial mode. Load curtailment of 117.79MW but relief at 400 kV GSS Babai is 87.46MW only.
15	132 kV S/C Niwana-Govindgarh Line-II	75.91	57.78	SPS Group-1	
16	132 kV S/C Niwana-Markhi Line	93.54	79.73		
17	20/25 MVA, 132/33 kV Transformer-I at Niwana	23.65	19.46		
18	20/25 MVA, 132/33 kV Transformer-II at Niwana	17.63	14.99		
19	220 kV S/C Babai-Reengus line	199	78.06		There is split bus arrangement on the 220 kV GSS Reengus. 220 kV S/C Reengus-Babai, 220 kV S/C Reengus-Renwal, 220 kV S/C Reengus-Chomu, and 220 kV S/C Reengus-Laxmangarh lines are connected on same bus. On tripping the 220 kV S/C Babai-Reengus lines, loading on the ICTs at 400 kV GSS Heerapura will increase and also loading on the interconnectors between 400 kV GSS Ratangarh and 220 kV GSS Ratangarh will be increased.
20	100 MVA, 220/132 kV Transformer-I at Khetri	80.51	72		
21	100 MVA, 220/132 kV Transformer-II at Khetri	80.51	72		
22	50 MVA, 220/33 kV Transformer-I at Khetri	14.44	14		
23	35 MVA, 220/33 kV Transformer-II	34.30	27		



	at Khetri				
24	35 MVA, 220/33 kV Transformer-III at Khetri	14.08	14		
25	132 kV S/C Khetri-Bhuwana Line	83.7	58	SPS Group-1	Load curtailment is 120MW.
26	132 kV S/C Khetri-Nangli Line	85.9	62	SPS Group-1	
27	132 kV S/C Khetri-Mehara Line	52.86	NR		Generally 132 kV GSS Mehara fed from Babai
28	20/25MVA, 132/33 kV Transformer-I at Babai	19.50	6.4		
29	20/25MVA, 132/33 kV Transformer-II at Babai	19.60	6.1		
30	132 kV S/C Babai-Mehada line	48.20	21.95 MW	SPS Group-1	Load curtailment is 60.75MW.
31	132 kV S/C Babai-Neem Ka Thana Line	90.20	38.80 MW	SPS Group-1	

- Incomer of 160MVA, 220/132 kV Transformer at Babai is connected to 132 kV Bus of 132 kV GSS Babai.
- Auxiliary supply of the 400 kV GSS Babai is taken from tertiary winding of 315MVA, 400/220 kV ICT-I at Babai and second source is taken from 132 kV GSS Babai.

### 3. Proposed SPS for ICTs at 400 kV GSS Babai

- Communication channel is available on the 220kV S/C Babai-Niwana line. Therefore, it is possible to trip the transformers and transmission lines at 220 kV GSS Niwana.
- Communication channel is available on the 220kV S/C Babai-Khetri Line-I&II. Therefore, it is possible to trip the transformers and transmission lines at 220 kV GSS Khetri.
- After detailed analysis of above loading conditions, grid interconnection issues, following lines are considered for tripping as soon as any one of the 2x315 MVA, 400/220 kV ICTs at Babai is tripped on fault/protection or overloading of the ICTs is observed:-

1. **SPS Group-1: Trip command is generated to trip the following lines and transformers when 100% loading of the 315 MVA, 400/220 kV ICT-1 or ICT-2 at Babai is reached due to tripping of any one of the ICT or overloading of the ICTs:-**

- 220 kV S/C Babai-Niwana line at 400 kV GSS Babai
- 132 kV S/C Niwana-Govindgarh Line-I at 220 kV GSS Niwana
- 132 kV S/C Niwana-Govindgarh Line-II at 220 kV GSS Niwana
- 132 kV S/C Babai-Neem Ka Thana Line at 132 kV GSS Babai
- 132 kV S/C Babai-Mehara Line at 132 kV GSS Babai
- 132 kV S/C Khetri-Bhuwana Line at 220 kV GSS Khetri



- 132 kV S/C Khetri-Nangli Line at 220 kV GSS Khetri
- 132 kV S/C Khetri-Mehara Line at 220 kV GSS Khetri

**Implementation of SPS Logic-1:-** This logic will be implemented by taking reference from overcurrent relays of the 400/220 kV ICTs at 400 kV GSS Babai. Trip command will be initiated if current exceed 100% loading of the ICTs which will be communicated to different locations to trip the elements identified and mentioned above.

- Tripping commands for transformers and transmission lines are to be taken from overload relay/over current back up relay on 400 kV and/or 220 kV side of 400/220 kV ICTs at Babai considering 100% loading with appropriate time delay to avoid tripping during the through faults. Further, time grading of the backup elements may also be correlated for time delay of overloading.
- Schematic diagram for tripping of 220/132 kV Transformers, 220 kV lines and 132 kV lines included in SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai is shown below in Figure 2.

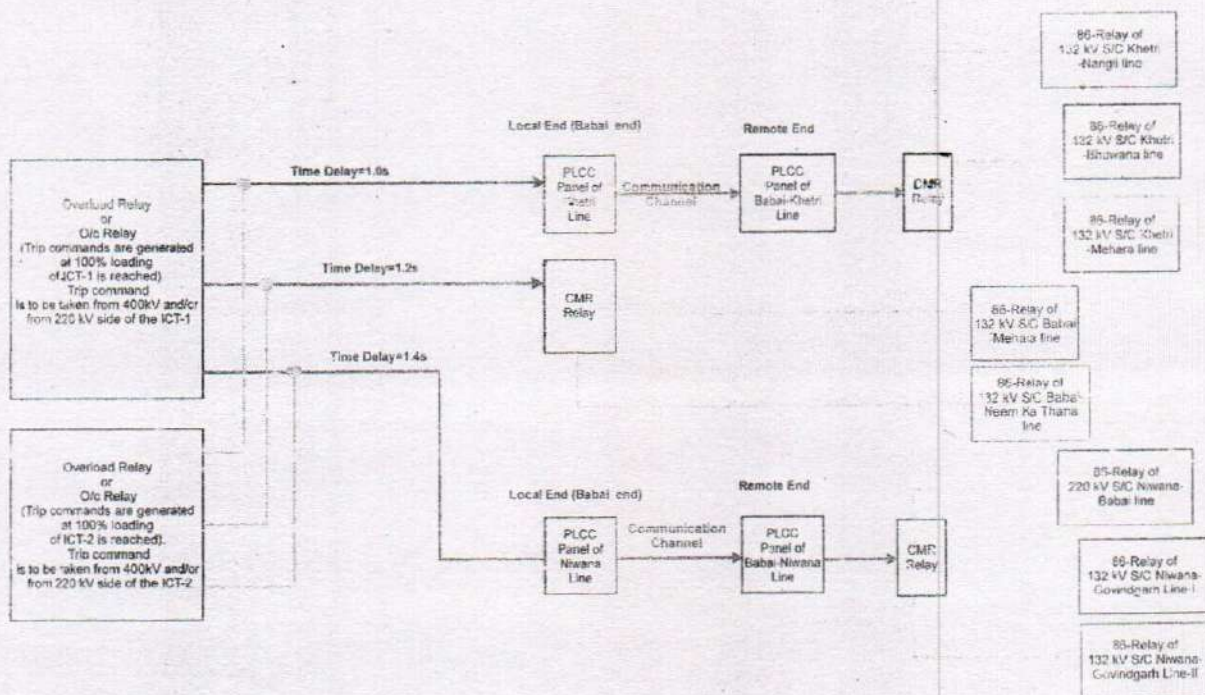


Fig. 2 Schematic diagram of proposed logics for SPS of 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai



- 132 kV S/C Govindgarh-Chomu line will be normally kept charged on no load till the SPS is in operation at 400 kV GSS Babai. This line can only be used to cater load demand if it is really needed and will be decided by the LD control room.
- For load management, tripped transmission lines and transformers may be re-connected after curtailing the load to such a quantum to maintain loadings on the healthy 400/220 kV ICTs within permissible limits.





**RVPN**  
An ISO 9001:2000  
Certified Company

## RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED.

[Corporate Identity Number (CIN):U40109RJ2000SGC016485]

(Regd. Office: Vidyut Bhawan, Jan Path, Jyoti Nagar, Jaipur - 302 005)

OFFICE OF THE SUPERINTENDING ENGINEER (PROJECT & PLANNING)

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No. RVPN/SE(P&P)/XEN-2(P&P)/AE-2/ F. /D

Jaipur, Dt.

To  
The General Manager (NRLDC)  
Grid Controller of India Limited,  
18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai  
New Delhi-110016.

Sub:- Proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai.

On the above captioned subject, point wise reply to the points raised by the OCC forum in the 217<sup>th</sup> OCC meeting held on dated 15.03.2024 regarding proposed SPS for the 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Babai is detailed below:-

**Query:** RVPN to confirm whether load loss would be there in proposed logic. If load is to be shed, whether it is of critical nature.

**RVPN Reply:** Load curtailment will be done as per proposed SPS which is not critical in nature.

**Query:** Time delay of 1.4sec may be checked. Testing may be carried out to check time taken for signal to travel from Babai to remote tripping stations. The time recorded may be mentioned in the proposed SPS logic itself.

**RVPN Reply:** As discussed with the SE(Protection Engineering), time delay of 1.4s for tripping of the lines is in conformity with other protection settings. As intimated by the AEN (comm.) RVPN, Khetri Nagar, time taken in traveling of signal from 400 kV GSS Babai end to remote tripping station 220 kV GSS Khetri Nagar is checked & recorded as 21ms after testing.

**Query:** Confirm whether ICT augmentation is planned at 400kV GSS Babai.

**RVPN Reply:** Work order for installation of 3rd 315 MVA, 400/220 KV ICT at 400 KV GSS, Babai has been placed by the SE (Automation) Jaipur vide letter No. RVPN/SE (Automation)/SPV/TN-14/Contract/P.Ø. 149/ D. 177 dated 15.03.2024

Submitted with request to please consider above reply to accord necessary approval of the OCC forum.

(S.C. Meena)  
Chief Engineer (PP&D)  
RVPNL, Jaipur.

Copy to the following for information and necessary action please-

1. The Member Secretary (NRPC), 18 A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016
2. The Chief Engineer (LD/T&C/MPT&S/O&M), RVPN, Jaipur/Jodhpur/Jodhpur/RVUN-STPS-Suratgarh.
3. The Chief Engineer, Power System Planning & Appraisal Division, CEA, Sewa Bhawan, RK Puram-I, New Delhi-110056
4. The Superintending Engineer (Operation), NRPC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016.
5. The System Operator-2, NRLDC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016

Chief Engineer (PP&D)  
RVPNL, Jaipur

RajKaj Ref  
6625003



### Signature valid

Digitally signed by Surish Chand Meena  
Designation: Chief Engineer  
Date: 2024.04.16 12:51:56 IST  
Reason: Approved



उत्तर प्रदेश राज्य भार प्रेषण केन्द्र लि०  
यू०पी०एस०एल०डी०सी० परिसर, विभूति  
खण्ड- II, गोमती नगर, लखनऊ-226010  
ई-मेल : sera@upsldc.org



**U.P. State Load Despatch Centre Ltd.**  
UPSLDC Complex, Vibhuti Khand – II  
Gomti Nagar, Lucknow- 226010  
E-mail: sera@upsldc.org

No: 1927 /SE(R&A)/EE-II/Anpara SPS

Dated: - 07.06.2024

**SE (Operations), 18 – A SJSS Marg,  
Katwaria Sarai, New Delhi,  
110016. (seo-nrpc@nic.in)**

**Subject: -Agenda on revised System Protection Scheme (SPS) scheme for Anpara Complex.**

After commissioning of 2X1000MVA ICTs at Obra CTPS, System Protection Scheme (SPS) for Anpara complex is to be revised. Based on the discussion with all stakeholders and study of Anpara complex, UPSLDC proposes to revise the SPS for Anpara Complex.

It is therefore, requested to kindly include the revised SPS logic in the agenda of 220<sup>th</sup> OCC meeting for discussion and approval.

**Encl: - As above**

*Amit Narain*

**(Amit Narain)**  
**Superintending Engineer (R&A)**

No: /SE(R&A)/EE-II/Anpara SPS

Dated: -

2024

Copy forwarded to via e-mail following for information and necessary action:-

1. Chief Engineer (PSO), UPSLDC Vibhuti Khand – II, Gomti Nagar, Lucknow.
2. General Manager, NRLDC 18-A, SJSS Marg, Katwaria Sarai, New Delhi-110016.
3. Chief Engineer (Thermal Operation), UPRVUNL, 14thFloor, Shakti Bhawan Extn., Lucknow.
4. Chief Engineer (Trans. Central), UPPTCL, Pareshan Bhawan, Vibhuti Khand, Gomti Nagar Lucknow.
5. Chief Engineer (Trans. South - East), U.P. Power Transmission Corporation Ltd., 57, George Town, Prayagraj- 211003.
6. Chief General Manager, Anpara, Thermal Power Station, Anpara.
7. Chief General Manager, (Obra) Thermal Power Station, Obra, Sonbhadra Pin code- 231219.
8. M/s LANCO – Anpara Power Ltd, 411/09 River Side Apartment, New Hyderabad Lucknow-226007(arun.tholia@meilanparapower.com)

*Amit Narain*  
**(Amit Narain)**  
**Superintending Engineer (R&A)**

## Study for Revision of SPS for Anpara Complex

**Objective:** To Review the System Protection Scheme for safe evacuation of power from Anpara Complex after commissioning of 2X1000 MVA ICTs at Obra C TPS

**Base case:**

Generator	MW
Anpara A&B	1475
Anpara C	1110
Anpara D	900
Obra Thermal	510
Rihand Hydro Complex	0
Obra C	1250
All India Demand	208186
All India Generation	215000
UP Demand	27800
UP Generation	15200

400 kV Obra C-Jaunpur and 400 kV Obra B-Jaunpur are in service.

2X1000 MVA ICTs at Obra C is in of service.

400 kV Anpara Singrauli line is out service.

## **Here studies have been carried out for following scenarios;**

**Case-1:** Tripping of 765 kV Anpara C-Unnao

**Case-2:** Tripping of 765 kV Anpara D-Obra C

**Case-3:** Tripping of 765 kV Obra C-Unnao

**Case-4:** Tripping of **Both 765kV Anpara C-Unnao AND Anpara D-Obra C**

**Case-5:** Tripping of **Both 765kV Anpara C-Unnao AND Obra C –Unnao**

**Case-6:** Tripping of **Both 765kV Anpara D-Obra C AND Obra C–Unnao**

**Case-7:** Tripping of Two ICTs (2X1000 MVA) at 765 kV substation Obra C

**Case-8:** Tripping of One ICT (1X1000 MVA) at 765 kV substation Unnao

**Case-9:** Tripping of Two ICT (2X1000 MVA) at 765 kV substation Unnao

**Case-10:** Tripping of Three ICTs (1X1000 MVA) at 765 kV substation Unnao

## **Inferences from studies:**

- 1. In case of single contingencies (Case No 1, 2, 3 and 8), there is no constraint observed.**
- 2. Overloading of 400kV Anpara-Obra B line**
  1. Overloading of 400kV Anpara –Obra line is observed in Case No.-4 and Case No.-7.
  2. As per study if loading of 400kV Anpara-Obra line is more than 1100MW, generation reduction of 1400MW is required.
  3. In case loading lies between 900MW and 1100MW, generation reduction of 900 MW is sufficient to keep the loading of the line below 800MW.
- 3. Overloading of 400kV Obra C-Obra B line**
  1. Overloading of 400kV Obra C- Obra B is observed in Case No.-5, 6 & 10.
  2. As per study, in case loading of 400kV Obra C- Obra B is more than 1100MW, tripping of one unit at Obra C is required.
  3. However if loading of the same line, lies between 900-1100MW, Automatic Run Back shall be done at Obra C to keep the loading below 900MW.

### Loading Scenario for various contingencies in Anpara Complex

S.No.	Cases	400kV Anpara-Obra B (MW)	765 Anpara_C-Unnao(MW)	400kV Obra C-Obra B(MW)	765kV AnparaD-ObraC-Unnao(MW)	765kV ObraC-Unnao(MW)	ICTs at 765 kV Unnao (MW)
1	Basecase flow (MW)	490	1011	523	503	998	664 each
2	765kV AnparaC-Unnao out	628	0	639	1126	1450	478 each
3	765kV Anpara D-Obra C out	757	1157	192	0	144	662 each
4	765kV Obra C-Unnao out	483	1426	834	-116	0	470 each
5	Both 765kV Anpara C-Unnao AND Anpara D-Obra C out	1406	0	-225	0	1221	403 each
6	Both 765kV AnparaC-Unnao AND ObraC-Unnao out	712	0	1273	471	0	0
7	Both 765kV Anpara D-ObraC AND Obra C-Unnao out	406	1405	942	0	0	463 each
8	Both ICT at Obra C Trip	954	1075	-173	-101	1148	735 each
9	One ICT at Unnao Trip	507	946	577	499	925	927 each
10	Three ICT at Unnao Trip*	709	0	1277	444	0	0

**\* Tripping of 2 ICTs at 765 kV Unnao leads to tripping of all the three ICTs**

**% Sensitivity of Transmission elements with respect to change in Generation**

S.No.	Transmission elements	Anpara A&B TPS	Anpara_C TPS	Anpara DTTPS	Obra CTTPS	Obra BTTPS
1	400 kV Obra C-Obra B	0 %	17.64%	18.00%	29.76%	-32.35%
2	400 kV Anpara-Obra B	28.70%	11.64%	11.33%	1.92%	-21.76%
3	400 kV Anpara –Mau	10.43%	8.36%	8.22%	7.52%	6.47%
4	400 kV Anpara Sarnath ckt 1	12.39%	9.64%	9.56%	8.48%	7.06%
5	400 kV Anpara Sarnath ckt 2	12.39%	9.64%	9.56%	8.48%	7.06%

**% Sensitivity = Change in Line Loading\*100/Change in Generation**



## **Logic for SPS**

### **Contingency related to overloading of 400 kV Obra C-Obra B line**

- i. If  $900 < P1 < 1100$ - Automatic backdown at Obra C till P 1, becomes less than 900.**
- ii. If  $P1 > 1100$ - Tripping of one Unit at Obra C.**

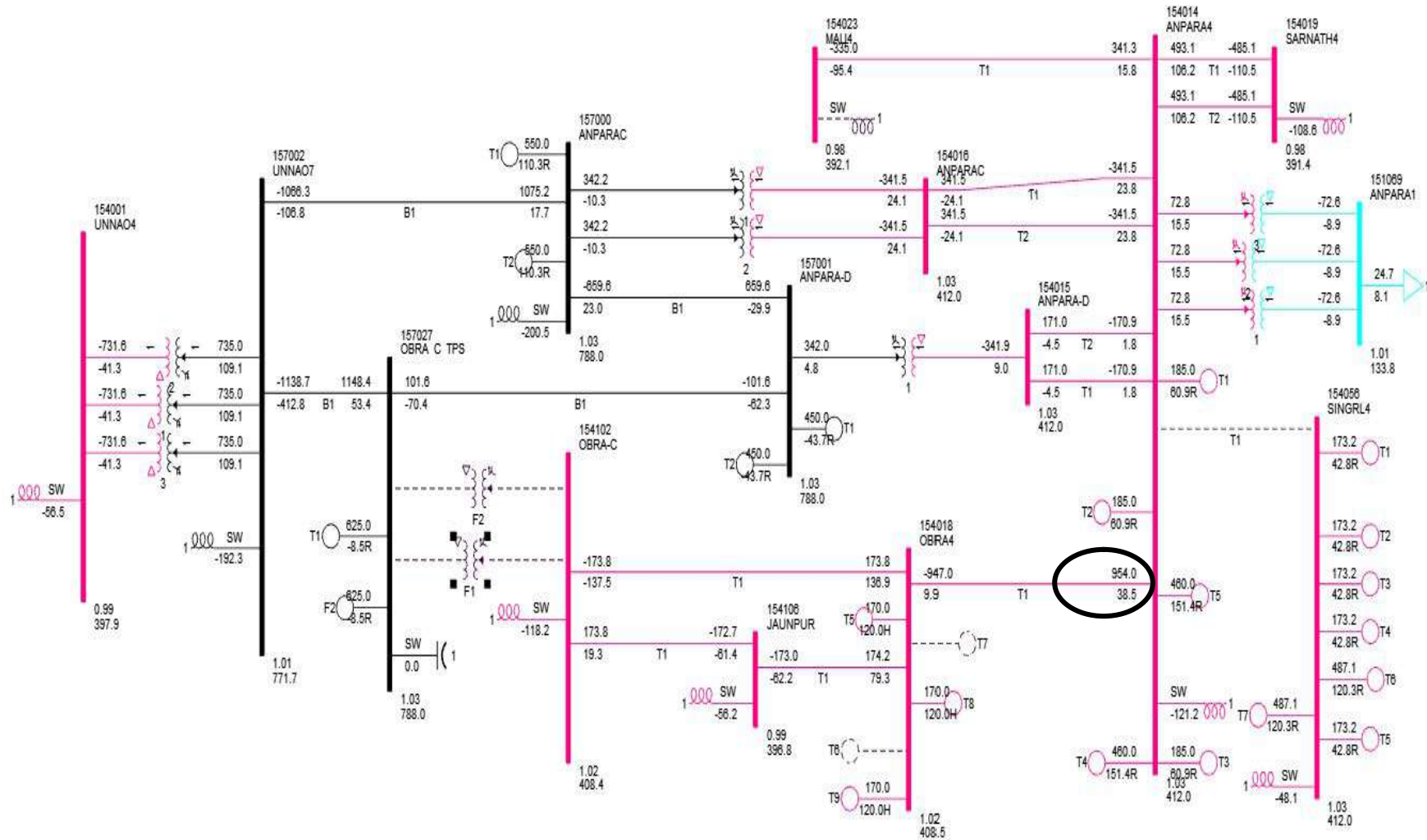
### **Contingency related to overloading of 400 kV Anpara-Obra B line**

- iii. If  $900 < P2 < 1000$ - Automatic backdown at Anpara C AND Anpara D till P2 , becomes less than 900**
- iv. If  $1000 < P2 < 1100$ - Tripping of one unit at Anpara C or D and automatic backdown of Generation of remaining Unit of Anpara C AND Anpara D till P2 , becomes less than 900**
- v. If  $P2 > 1100$ - Tripping of two units at Anpara C TPS AND Anpara DTSPS and automatic backdown of Generation of remaining Unit of Anpara C AND Anpara D till P2 , becomes less than 900**

**Where  $P1$ = Loading of 400 kV Obra C-Obra B line**

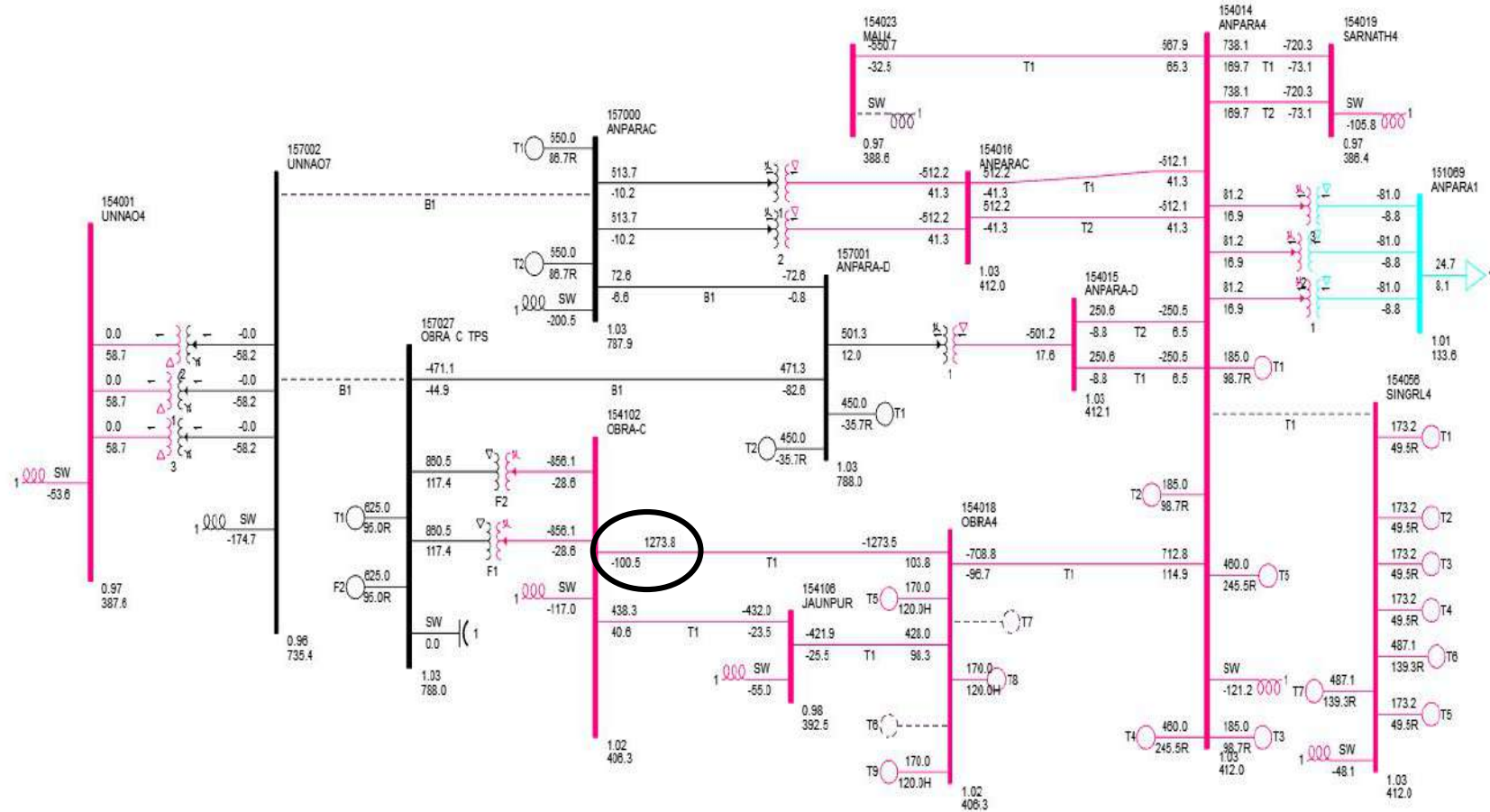
**$P2$  = Loading of 400 kV Anpara-Obra B line**

## Both ICT Trip at Obra C

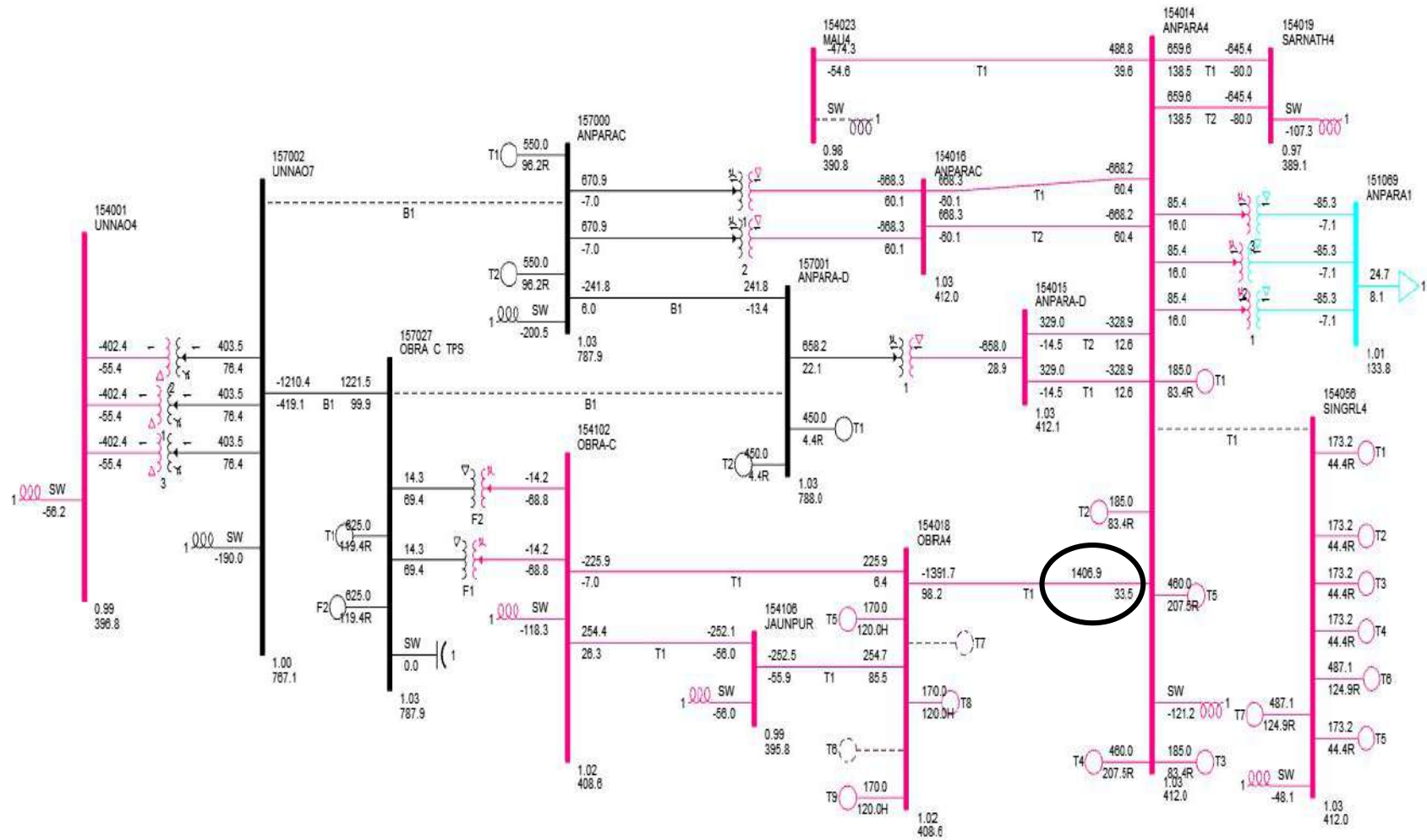




## Both 765kV AnparaC-Unnao AND ObraC –Unnao out



## Both 765kV Anpara C-Unnao AND Anpara D-Obra C out









6. GM, NRLDC asked UPPTCL to brief the reason for frequent fault detection in both of the 132 KV lines. UPPTCL representative apprised that fault in their underlying system is being sensed by the relays at POWERGRID end and actual tripping is not occurring.
7. POWERGRID representative stated that 400/132kV single ICT at Ballia has fed number of faults in 132kV through its lifetime. With feeding these many faults, the reliability of 400/132kV ICT is reduced and the ICT is kept under observation as per POWERGRID practice. In case the ICT gets out, there will be no supply at 132kV to UPPTCL and only other auxiliary source for HVDC would be 33kV supply from DISCOM which is also not reliable.
8. GM NRLDC enquired UPPTCL representative about the actions being taken at their end for improving reliability of auxiliary supply to Ballia HVDC. UPPTCL representative stated that instructions have been given to transmission as well as distribution team to improve maintenance for the said lines. However, maintenance of 33kV lines is under jurisdiction of DISCOM. Even with all possible efforts, 33kV lines may trip and remain under long outage. Further, he added that fault in their underlying system is a general phenomenon and could not be avoided as 33kV feeders are passing close to road and also have trees nearby. He added that higher number of tripping during Aug23-Dec23 could be due to rains and wind during monsoon season. During last 4 months, may be due to less storms/rains less number of tripping were reported.
9. CTUIL representative stated that HVDC Ballia is very important element of NR Grid and 02 nos. reliable sources for auxiliary supply must be ensured as per the CEA (Technical standards for connectivity to the Grid) Regulation .
10. Thereafter, POWERGRID NR-3 appraised the detail of auxiliary supply arrangement at all other POWERGRID's HVDC Stations on PAN India basis and stated that most of the HVDC stations are having more than 02 nos. reliable independent sources for auxiliary supply with at least 02 nos. from tertiary of ICTs located in POWERGRID substation.
11. NRLDC representative enquired as CEA standards specify for two reliable auxiliary source of supply, so in case HVDC Ballia is provided with two separate auxiliary supply source by the means of 765/400kV ICT and 400/132kV ICT tertiaries then whether, POWERGRID requires 33kV supply from UP DISCOM.
12. POWERGRID representative stated that they do not require 33kV supply from UP DISCOM for substation auxiliary, but it is required for providing supply to colony in Ballia S/s premises. As the present auxiliary arrangement already has provision for 33kV supply from UP DISCOM, the same would not be dismantled.
13. POWERGRID representative stated that HVDC system is different from normal HVAC substation. In case of HVDC system, if there is any delay in changeover due to any reason, the HVDC auxiliary and HVDC system will trip. In case of normal HVAC

21/09

AS

पंकज शर्मा / PANKAJ SHARMA  
 मुख्य महाप्रबन्धक (परि.प्र.) / Chief G.M. (AM)  
 पावर ग्रिड कॉर्पोरेशन ऑफ इण्डिया लि  
 POWER GRID CORPORATION OF INDIA LTD  
 उत्तरी क्षेत्र-III/उत्तरी क्षेत्र-III मुख्यालय/Northern Region-III R.H.Q  
 लखनऊ (उ.प्र.) / Lucknow (U.P.)-226002

AN  
 Executive Engineer  
 Electricity Transmission Division  
 Ballia



substation, the supply on DG set can be relied however for HVDC system, DG set cannot be relied as by the time DG set is operational, HVDC auxiliaries may trip.

14. NRLDC representative stated that Ballia-Bhiwadi HVDC is very important link for grid operation. With commissioning of RE generation in Western Rajasthan, presently flow is from Bhiwadi to Ballia. In future, there may be requirement of operating the Ballia-Bhiwadi HVDC from Ballia to Bhiwadi during evening hours and operating from Bhiwadi to Ballia during solar generation period.

15. POWERGRID representative proposed that-

Additional Source of Auxiliary Power connectivity from tertiary of 765/400/33 kV ICT-2 for Reliable Auxiliary Supply to  $\pm 500$ kV HVDC Ballia Substation with approx. cost estimate of Rs 1.25 Cr may be considered under ADDCAP. Breakup as shared by POWERGRID is attached as Annexure-III.

16. GM, NRLDC asked POWERGRID, NR3 to submit the supporting documents regarding provision of 02 nos. dedicated source from ICT tertiary at other POWERGRID HVDC Stations. Further, they also asked to submit break-up of cost estimate for implementation of above work and copy of previous letters to UPPTCL for intimation of such faults/breakdown.

**Analysis by Committee:**

- a) For all HVDC substations of POWERGRID across the country which do not have any generating unit connected, two auxiliary sources have been provided from two ICTs located within the premises of POWERGRID S/s.
- b) For new HVDC proposed i.e. Bhadia3-Fatehpur HVDC and recently charged Raigarh-Pugalur HVDC, auxiliary supply have been provided from two ICTs located within the premises. Relevant extract of RfP document is attached as Annexure-IV.
- c) It is clear from the discussion held in meeting and previous experience that supply from state DISCOM is not reliable and would not be reliable in future also, accordingly 33kV supply from UP DISCOM can not be considered as reliable source.
- d) POWERGRID has mentioned that HVDC system is different from normal HVAC substation. In case of HVDC system, if there is any delay in changeover due to any reason, the HVDC auxiliary and HVDC system will trip.
- e) 400/132kV ICT at Ballia has fed many faults in 132kV network in case of faults in UPPTCL system accordingly, ICT may become out at any point of time, therefore that source is also not reliable. In case new auxiliary is approved for Ballia S/s, till the

2024

पंकज शर्मा / PANKAJ SHARMA  
मुख्य महाप्रबन्धक (परि.प.) / Chief G.M. (AM)  
भारतीय विद्युत कॉर्पोरेशन ऑफ इण्डिया लि  
POWER GRID CORPORATION OF INDIA LTD  
उत्तरी क्षेत्र-III/उत्तरी क्षेत्र-III North Region-III R.H.Q  
लखनऊ (2000) / Lucknow (U.P.)-226002

Executive Engineer  
Electricity Transmission Division  
Ballia

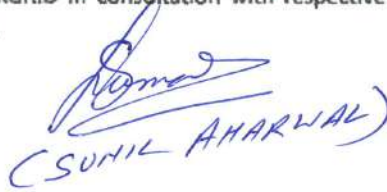
implementation of that auxiliary scheme, the condition of 400/132kV ICT would further deteriorate.

- f) HVDC Ballia is very important element of NR Grid and 02 nos. reliable sources for auxiliary supply need to be ensured as per the CEA standards.
- g) Since the proposal by POWERGRID will lead to ADDCAP of 1.25 Cr, the matter may be deliberated at OCC forum and subsequently at NRPC level before submission from POWERGRID side to CERC.

**Recommendation:**

On the basis of supporting documents and as per prevailing practice in other HVDC stations, proposal of POWERGRID NR3 can be considered and same was agreed by all the representatives from NRLDC, POWERGRID, CTUIL and UPPTCL.

However, final approval shall be issued after deliberation and consent by OCC and then NRPC forum. Additional issues such as installation of meters etc. shall also be taken care by POWERGRID in consultation with respective utility after approval is accorded from NRPC forum.

  
(SUNIL AHARWAL)

(NRLDC)

20/6/21  
RAJESH KUMAR

(CTUIL)

**RAJESH KUMAR**  
Chief Manager  
CENTRAL TRANSMISSION UTILITY OF INDIA LTD.  
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Power Grid Corporation of India Ltd.)  
(A Government of India Enterprise)  
Plot No.-2, Sector-29, Gurgaon-122 001 (Haryana)

(UPPTCL)

  
**Executive Engineer**  
**Electricity Transmission Division**  
**Ballia**

(POWERGRID)

  
पंकज शर्मा / PANKAJ SHARMA  
मुख्य महाप्रबंधक (परि.प्र.) / Chief G.M. (AM)  
पावर ग्रीड कॉर्पोरेशन ऑफ इण्डिया लि.  
POWER GRID CORPORATION OF INDIA LTD.  
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लखनऊ (उत्तर) / Lucknow (U.P.)-226002

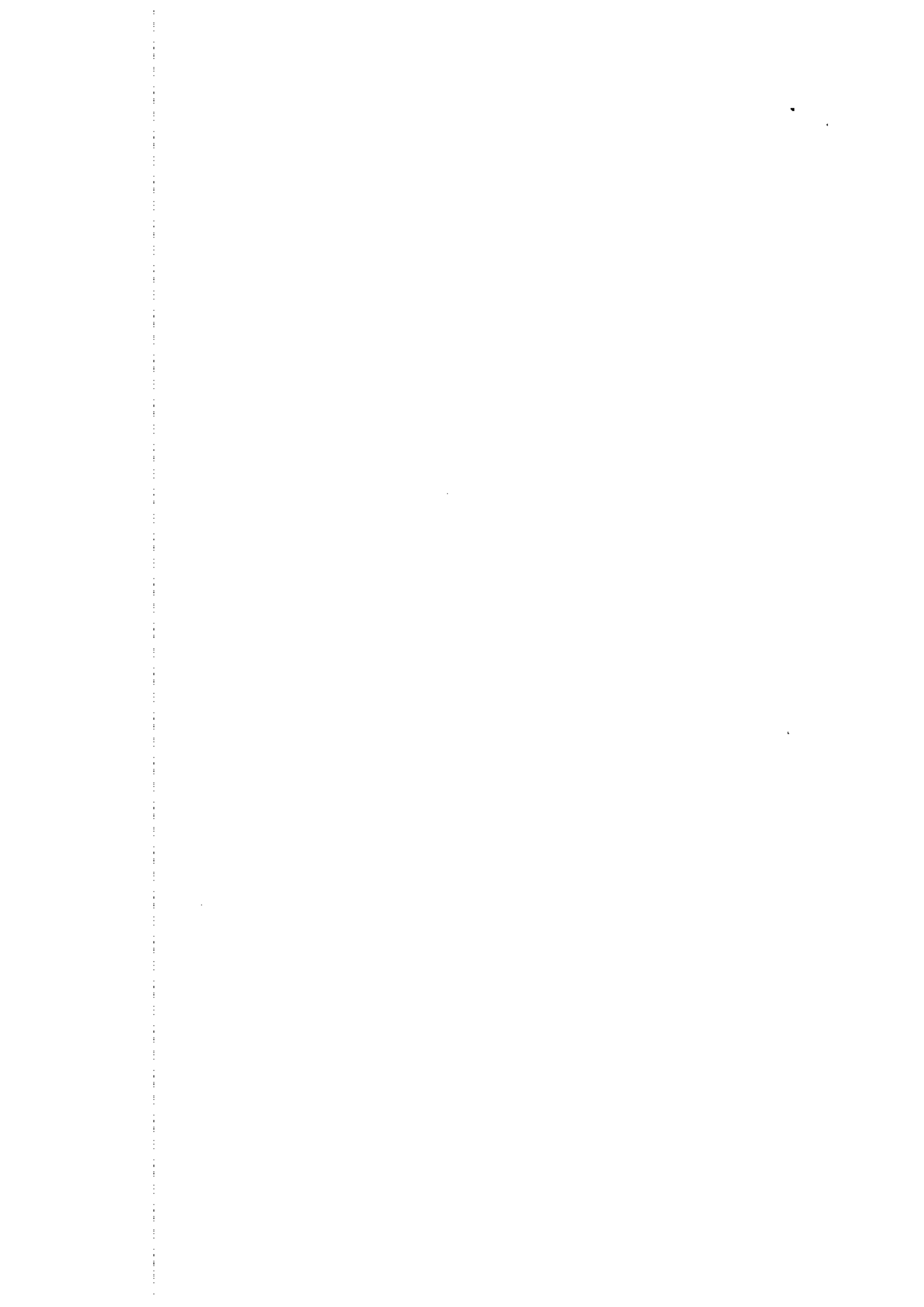
**Participant list:**

S. No.	Name	Organisation	Designation
1	Sunil Kumar Ahanwal	NRLDC	General Manager
2	Gaurav Matviya	NRLDC	Manager
3	Ajit Kumar Yadav	NRLDC	Deputy Manager
4	Rakesh Kumar	CTUIL	Chief Manager
5	Pankaj Sharma	POWERGRID	Chief General Manager
6	Gunjan Agrawal	POWERGRID	
7	TP Verma	POWERGRID	
8	AK Singh	POWERGRID	
9	CB Pal	UPPTCL	Superintending Engineer
10	Ashok	UPPTCL	Executive Engineer

- Retired

  
(SUNIL AHARWAL)  
NRLDC.

  
PANKAJ SHARMA  
Chief G.M. (AM)  
POWERGRID  
CORPORATION OF INDIA LTD  
Northern Region-II R.H.Q.  
Lucknow (U.P.)-226002



***Tapping Tertiary of 765/400/33 kV ICT -2 for Reliable  
Auxiliary Power Supply to  $\pm 500$  kV HVDC Ballia Sub-Station  
& 765/400/132 KV Ballia HVAC Sub-station.***



➤ *Gist of Balia HVDC & HVDC substations :*

- *500kV Ballia – Bhiwadi HVDC Bi-pole with 2500MW power transfer capacity.*
  
  - *765kV Elements*
    - ❖ *3 Nos of 765kV Circuits (Inter & Intra regional connectivity)*
    - ❖ *2 Nos. of 765/400kV ICTs*
    - ❖ *2 Nos. of 765kv Bus Reactors*
  
  - *400kV Elements*
    - ❖ *10 Nos of 400kV Circuits (Inter & Intra regional connectivity)*
    - ❖ *1 Nos. of 400/132kV ICTs*
    - ❖ *4 Nos. of 400kv Bus Reactors*
  
  - *132kV Elements*
    - ❖ *2 Nos of 132kV Transmission lines ( UPPTCL feeders) connected with 200 MVA, 400/132/33kV ICT -1.*
- *Successful operation of HVDC auxiliary system such as Thyristor cooling water pump, Tap changer of Converter transformer etc are wholly dependent on uninterrupted Auxiliary power supply.*

## Connectivity of Auxiliary Sources at Ballia HVDC & HVAC Substations

Year  
2007

- 400kV Ballia Substation commissioned
- Auxiliary source : Only one dedicated 33kV Feeder from UPPTCL S/s.

Year  
2010

- +/- 500kV HVDC Ballia – Bhiwadi Bi-Pole commissioned
- Second Auxiliary sources from 200MVA ,400/132/33kV ICT -1 Tertiary

Year  
2012

- 765kV Ballia Substation was commissioned along with 02 Nos - 765/400/33kV ICTs.

➤ ***Presently Auxiliary AC supply of Ballia HVDC & HVAC system are operated and maintained with support of 02 sources:***

- 1. From Tertiary of 200MVA ,400/132kV ICT-1 at Balia*
- 2. 33kV Dedicated feeder from 132/33kV Simrli Jamalpur (UPPTCL) substation.*

***Constraints in Reliable dual source of Auxiliary supply at Ballia HVDC & HVAC :***

- 1. Tertiary supply connected through 400/132kV ICT 1 at Ballia - Protective relay senses frequent faults in associated 132kV lines.*
- 2. Frequent interruptions in 33kV dedicated UPPTCL feeder.*



## ***Operational issues due to Auxiliary supply at Ballia HVDC & HVAC***

- Both supplies are always on load condition to HVDC LVAC buses of Pole- 1 and Pole-2 and Bus Coupler under open condition. This provision is standard for HVDC Auxiliary supply to prevent dead bus condition during changeover in case of any one supply fails.*
- There were frequent faults in 02 Nos 132 KV transmission lines connected with 400/132/33kV ICT at Ballia and it affects reliability of the ICT. Earlier total 673 line faults were detected in 132kV UPPTCL Lines from August'23 to October'23 and same was discussed and deliberation in 214<sup>th</sup> OCC meeting. After remedial action, total 200 faults have been detected in last 04 months which is also a big number and same needs to be rectified.*
- Apart of above frequent faults in 132 KV Lines, frequent breakdown of 33KV UPPTCL feeder has also been noticed and during breakdown of 33 KV UPPTCL feeders, the Auxiliary Power supply changeover occurs multiple times which is undesirable in view of frequent MV/LT CB operation, Valve Cooling Pump changeovers & UPS bypass operation etc.*
- Detail of frequent fault detection and tripping of 33 KV UPPTCL feeders are tabulated below-*

• **Fault sensed by 400/132kV ICT at Ballia due to frequent line faults (Period : Jan 24 to Apr 24)**

Date	Time	Locati	Volta	Bay/L	Devic	Information Text	Value	Ack
11-01-2	11:28:05	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-01-2	19:59:15	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-01-2	20:05:43	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-01-2	20:06:05	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-01-2	20:10:55	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
12-01-2	15:49:52	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
12-01-2	16:12:45	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-01-2	07:20:17	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-01-2	13:09:42	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
16-01-2	07:20:13	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
17-01-2	15:47:05	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
18-01-2	08:58:30	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
19-01-2	19:58:15	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
20-01-2	07:00:03	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
22-01-2	07:19:55	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
22-01-2	08:46:55	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
22-01-2	13:21:45	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
22-01-2	15:24:03	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
22-01-2	21:38:35	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
23-01-2	06:46:05	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
23-01-2	07:21:15	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
23-01-2	07:30:33	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
24-01-2	11:15:15	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
27-01-2	06:42:55	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
27-01-2	06:45:47	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
27-01-2	06:54:01	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
27-01-2	13:06:13	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
28-01-2	03:12:51	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
28-01-2	03:33:50	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
29-01-2	08:30:21	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
29-01-2	13:32:24	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
30-01-2	15:11:25	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
30-01-2	16:25:01	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
30-01-2	17:13:53	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	

Date	Time	Locati	Volta	Bay/L	Devic	Information Text	Value	Ack
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01-02-2	08:11:31	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
03-02-2	06:25:51	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
03-02-2	06:39:23	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
03-02-2	10:25:43	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
03-02-2	10:31:35	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
03-02-2	11:01:46	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
03-02-2	12:25:31	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
03-02-2	16:20:13	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
05-02-2	03:54:13	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
05-02-2	03:54:13	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
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06-02-2	10:30:15	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
07-02-2	10:40:31	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-02-2	12:26:51	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-02-2	12:28:55	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-02-2	12:37:32	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-02-2	14:27:34	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
09-02-2	08:29:45	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
12-02-2	12:20:17	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-02-2	06:20:05	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-02-2	06:23:12	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-02-2	06:32:05	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-02-2	06:43:14	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
14-02-2	05:28:15	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
14-02-2	06:19:12	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
14-02-2	23:46:35	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
15-02-2	07:19:55	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
16-02-2	07:25:05	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
18-02-2	12:37:21	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
18-02-2	15:33:15	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
21-02-2	03:19:53	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
21-02-2	03:47:05	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
21-02-2	14:51:44	KIOS	132	BAY 1	7SJ62	Total.Pickup	RAISEI	



Date	Time	Locat	Volta	Bay/C	Devic	Information Text	Value	Ackr
22-02-2	03:19:05	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
22-02-2	08:04:37	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
22-02-2	16:43:56	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
23-02-2	07:49:13	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
23-02-2	09:09:42	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
26-02-2	09:35:50	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
26-02-2	12:15:08	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
27-02-2	07:37:14	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
28-02-2	11:57:04	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
28-02-2	13:12:12	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
28-02-2	13:14:06	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
29-02-2	08:09:38	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
29-02-2	13:19:31	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
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02-03-2	10:05:13	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
02-03-2	14:20:45	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
03-03-2	03:30:05	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
03-03-2	14:25:14	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
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04-03-2	15:06:10	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
07-03-2	13:30:24	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
08-03-2	04:20:00	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
08-03-2	10:30:44	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
09-03-2	08:55:31	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
10-03-2	17:33:06	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
11-03-2	05:59:04	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
13-03-2	09:10:11	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
13-03-2	17:37:03	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
14-03-2	08:10:37	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	

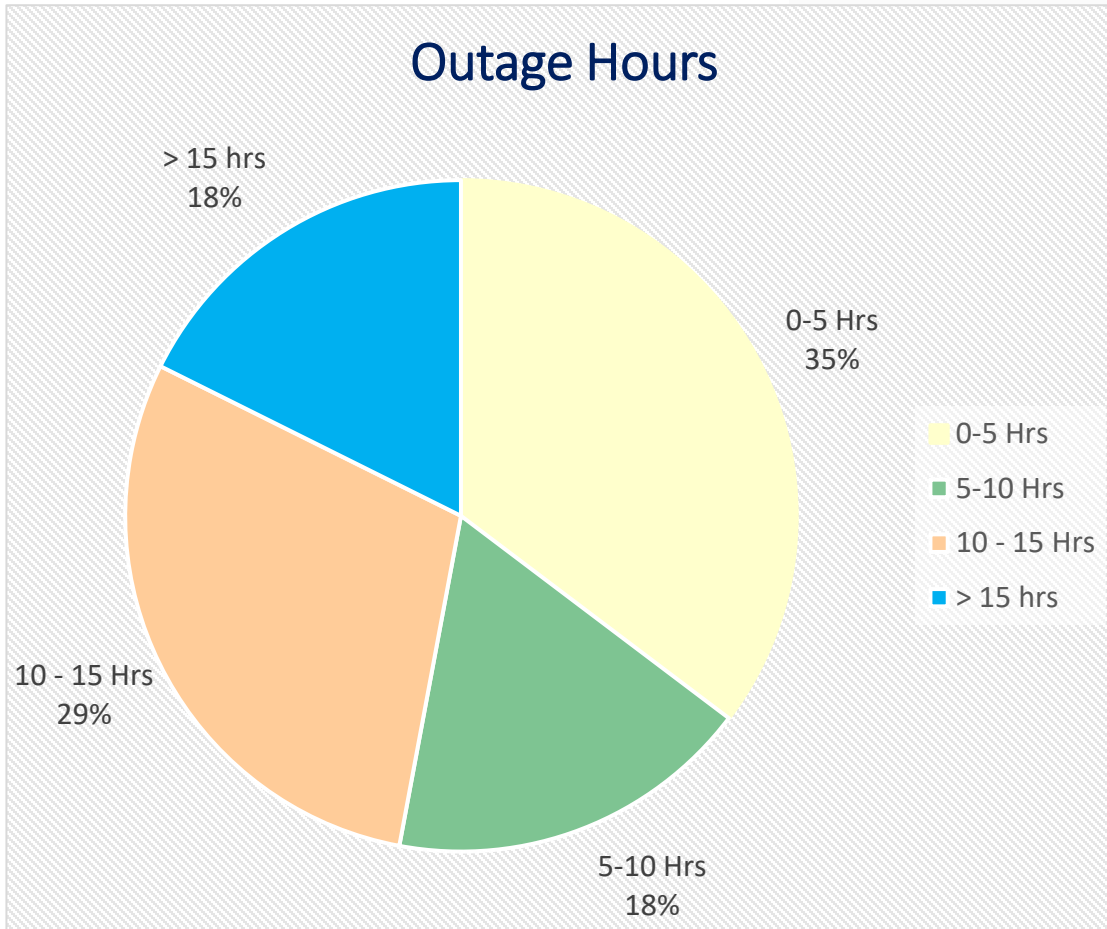
Date	Time	Locat	Volta	Bay/C	Devic	Information Text	Value	Ackr
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15-03-2	21:40:56	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
16-03-2	05:53:28	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
17-03-2	07:46:42	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
17-03-2	08:17:01	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
17-03-2	09:46:45	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
17-03-2	12:36:25	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
18-03-2	02:34:04	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
19-03-2	07:45:27	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
19-03-2	08:44:54	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
19-03-2	11:04:16	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
20-03-2	07:54:44	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
20-03-2	08:05:35	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
20-03-2	09:15:13	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
20-03-2	09:22:50	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
20-03-2	09:29:57	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
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20-03-2	13:10:45	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
20-03-2	13:27:25	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
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20-03-2	18:42:07	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
20-03-2	18:48:11	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
20-03-2	19:09:47	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
21-03-2	02:46:30	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
21-03-2	02:52:31	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
21-03-2	12:27:46	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
21-03-2	13:01:35	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
22-03-2	05:46:28	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
23-03-2	07:43:38	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
23-03-2	09:05:25	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
23-03-2	09:09:34	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	
23-03-2	13:53:37	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISE†	

Date	Time	Locat	Volta	Bay/C	Devic	Information Text	Value	Ackr
23-03-2	16:58:41	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
24-03-2	09:29:54	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
24-03-2	13:59:59	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
24-03-2	16:55:40	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
25-03-2	07:56:07	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
26-03-2	14:28:09	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
27-03-2	07:21:33	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
27-03-2	08:32:37	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
28-03-2	10:36:43	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
28-03-2	17:36:19	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
29-03-2	10:49:05	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
29-03-2	14:01:33	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
29-03-2	16:48:16	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
30-03-2	08:31:17	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
31-03-2	10:25:57	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
31-03-2	13:08:01	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	10:52:17	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
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01-04-2	13:02:10	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	13:17:54	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	13:39:36	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	13:40:51	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	13:40:52	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	14:22:59	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	14:45:16	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	14:47:24	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	15:02:26	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
01-04-2	17:22:35	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
02-04-2	06:49:40	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	

Date	Time	Locat	Volta	Bay/C	Devic	Information Text	Value	Ackr
04-04-2	10:05:53	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
05-04-2	05:39:29	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
05-04-2	07:11:49	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
05-04-2	08:56:56	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
05-04-2	11:10:48	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
06-04-2	06:17:35	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
06-04-2	11:38:09	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-04-2	13:50:09	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-04-2	14:55:14	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-04-2	17:39:21	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-04-2	20:12:46	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
08-04-2	20:40:53	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
10-04-2	05:31:26	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
10-04-2	06:05:21	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
10-04-2	10:17:26	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-04-2	05:58:56	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-04-2	07:36:06	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-04-2	11:23:27	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-04-2	16:46:37	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
11-04-2	21:33:47	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-04-2	07:08:50	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-04-2	16:20:01	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
13-04-2	18:27:53	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
14-04-2	07:13:23	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
14-04-2	13:36:39	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
16-04-2	11:29:42	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
16-04-2	12:02:47	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
16-04-2	15:23:12	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
16-04-2	15:41:21	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	
17-04-2	10:55:14	KIOS†	132	BAY 1	7SJ62	Total.Pickup	RAISEI	



- Auxiliary Supply – 33kV UPPTCL feeder Interruption details**

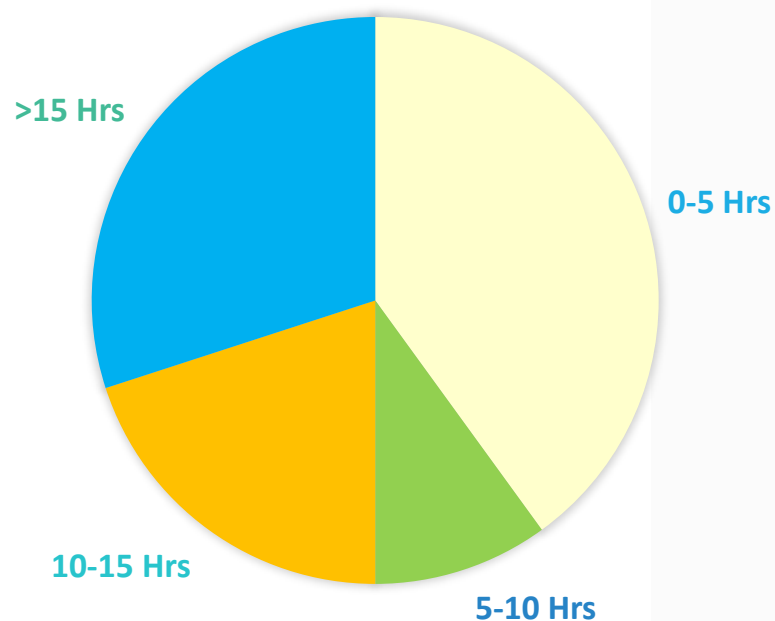


33KV UPPCL TRIPPING DETAILS			
Time of Tripping		Line taken into service	
DATE	TIME	DATE	TIME
01.05.2023	20:05	02.05.2023	10:44
07.05.2023	19:40	08.05.2023	12:09
20.05.2023	11:43	20.05.2023	17:59
06.06.2023	23:59	07.06.2023	09:32
10.06.2023	16:14	10.06.2023	17:45
19.06.2023	06:20	19.06.2023	09:37
15.07.2023	14:18	15.07.2023	14:43
07.08.2023	03:29	07.08.2023	15:58
09.08.2023	06:17	09.08.2023	10:10
13.08.2023	08:53	13.08.2023	10:30
17.08.2023	19:58	18.08.2023	13:19
22.08.2023	22:40	23.08.2023	11:58
30.08.2023	18:46	01.09.2023	16:42
03.09.2023	09:35	03.09.2023	16:25
08.09.2023	09:51	09.09.2023	16:15
09.09.2023	20:54	21.09.2023	10:33
26.09.2023	13:09	26.09.2023	15:32
16.10.2023	22:02	17.10.2023	10:39
16.11.2023	23:24	18.11.2023	13:10
19.11.2023	20:19	20.11.2023	16:57



- Auxiliary Supply – 33kV UPPTCL feeder Interruption details (Jan 24 – April 24 )

### OUTAGE HOURS



### 33KV UPPCL TRIPPING TIME

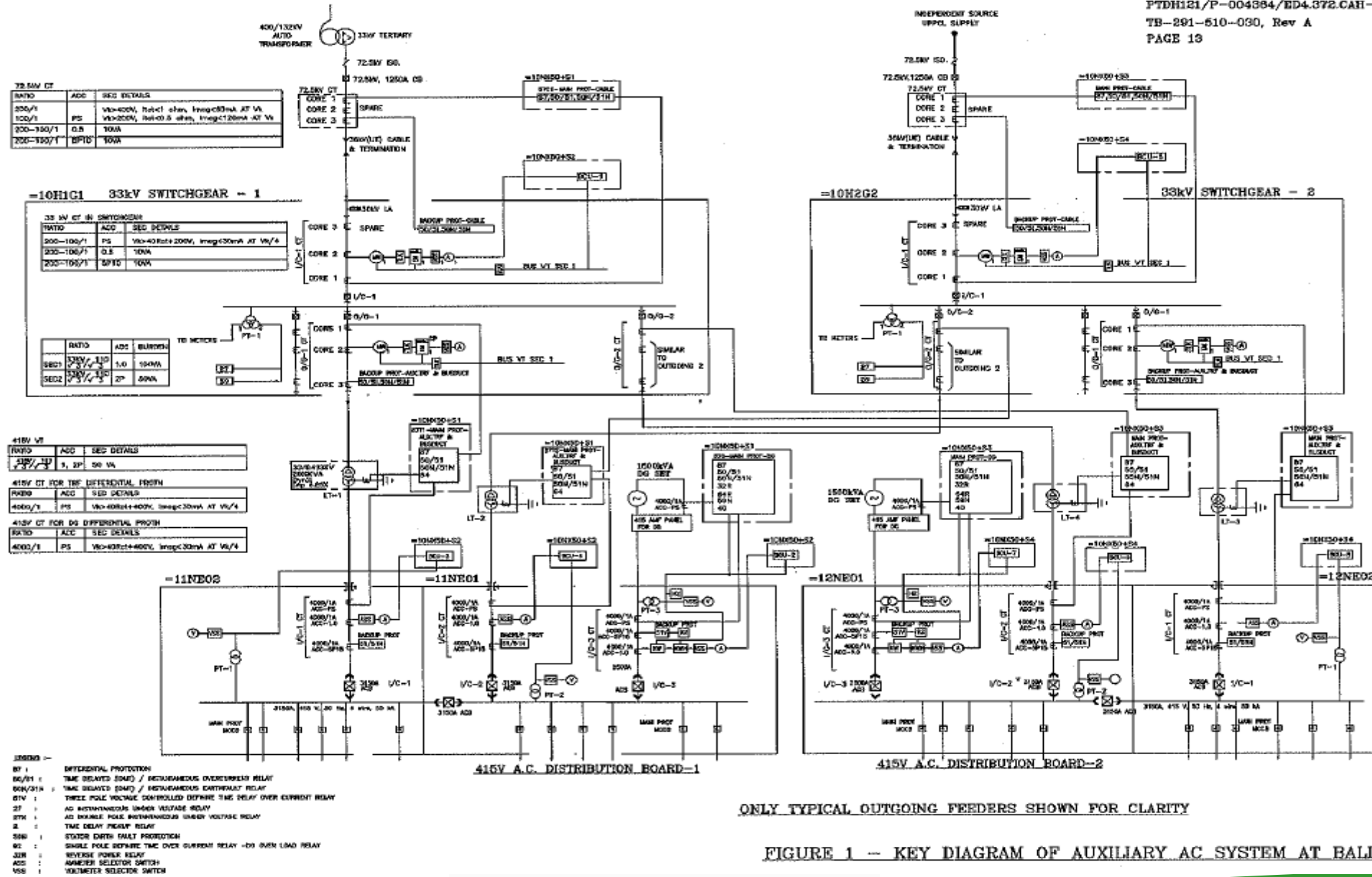
TRIPPING TIME		RESTORATION TIME	
Date	Time	Date	Time
06-02-24	14:58:13	06-02-24	17:28:35
08-02-24	06:30:58	08-02-24	17:26:16
09-02-24	06:24:49	10-02-24	09:59:11
21-02-24	03:07:16	21-02-24	16:46:53
22-02-24	17:46:34	27-02-24	15:44:56
19-03-24	03:34:49	19-03-24	12:24:28
20-03-24	09:58:00	20-03-24	12:25:56
15-04-24	12:21:30	16-04-24	11:49:50
16-04-24	11:51:00	16-04-24	12:53:40
17-04-24	08:51:30	17-04-24	11:55:10

## Availability of Reliable Dual source Auxiliary(HT Feeders) Connectivity in Various HVDC S/S

<i>Substation / Region</i>	<i>Source I</i>	<i>Source II</i>	<i>Others</i>
<b>Champa (WR-1)</b>	765/400/33KV ICT 1 Tertiary	765/400/33KV ICT 4 Tertiary	
<b>Kurushektra( NR1-)</b>	400/220/33KV ICT 1 Tertiary	400/220/33KV ICT 2 Tertiary	State 11kV Feeder for Construction purpose
<b>Raigarh(WR-1)</b>	765/400/33KV ICT 1 Tertiary	765/400/33KV ICT 2 Tertiary	State 11kV Feeder
<b>Pugalur(SR-2)</b>	400/220/33KV ICT 1 Tertiary	400/220/33KV ICT 2 Tertiary	State 11kV Feeder for Colony
<b>Thrissur (SR-2)</b>	400/220/33KV ICT 1 Tertiary	400/220/33KV ICT 2 Tertiary	
<b>Bhadrawati (WR-2)</b>	400/220/33KV ICT 1 Tertiary	400/220/33KV ICT 2 Tertiary	
<b>Vizag (SR-1)</b>	400/220/33KV ICT 1 Tertiary	400/220/33KV ICT 2 Tertiary	State 33 kV Feeder
<b>Bhiwadi (NR-1)</b>	400/220/33KV ICT 1 Tertiary	400/220/33KV ICT 2 Tertiary	State 33 kV Feeder for Colony
<b>Agra HVDC(NR-3)</b>	765/400/33KV ICT 1 Tertiary	400/220/33KV ICT 1 Tertiary	
<b>Agra HVAC(NR-3)</b>	765/400/33KV ICT 2 Tertiary		State 33 kV Feeder
<b>BiswanathCharili(NER)</b>	400/132/33KV ICT 1 Tertiary	400/132/33KV ICT 2 Tertiary	
<b>Alipurduar(ER)</b>	400/132/33KV ICT 1 Tertiary	400/132/33KV ICT 2 Tertiary	
<b>Rihand (NR-3)</b>	Rihand(NTPC) Stage 1	Rihand(NTPC) Stage 2	Rihand(NTPC) Stage 5
<b>Dadri (NR-1)</b>	Dadri(NTPC) Stage 1	Dadri(NTPC) Stage 2	
<b>Talcher (ER)</b>	Talcher Stage 2	Talcher Stage 3	Talcher Stage 4
<b>Kolar (SR-2)</b>	400/220/33KV ICT 1 Tertiary	400/220/33KV ICT 2 Tertiary	State 66 kV Feeder

# EXISTING 33KV INTERCONNECTION SCHEME

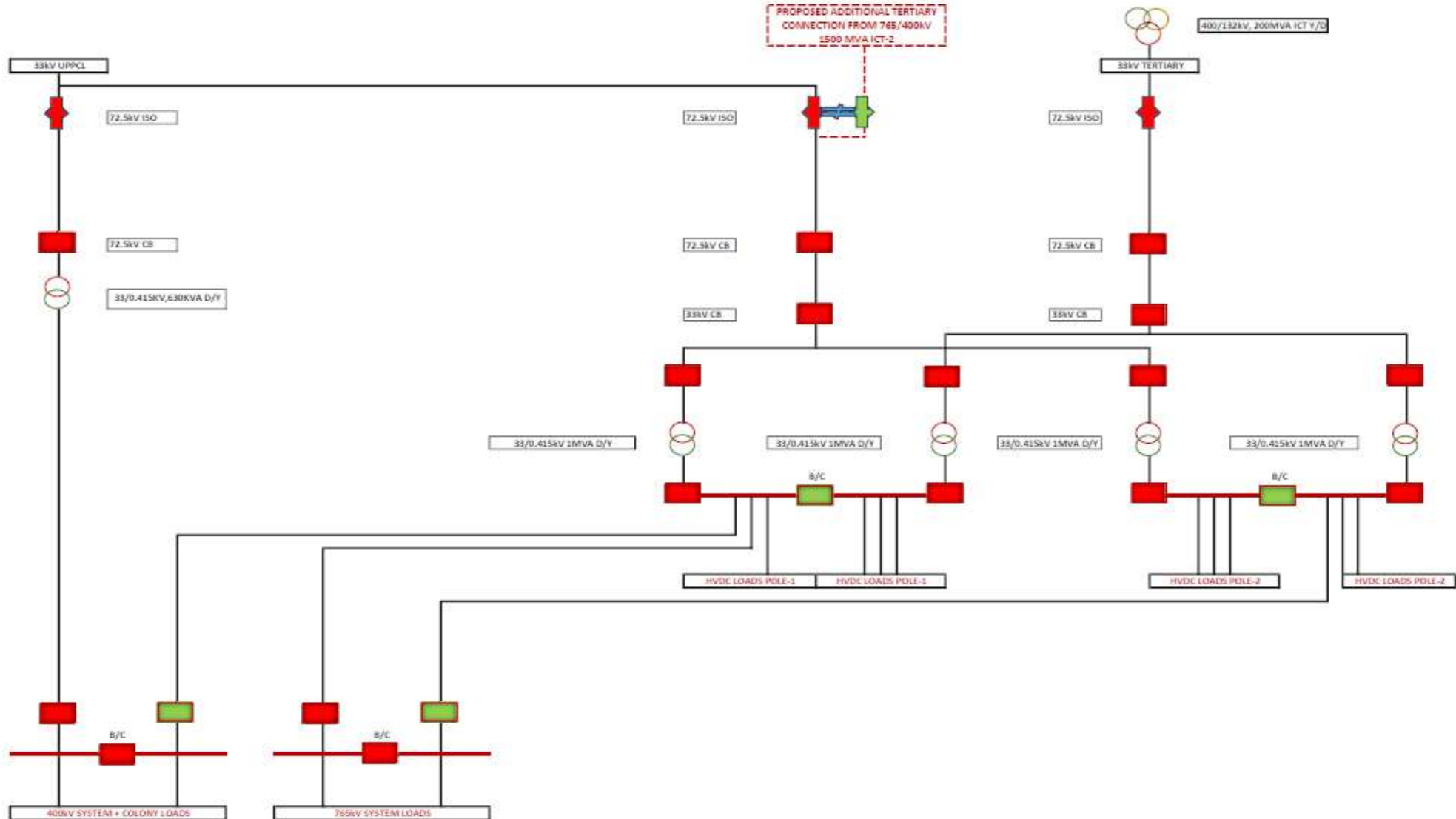
PTDH121/P-004384/ED4.372.CAH-A  
 TB-201-610-030, Rev A  
 PAGE 13



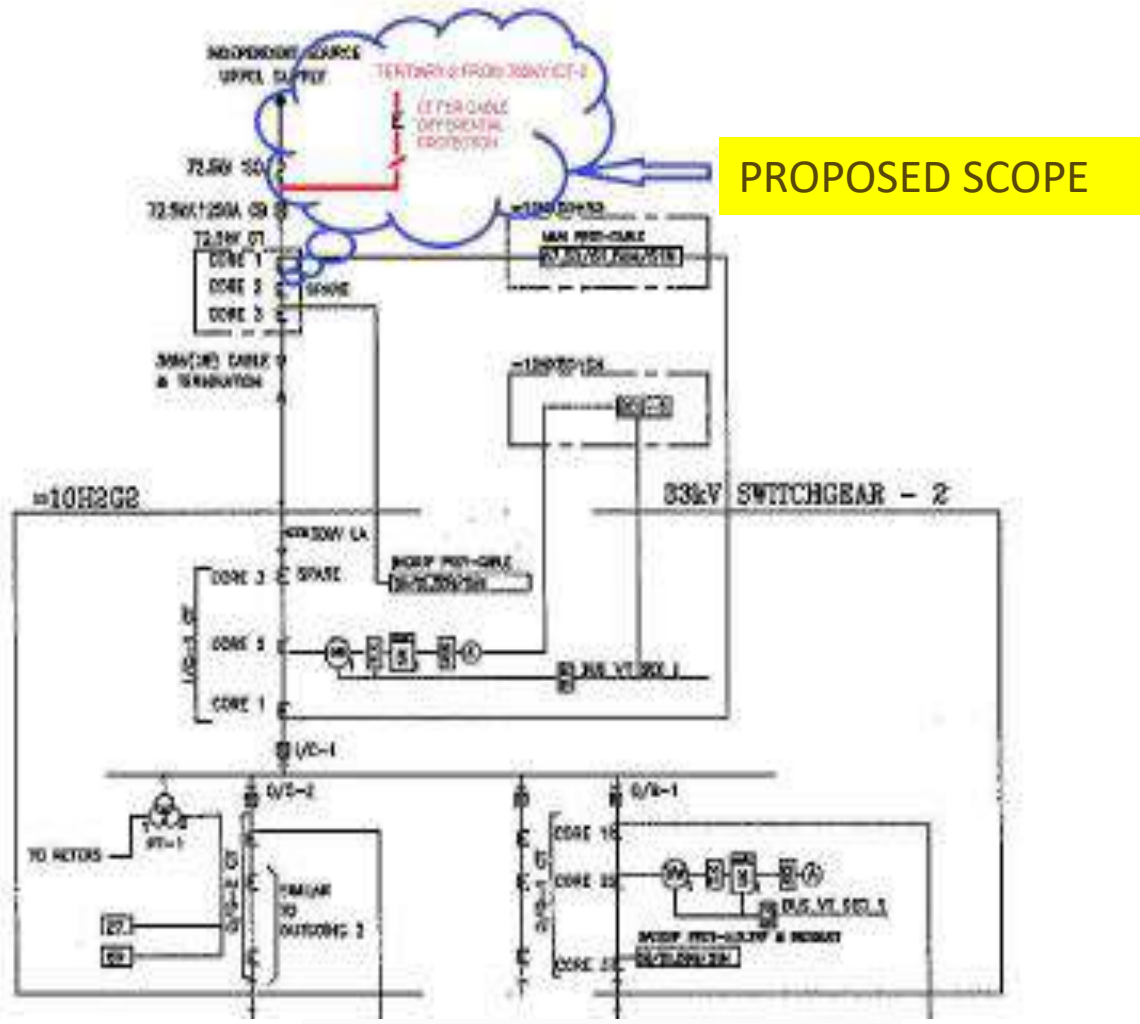
ONLY TYPICAL OUTGOING FEEDERS SHOWN FOR CLARITY

FIGURE 1 - KEY DIAGRAM OF AUXILIARY AC SYSTEM AT BALLIA

### AUXILIARY SUPPLY OVERVIEW AT BALLIA SUBSTATION



# PROPOSED 33KV INTERCONNECTION SCHEME





## ***Proposal for Reliable dual source of Auxiliary supply at Balia HVDC & HVAC***

- *To ensure reliability of auxiliary system for Balia HVDC & HVAC substation and as mentioned above in other HVDC stations which has provision for reliable dual sources of auxiliary supply from tertiary of the two independent ICTs or dedicated feeders from generating plants/State feeder as per site feasibility.*
- *Separate connection from Tertiary supply of 765/400/33kV ICT-2 is necessitated for reliable sources to HVDC and HVAC Auxiliary Power Supply in view of Non reliability of existing source.*

*In view of above facts, POWEGRID proposes that –Optional Source connectivity from tertiary of 765/400/33 kV ICT-2 in addition to the existing UPPTCL Supply(33kV feeder) & 200MVA 400/132kV ICT Tertiary for Reliable Auxiliary Supply to  $\pm 500$ kV HVDC Ballia Substation with approx. cost estimate of Rs 1.25 Cr may be considered under ADDCAP.*

कार्यालय/साइट: 765/400 /132 के.वी. एचवीएसी & ±500 के.वी. एचवीडीसी बलिया उपकेंद्र, इब्राहिमपट्टी, बलिया (उ.प्र.)-221716  
Office/Site: 765/400/132kV HVAC & ±500 kV HVDC Ballia Substation, Ibrahimpatti, Ballia (U.P.)- 221716

**Ref. No.:** NR3/BAL/HVDC/132 kV/UPPCL/03

**Date:** 17.04.2024

**URGENT**

To,  
Executive Engineer,  
ETD, UPPTCL (I/C Sikandarpur)  
Ballia (UP)

**Sub: Frequent Fault Current being fed through 132 kV S/C Sikanderpur (UPPCL) Transmission Line from our 200 MVA, 400/132/33 kV Transformer installed at POWERGRID Ibrahimpatti, Ballia Substation.**

**Our Ref.:** Our Letter NR3/BAL/HVDC/132 kV/UPPCL dated 01/09/2022

Dear Sir,

It is to once again inform you that the numerous fault current pickups are still being detected at POWERGRID Ballia end in 132 kV S/C Sikanderpur Transmission Line (Owned by UPPCL). The matter is of deep concern that our 400/132kV 200MVA BHEL ICT is still feeding fault currents because of downstream faults in your network. We have analyzed fault pickups data from 11<sup>th</sup> Jan 2024 to 17<sup>th</sup> Apr 2024 and found a total of 200 faults pickups means approximately 50 Faults per month, which shows there is no reduction of the number of faults from our earlier communication. Since the fault currents are being fed from our 200 MVA, 400/132/33 kV Transformer, therefore life expectancy of the transformer is being compromised.

It is therefore once again requested that kindly take appropriate action so that such a serious issue may be resolved on urgency basis.

The matter may please be treated as most urgent.

Thanking you.

Yours truly,



(T.P. Verma)

Sr. DGM (Substation)

टी.पी. वर्मा / T.P. VERMA  
उप महाप्रबंधक/Dy. General Manager  
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड  
POWER GRID CORPORATION OF INDIA LIMITED  
(भारत सरकार का उद्यम, A Govt. of India Enterprise)  
765/400/132kV/±500kV HVDC Ballia SS  
Ibrahimpatti, Ballia 221716 (U.P.)

**CC:**

1. CGM (AM), RHQ, NR-3, Lucknow for kind information please.
2. Sr. GM Ballia Substation for kind information please.
3. GM (AM), RHQ, NR-3, Lucknow for kind information please.

क्षेत्रीय मुख्यालय/ उप-केंद्र/साइटऑफिस: Village & Post- Ibrahimpatti, Tehsil- Belthara Road, District- Ballia (221716), (Uttar Pradesh)

केन्द्रीय कार्यालय: "साँदाग्निनी", प्लॉट नंबर 2, सेक्टर -29, गुरुग्राम -122001, (हरियाणा) दूरभाष: 0124-2571700-719

Corporate Office: "Saudamini", Plot No. 2, Sector-29, Gurugram-122001, (Haryana) Tel.: 0124-2571700-719

पंजीकृत कार्यालय: बी -9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली -110 016. दूरभाष: 011-26560112, 26560121, 26564812, 26564892, CIN: L40101DL1989GOI038121

Registered Office: B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110 016. Tel: 011-26560112, 26560121, 26564812, 26564892, CIN : L40101DL1989GOI038121

Website: www.powergridindia.com

कार्यालय/साइट: 765/400/132 के.वी. एचवीएसी & ±500 के.वी. एचवीडीसी बलिया उपकेंद्र, इब्राहिमपट्टी, बलिया (उ.प्र.)-221716  
Office/Site: 765/400/132kV HVAC & ±500 kV HVDC Ballia Substation, Ibrahimhatti, Ballia (U.P.)- 221716

Ref. No.: NR3/BAL/HVDC/132 KV/UPPCL/02

Date: 22.02.2024

**URGENT**

To,  
Executive Engineer,  
EEE, UPPCL (Semari Jamalpur)  
Ballia

Ref.: Our Letter Ref. NR3/BAL/HVDC/33 KV/UPPCL/01 dated 01.12.2023

Sub: **Frequent interruptions in 33 kV UPPCL Feeder.**

Dear Sir,

As intimated vide above referred letter that we are facing frequent interruptions in the 33 kV dedicated supply from 132/33 kV Simri Jamalpur UPPCL Substation due to which operation of 2500MW HVDC Ballia-Bhiwadi Line has become very difficult. This power supply is being used to feed power to HVDC auxiliary system such as thyristor cooling water pump, tap changer of converter transformer etc. The successful operation of any HVDC system is totally dependent on successful operation of auxiliary systems which in turn require uninterrupted auxiliary power supply.

However, POWERGRID Ballia Substation is still facing frequent interruptions on 33kV dedicated UPPCL feeder.

It is therefore requested that kindly review & resolve the frequent interruptions in 33kV UPPCL feeder. Also, details of rectification as carried out may also be forwarded to us.

The matter must be treated as most urgent.

Thanking you.

Yours truly,

  
(T.P. Verma)

Sr. DGM (Substation)

टी.पी.वर्मा / T. P. VERMA  
उप महाप्रबंधक/Dy. General Manager  
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड  
POWER GRID CORPORATION OF INDIA LIMITED  
(भारत सरकार का उद्यम / A Govt. of India Enterprise)  
765/400/132kV/±500kV HVDC Ballia SS  
Ibrahimhatti, Ballia-221716 (U.P.)

- CC: 1. CGM (AM), RHQ, NR-3, Lucknow for kind information please.  
2. Sr. GM (AM), RHQ, NR-3, Lucknow for kind information please.  
3. Sr. GM Ballia Substation for kind information please.

क्षेत्रीय मुख्यालय/ उप-केन्द्र/साइटऑफिस: Village & Post- Ibrahimhatti, Tehsil- Belthara Road, District- Ballia (221716), (Uttar Pradesh) दूरभाष: 05491- 251611, 251644

केन्द्रीय कार्यालय: "सादामिनी", प्लॉट नंबर 2, सेक्टर -29, गुरुग्राम -122001, (हरियाणा) दूरभाष: 0124-2571700-719

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पंजीकृत कार्यालय: बी -9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली -110 016. दूरभाष: 011-26560112, 26560121, 26564812, 26564892. CIN: L40101DL1989GOI038121

Registered Office: B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110 016. Tel: 011-26560112, 26560121, 26564812, 26564892. CIN : L40101DL1989GOI038121

Website: www.powergridindia.com

All Prices are in Indian Rupees.

Sl. No.	Item Description	Unit	Qty.	Supply Rate	Supply Amount	Remarks
1	2	3	4			
<b>EX-WORKS SUPPLY CHARGES</b>						
<b>A</b>	<b>SUPPLY PART :</b>					
1	72.5kV class, 1250A, 31.5kA Circuit Breaker (3-ph) with support structure.	Nos.	1	5,09,766.00	5,09,766.00	SOR June-23
2	72.5kV class, 100A, 31.5KA, with 120% extended rating Current Transformer (1-ph) as per Technical specification.	Nos.	6	2,14,664.00	12,87,984.00	SOR June-23
3	72.5kV class, Voltage Transformer (1-ph).	Nos.	3	1,11,760.00	3,35,280.00	SOR June-23
4	72.5kV class, 1250A, 31.5kA Isolator (3-ph)-HDB including support insulator without Earthswitch	Set	2	1,87,257.00	3,74,514.00	SOR June-23
5	Standard pipe structures for 72.5kV CT (1-phase)	Nos.	6	17,994.00	1,07,964.00	SOR June-23
6	Standard pipe structures for 72.5kV CVT (1-phase)	Nos.	3	17,994.00	53,982.00	SOR June-23
7	Standard pipe structures for 72.5kV Isolator (3-phase)	Nos.	2	1,02,006.00	2,04,012.00	SOR June-23
8	Standard pipe structures for 72.5kV for BPI (height 5.8m) excluding Wave Trap	Nos.	15	16,172.00	2,42,580.00	SOR June-23
9	Standard pipe structures for 72.5kV for BPI (height 4.4m) excluding Wave Trap	Nos.	3	16,172.00	48,516.00	SOR June-23
10	72.5kV BPI of height 770mm (1-phase)	Nos.	18	5,224.00	94,032.00	SOR June-23
11	28 mm Dia Foundation bolts including nuts, check nuts and washers for lattice and pipe structures.	Nos.	84	725.00	60,900.00	SOR June-23
12	33kV 1Cx185sqmm XLPE AL Armoured Cable alongwith Accessoried as per Technical Spectification	KM	1.8	5,95,339.00	10,71,610.20	<b>As per SAP PO 5100046160</b>
13	33KV XLPE Cable Termination Equipment along with structure and Accessories for Outdoor termination (one set consists of complete requirement for one bay)	SET	1.0	1,14,197.00	1,14,197.00	SOR June-23
14	Power Cable-4C x 6 sqmm Aluminium PVC (1.1kV Grade)	KM	0.2	94,901.00	18,980.20	SOR June-23
15	Power Cable-2C x 6 sqmm Aluminium PVC (1.1kV Grade)	KM	0.2	71,277.00	14,255.40	SOR June-23
16	Contol Cable (PVC)Copper 1.1kV grade - 14C x 2.5 sqmm	KM	2.0	4,10,957.00	8,21,914.00	SOR June-23
17	Contol Cable (PVC)Copper 1.1kV grade - 10C x 2.5 sqmm	KM	2.0	2,45,319.00	4,90,638.00	SOR June-23

SI. No.	Item Description	Unit	Qty.	Supply Rate	Supply Amount	Remarks
18	Contol Cable (PVC)Copper 1.1kV grade - 5C x 2.5 sqmm	KM	1.0	1,33,662.00	1,33,662.00	SOR June-23
19	Control & Relay Panel with Cable Differential Protection, Triple Instantaneous Over Current relay with Adjusted Definite Mean Time, Instantaneous Earth Fault Relay with Adjusted Definite Mean Time, Master Trip relay. / Control, Relay & Protection Panel for 33 kV Transformer (-with Automation in existing SCADA)	Set	1	5,10,694.00	5,10,694.00	SOR June-23
20	Erection Hardware for the 72.2kV Equipment for Tertiary loading as per Technical Spectification (Insulator String, Disc Insulator, Hardware, Conductor, AL Tube, Busbar Materials, Cable Trays, Ba MB, Clamps, Spacers, Connectors including Equipment Connector, Junction Boxes, Earthwire, Earthing Material Risers, Auxiliary Earth Mat (Excluding Main Earthmat) burried Cable Trenches, pipe equipment, & Lighting, all Accessories etc.)	Set	1	6,44,012.00	6,44,012.00	SOR June-23
21	33kV 1Cx185 sqmm XLPE Power straight through Cable Jointing Kit (Raychem/3M Kit)	Nos.	2	4,850.00	9,700.00	Offer dated 19.06.23 at Annexure-3F
22	33KV Heat shrinkable Bus Bar insulation Tube for ACSR Moose conductor-dia 31.77mm (Raychem/3M Kit)	Meter	20	2,655.00	53,100.00	Offer dated 19.06.23 at Annexure-3F
23	33KV Heat shrinkable Bus bar insulation sleeve for 3 Inch IPS Tube - (Raychem/3M Kit)	Meter	80	6,880.00	5,50,400.00	Offer dated 19.06.23 at Annexure-3F
24	33kV Heat shrinkable Tape for Isolator, CT, VT, All Connectors, Corona bell etc (Raychem/3M kit), 1M-1EA	Meter	50	3,515.00	1,75,750.00	Offer dated 19.06.23 at Annexure-3F
<b>B</b>	<b>MANDATORY SPARES</b>					
25	One piece of all Clamps and connectors	Set	1	32,200.60	32,200.60	10% Cost of Erection Hardware
26	72.5kV CB 1250A, 31.5kA CB-1 Pole	No	1	3,91,216.00	3,91,216.00	SOR June-23
27	72.5kV class, 100A, 31.5kA, with 120% extended rating Current Transformer (1-ph) with 2 core-100/1 and One Core 50/1	Nos	1	1,43,233.00	1,43,233.00	SOR June-23
28	72.5kV class, Voltage Transformer (1-ph).	Nos	1	1,33,501.00	1,33,501.00	SOR June-23



<b>Sl. No.</b>	<b>Item Description</b>	<b>Unit</b>	<b>Qty.</b>	<b>Supply Rate</b>	<b>Supply Amount</b>	<b>Remarks</b>
29	One Pole of 72.5kV class, 1250A, 31.5kA Isolator (3-ph)-HDB including support insulator without Earthswitch	Nos	1	1,43,604.00	1,43,604.00	SOR June-23
30	72.5kV BPI of height 770mm (1-phase)	Nos	1	5,224.00	5,224.00	SOR June-23
	<b>TOTAL</b>				87,77,421.40	

**BOQ Cum Cost Estimate for Shifting of UPPCL Auxiliary Supply to Tertiary Bus of 765/400 kV ICT-1 for Reliable Auxiliary Power Supply to ±500kV HVDC Ballia Substation**

**Estimated Cost (F&I)**

**Annexure-3B**

All Prices are in Indian Rupees.

Sl. No.	Item Description	Unit	Qty.	Unit Freight, In-transit Insurance & loading Charges	Total Freight, In-transit Insurance & loading Charges	Remarks
1	2	3	4	5	6 = 4 x 5	
<b>F&amp;I Portion FOR Supply of Materials to POWERGRID, Ballia Sub-Station</b>						
A	<b>SUPPLY PART :</b>					
1	72.5kV class, 1250A, 31.5kA Circuit Breaker (3-ph) with support structure.	Nos.	1	20391	20390.64	
2	72.5kV class, 100A, 31.5KA, with 120% extended rating Current Transformer (1-ph) as per Technical specification.	Nos.	6	8587	51519.36	
3	72.5kV class, Voltage Transformer (1-ph).	Nos.	3	4470	13411.2	
4	72.5kV class, 1250A, 31.5kA Isolator (3-ph)-HDB including support insulator without Earthswitch	Set	2	7490	14980.56	
5	Standard pipe structures for 72.5kV CT (1-phase)	Nos.	6	720	4318.56	
6	Standard pipe structures for 72.5kV CVT (1-phase)	Nos.	3	720	2159.28	
7	Standard pipe structures for 72.5kV Isolator (3-phase)	Nos.	2	4080	8160.48	
8	Standard pipe structures for 72.5kV for BPI (height 5.8m) excluding Wave Trap	Nos.	15	647	9703.2	
9	Standard pipe structures for 72.5kV for BPI (height 4.4m) excluding Wave Trap	Nos.	3	647	1940.64	
10	72.5kV BPI of height 770mm (1-phase)	Nos.	18	209	3761.28	
11	28 mm Dia Foundation bolts including nuts, check nuts and washers for lattice and pipe structures.	Nos.	84	29	2436	
12	33kV 1Cx185 sqmm XLPE AL Armoured Cable alongwith Accessoried as per Technical Spectification	KM	2	23814	42864.408	
13	33KV XLPE Cable Termination Equipment along with structure and Accessories for Outdoor termination (one set consists of complete requirement for one bay)	SET	1	4568	4567.88	

Sl. No.	Item Description	Unit	Qty.	Unit Freight, In -transit Insurance & loading Charges	Total Freight, In -transit Insurance & loading Charges	Remarks
14	Power Cable-4C x 6 sqmm Aluminium PVC (1.1kV Grade)	KM	0	3796	759.208	
15	Power Cable-2C x 6 sqmm Aluminium PVC (1.1kV Grade)	KM	0	2851	570.216	
16	Contol Cable (PVC)Copper 1.1kV grade - 14C x 2.5 sqmm	KM	2	16438	32876.56	
17	Contol Cable (PVC)Copper 1.1kV grade - 10C x 2.5 sqmm	KM	2	9813	19625.52	
18	Contol Cable (PVC)Copper 1.1kV grade - 5C x 2.5 sqmm	KM	1	5346	5346.48	
19	Control & Relay Panel with Cable Differential Protection, Triple Instantaneous Over Current relay with Adjusted Definite Mean Time, Instantaneous Earth Fault Relay with Adjusted Definite Mean Time, Master Trip relay. / Control, Relay & Protection Panel for 33 kV Transformer (-with Automation in existing SCADA)	Set	1	20428	20427.76	
20	Erection Hardware for the 72.2kV Equipment for Tertiary loading as per Technical Spectification (Insulator String, Disc Insulator, Hardware, Conductor, AL Tube, Busbar Materials, Cable Trays, Ba MB, Clamps, Spacers, Connectors including Equipment Connector, Junction Boxes, Earthwire, Earthing Material Risers, Auxiliary Earth Mat (Excluding Main Earthmat) burried Cable Trenches, pipe equipment, & Lighting, all Accessories etc.)	Set	1	25760	25760.48	
21	33kV 1Cx185 sqmm XLPE Power straight through Cable Jointing Kit (Raychem/3M Kit)	Nos.	2	300	600	Offer dated 19.06.23 at Annexure-3F
22	33KV Heat shrinkable Bus Bar insulation Tube for ACSR Moose conductor-dia 31.77mm (Raychem/3M Kit)	Meter	20	30	600	Offer dated 19.06.23 at Annexure-3F
23	33KV Heat shrinkable Bus bar insulation sleeve for 3 Inch IPS Tube - (Raychem/3M Kit)	Meter	80	30	2400	Offer dated 19.06.23 at Annexure-3F
24	33kV Heat shrinkable Tape for Isolator, CT, VT, All Connectors, Corona bell etc (Raychem/3M kit)	Meter	50	30	1500	Offer dated 19.06.23 at Annexure-3F

Sl. No.	Item Description	Unit	Qty.	Unit Freight, In -transit Insurance & loading Charges	Total Freight, In -transit Insurance & loading Charges	Remarks
	<b>MANDATORY SPARES</b>					
25	One piece of all Clamps and connectors	Set	1	1288	1288.024	
26	72.5kV CB 1250A, 31.5kA CB-1 Pole	No	1	15649	15648.64	
27	72.5kV class, 100A, 31.5kA, with 120% extended rating Current Transformer (1-ph) with 2 core-100/1 and One Core 50/1	Nos	1	5729	5729.32	
28	72.5kV class, Voltage Transformer (1-ph).	Nos	1	5340	5340.04	
29	One Pole of 72.5kV class, 1250A, 31.5kA Isolator (3-ph)-HDB including support insulator without Earthswitch	Nos	1	5744	5744.16	
30	72.5kV BPI of height 770mm (1-phase)	Nos	1	209	208.96	
	<b>TOTAL</b>				<b>324638.856</b>	

33959.1

**BOQ Cum Cost Estimate for Shifting of UPPCL Auxiliary Supply to Tertiary Bus of 765/400 kV ICT-1 for Reliable Auxiliary Power Supply to ±500kV HVDC Ballia Substation**

**Estimated Cost (Service)**

**Annexure-3C**

**All Prices are in Indian Rupees.**

Sl. No.	Item Description	Unit	Qty.	Rate	Amount	Remarks
<b>1</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	
	<b>ERECTION &amp; CIVIL PORTION</b>					
	<b>Erection Charges</b>					
1	72.5kV class, 1250A, 31.5kA Circuit Breaker (3-ph) with support structure.	Nos.	1	7,843.00	7,843.00	SOR June-23
2	72.5kV class, 100A, 31.5KA, with 120% extended rating Current Transformer (1-ph) as per Technical specification.	Nos.	6	5,377.00	32,262.00	SOR June-23
3	72.5kV class, Voltage Transformer (1-ph).	Nos.	3	1,192.00	3,576.00	SOR June-23
4	72.5kV class, 1250A, 31.5kA Isolator (3-ph)-HDB including support insulator without Earthswitch	Set	2	6,984.00	13,968.00	SOR June-23
5	Standard pipe structures for 72.5kV CT (1-phase)	Nos.	6	1,053.00	6,318.00	SOR June-23
6	Standard pipe structures for 72.5kV CVT (1-phase)	Nos.	3	1,053.00	3,159.00	SOR June-23
7	Standard pipe structures for 72.5kV Isolator (3-phase)	Nos.	2	5,946.00	11,892.00	SOR June-23
8	Standard pipe structures for 72.5kV for BPI (height 5.8m) excluding Wave Trap	Nos.	15	848.00	12,720.00	SOR June-23
9	Standard pipe structures for 72.5kV for BPI (height 4.4m) excluding Wave Trap	Nos.	3	848.00	2,544.00	SOR June-23
10	72.5kV BPI of height 770mm (1-phase)	Nos.	18	1,592.00	28,656.00	SOR June-23
11	28 mm Dia Foundation bolts including nuts, check nuts and washers for lattice and pipe structures.	Nos.	84	404.00	33,936.00	SOR June-23
12	33kV 1Cx185 sqmm XLPE AL Armoured Cable alongwith Accessoried as per Technical Spectification	KM	1.8	2,59,712.00	4,67,481.60	SOR June-23



SI. No.	Item Description	Unit	Qty.	Rate	Amout	Remarks
13	33KV XLPE Cable Termination Equipment along with structure and Accessories for Outdoor termination (one set consists of complete requirement for one bay)	SET	1	10,694.00	10,694.00	SOR June-23
14	Power Cable-4C x 6 sqmm Aluminium PVC (1.1kV Grade)	KM	0.2	26,430.00	5,286.00	SOR June-23
15	Power Cable-2C x 6 sqmm Aluminium PVC (1.1kV Grade)	KM	0.2	26,430.00	5,286.00	SOR June-23
16	Contol Cable (PVC)Copper 1.1kV grade - 14C x 2.5 sqmm	KM	2	43,459.00	86,918.00	SOR June-23
17	Contol Cable (PVC)Copper 1.1kV grade - 10C x 2.5 sqmm	KM	2	38,243.00	76,486.00	SOR June-23
18	Contol Cable (PVC)Copper 1.1kV grade - 5C x 2.5 sqmm	KM	1	31,291.00	31,291.00	SOR June-23
19	Control & Relay Panel with Cable Differential Protection, Triple Instantaneous Over Current relay with Adjusted Definite Mean Time, Instantaneous Earth Fault Relay with Adjusted Definite Mean Time, Master Trip relay. / Control, Relay & Protection Panel for 33 kV Transformer (-with Automation in existing SCADA)	Set	1	9,762.00	9,762.00	SOR June-23
20	Erection Hardware for the 72.2kV Equipment for Tertiary loading as per Technical Spectification (Insulator String, Disc Insulator, Hardware, Conductor, AL Tube, Busbar Materials, Cable Trays, Ba MB, Clamps, Spacers, Connectors including Equipment Connector, Junction Boxes, Earthwire, Earthing Material Risers, Auxiliary Earth Mat (Excluding Main Earthmat) burried Cable Trenches, pipe equipment, & Lighting, all Accessories etc.)	Set	1	72,219.00	72,219.00	SOR June-23

Sl. No.	Item Description	Unit	Qty.	Rate	Amout	Remarks
21	33kV 1Cx185 sqmm XLPE Power straight through Cable Jointing Kit (Raychem/3M Kit)	Nos.	2	590.00	1,180.00	Offer dated 19.06.23
22	33KV Heat shrinkable Bus Bar insulation Tube for ACSR Moose conductor-dia 31.77mm (Raychem/3M Kit)	Meter	20	590.00	11,800.00	Offer dated 19.06.23
23	33KV Heat shrinkable Bus bar insulation sleeve for 3 Inch IPS Tube - (Raychem/3M Kit)	Meter	80	590.00	47,200.00	Offer dated 19.06.23
24	33kV Heat shrinkable Tape for Isolator, CT, VT, All Connectors, Corona bell etc (Raychem/3M kit)	Meter	50	590.00	29,500.00	Offer dated 19.06.23
B	<b>Civil works</b>					
25	Excavation of all kind of soil including rock for all leads and lifts, Backfilling, disposal of surplus earth within lead of 2KM as per technical Specification. The surplus earth shall be roughly graded.	CUM	80.73	253.00	20,424.69	SOR June-23
26	Providing and laying in position cement concrete of specified grade including the cost of centering and shuttering - All work up to plinth level : 1:4:8 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone	CUM	2.577	4,017.00	10,353.32	SOR June-23
27	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering- all work upto plinth level ; 1:5:10 (01 cement: 5 coarse sand (Zone-III): 10 graded stone aggregates 40mm nominal size) and applying cement slurry in the ratio of (1 cement : 6 fine aggregates) with cement consumption for slurry 150kg for every 100sqm as per POWERGRID Norms.	CUM	20.522	3,531.00	72,464.06	SOR June-23

Sl. No.	Item Description	Unit	Qty.	Rate	Amout	Remarks
28	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level :1:1.5:3 (1 cement : 1.5 coarse sand (zone-III): 3 graded stone aggregate 20 mm nominal size)	CUM	13.025	6,727.00	87,620.86	SOR June-23
29	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level.Thermo-Mechanically Treated bars. (Chairs, OverLap, wastages, etc. deemed to be included & shall not measured)	MT	0.775	74,937.00	58,043.39	SOR June-23
30	RCC Culvert and Cable Trench Crossing including Supplying and Laying of Hume Pipe 300mm Dia of Grade NP-3 excluding Concrete	RM	30.00	2,363.00	70,890.00	SOR June-23
31	Removing,cleaning and washing of existing stones and respreading of stones in switchyard excluding PCC.	SQM	271.25	100.00	27,125.00	SOR June-23
32	Supplying & spreading of 40mm single sized stone chips to the 100mm thickness over switchyard surface including transportation, loading, unloading and stacking	CUM	13.56	1,947.00	26,406.19	SOR June-23
33	Antiweed Treatment	SQM	187.50	20.00	3,750.00	SOR June-23
34	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of	CUM	4.125	2,196.00	9,058.50	SOR June-23
35	Demolishing cement concrete (PCC) manually/ by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in - charge:Nominal concrete 1:5:10 or leaner mix (i/c equivalent design mix	CUM	18.750	354.00	6,637.50	SOR June-23
36	Burried Cable Trenches for Aux Power Arrangement	M	600.000	1,424.00	8,54,400.00	SOR June-23
	<b>Total</b>				<b>22,59,151.10</b>	

Annexure-3D

<b>SUMMARY OF TAXES &amp; DUTIES APPLICABLE ON GOODS</b>		
<b>Sl. No.</b>	<b>Item Nos.</b>	<b>Total Price (INR)</b>
<b>1</b>	<b>TOTAL GST ON GOODS</b>	
	Total GST for Supply of Goods (inter-alia including Type Test Charges) between the Contractor and the Employer which are not included in the Ex-works price.	<b>15,79,935.85</b>
<b>2</b>	<b>TOTAL GST ON SERVICES</b>	
	Total GST for Service Charges, if, any between the Contractor and the Employer which are not included in the Service Charges	<b>4,06,647.20</b>
	<b>GRAND TOTAL [1+2]</b>	<b>19,86,583.05</b>

## Annexure-3E

<b>(GRAND SUMMARY)</b>		
<b>Sl. No.</b>	<b>Description</b>	<b>Total Price (INR)</b>
<b>1</b>	<b>TOTAL SCHEDULE NO. 1</b>	<b>87,77,421.40</b>
	Ex-works price of Plant and Equipment including Type Test Charges	
<b>2</b>	<b>TOTAL SCHEDULE NO. 2</b>	<b>3,24,638.86</b>
	Local Transportation, In-transit Insurance, loading and unloading	
<b>3</b>	<b>TOTAL SCHEDULE NO. 3</b>	<b>22,59,151.10</b>
	Service (Installation & commissioning) Charges	
<b>5</b>	<b>TOTAL [1+2+3]</b>	<b>1,13,61,211.36</b>
	Total Charges excluding GST (Supply and Service Only)	
<b>6</b>	<b>TOTAL SCHEDULE NO. 4</b>	<b>19,86,583.05</b>
	Taxes and Duties	
<b>7</b>	<b>GRAND TOTAL [1+2+3+4-5]</b>	<b>1,33,47,794.41</b>



Sl. No.	Item Description	Parameters
16.	HVDC control system*	Main + hot standby
17.	HVDC protection system*	Duplicated Protection
18.	Auxiliary supply source	Supply sources tapped from 33 kV side of 2 nos. of 400/33 kV transformer (50 MVA) at Bhadla HVDC and 33 kV tertiary of 2 Nos. 765/400/33 kV ICT at Fatehpur. Each auxiliary power shall be fetched from both separate sources of the 33 kV auxiliary supply in station
19.	DC Harmonic filter	Minimum One DC filter for each pole at each HVDC terminal station
20.	AC Network Impedance	Relevant CIGRE/IEC document shall be used for the Network harmonic impedance together with information in PSSE network files provided by CTU.
21.	Negative sequence voltage (fundamental frequency)	1% for Design of equipment 1.5% for rating of equipment
22.	HVDC line online fault locator for pole lines	One No. per pole at each terminal station [when not integrated with Control & Protection System]
23.	HVDC paralleling and de-paralleling switch	As per Requirement
24.	Smoothing reactor on DC bus	As per requirement but not less than 33% of total milli Henry (mH) required for each pole, shall be provided on DC pole bus
25.	Blocking filter	As per requirement
26.	Reliability and Availability Design Targets	As per Table 10
27.	Station Loss evaluation criteria	Methodology as per IEC 61803 and Target figures stated in Table 10
28.	System Grounding	Solidly grounded

\*TSP can provide integrated Control and Protection system as well, meeting functional requirements.

The criteria for the design and control of the network shall be as follows:

- 400 kV AC bus voltages shall normally be within  $\pm 5.0\%$  of nominal voltage (400 kV). Bus voltages outside this range may occur from time to time and may exist for long

in the switchyard from entering the valve hall and overstressing the thyristor valves. It decreases the incident of commutation failures by limiting the rate of change of current caused by rapid voltage changes. It is also being considered to provide smoothing reactor in the neutral bus to optimize the cost of the project. Smoothing reactor will be of air core type.

#### **10.2.9 TELECOMMUNICATION**

The proper and smooth operation of the HVDC system shall depend on a highly reliable and effective telecommunication system between the two terminals. For this purpose, necessary telecommunication equipment, through Fibre Optic communication network shall be provided between the converter stations. This shall be achieved by installing optical ground wire(OPGW) with 24 fibres on one of the peaks of the 800 kV HVDC line and repeater station. Repeater station shall be preferably located in the substation en route to HVDC line. The fibre optic communication channels shall be used for both data and speech between the converter stations. The backup to this Fiber Optic link shall be provided with F.O Network being developed for AC substations in WR & SR.

#### **10.2.10 DEDICATED METALLIC RETURN**

Additional third conductor shall be used as return path between HVDC converters. The necessary DC switchgear arrangement required for establishing the return path shall be part of HVDC terminal. The conductor shall be laid on the same tower on which the pole conductors are installed with due consideration to electrical clearances (ROW), current rating etc.

#### **10.2.11 AUXILIARY ELECTRICAL & MECHANICAL SYSTEM**

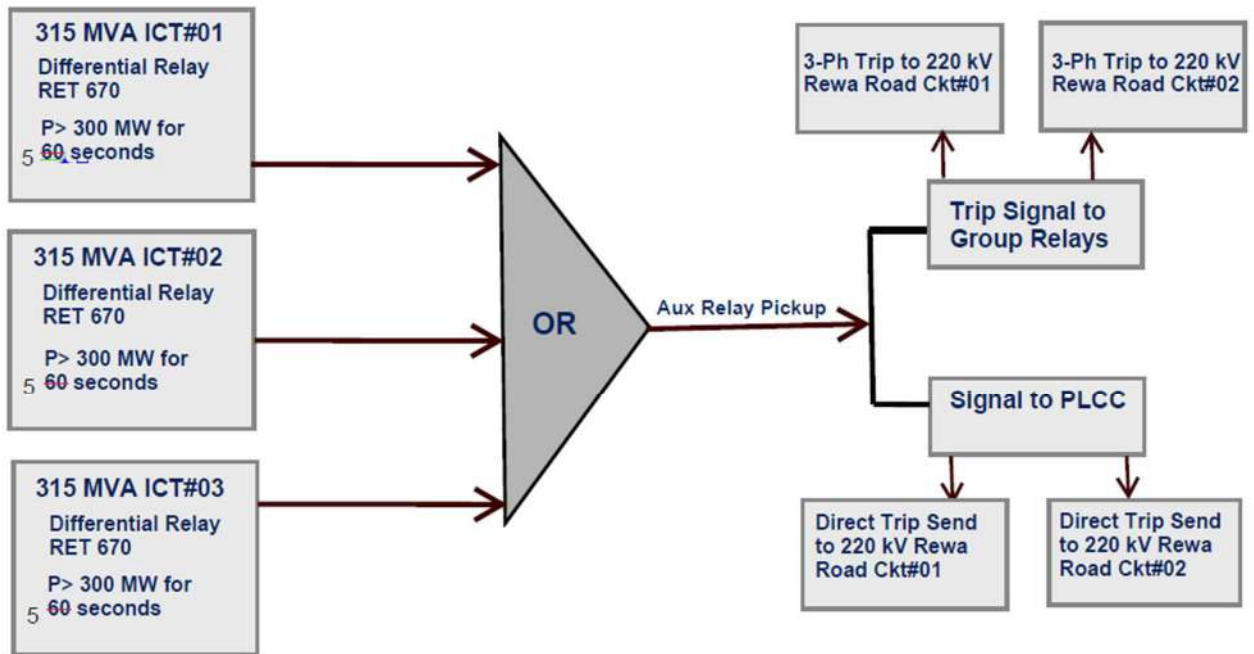
A HVDC station requires a very reliable auxiliary power supply for smooth operation. For the Pugalur terminal, the auxiliary power requirement is proposed to be met from the two 400/110/33kV, 200 MVA transformers to be procured as part of Scheme 1 scope. For Raigarh station, the auxiliary power shall be taken at 33kV from the tertiary of two 765 kV ICT's existing at Raigarh. Back up auxiliary power for both terminals shall be available from suitably rated DG sets.

Other systems such as Control room Air conditioning, Fire fighting, illumination system, Oil handling, AC and DC auxiliary power supplies, station grounding, Public address and internal communication system, etc. shall be suitably provided as-is mandatory in all HVDC Installation. An independent VESDA (or equivalent) System shall be installed in each valve hall for early detection of incipient fire/smoke. In addition, UV sensors to detect electrical arcs shall also be installed within the valve hall. A fully computerized and automatic Building Management System (BMS) shall control the operation of the mechanical systems serving the valve hall and service building and other systems.. Borewell water is proposed to be used to meet the water requirements of the project.

#### **10.2.12 CREEPAGE DISTANCES AND ELECTRIC FIELD**

The creepage distances being specified for the HVDC system are as follows:

**SYSTEM PROTECTION SCHEME LOGIC TO ADDRESS OVERLOADING OF 3X315 MVA ICTS  
AT ALLAHABAD SS**







# DELHI TRANSCO LIMITED

A Govt. of NCT of Delhi Undertaking  
An ISO 9001:2015 Certified Company  
Office of DGM (T) O&M- East

220 KV Patparganj Office Complex, Near Urja Vihar,  
Mandawali Phatak, DELHI -110092

Corporate Identification Number (CIN) - U40103DL2001SGC111529

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No. F/DTL/206/Opr.(O&M.)/DGM(East)/2023/F-20/69

Date: 20-03-2024

**Superintending Engineer,**

Electricity Transmission Circle- Ghaziabad,  
132kV Substation Lal Kuan, Bullandshahar Road,  
Ghaziabad-201002 (UP)

Email ID:- [setgzb@upptcl.org](mailto:setgzb@upptcl.org)

**Subject: - Restoration of 220kV D/C DTL Ghazipur—220kV UPPTCL Sector-62  
Noida & 220kV UPPTCL Sahibabad Lines.**

Dear Sir,

This is in reference to letter no.-682 dated 05.03.2022 of EE (ETD-I) wherein it has been apprised that due to waste dumped by MCD, Delhi near and around Tower No.-4 of subjected D/C lines, the conductors have been dismantled and transmission of power has been discontinued from these transmission lines. Further, DTL has been requested to take up the matter with MCD, Delhi for following up the matter of compensation for restoration of tower in lieu.

In this regard, it is stated that the matter has been taken up with MCD under intimation to EE (ETD-I); however, the same is pending at their end in MCD.

It is evident that these transmission lines play pivotal role while meeting the requirement of power to and fro from Delhi and UP (Noida) and vice-versa in case of any exigency and eventuality and hence prolonged outage of these transmission lines may not be in the overall interest of DTL and UPPTCL and hence your goodself is requested to kindly direct the concerned officer for early restoration of these lines as per applicable rules. The expenditure to be incurred may be explored for booking in R&M Head of UPPTCL in view of overall interest of the power system of NR.

Hope you shall take an early action in this regard.

Thanks and regards

*Ram Kumar*  
20/03/2024

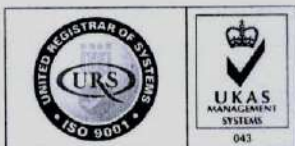
(Ram Kumar)

Dy GM(T) O&M-East Circle

**Copy to:-**

- |   |                               |
|---|-------------------------------|
| 1. ED(T) O&M-II   | For kind information please.  |
| 2. Chief Engineer, Transmission<br>West Zone, Meerut<br>(Email ID: <a href="mailto:cetw@upptcl.org">cetw@upptcl.org</a> ) | For further direction please. |
| 3. Sr Manager(T) O&M-5  | For follow up.                |

file



Office; DGM( T) O&M-East Patparganj Office Complex, Delhi 92 ,  
Regd office : Shakti Sadan, Kotla Road, New Delhi – 110 002  
Visit us at [www.delhitransco.gov.in](http://www.delhitransco.gov.in)



# DELHI TRANSCO LIMITED

A Govt. of NCT of Delhi Undertaking

An ISO 9001:2015 Certified Company

Office of DGM (T) O&M- East

220 KV Patparganj Office Complex, Near Urja Vihar,

Mandawali Phatak, DELHI -110092

Corporate Identification Number (CIN) - U40103DL2001SGC111529

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No. F/DTL/206/Opr.(O&M.)/DGM(East)/2023/F-90/68

Date: 20-03-2024

Chief Engineer- Project-DEMS  
Department of Environment Management  
CIVIC Center, Delhi Municipal Corporation  
Minto Road, New Delhi-110002

**Subject: - Restoration of 220kV D/C DTL Ghazipur—220kV UPPTCL Sector-62  
Noida & 220kV UPPTCL Sahibabad Lines.**

Dear Sir,

This is in reference to letter no.-682 dated 05.03.2022 of EE (ETD-I) wherein it has been apprised that due to waste dumped by MCD, Delhi near and around Tower No.-4 of subjected D/C lines, the conductors have been dismantled and transmission of power has been discontinued from these transmission lines. Further, DTL has been requested to take up the matter with MCD, Delhi for following up the matter of compensation for restoration of tower.

In this regard, it is stated that the matter has been taken up with your goodself by our Sr Manger (T) O&M-5 vide letters bearing no.-28 dated 11.07.2022 and 43 dated 31.08.2022 for early releasing the compensation amount as asked by UPPTCL by seeing the urgency and importance of the subjected transmission lines. However, it has been noted that the matter is still remained pending for decision.

It is evident that these transmission lines play pivotal role while meeting the requirement of power to and fro from Delhi and UP (Noida) and vice-versa in case of any exigency and eventuality and hence prolonged outage of these transmission lines may not be in the overall interest of Delhi and UP States and hence your goodself is requested to kindly direct the concerned officer for taking an early decision in this regard.

Hope you shall take an early action in this regard.

Thanks and regards

20/03/2024

(Ram Kumar)

Dy GM(T) O&M-East Circle

**Copy to:-**

1. ED(T) O&M-II For kind information please.
2. Addl. Commissioner (Engg.),  
CIVIC Center, Delhi Municipal  
Corporation, Minto Road,  
New Delhi-110002 For kind direction please.  
Email ID: [addlcmrmd@mcd.nic.in](mailto:addlcmrmd@mcd.nic.in)
3. Sr Manager(T) O&M-5 For follow up.



Office; DGM( T) O&M-East Patparganj Office Complex, Delhi 92 ,  
Regd office : Shakti Sadan, Kotla Road, New Delhi - 110 002  
Visit us at [www.delhitransco.gov.in](http://www.delhitransco.gov.in)





# DELHI TRANSCO LIMITED

(A Govt. of NCT of Delhi Undertaking)

An ISO 9001:2015 Certified Company

Office of Dy. Manager (Tech.) Maintenance

220 KV, S/Stn. Gazipur, Near Gazipur Dairy Farm, New Delhi-110096

Ph.: 011-22770009, Mob. 9999533362

5

F.DTL/2022-23 / Sr. Mgr(T) O&M E-5/45.

dated: 31.08.2022

Chief Engineer (Project & Dems)  
Civic Center, Delhi Municipal Corporation,  
Minto Road, New Delhi-110002

**Subject – Regarding battered & Vulnerable Tower No. 4 (C-Type) of Double Ckt. Line connecting Noida Sec-62 & Sahibabad to Delhi Transco Limited, Gazipur, Delhi – Power Transmission corridor UP – Delhi (Emergency Power evacuation & supply)**

Dear Sir,

May kindly refer Letter No. 682 dated 05.07.2022 issued by Executive Engineer(Electrical Transmission Division-I (UPPTCL) addressing to your good office (enclosed herewith) wherein it is mentioned that due to excessive pressure of garbage dumping at Gazipur dumping site Transmission tower No. 4, belongs to Power Transmission corridor UP – Delhi (Emergency Power evacuation & supply) has been battered & Vulnerable. As mentioned in Letter itself, this double Ckt. Line has been discontinued & de-strengthening of conductor has been done in consideration to public safety.

As this Transmission Line Tower No-4 is utmost important catering (C-Type) of Double Ckt. Line connecting Noida Sec-62 & Sahibabad to Delhi Transco Limited, Gazipur, Delhi and meets power requirements in case of Emergency of power (Evacuation & supply) between both states.

As informed through Letter of M/s UPPTCL that compensation in respect to mentioned above was appraised in your good office and after payments towards such cost the work for re-establishment of tower & strengthening of conductor is to be done by M/s UPPTCL.

You are requested to take the needful action in this regard at the earliest so that essential Power Corridor connecting UP to Delhi may function again.

Sd/-

B.D. Sharma

Sr. Manager (T) O&M E-5



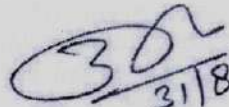
Regd. office : Shakti Sadan, Kotla Road, New Delhi – 110 002  
Corporate Identification No. (CIN) – U40103DL2001SGC111529

Tel: 23235380 Fax: 23238064

Website : www.dtl.gov.in

Copy to;

1. DGM (T) O&M East :- for favor of information pl.
- ✓ 2. **Sh. Satendra Kumar, Executive Engineer, UPPTCL** :- With the request for re-establishment of tower & strengthening of conductor (under intimation to this office before start of work) for utilizing the UP-Delhi Power Corridor in case of Emergency of Power in any State. Delhi Municipal corporation has been requested in response to your Letter dated 05.07.2022 & 23.08.2022.
3. Office Copy

  
31/8/2022  
B.D. Sharma  
Sr. Manager(T) O&M E-5

No-041  
Subject -

56  
00



No-104/ETSD/III/SBB

Date - 23/08/2022

(4)

Subject - Regarding breakdown of 220 kv sahibabad. Ghazipur & 220 kv Noida sec-2 Ghazipur line.

Sr Manager OAM ES  
220 kv S/S Ghazipur  
Delhi Transco Ltd.  
Near DDA, Janta flat  
Delhi - 110096.



DM (GZP)  
Pl. put up draft letter  
to MCD. 30  
29-8-2022

In reference of above subject & letter no. 682/ETD-I/GZB dt 05.07.2022 it is to acknowledge that 220 kv sahibabad-Ghazipur & 220 kv Noida sec-2 Ghazipur line is still in breakdown due to damage of tower no. 4. It happened due to fall of waste from MED dumpyard. We are continuously writing to MCD to erect new tower in place of damage or deposit required amount to erect the tower, but no active action has been taken although verbally they have accepted that it was happened due to fall of dumpyard waste.

So it is to inform that in future no supply will be provided to Ghazipur even in case of emergency as the line is in breakdown condition.

If possible try to communicate with MCD to resolve the issue.

Anshul  
SDO-III  
SBB

Copy to -  
EE, ETD-Ist, Ghazabad



Letter No- 96/ETSD/III/SBB

Date - 03/08/2022

Subject - Regarding breakdown of 220KV Sahibabad Ghazipur line from date 30.04.2022. (3)

Executive Engineer.  
ETD - Ist, Ghazipur.



In reference of above subject it is to acknowledge that 220KV Sahibabad-Ghazipur line is still in breakdown. As it is interstate line and tower number 4 has been damaged on 30.04.2022 due to dumpyard waste of MCD. It is inform to MCD and many meetings has been organised with their chief but no initiative has been taken from MCD side so that line could be restored after erection of new tower.

Please do the needfull so that in case of any emergency supply disturbance could be avoided due to this type of ignorance from MCD side.

Ab-III

Chits  
26/8/22  
DM, GIP

Anshudeep  
500-III  
220 KV S/S  
Sahibabad,

Copy to -

- 1) SE, ETC, Ghazipur
- 2) Sr. Manager O&M ES, 220 KV S/S Ghazipur, Delhi Transco  
(Please remind MCD to take important step to erect new towers in place of damaged tower)

→ ( DM(GIP) pl. put up draft letter 302 26/8/2022 SR(MR/DM) E-1



2

	<p><b>DELHI TRANSCO LIMITED</b>          (A Govt. of NCT of Delhi Undertaking)          An ISO 9001:2015 Certified Company  <b>Office of Sr. Manager (Tech.) Maintenance</b>          220 KV, S/Sin. Gazipur, Near Gazipur Dairy Farm, New Delhi-110096          Ph.: 011-22770009, Mob. 9999533362</p>
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F.DTL/2022-23 / Sr. Mgr(T) O&M E-5/28.

dated: 11.07.2022

Chief Engineer (Project & Dems)  
 Civic Center, Delhi Municipal Corporation,  
 Minto Road, New Delhi-110002

**DGM (T) O&M-East**  
**Delhi Transco Limited**  
 Diary No. .... 297 .....  
 Date ..... 12/7/22 .....

**Subject – Regarding battered & Vulnerable Tower No. 4 (C-Type) of Double Ckt. Line connecting Noida Sec-62 & Sahibabad to Delhi Transco Limited ,Gazipur, Delhi – Power Transmission corridor UP – Delhi (Emergency Power evacuation & supply)**

Dear Sir,

May kindly refer Letter No. 682 dated 05.07.2022 issued by Executive Engineer(Electrical Transmission Division-I (UPPTCL) addressing to your good office (enclosed herewith) wherein it is mentioned that due to excessive pressure of garbage dumping at Gazipur dumping site Transmission tower No. 4, belongs to Power Transmission corridor UP – Delhi (Emergency Power evacuation & supply) has been battered & Vulnerable. As mentioned in Letter itself, this double Ckt. Line has been discontinued & de-strengthening of conductor has been done in consideration to public safety.

As this Transmission Line Tower No-4 is utmost important catering (C-Type) of Double Ckt. Line connecting Noida Sec-62 & Sahibabad to Delhi Transco Limited, Gazipur, Delhi and meets power requirements in case of Emergency of power (Evacuation & supply) between both states.

As informed through Letter of M/s UPPTCL that compensation in respect to mentioned above was appraised in your good office and after payments towards such cost the work for re-establishment of tower & strengthening of conductor is to be done by M/s UPPTCL.

You are requested to take the needful action in this regard at the earliest so that essential Power Corridor connecting UP to Delhi may function again.

Sd/-  
 B.D. Sharma  
 Sr. Manager (T) O&M E-5

 <p><b>JAS-ANZ</b>  <b>BSCIC</b>          ISO 9001 REGISTERED</p>	<p>Regd. office : Shakti Sadan, Kotta Road, New Delhi – 110 002          Corporate Identification No. (CIN) – U40103DL2001SGC111529          Tel: 23235380 Fax: 23238064          Website : www.dtl.gov.in</p>
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# DELHI TRANSCO LIMITED

(A Govt. of NCT of Delhi Undertaking)  
An ISO 9001:2015 Certified Company  
Office of Sr. Manager (Tech.) Maintenance  
220 KV, S/Stn. Gazipur, Near Gazipur Dairy Farm, New Delhi-110096  
Ph.: 011-22770009, Mob. 9999533362

Copy to: DGM (T) O&M East  
Delhi Transco Limited  
Diary No. 123

- ✓ DGM (T) O&M East :- for favor of information pl.
- 2. Sh. Satendra Kumar, Executive Engineer, UPPTCL :- With the request for re-establishment of tower & strengthening of conductor (under intimation to this office before start of work) for utilizing the UP-Delhi Power Corridor in case of Emergency of Power in any State.
- 3. Office Copy



*Mgr (T) E-5*



*B.D. Sharma*  
Sr. Manager (T) O&M E-5  
11/7/2022

*Please follow up, personally for early action by UPPTCL follow up pl.*

*302*  
*28/7/2022*  
*Sr. Mgr (O&M) E-5*

*12/07/2022*

DM (GZP)

 	<p>Regd. office : Shakti Sadan, Kotla Road, New Delhi - 110 002 Corporate Identification No. (CIN) - U40103DL2001SGC111529 Tel: 23235380 Fax: 23238064 Website : www.dtl.gov.in</p>
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कार्यालय  
अधिसासी अभियन्ता  
उ० प्र० पावर ट्रांसमिशन कारपोरेशन लि०  
विद्युत पारिषण खण्ड-प्रथम  
132 केवी उपकेन्द्र लाल कुआँ  
बुलन्दशहर रोड,  
गाजियाबाद - 201002  
मोबाइल -07290059803  
दूरभाष नं० 0120 - 2886391



OFFICE OF THE  
EXECUTIVE ENGINEER  
U.P. POWER TRANS. CORP. LTD  
ELECTY. TRANS. DIVISION-I  
132 KV S/S LAL KUAN BSR Rd.  
Ghaziabad  
E-mail ID: ceetd1gzb@upptel.org  
Cin-U40101UP2004SGC028687  
GSTIN: 09AARCD0823E729

1

पत्रांक 682 / वि०पा०ख०प्र० / गा०बाद /

दिनांक 05/08/2022

विषय :- 220 के०वी० उपकेन्द्र साहिबाबाद व 220 के०वी० उपकेन्द्र सैक्टर-62 नोएडा को 220 के०वी० उपकेन्द्र गाजीपुर से जोड़ने वाली 220 के०वी० द्विपथ लाईन का नैरो बेस एंगल टावर (सी टाईप) नं०-4 कूड़े के पहाड़ के पास मुर्गा मण्डी दिल्ली में क्षतिग्रस्त व असुरक्षित होने के सम्बन्ध में।

Sr. Manager O&M ES  
220 KV S/S Ghazipur  
Delhi Transco Ltd.  
Near D.D.A, Janta Flat  
Delhi-110096



उपरोक्त विषयक आपको अवगत कराना है कि 220 के०वी० उपकेन्द्र साहिबाबाद व 220 के०वी० उपकेन्द्र सैक्टर-62 नोएडा से 220 के०वी० उपकेन्द्र गाजीपुर को जोड़ने वाली 220 के०वी० द्विपथ लाईन की पैट्रोलिंग दिनांक 30.04.2022 को करते समय पाया कि द्विपथ लाईन का नैरो बेस टावर नं०-4 लेग के पास दिल्ली नगर निगम द्वारा अत्यधिक कूड़ा डालने से कूड़े के पहाड़ से उत्पन्न दवाव के कारण कूड़े के पहाड़ की ओर तिरछा हो गया था। जिससे उक्त टावर क्षतिग्रस्त व असुरक्षित हो गया और किसी भी दुर्घटना होने की प्रबल सम्भावना थी। दिल्ली मण्डी क्षेत्र में जनघन की सुरक्षा की दृष्टि को देखते हुए द्विपथ लाईन को उसी समय से बन्द कर दिया गया है और बाद में उक्त क्षतिग्रस्त टावर नं०-4 से विद्युत लाईन की डि-स्ट्रैथनिंग कर टावर को डिस्मेन्टल कर लिया गया है। आम संज्ञानित है कि इस द्विपथ लाईन के द्वारा उ०प्र० एवं दिल्ली के मध्य आपातकालीन स्थिति में 220 के०वी० उपकेन्द्र साहिबाबाद व 220 के०वी० उपकेन्द्र सैक्टर-62 नोएडा से 220 के०वी० उपकेन्द्र गाजीपुर दिल्ली के द्वारा विद्युत का आदान-प्रदान किया जाता है।

इस टावर की क्षतिपूर्ति हेतु आयुक्त महोदय, पूर्वी दिल्ली नगर निगम, दिल्ली को इस कार्यालय के पत्रांक 477/विपाख-प्र/गा०बाद दिनांक 02.05.2022 के द्वारा अवगत कराकर क्षतिपूर्ति हेतु अनुरोध किया गया।

इस टावर की क्षतिपूर्ति हेतु दिनांक 03.06.2022 सायं 5:00 बजे मुख्य अभियन्ता (Project & Dems), सिविक सेन्टर, दिल्ली नगर निगम, मीन्टो रोड, दिल्ली के साथ उनके कार्यालय में अधीक्षण अभियन्ता, विद्युत परिषण मण्डल, गाजियाबाद एवं अधोहस्ताक्षरकर्ता के साथ वार्ता की गई थी। जिसमें उनके द्वारा 220 के०वी० द्विपथ लाईन पर लगे टावरों की भूमि के अनापत्ति प्रमाण पत्र एम०सी०डी० द्वारा निर्गत किये गये पत्र को उपलब्ध कराने के लिये कहा गया था।

यह द्विपथ लाईन दिल्ली मेट्रो रेल कारपोरेशन लि० द्वारा वर्ष 2015-16 में बनायी गई थी। जिसको उपमहाप्रबन्धक/ई/यू०सी०, दिल्ली मेट्रो रेल कारपोरेशन लि०, फ्रेन्क एन्थोनी पब्लिक स्कूल, लाला लाजपत राय मार्ग, लाजपत नगर-चतुर्थ, नई दिल्ली ने अपने पत्रांक DMRC/ELECT/Ph.-III/UD/UPPTCL/2016 दिनांक 01.07.2016 के द्वारा अधिसासी अभियन्ता, विद्युत पारिषण खण्ड-प्रथम, उ०प्र०पा०ख०प्र०/गा०बाद, गाजियाबाद को हस्तांतरित की गई थी।

इस सम्बन्ध में संयुक्त महाप्रबन्धक/ई/, दिल्ली मेट्रो रेल कारपोरेशन लि०, फ्रेन्क एन्थोनी पब्लिक स्कूल, लाला लाजपत राय मार्ग, लाजपत नगर-चतुर्थ, नई दिल्ली ने अपने पत्रांक DMRC/ELECT/Ph.-III/UD/UPPTCL/ दिनांक 13.06.2022 के द्वारा प्रदान किया गया अनापत्ति प्रमाण पत्र (छायाप्रति संलग्न) इस कार्यालय के पत्रांक 635/विपाख-प्र/गा०बाद दिनांक 16.06.2022 के द्वारा संलग्न कर क्षतिपूर्ति कराने के लिये उपलब्ध करा दिया गया है।



कार्यालय  
अधिशायी अभियन्ता  
उ० प्र० पावर ट्रांसमिशन कारपोरेशन लि०  
विद्युत पारेषण खण्ड-प्रथम  
132 केवी उपकेन्द्र लाल कुआँ  
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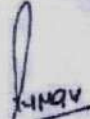


OFFICE OF THE  
EXECUTIVE ENGINEER  
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132 KV S/S LAL KUAN BSR Rd.  
Ghaziabad  
E-mail ID: ceetd1gzb@upptel.org  
Cin-U40101UP2004SGC028687  
GSTIN.-09AAACU8823E1Z9

इस सम्बन्ध में दिनांक 30.06.2022 को मुख्य अभियन्ता (Project & Dems), सिविक सेन्टर, दिल्ली नगर निगम, मीन्टो रोड, दिल्ली के कार्यालय में अधोहस्ताक्षरकर्ता द्वारा वार्ता कर क्षतिपूर्ति हेतु अनुरोध किया गया है।

इस द्विपथ लाईन के द्वारा अब उ० प्र० एवं दिल्ली के बीच आपातकालीन स्थिति में विद्युत का आदान-प्रदान क्षतिग्रस्त टावर व लाईन के पुनः निर्माण के उपरान्त ही किया जाना सम्भव हो सकेगा।

अतः आपसे अनुरोध है कि आप भी अपने स्तर से क्षतिग्रस्त टावर व लाईन के पुनः निर्माण के लिये दिल्ली नगर निगम से क्षतिपूर्ति प्रदान करने हेतु आवश्यक कार्यवाही करने का कष्ट करें।

  
(सतेन्द्र कुमार)  
अधिशायी अभियन्ता

पत्रांक / विपाख-प्र/गा०बाद तद दिनांक

प्रतिलिपि निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित हैं।

1. मुख्य अभियन्ता (पा०पं०) उ० प्र० पा० ट्रा० का० लि०, पारेषण भवन, 130-डी, विक्टोरिया पार्क, मेरठ।
2. मुख्य अभियन्ता (Project & Dems), सिविक सेन्टर, दिल्ली नगर निगम, मीन्टो रोड, दिल्ली।
3. अधीक्षण अभियन्ता, विद्युत पारेषण मण्डल, गाजियाबाद।
4. अधिशायी अभियन्ता, विद्युत पारेषण खण्ड-द्वितीय, नोएडा।

(सतेन्द्र कुमार)  
अधिशायी अभियन्ता

Status of performance indices report of April 2024		
S. No.	Utility	Status of Protection Performance Indices
1	PGCIL	Received (NR-3)
2	NTPC	Not Received
3	BBMB	Received (Transmission)
4	THDC	Received
5	SJVN	Not Received
6	NHPC	Received
7	NPCIL	Received from RAP (1-8), NAP (1-2)
8	DTL	Received
9	HVPNL	Received
10	RRVPNL	Received
11	UPPTCL	Received combinedly
12	PTCUL	Not Received
13	PSTCL	Received
14	HPPTCL	Received
15	IPGCL	Not Received
16	HPGCL	Not Received
17	RRVUNL	Received
18	UPRVUNL	Received from DTPS Anpara
19	UJVNL	Received (Khodri, chibro, vyasi, Dharasu)
20	HPPCL	Not Received
21	PSPCL	Not Received
22	HPSEBL	Not Received
23	Prayagraj Power Generation Co. Ltd.	Not Received
24	Aravali Power Company Pvt. Ltd	Received
25	Apraava Energy Private Limited	Received
26	Talwandi Sabo Power Ltd.	Not Received
27	Nabha Power Limited	Received
28	Lanco Anpara Power Ltd	Not Received
29	Rosa Power Supply Company Ltd	Received
30	Lalitpur Power Generation Company Ltd	Received
31	MEJA Urja Nigam Ltd.	Not Received
32	Adani Power Rajasthan Limited	Received (Kawai)
33	JSW Energy Ltd. (KWHEP)	Not Received
34	AESL	Received (MTSCL)
35	Tata Power Renewable Energy Ltd.	Received
36	UT of J&K	Not Received
37	UT of Ladakh	Not Received
38	UT of Chandigarh	Not Received
39	ATIL, BKTL, FBTL	Not Received
40	INDIGRID	Received
41	POWERLINK	Not Received
42	ADHPL	Received
43	Sekura Energy Limited	Not Received
44	WUPPTCL	Received
45	SEUPPTCL	Not Received
46	Vishnuprayag Hydro Electric Plant (I.P.)	Not Received
47	Alaknanda Hydro Electric Plant (GVK)	Not Received

Status of performance indices report of May 2024		
S. No.	Utility	Status of Protection Performance Indices
1	PGCIL	Not Received
2	NTPC	Not Received
3	BBMB	Not Received
4	THDC	Received (Tehri HEP)
5	SJVN	Not Received
6	NHPC	Not Received
7	NPCIL	Received (RAP- 1-6), NAP (1-2)
8	DTL	Not Received
9	HVPNL	Received
10	RRVPNL	Not Received
11	UPPTCL	Received
12	PTCUL	Received
13	PSTCL	Not Received
14	HPPTCL	Not Received
15	IPGCL	Not Received
16	HPGCL	Not Received
17	RRVUNL	Received (DCCPP- Dholpur, KSTPS-Kota, CTPP-CHHABRA, STPS Suratgarh )
18	UPRVUNL	Received (DTPS-Anpara)
19	UJVNL	Received (Dharshu, Uttrakashi)
20	HPPCL	Not Received
21	PSPCL	Not Received
22	HPSEBL	Not Received
23	Prayagraj Power Generation Co. Ltd.	Not Received
24	Aravali Power Company Pvt. Ltd	Received
25	Apraava Energy Private Limited	Not Received
26	Talwandi Sabo Power Ltd.	Not Received
27	Nabha Power Limited	Received
28	Lanco Anpara Power Ltd	Not Received
29	Rosa Power Supply Company Ltd	Received
30	Lalitpur Power Generation Company Ltd	Received
31	MEJA Urja Nigam Ltd.	Not Received
32	Adani Power Rajasthan Limited	Received (Kawai)
33	JSW Energy Ltd. (KWHEP)	Not Received
34	AESL	Not Received
35	Tata Power Renewable Energy Ltd.	Received
36	UT of J&K	Not Received
37	UT of Ladakh	Not Received
38	UT of Chandigarh	Not Received
39	ATIL, BKTL, FBTL	Received (ATIL)
40	INDIGRID	Received
41	POWERLINK	Not Received
42	ADHPL	Received
43	Sekura Energy Limited	Not Received
44	WUPPTCL	Received
45	SEUPPTCL	Not Received
46	Vishnuprayag Hydro Electric Plant (J.P.)	Not Received
47	Alaknanda Hydro Electric Plant (GVK)	Not Received



**Status of Protection Audit Plan for FY 2024 -25**

S. No.	NRPC Member	Category	Status
1	PGCIL	Central Government owned Transmission Company	Received (NR-1,3)
2	NTPC	Central Generating Company	Received
3	BBMB		Received
4	THDC		Received
5	SJVN		
6	NHPC		Received
7	NPCIL		
8	DTL		State Transmission Utility
9	HVPNL	Received	
10	RRVNL		
11	UPPTCL	Received for Jhansi, Lucknow, Meerut zone	
12	PTCUL	Received	
13	PSTCL		
14	HPPTCL	Received	
15	IPGCL	State Generating Company	
16	HPGCL		
17	RRVUNL		Received
18	UPRVUNL		
19	UJVNL		
20	HPPCL		
21	PSPCL		State Generating Company & State owned Distribution Company
22	HPSEBL	Distribution company having Transmission connectivity ownership	
23	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Received
24	Aravali Power Company Pvt. Ltd		
25	Apraava Energy Private Limited		Received
26	Talwandi Sabo Power Ltd.		
27	Nabha Power Limited		
28	Lanco Anpara Power Ltd		
29	Rosa Power Supply Company Ltd		
30	Lalitpur Power Generation Company Ltd		Received
31	MEJA Urja Nigam Ltd.		
32	Adani Power Rajasthan Limited		Received (Kawai)
33	JSW Energy Ltd. (KWHEP)		
34	AESL	Other Transmission licensee	
35	Tata Power Renewable Energy Ltd.	IPP having less than 1000 MW installed capacity (alphabetical rotaional basis)	
36	UT of J&K	UT of Northern Region	
37	UT of Ladakh		
38	UT of Chandigarh		
39	ATIL	Other transmission licensee in NR	
40	INDIGRID		Received
41	POWERLINK		
42	ADHPL		Received
43	Sekura Energy Limited		
44	WUPPTCI	Other transmission licensee in UP	
45	SEUPPTCL	Other transmission licensee in UP	
46	Vishnuprayag Hydro Electric Plant (J.P.)	Other Generating Units in UP	
47	Alaknanda Hydro Electric Plant (GVK)	Other Generating Units in UP	

**Status of 3rd Party Protection Audit Plan**

S. No.	NRPC Member	Category	Status	Schedule submitted as per utility	Present Status Completed (yes/no)
1	PGCIL	Central Government owned Transmission Company			
2	NTPC	Central Generating Company	Received (Tanda)	By 17.07.2025	
3	BBMB				
4	THDC				
5	SJVN				
6	NHPC				
7	NPCIL				
8	DTL		State Transmission Utility		
9	HVPNL				
10	RRVPNL				
11	UPPTCL				
12	PTCUL				
13	PSTCL				
14	HPPTCL				
15	IPGCL	State Generating Company			
16	HPGCL				
17	RRVUNL				
18	UPRVUNL		Received (DTPS-Anpara)	01.05.2024	
19	UJVNL				
20	HPPCL				
21	PSPCL	State Generating Company & State owned Distribution Company			
22	HPSEBL	Distribution company having Transmission connectivity ownership			
23	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity			
24	Aravali Power Company Pvt. Ltd				
25	Apraava Energy Private Limited		Received	By May, 2025	
26	Talwandi Sabo Power Ltd.				
27	Nabha Power Limited				
28	Lanco Anpara Power Ltd				
29	Rosa Power Supply Company Ltd		Received	By 30.09.2024	
30	Lalitpur Power Generation Company Ltd				
31	MEJA Urja Nigam Ltd.				
32	Adani Power Rajasthan Limited		Received (Kawai)	September, 2024	
33	JSW Energy Ltd. (KWHEP)				
34	AESL	Other Transmission licensee			
35	Tata Power Renewable Energy Ltd.	IPP having less than 1000 MW installed capacity (alphabetical rotational basis)			
36	UT of J&K	UT of Northern Region			
37	UT of Ladakh				
38	UT of Chandigarh				
39	ATIL	Other transmission licensee in NR			
40	INDIGRID				
41	POWERLINK				
42	ADHPL		Received	30.09.2024	
43	Sekura Energy Limited				
44	WUPPTCI	Other transmission licensee in UP	Received	2023-24	
45	SEUPPTCL	Other transmission licensee in UP			
46	Vishnuprayag Hydro Electric Plant (J.P.)	Other Generating Units in UP			
47	Alaknanda Hydro Electric Plant (GVK)	Other Generating Units in UP			



# उत्तर क्षेत्रीय विद्युत समिति

## NORTHERN REGIONAL POWER COMMITTEE



# Protection Philosophy/Protocol of Northern Region

*(developed in compliance of IEGC 2023)*

**~~Version: 2.0~~**

*~~(approved in 71st NRPC meeting held on 29.01.2024)~~*

**~~January 2024~~**

*Protection Philosophy/Protocol of Northern Region  
(approved in 71st NRPG meeting held on 29.01.2024)*

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## 1. Transmission line & Cable

S.N.	Protection Setting/ Protocol	Mandated Setting for transmission lines
1	Protection Scheme	<p><b>220kV and above:</b> Independent Main-I and Main-II protection (of different make OR different type/different algorithm) of non-switched numerical type is to be provided with carrier aided scheme.</p> <p><b>132kV and below:</b> One non-switched distance protection scheme and, directional over current and earth fault relays, should be provided as back up.</p>
2	Distance Protection Zone-1	<p>Reach: 80% of the protected line; 110% of the protected line (In case of radial lines)</p> <p>Time Setting: Instantaneous.</p>
3	Distance Protection Zone-2	<p>Reach: Single Circuit Line: 120% of length of principle line section. Double circuit line: 150% coverage of line to take care of under reaching due to mutual coupling effect.</p> <p>Time setting:</p> <ul style="list-style-type: none"> <li>i. 0.35 second <i>(considering LBB time of 200mSec, CB open time of 60ms, resetting time of 30ms and safety margin of 60ms)</i></li> <li>ii. 0.5-0.6 second <i>(For a long line followed by a short line)</i></li> </ul>

*Protection Philosophy/Protocol of Northern Region  
(approved in 71st NRPG meeting held on 29.01.2024)*

<b>4</b>	<b>Distance Protection Zone-3</b>	<p>Reach: Zone-3 should overreach the remote terminal of the longest adjacent line by an acceptable margin (typically 20% of highest impedance seen) for all fault conditions.</p> <p>Time Setting: 800-1000 msec</p> <p>If zone-3 reach transcends to other voltage level, time may be taken upto 1.5 sec.</p>
<b>5</b>	<b>Distance Protection Zone- 4</b>	<p>The Zone-4 reverse reach must adequately cover expected levels of apparent bus bar fault resistance. Time may be coordinated accordingly.</p> <p>Where Bus Bar protection is not available, time setting: 160 msec.</p>
<b>6</b>	<b>Power Swing Blocking</b>	<p>Block tripping in all zones, all lines.</p> <p>Out of Step tripping to be applied on all inter-regional tie lines.</p> <p>Deblock time delay = 2s</p>
<b>7</b>	<b>Protection for broken conductor</b>	<p>Negative Sequence current to Positive Sequence current ratio more than 0.2 (i.e. <math>I_2/I_1 \geq 0.2</math>)</p> <p>Alarm Time delay: 3-20 sec.</p> <p>Tripping may be considered for radial lines to protect single phasing of transformers.</p>
<b>8</b>	<b>Switch on to fault (SOTF)</b>	<p>Switch on to fault (SOTF) function to be provided in distance relay to take care of line energization on fault.</p>
<b>9</b>	<b>VT fuse fail detection function</b>	<p>VT fuse fail detection function shall be correctly set to block the distance function operation on VT fuse failure.</p>
<b>10</b>	<b>Carrier Protection</b>	<p>To be applied on all 220kV and above lines with the only exception of radial feeders.</p>

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*(approved in 71st NRPC meeting held on 29.01.2024)*

<b>11</b>	<b>Back up Protection</b>	1. On 220kV and above lines with 2 Main Protections: <ul style="list-style-type: none"><li>• Back up Earth Fault protections alone to be provided.</li><li>• No Over current protection to be applied.</li></ul> 2. At 132kV and below lines with only one Main protection: <ul style="list-style-type: none"><li>• Back up protection by IDMT O/C and E/F to be applied.</li></ul>
<b>12</b>	<b>Auto Reclosing with dead time.</b>	AR shall be enabled for 220 kV and above lines for single pole trip and re-closing. Dead time = 1.0s. Reclaim time = 25.0s  Auto-recloser shall be blocked for following: <ul style="list-style-type: none"><li>i. faults in cables</li><li>ii. Breaker Fail Relay</li><li>iii. Line Reactor Protections</li><li>iv. O/V Protection</li><li>v. Received Direct Transfer trip signals</li><li>vi. Busbar Protection</li><li>vii. Zone 2/3 of Distance Protection</li><li>viii. Circuit Breaker Problems.</li></ul> CB Pole discrepancy relay time: 1.5 sec; for tie breaker: 2.5 sec

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<b>13</b>	Line Differential	<p>For cables and composite lines, line differential protection with built in distance back up shall be applied as Main-I protection and distance relay as Main-II protection.</p> <p>For very short line (less than 10 km), line differential protection with distance protection as backup (built- in Main relay or standalone) shall be provided mandatorily as Main-I and Main-II.</p> <p>Differential protection may be done using dark fiber (preferably), or using bandwidth.</p>
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<b>14</b>	<b>Over Voltage Protection</b>	<p>FOR 765kV LINES/CABLE:</p> <p>Low set stage (Stage-I): 106% - 109% (typically 108%) with a time delay of 5 seconds. High set stage (Stage-II): 140% - 150% with a time delay of 100 milliseconds.</p> <p>400kV LINES/CABLE:</p> <p>Low set stage (Stage-I): 110% - 112% (typically 110%) with a time delay of 5 seconds. High set stage (Stage-II): 140% - 150% with a time delay of 100 milliseconds.</p> <p>FOR 220 KV LINES:</p> <p>No over-voltage protection shall be used.</p> <p>FOR 220 KV CABLE:</p> <p>Low set stage (Stage-I): 110% - 112% (typically 110%) with a time delay of 5 seconds. High set stage (Stage-II): 140% - 150% with a time delay of 100 milliseconds.</p> <p>Drop-off to pick-up ratio of overvoltage relay: better than 97%</p> <p>Grading: Voltage as well as time grading may be done for multi circuit lines/cable.</p>
<b>15</b>	<b>Resistive reach setting to prevent load point encroachment</b>	<p>Following criteria may be considered for deciding load point encroachment:</p> <ul style="list-style-type: none"><li>• Maximum load current (<math>I_{max}</math>) may be considered as 1.5 times the thermal rating of the line or 1.5 times the associated bay equipment current</li></ul>

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(approved in 71st NRPC meeting held on 29.01.2024)*

		<p>rating (the minimum of the bay equipment individual rating) whichever is lower. (Caution: The rating considered is approximately 15minutes rating of the transmission facility).</p> <ul style="list-style-type: none"> <li>• Minimum voltage (<math>V_{min}</math>) to be considered as 0.85pu (85%).</li> </ul>
<b>16</b>	<b>Direct Inter-trip</b>	<p>To be sent on operation of following:</p> <ol style="list-style-type: none"> <li>i. Overvoltage Protection</li> <li>ii. LBB Protection</li> <li>iii. Busbar Protection</li> <li>iv. Reactor Protection</li> <li>v. Manual Trip (400 kV and above)</li> <li>vi. Cable Fault (in composite lines)</li> </ol>
<b>17</b>	<b>Permissive Inter-trip</b>	To be sent on operation of Distance Protection

## 2. Series Compensated lines

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*(approved in 71st NRPC meeting held on 29.01.2024)*

<b>1</b>	<b>Lines with Series and other compensations in the vicinity of Substation</b>	<ul style="list-style-type: none"> <li>• Zone-1:FSC end: 60% of the protected line. Time: Instantaneous; Remoted end: 60% of the protected line with 100ms-time delay. POR Communication scheme logic is modified such that relay trips instantaneously in Zone-1 on carrier receive.</li> <li>• Zone-2: 120 % of uncompensated line impedance for single circuit line. For Double circuit line, settings may be decided on basis of dynamic study in view of zero sequence mutual coupling.</li> <li>• Phase locked voltage memory is used to cope with the voltage inversion. Alternatively, an intentional time delay may be applied to overcome directionality problems related to voltage inversion.</li> <li>• over-voltage stage-I setting for series compensated double circuit lines may be kept higher at 113%.</li> </ul>
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### 3. Busbar protection

<b>1</b>	<b>Busbar protection</b>	To be applied on all 220kV and above sub stations with the only exception of 220kV radial fed bus bars.
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### 4. Local Breaker Back-up

*Protection Philosophy/Protocol of Northern Region*

*(approved in 71st NRPC meeting held on 29.01.2024)*

<b>1</b>	<b>Local Breaker Backup (LBB)</b>	For 220 kV and above level substations as well as generating stations switchyards, LBB shall be provided for each circuit breaker. LBB Current sensor $I > 20\% I_n$ LBB time delay = 200ms In case of variation in CT ratio, setting may be done accordingly.
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## 5. Power Transformer

### 5.1 Differential Protection

1	Id min (sensitivity) i.e. multiple of trans. HV side rated current	Default: 0.3 pu Or If tap range is -X% to +Y%, then (X+Y)% may be kept as setting.
2	First Slope	around 10%. In case of differential relay with only two slopes, this slope is considered as zero.
3	Second Slope	15% to 25%
4	Third Slope	60% to 80%
5	Unrestrained operation level	10.0 pu special care shall be taken in order to prevent unwanted operation of transformer differential IED for through-faults due to different CT saturation of "T-connected" CTs. In such cases, unrestrained operational level may be taken as 20-25pu.
6	Max. ratio of 2nd harm. to fundamental harm dif. curr. in %	I2/I1Ratio = 15%
7	Max. ratio of 5th harm. to fundamental harm dif. curr. in %	I5/I1Ratio = 25%
8	Second and fifth harmonics restrain feature	Enabled
9	Cross block feature	Enabled

### 5.2 Restricted earth fault (REF) protection

1	Pick up current (IREF)	10% of Full load current (IFL).
2	Stabilizing resistor (RSTAB)	stabilizing resistor (RSTAB) is obtained by dividing stabilizing voltage (VSTAB) by pick-up current. Stabilizing voltage $VSTAB = IF \times (RCT + 2RL)$ $RSTAB = VSTAB / IREF$ Where: IF = Maximum through fault current, RCT = CT resistance, RL = CT circuit lead resistance.

### 5.3 Over Current Protection

1	Scheme	To be implemented on both sides of ICT
2	Low set Directional	Pick up: 125-150% of full load current Characteristics: IDMT Co-ordination: to be coordinated with distance relay zone 3 settings of outgoing feeders.
3	High Set Non-Directional	Pick Up: 110-130% of the through fault level of the transformer Characteristics: DT; 50 to 100msec

### 5.4 Earth Fault Protection

1	Scheme	To be implemented on both sides of ICT
2	Low set Directional	Pickup: 20-80% of rated full load current Characteristics: IDMT Co-ordination: to be coordinated with earth fault relay setting of outgoing feeders.
3	High Set Non-Directional	Pick Up: 110-130% of the through fault level of the transformer Characteristics: DT; 50 to 100msec

### 5.5 Overexcitation protection:

Shall be provided on both HV and LV sides as below:

U/F %	Time set (s)
110	9000
118	90
126	49.5
134	18
142	4
150	1



## 6. Shunt Reactor protection

### 6.1 Differential Protection

1	Id min (sensitivity) i.e. multiple of trans. HV side rated current	Default: 0.3 pu Or If tap range is -X% to +Y%, then (X+Y)% may be kept as setting.
2	First Slope	around 10%. In case of differential relay with only two slopes, this slope is considered as zero.
3	Second Slope	15% to 25%
4	Third Slope	60% to 80%
5	Unrestrained operation level	10.0 pu special care shall be taken in order to prevent unwanted operation of transformer differential IED for through-faults due to different CT saturation of "T-connected" CTs. In such cases, unrestrained operational level may be taken as 20-25pu.
6	Max. ratio of 2nd harm. to fundamental harm dif. curr. in %	I2/I1Ratio = 15%
7	Max. ratio of 5th harm. to fundamental harm dif. curr. in %	I5/I1Ratio = 25%
8	Second and fifth harmonics restrain feature	Enabled
9	Cross block feature	Enabled

### 6.2 Impedance/ Zone protection

1	Setting	60% of reactor impedance
2	Time setting	1 sec

### 6.3 Phase overcurrent

1	DT	setting of 2.5 times rated current with a time delay of 0.1s
2	IDMT	1.5 times of rated current

### 6.4 REF/ Residual OC

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**National Load Despatch Centre**  
**Import of Punjab Transfer Capability for**  
**Jun-24**

Issue Date: 29-05-2024

Issue Time: 15:00

Revision No. 2

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC)	Reliability Margin	Available Transfer Capability (ATC)	Approved GNA (MW)	Margin Available for T-GNA (MW)	Changes in TTC w.r.t. Last Revision	Comments
1st June 2024 to 31st June 2024	00-24	10000	500	9500	5497	4003	500	Commissioning of 400/220kV Dhanansu ICT1 and forced outage of LehraMohabbat Unit 2
<b>Limiting Constraints</b>		1. N-1 contingency of 400/220KV ICTs at Rajpura, Ludhiana, Muktsar. 2. Loading close to N-1 contingency limits of 400/220kV Patran, Malerkotla, Dhanansu and Jalandhar ICTs 3. 220 kV underlying network at Jalandhar, Ludhiana and Amritsar 4. Punjab SLDC to ensure minimum internal generation above 5000MW for this ATC/TTC.						

**National Load Despatch Centre  
Import Capability of Uttar Pradesh for**

**Jun-24**

01-06-2024

Issue Date: 29-05-2024

Issue Time: 1600

Revision No. 2

<b>Date</b>	<b>Time Period in IST (hrs)</b>	<b>Total Transfer Capability (TTC) (MW)</b>	<b>Reliability Margin (MW)</b>	<b>Available Transfer Capability (ATC) (MW)</b>	<b>Approved General Network Access (MW)</b>	<b>Margin Available for Temporary General Network Access(MW)</b>	<b>Changes in TTC w.r.t. Last Revision</b>	<b>Comments</b>
1st June 2024 to 31st June 2024	00-24	16500	600	15900	9779	6121		<a href="https://www.upsldc.org/documents/20182/0/ttc_atc_24-11-16/4c79978e-35f2-4aef-8c0f-7f30d878dbde">https://www.upsldc.org/documents/20182/0/ttc_atc_24-11-16/4c79978e-35f2-4aef-8c0f-7f30d878dbde</a>
<b>Limiting Constraints</b>		N-1 contingency of 400/220kV Azamgarh, Allahabad(PG), Gorakhpur (UP), Sarnath, Lucknow (PG) ICTs						

**National Load Despatch Centre  
Import Capability of Haryana for**

**Jun-24**

01-06-2024

Issue Date: 29-05-2024

Issue Time: 1600

Revision No. 2

<b>Date</b>	<b>Time Period in IST (hrs)</b>	<b>Total Transfer Capability (TTC) (MW)</b>	<b>Reliability Margin (MW)</b>	<b>Available Transfer Capability (ATC) (MW)</b>	<b>Approved General Network Access (MW)</b>	<b>Margin Available for Temporary General Network Access(MW)</b>	<b>Changes in TTC w.r.t. Last Revision</b>	<b>Comments</b>
1st June 2024 to 31st June 2024	00-24	9336	250	9086	5418	3668		<a href="https://hvpn.org.in/#/atcttc">https://hvpn.org.in/#/atcttc</a>
<b>Limiting Constraints</b>		N-1 contingency of 400/220kV ICTs at Deepalpur and Panipat(BBMB)						

**National Load Despatch Centre  
Import Capability of Rajasthan for**

**Jun-24**

01-06-2024

Issue Date: 29-05-2024

Issue Time: 1600

Revision No. 2

<b>Date</b>	<b>Time Period in IST (hrs)</b>	<b>Total Transfer Capability (TTC) (MW)</b>	<b>Reliability Margin (MW)</b>	<b>Available Transfer Capability (ATC) (MW)</b>	<b>Approved General Network Access (MW)</b>	<b>Margin Available for Temporary General Network Access(MW)</b>	<b>Changes in TTC w.r.t. Last Revision</b>	<b>Comments</b>
1st June 2024 to 31st June 2024	00-24	7600	600	7000	5689	1311		<a href="https://sldc.rajasthan.gov.in/rrvpnl/scheduling/download">https://sldc.rajasthan.gov.in/rrvpnl/scheduling/download</a>
<b>Limiting Constraints</b>		N-1 contingency of 400/220kV Heerapura, Jodhpur, Bikaner, Ajmer, Merta, Hindaun and Bhinmal ICTs						



**National Load Despatch Centre**  
**Import Capability of Delhi for**

**Jun-24**

01-06-2024

Issue Date: 29-05-2024

Issue Time: 1600

Revision No. 2

<b>Date</b>	<b>Time Period in IST (hrs)</b>	<b>Total Transfer Capability (TTC) (MW)</b>	<b>Reliability Margin (MW)</b>	<b>Available Transfer Capability (ATC) (MW)</b>	<b>Approved General Network Access (MW)</b>	<b>Margin Available for Temporary General Network Access(MW)</b>	<b>Changes in TTC w.r.t. Last Revision</b>	<b>Comments</b>
1st June 2024 to 31st June 2024	00-24	7300	300	7000	4810	2190		<a href="https://www.delhisldc.org/resources/atctcreport.pdf">https://www.delhisldc.org/resources/atctcreport.pdf</a>
<b>Limiting Constraints</b>		N-1 contingency of 400/220kV Mundka, HarshVihar and Bawana (bus-split) ICTs.						

**National Load Despatch Centre  
Import Capability of HP for**

**Jun-24**

01-06-2024

Issue Date: 29-05-2024

Issue Time: 1600

Revision No. 2

<b>Date</b>	<b>Time Period in IST (hrs)</b>	<b>Total Transfer Capability (TTC) (MW)</b>	<b>Reliability Margin (MW)</b>	<b>Available Transfer Capability (ATC) (MW)</b>	<b>Approved General Network Access (MW)</b>	<b>Margin Available for Temporary General Network Access(MW)</b>	<b>Changes in TTC w.r.t. Last Revision</b>	<b>Comments</b>
1st June 2024 to 31st June 2024	00-24	1680	100	1580	1130	450		<a href="https://hpslhc.com/mrm_category/ttc-atc-report/">https://hpslhc.com/mrm_category/ttc-atc-report/</a>
<b>Limiting Constraints</b>		High loading of 220kV Hamirpur-Hamirpur D/C. Overloading of 2*200MVA Kuniyar transformers						

**National Load Despatch Centre  
Import Capability of Uttarakhand for**

**Jun-24**

01-06-2024

Issue Date: 29-05-2024

Issue Time: 1600

Revision No. 2

<b>Date</b>	<b>Time Period in IST (hrs)</b>	<b>Total Transfer Capability (TTC) (MW)</b>	<b>Reliability Margin (MW)</b>	<b>Available Transfer Capability (ATC) (MW)</b>	<b>Approved General Network Access (MW)</b>	<b>Margin Available for Temporary General Network Access(MW)</b>	<b>Changes in TTC w.r.t. Last Revision</b>	<b>Comments</b>
1st June 2024 to 31st June 2024	00-24	1700	100	1600	1402	198		<a href="https://uksldc.in/ttc-atc">https://uksldc.in/ttc-atc</a>
<b>Limiting Constraints</b>	N-1 contingency of 400/220kV Kashipur ICTs. High loading of 220kV Roorkee-Roorkee and 220kV CBGanj-Pantnagar lines							

**National Load Despatch Centre  
Import Capability of J&K for**

**Jun-24**

01-06-2024

Issue Date: 29-05-2024

Issue Time: 1600

Revision No. 2

<b>Date</b>	<b>Time Period in IST (hrs)</b>	<b>Total Transfer Capability (TTC) (MW)</b>	<b>Reliability Margin (MW)</b>	<b>Available Transfer Capability (ATC) (MW)</b>	<b>Approved General Network Access (MW)</b>	<b>Margin Available for Temporary General Network Access(MW)</b>	<b>Changes in TTC w.r.t. Last Revision</b>	<b>Comments</b>
1st June 2024 to 31st June 2024	00-24	2800	100	2700	1977	723		
<b>Limiting Constraints</b>		N-1 contingency of 400/220KV ICTs at Amargarh 220 kV underlying network at Amargarh, Wagoora						

**National Load Despatch Centre  
Import Capability of Chandigarh for**

**Jun-24**

01-06-2024

Issue Date: 29-05-2024

Issue Time: 1600

Revision No. 2

<b>Date</b>	<b>Time Period in IST (hrs)</b>	<b>Total Transfer Capability (TTC) (MW)</b>	<b>Reliability Margin (MW)</b>	<b>Available Transfer Capability (ATC) (MW)</b>	<b>Approved General Network Access (MW)</b>	<b>Margin Available for Temporary General Network Access(MW)</b>	<b>Changes in TTC w.r.t. Last Revision</b>	<b>Comments</b>
1st June 2024 to 31st June 2024	00-24	400	20	380	342	38		
<b>Limiting Constraints</b>		N-1 contingency of 220kV Nallagarh-Kishengarh						





ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड  
भारत सरकार का उद्यम  
GRID CONTROLLER OF INDIA LIMITED  
(A Government of India Enterprise)



[formerly Power System Operation Corporation Limited (POSOCO)]

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## (Report on Multiple elements tripping at 400/220kV Bikaner(RS))

1. **Date & Time of event:** 05:37 hrs on 28.05.2024

2. **Location/Control Area:** Rajasthan

3. **Plant/Substation Name:** 400/220kV Bikaner(RS)

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

5. **Antecedent Condition:**

- NR Load : 73388 MW
- Affected state load (Rajasthan) : 15407 MW
- Frequency : 50.03 Hz
- Weather condition : Normal
- IR exchange : 21920 MW

6. **Generation loss/Load loss:** Change in demand of approx. 620MW in Rajasthan Control area. (As per SCADA)

7. **Duration of interruption:** 01:01 (hh:mm) (Restoration time: 06:38 hrs); Energy unserved: 0.63MUs

8. **Tripped elements:**

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	400/220 kV 315 MVA ICT 1 at Bikaner(RS)	05:37 hrs	06:39 hrs	Over current protection operated
2.	400/220 kV 315 MVA ICT 2 at Bikaner(RS)		06:38 hrs	WTI protection operated

9. **Details of fault (if any):**

- i) Nature of fault: No fault in system as per PMU
- ii) Fault clearing time: NA

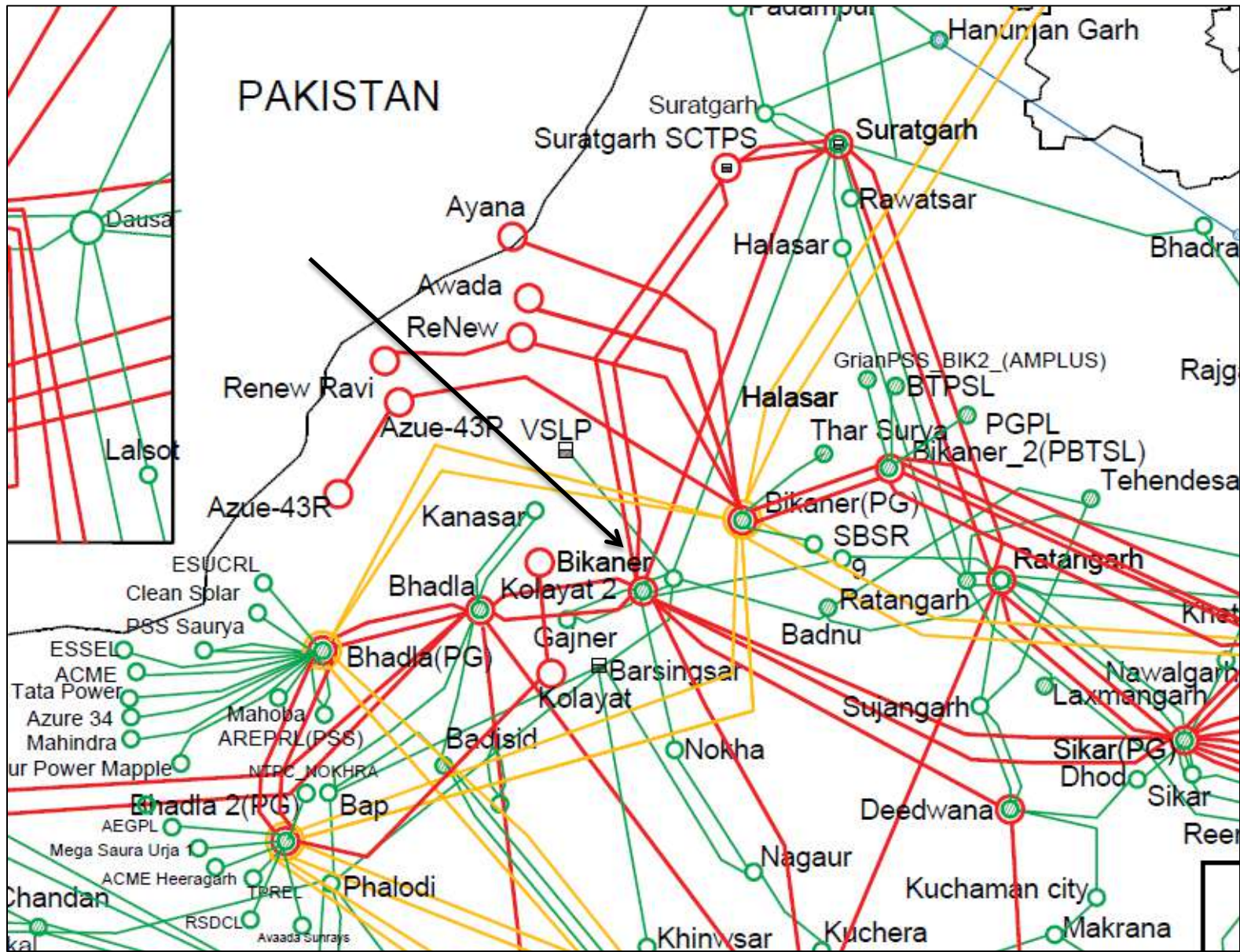
## **10. Brief description of event:**

- i) During antecedent condition, 400/220 kV 315 MVA ICT 1 and 500 MVA ICT 2 at Bikaner(RS) was carrying approx. 294MVA and 296MVA respectively. 220kV Bikaner-Dungargarh (RS) line was in open condition from Bikaner end.
- ii) As reported, at 05:37 hrs, 400/220 kV 315 MVA ICT 2 at Bikaner(RS) tripped on WTI (Winding Temperature Indicator) protection operation.
- iii) As per PMU at Bhadla(PG), no fault in system is observed.
- iv) Due to tripping of ICT-2, SPS implemented at Bikaner(RS) S/s related to overloading of remaining ICTs after tripping of any ICT operated. As per SPS scheme, 220kV Bikaner-Nokha (RS) line and 220kV Bikaner-Dungargarh (RS) line has to open. 220kV Bikaner-Nokha (RS) line (carrying ~140MW) opened on SPS operation.
- v) With the tripping of 400/220kV ICT-2, load shifted on 400/220kV ICT-1 and as 220kV Bikaner-Dungargarh (RS) line was already in open condition, after SPS operation sufficient load relief was not achieved. Thus, loading of ICT-1 remained in the range of ~400MVA.
- vi) Further, 400/220 kV 315 MVA ICT 1 at Bikaner(RS) also tripped on overcurrent protection operation.
- vii) As per SCADA, change in demand of approx. 620MW is observed in Rajasthan control area.
- viii) As reported, setting of WTI in ICT-2 has been revised from 85-90°C to 95-100°C.

## **11. Preliminary Observations:**

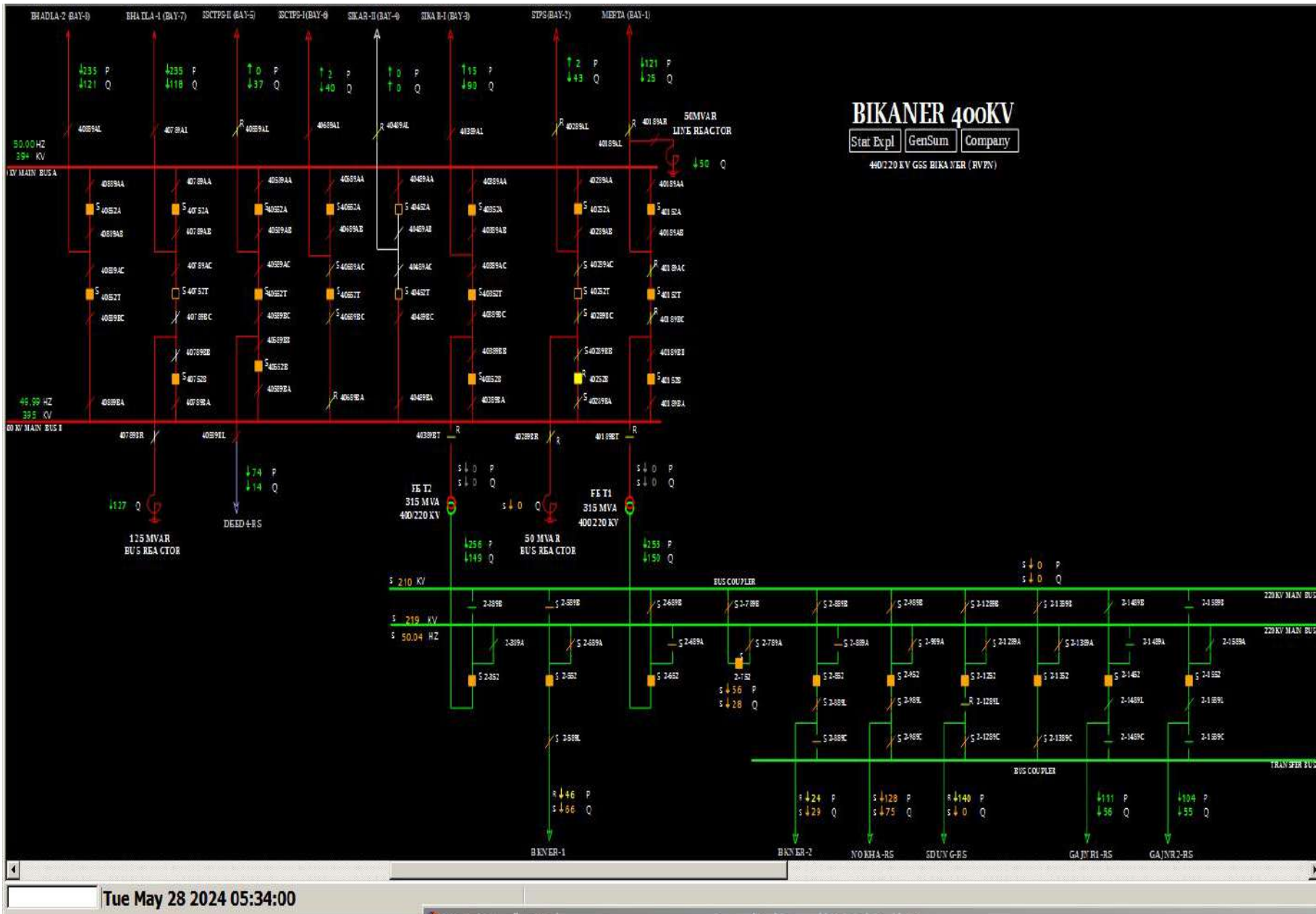
- i) Availability of feeders implemented in SPS logic need to be ensured and SPS scheme logic may be reviewed to ensure sufficient load relief on SPS operation.
- ii) Expeditious actions need to be taken to commission the new 400/220kV ICT at Bikaner(RS) to ensure N-1 compliance at 400/220kV Bikaner(RS) S/s.
- iii) SCADA data of 400/220kV Bikaner(RS) S/s was not healthy during the event. Availability and healthiness of SCADA data need to be ensured.
- iv) Remedial action taken report need to be shared.

# Network Diagram



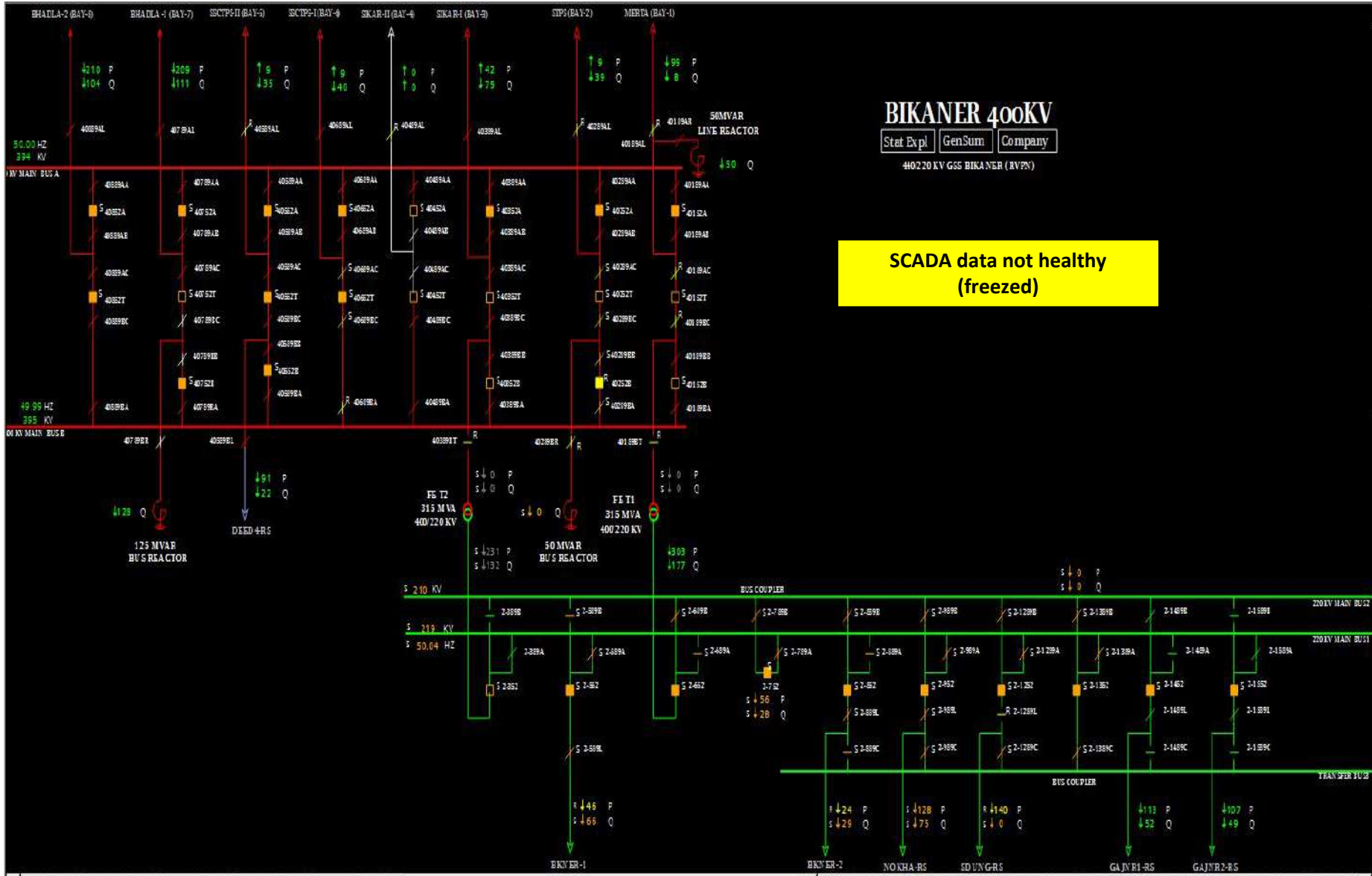


# SLD of 400/220kV Bikaner(RS) before the event



Tue May 28 2024 05:34:00

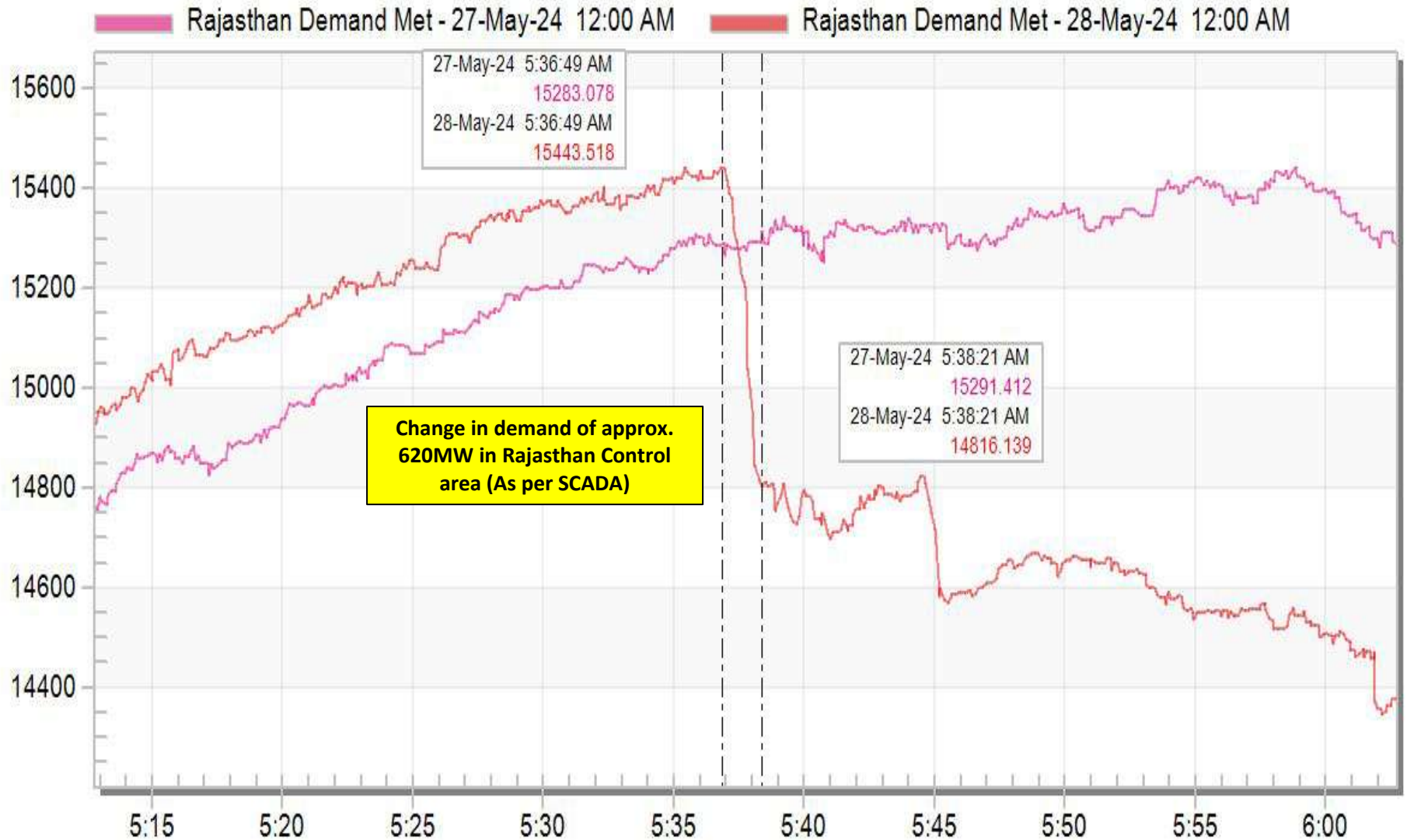
# SLD of 400/220kV Bikaner(RS) after the event





# Rajasthan Demand during the event

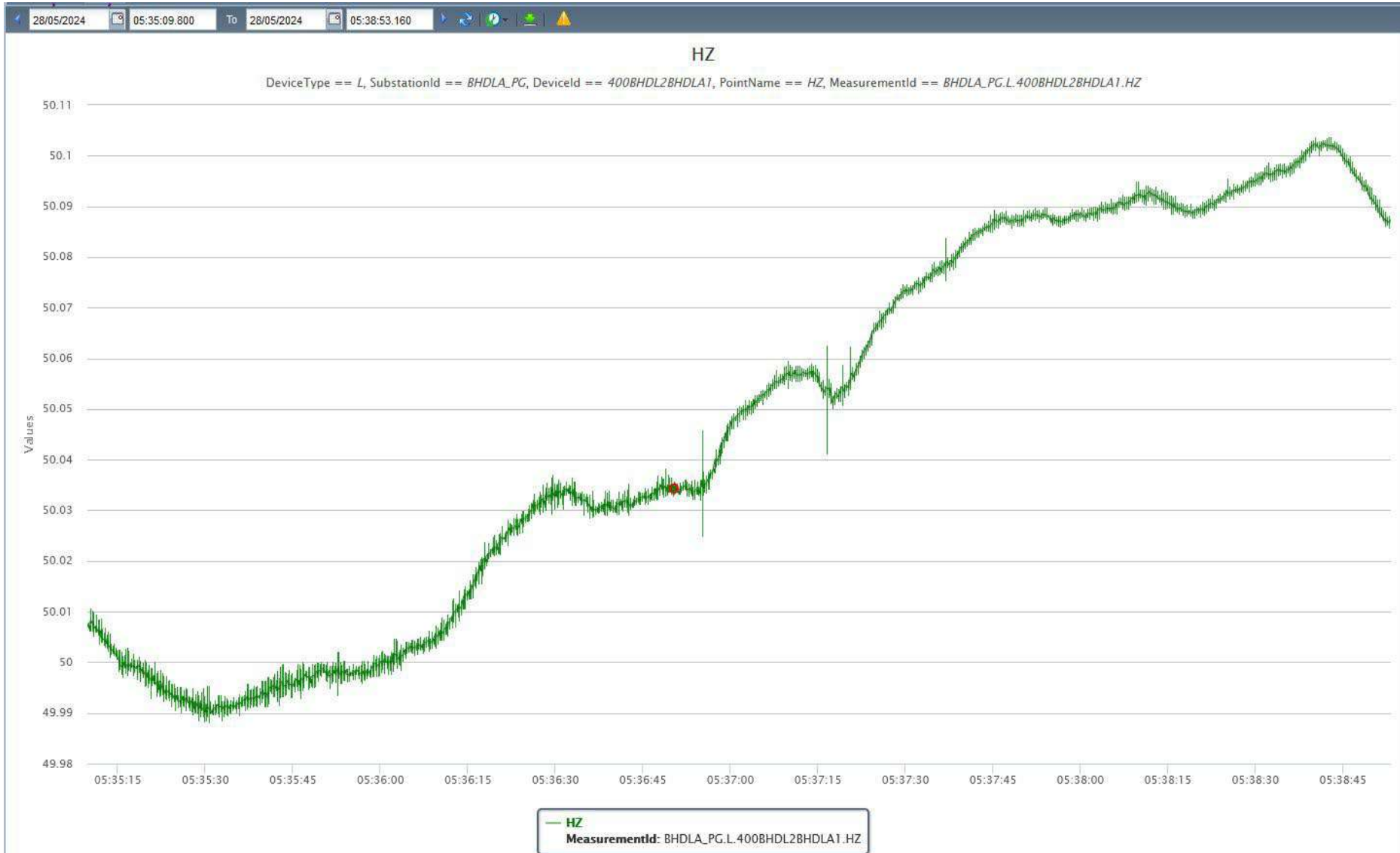
## Rajasthan Demand Met



May 27 Mon 2024

# PMU Plot of frequency at Bhadla(PG)

05:36 hrs/28-May-24



# PMU Plot of phase voltage magnitude at Bhadla(PG)

05:36 hrs/28-May-24

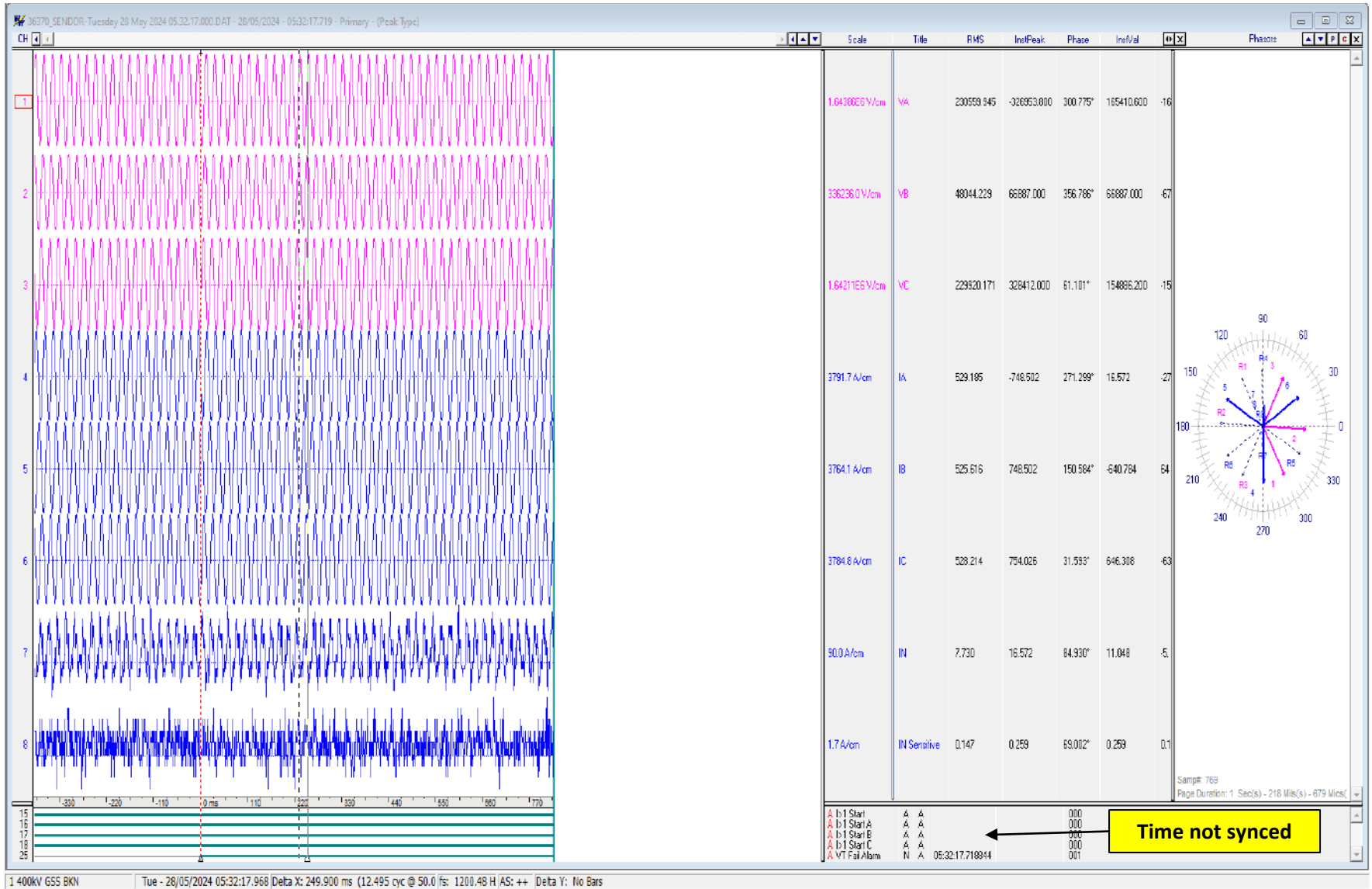
28/05/2024 05:36:10.200 To 28/05/2024 05:38:58.560

R Y B Phase Voltage



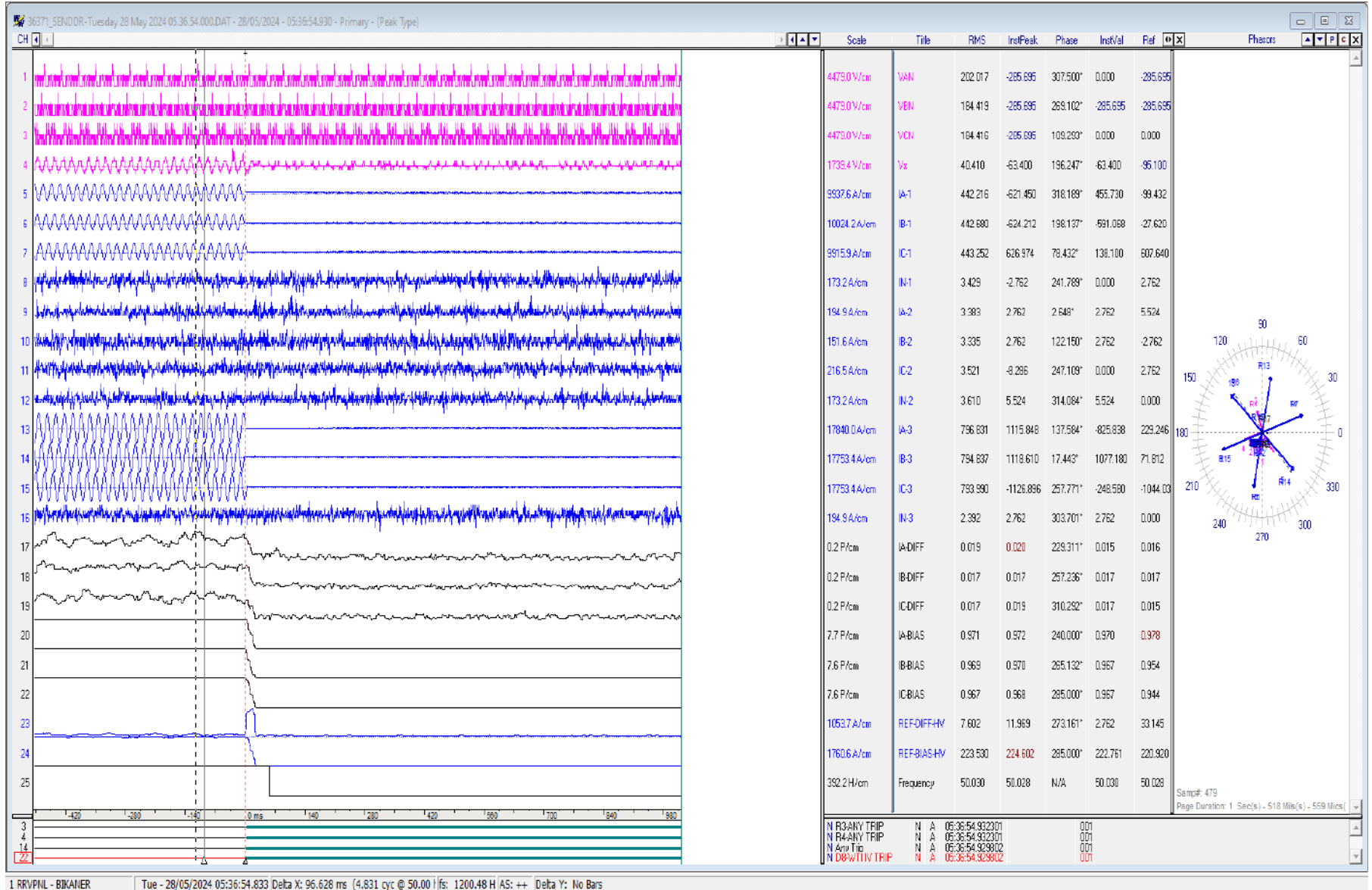
<b>VBM</b>	<b>VRM</b>	<b>YRM</b>
SubstationId: BHDLA_PG	SubstationId: BHDLA_PG	SubstationId: BHDLA_PG
DeviceId: 400BHDL28HDLA1	DeviceId: 400BHDL28HDLA1	DeviceId: 400BHDL28HDLA1

# DR of 400/220 kV 315 MVA ICT 1 at Bikaner(RS) (HV side)



✓ Overcurrent protection started (phase currents ~530A)

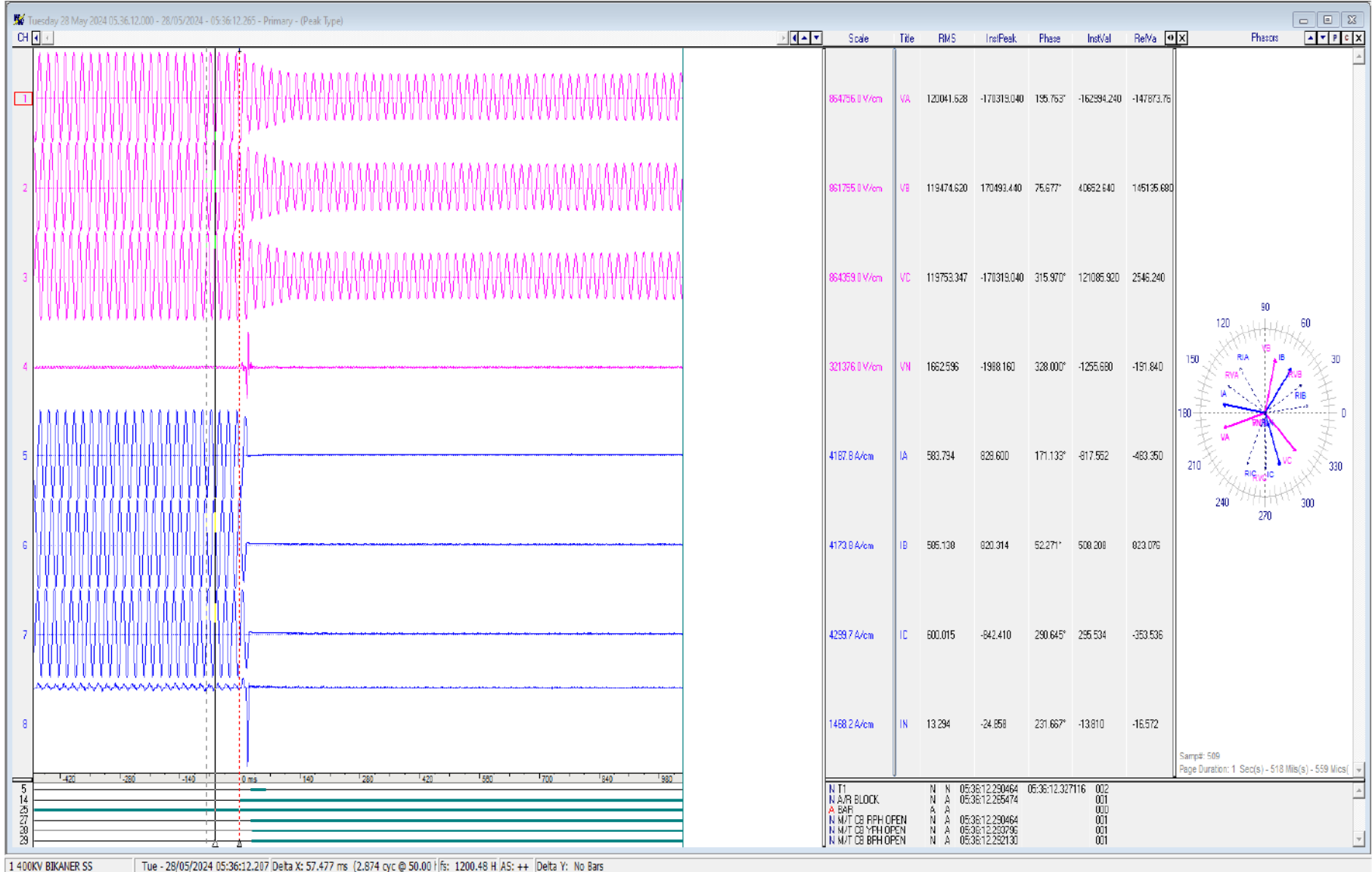
# DR of 400/220 kV 315 MVA ICT 2 at Bikaner(RS) (HV side)



✓ WTI protection started (phase currents during antecedent condition: ~440A)



# DR of 220kV Bikaner-Nokha (RS) line of Bikaner(RS) end



✓ 220kV Bikaner-Nokha (RS) line tripped on SPS operation

# SCADA SOE

Time	Station Name	Voltage	Element Name	Element Type	Element Status	Remarks
05:36:54,604	BIKANER400	400kV	24SIKAR1	Circuit Breaker	Open	Main & Tie CB at 400kV side of 400/220kV 315MVA ICT-2 at Bikaner(RS) opened
05:36:54,614	BIKANER400	400kV	09T2	Circuit Breaker	Open	
05:36:54,620	BIKANER400	220kV	04T2	Circuit Breaker	Open	CB at 220kV side of 400/220kV 315MVA ICT-2 at Bikaner(RS) opened
05:37:16,337	BIKANER400	400kV	14MER_T1	Circuit Breaker	Open	Main & Tie CB at 400kV side of 400/220kV 315MVA ICT-1 at Bikaner(RS) opened
05:37:16,338	BIKANER400	400kV	15T1	Circuit Breaker	Open	



ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड  
भारत सरकार का उद्यम  
GRID CONTROLLER OF INDIA LIMITED  
(A Government of India Enterprise)



[formerly Power System Operation Corporation Limited (POSOCO)]

उत्तर क्षेत्रीय भार प्रेषण केन्द्र / Northern Regional Load Despatch Centre

कार्यालय : 18-ए, शहीद जीत सिंह सनसनवाल मार्ग, कटवारिया सराय, नई दिल्ली-110016

Office : 18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi-110016

CIN : U40105DL2009GOI188682, Website : www.nrlc.in, E-mail : nrlc@grid-india.in, Tel: 011 26519406, 26523869, Fax: 011 26852747

## (Report on Multiple elements tripping at 400/220kV Bikaner(RS))

1. **Date & Time of event:** 10:43 hrs on 28.05.2024

2. **Location/Control Area:** Rajasthan

3. **Plant/Substation Name:** 400/220kV Bikaner(RS)

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

5. **Antecedent Condition:**

- NR Load : 81584 MW
- Affected state load (Rajasthan) : 16725 MW
- Frequency : 49.95 Hz
- Weather condition : Heat wave
- IR exchange : 15833 MW

6. **Generation loss/Load loss:** Change in demand of approx. 495MW in Rajasthan Control area. (As per SCADA)

7. **Duration of interruption:** 00:48 (hh:mm) (Restoration time: 11:31 hrs);  
Energy unserved: 0.39MUs

8. **Tripped elements:**

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	400/220 kV 315 MVA ICT 1 at Bikaner(RS)	10:43 hrs	11:31 hrs	Over current protection operated
2.	400/220 kV 315 MVA ICT 2 at Bikaner(RS)		11:32 hrs	

9. **Details of fault (if any):**

- i) Nature of fault: No fault in system as per PMU
- ii) Fault clearing time: NA

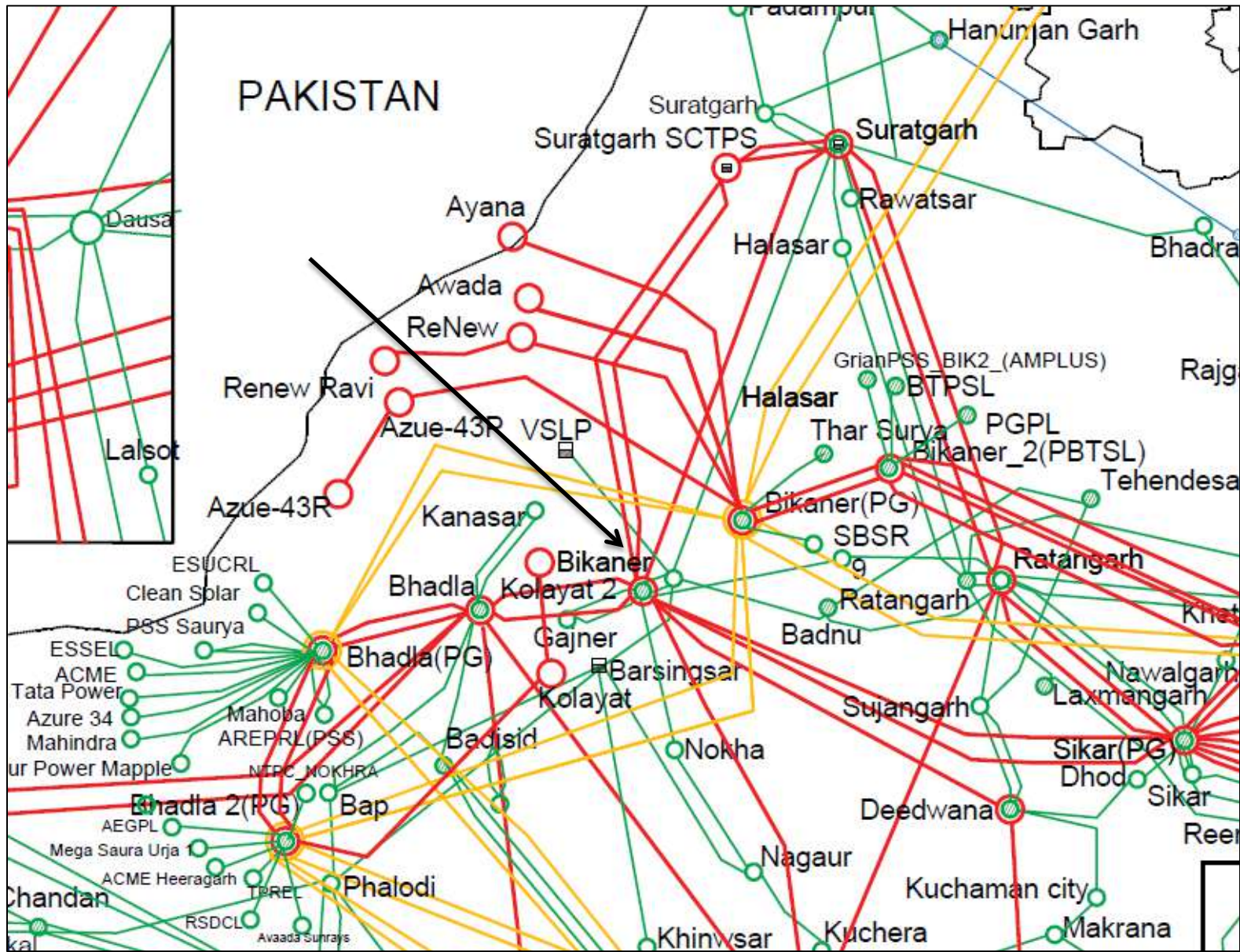
## 10. Brief description of event:

- i) During antecedent condition, 400/220 kV 315 MVA ICT 1 and 500 MVA ICT 2 at Bikaner(RS) were carrying approx. 300MVA. 220kV Bikaner-Dungargarh (RS) line was in open condition from Bikaner end.
- ii) As reported, at 10:43 hrs, 400/220 kV 315 MVA ICT 2 at Bikaner(RS) tripped on overcurrent protection operation.
- iii) From DR of 400/220 kV 315 MVA ICT 2 at Bikaner(RS) of HV side, it is observed that phase current were started increasing from 430A and reached till ~590A due to sudden increase in loading of 220kV Bikaner-Nokha (RS) line. Reason of sudden increase in loading of line is not identified yet.
- iv) As per PMU at Bhadla(PG), no fault in system is observed.
- v) Due to tripping of ICT-2, SPS implemented at Bikaner(RS) S/s related to overloading of remaining ICTs after tripping of any ICT operated. As per SPS scheme, 220kV Bikaner-Nokha (RS) line and 220kV Bikaner-Dungargarh (RS) line has to open. 220kV Bikaner-Nokha (RS) line opened on SPS operation. As per DR of 220kV Bikaner-Nokha (RS) line, phase current of line before tripping was in the range of ~680A.
- vi) With the tripping of 400/220kV ICT-2, load shifted on 400/220kV ICT-1 and as 220kV Bikaner-Dungargarh (RS) line was already in open condition, after SPS operation sufficient load relief was not achieved. Thus, loading of ICT-1 remained high (phase current increased from ~590A to ~770A after tripping of ICVT-2).
- vii) Further, 400/220 kV 315 MVA ICT 1 at Bikaner(RS) also tripped on overcurrent protection operation.
- viii) As per SCADA, change in demand of approx. 495MW is observed in Rajasthan control area.

## 11. Preliminary Observations:

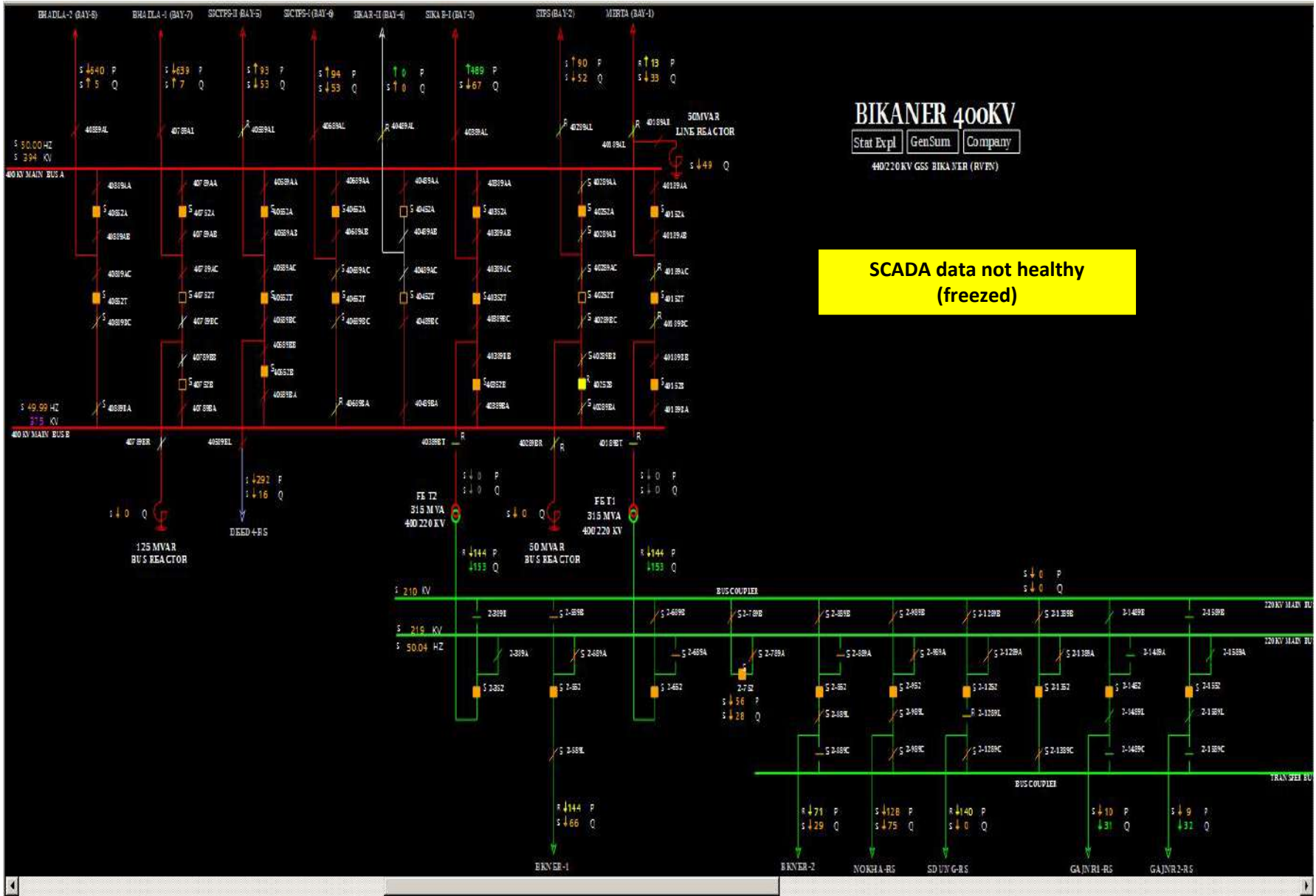
- i) Availability of feeders implemented in SPS logic need to be ensured and SPS scheme logic may be reviewed to ensure sufficient load relief on SPS operation.
- ii) Expeditious actions need to be taken to commission the new 400/220kV ICT at Bikaner(RS) to ensure N-1 compliance at 400/220kV Bikaner(RS) S/s.
- iii) SCADA data of 400/220kV Bikaner(RS) was not healthy during the event and elements tripping also not recorded in SCADA SOE. Availability and healthiness of SCADA data need to be ensured.
- iv) Remedial action taken report need to be shared.

# Network Diagram

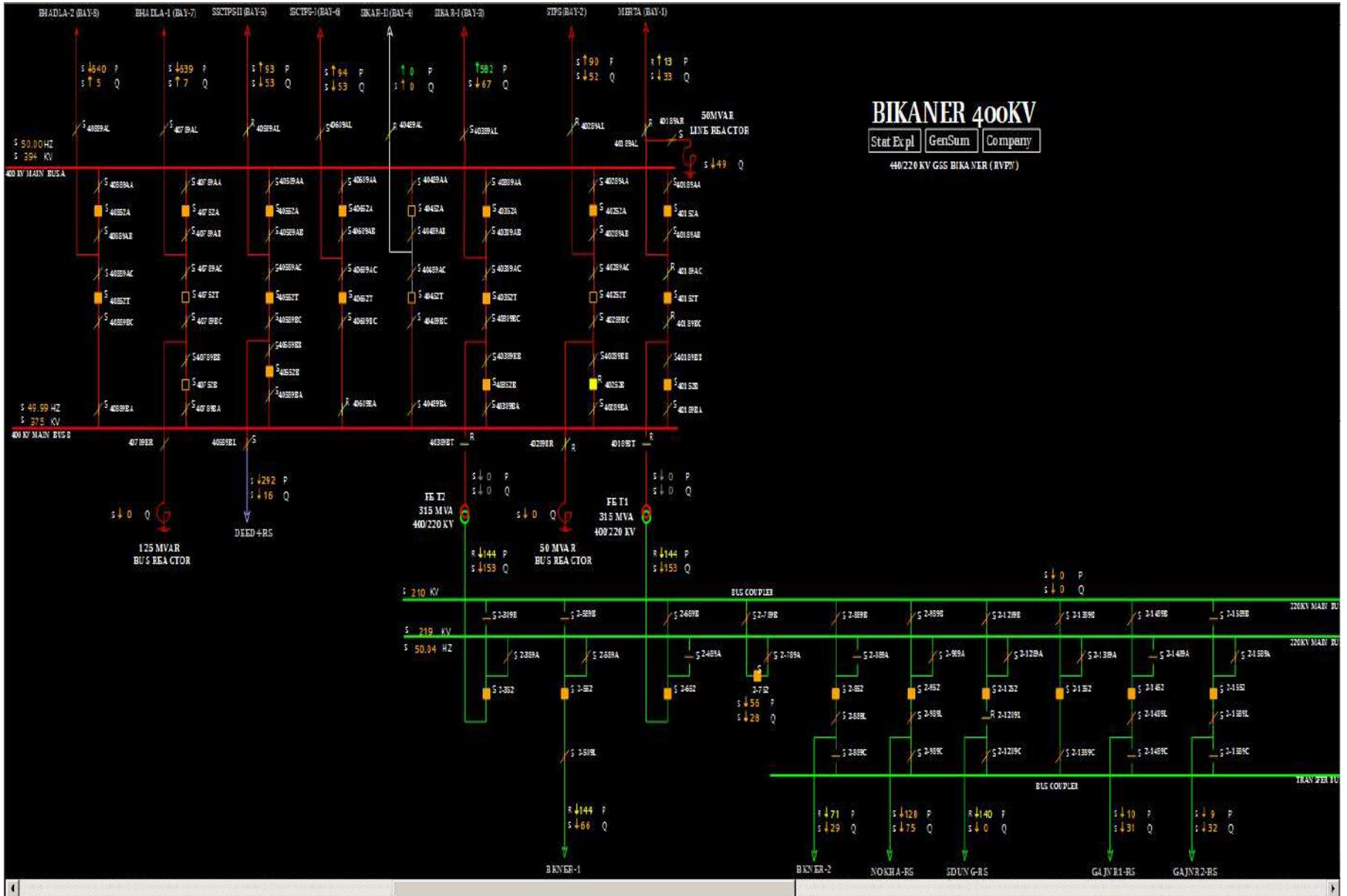




# SLD of 400/220kV Bikaner(RS) before the event

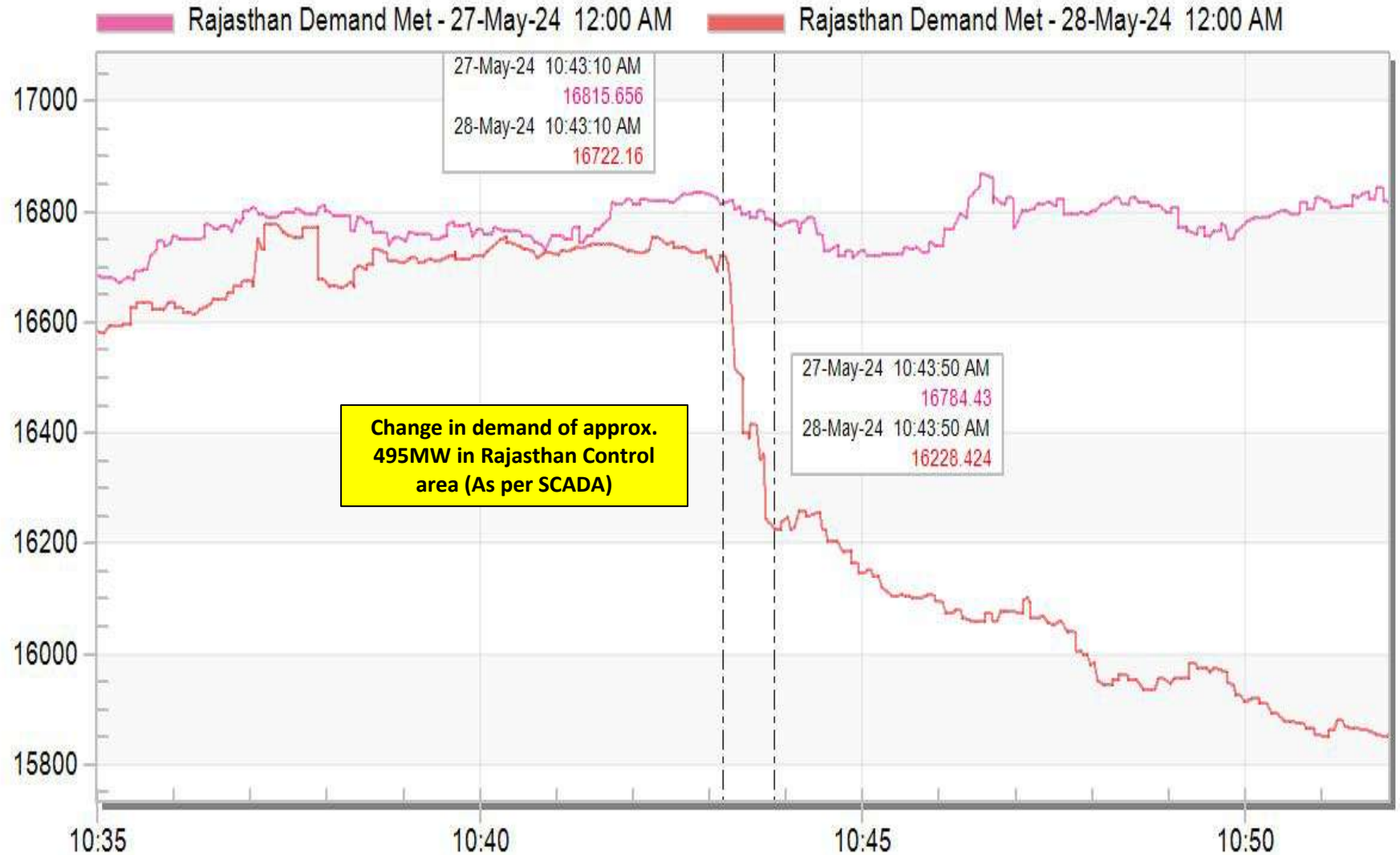


# SLD of 400/220kV Bikaner(RS) after the event



# Rajasthan Demand during the event

## Rajasthan Demand Met



May 27 Mon 2024

# PMU Plot of frequency at Bhadla(PG)

10:43 hrs/28-May-24



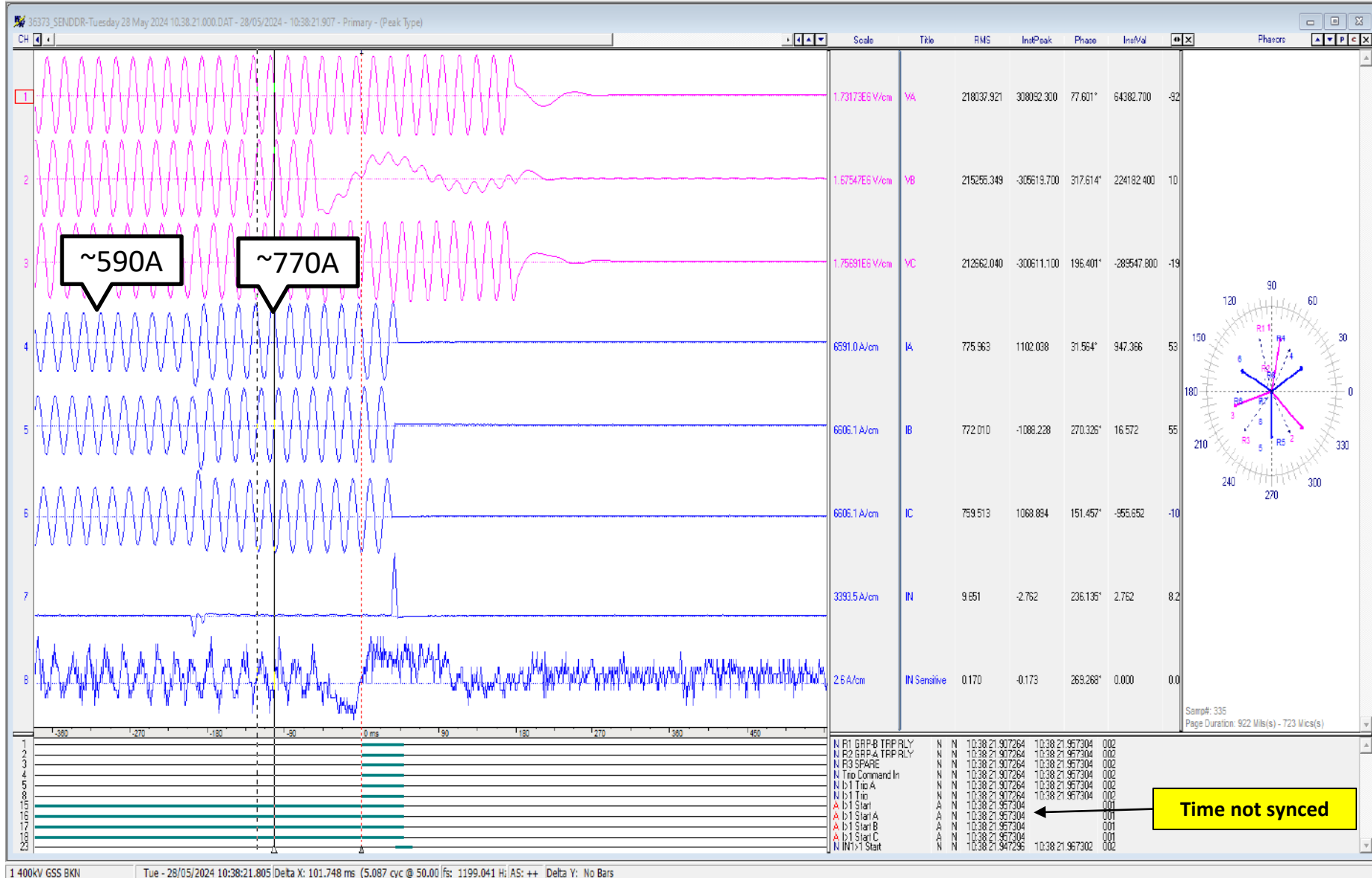
# PMU Plot of phase voltage magnitude at Bhadla(PG)

10:43 hrs/28-May-24



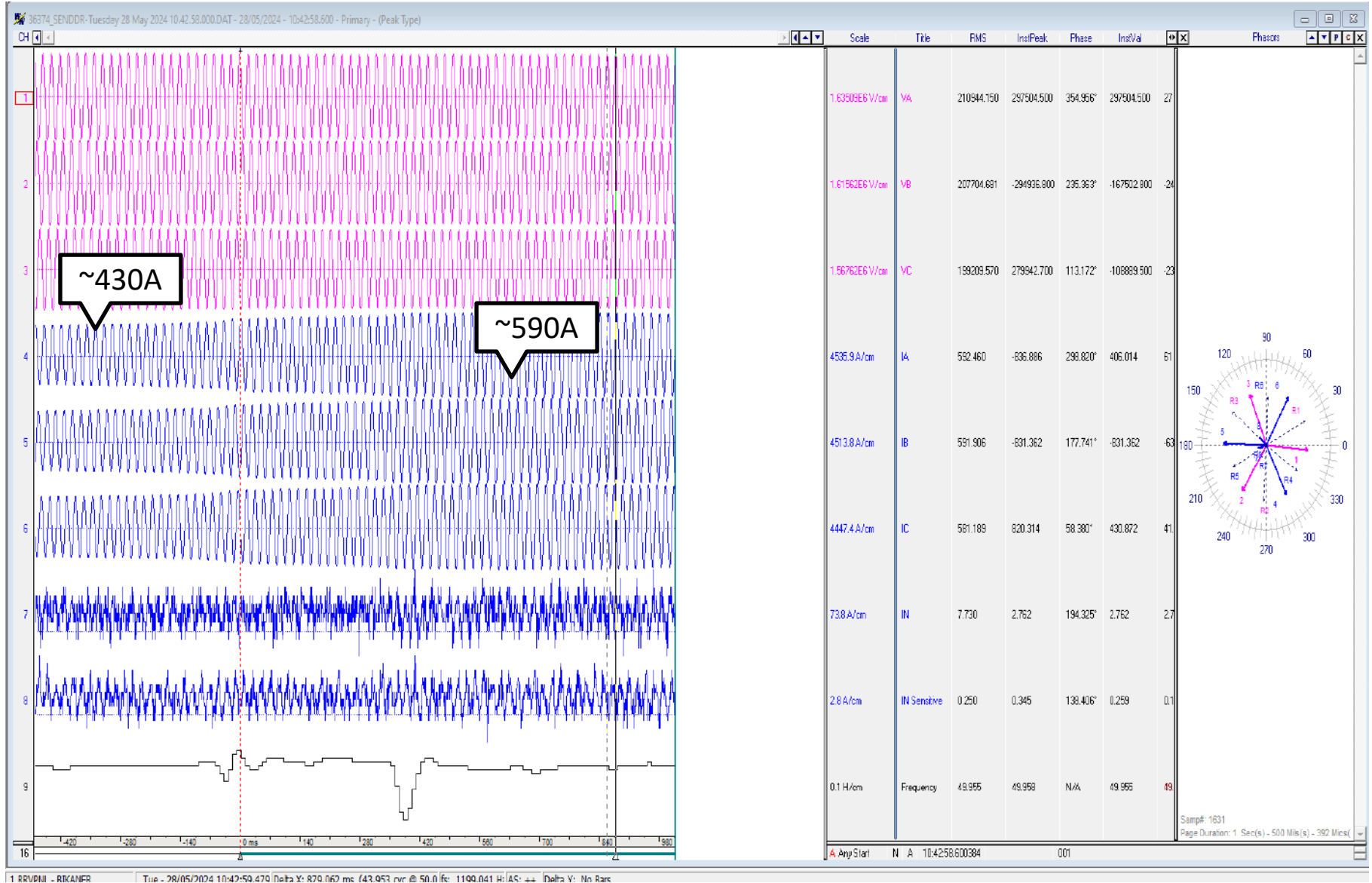


# DR of 400/220 kV 315 MVA ICT 1 at Bikaner(RS) (HV side)



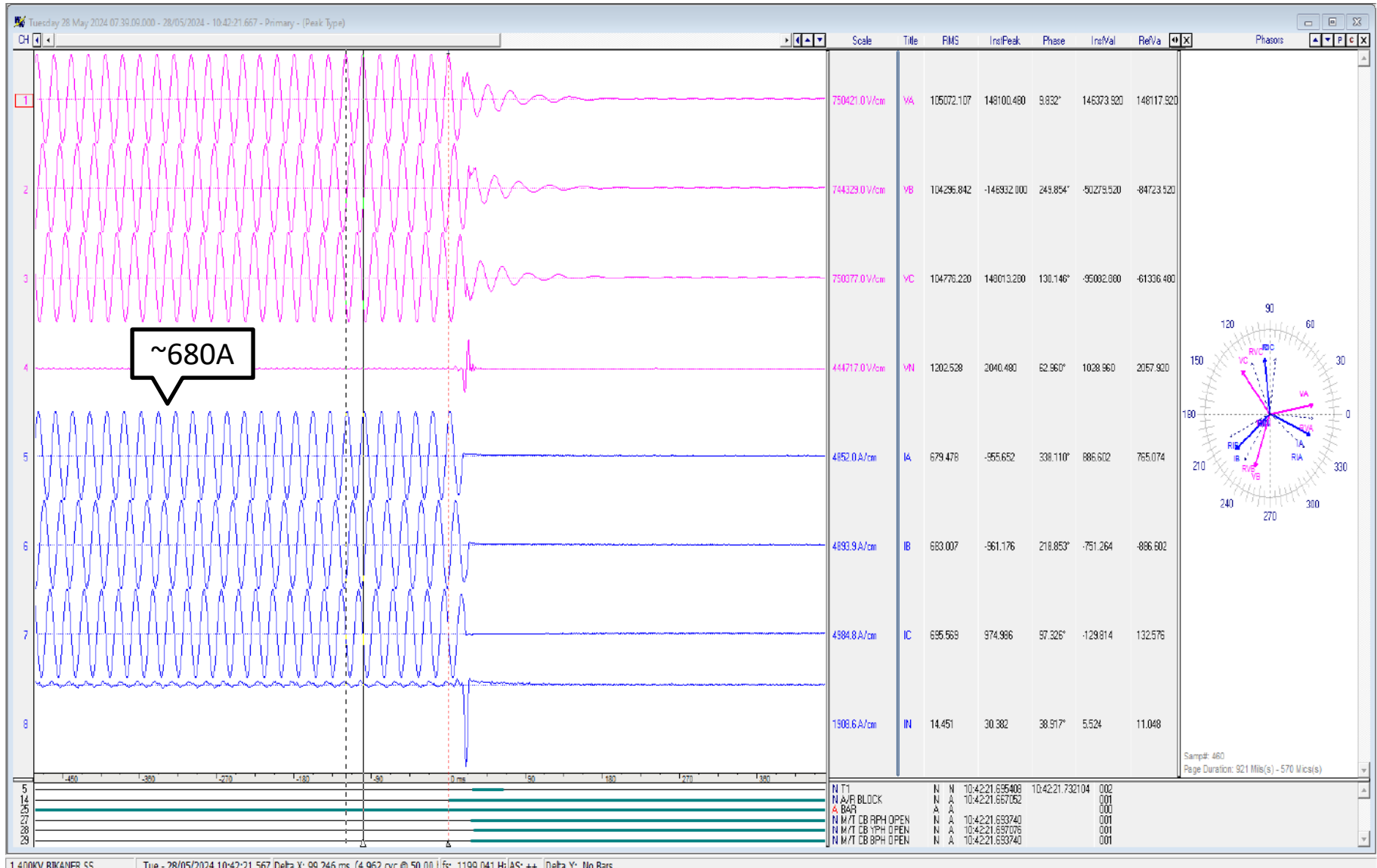
✓ ICT tripped on overcurrent protection operation

# DR of 400/220 kV 315 MVA ICT 2 at Bikaner(RS) (HV side)



✓ As reported, ICT tripped on overcurrent protection operation

# DR of 220kV Bikaner-Nokha (RS) line of Bikaner(RS) end



✓ 220kV Bikaner-Nokha (RS) line tripped on SPS operation

Sr No	Element Name	Outage Date	Outage Time	Reason
1	220 KV Amberi(RS)-Kankroli(PG) (RS) Ckt-1	04-May-24	15:00	Phase to earth fault B-N. As per PMU, B-N fault occurred, no auto-reclosing is observed. As per DR (of both ends), B-N fault with successful A/R operation from Amberi end and B-phase CB-pole opened from Kankroli end.
		07-May-24	12:20	Phase to earth fault B-N. As per PMU, B-N fault occurred and delayed clearance of 920ms with no auto-reclosing observed. As per DR (of Kankroli end), 3-phase fault is observed. As per DR (of Amberi end), B-N fault with successful A/R operation is observed. Date & Time are not synced in DR of Amberi end.
		22-May-24	12:28	Phase to earth fault B-N. As per PMU & DR (of Kankroli end), B-N phase to earth fault with unsuccessful A/R operation is observed. DR of Amberi end not received.
		22-May-24	13:58	Phase to earth fault B-N. As per PMU & DR (of both ends), B-N phase to earth fault with unsuccessful A/R operation is observed. At Amberi end, A/R operation is observed in both Y & B phases, A/R operation scheme need to be reviewed.
2	220 KV Baghpat(PG)-Shamli(UP) (UP) Ckt-1	04-May-24	11:02	Phase to earth fault B-N. As per PMU & DR (of both ends), B-N phase to earth fault is observed. As per PMU, no auto-reclosing is observed. DR (.dat/.cfg) file not received from both ends.
		12-May-24	10:16	Phase to earth fault R-N. As per PMU & DR (of both ends), R-N phase to earth fault is observed. As per PMU, no auto-reclosing is observed. DR (.dat/.cfg) file not received from both ends.
		12-May-24	13:20	Phase to earth fault R-N. As per PMU & DR (of both ends), R-N phase to earth fault is observed. As per PMU, no auto-reclosing is observed. DR (.dat/.cfg) file not received from both ends.
		17-May-24	13:40	Phase to Phase Fault Y-B. As per PMU & DR (of both ends), Y-B phase to phase fault with delayed clearance of 240msec is observed. DR (.dat/.cfg) file not received from Shamli end.
		27-May-24	13:30	Phase to earth fault B-N. As per PMU & DR (of both ends), B-N phase to earth fault with no A/R operation is observed. DR (.dat/.cfg) file not received from Shamli end.
		28-May-24	11:34	Phase to earth fault B-N. As per PMU & DR (of both ends), B-N phase to earth fault with no A/R operation is observed. DR (.dat/.cfg) file not received from Shamli end.
3	220 KV Debari(RS)-RAPS_A(NP) (RS) Ckt-1	06-May-24	12:27	Phase to earth fault B-N. As per PMU, no fault is observed. As per DR (Debari end), B-N phase to earth fault is observed. DR of RAPS_A end not received.
		13-May-24	12:18	Phase to earth fault B-N. As per PMU, B-N fault occurred, no auto-reclosing is observed. DR of both ends not received.
		13-May-24	14:30	Phase to earth fault B-N. As per PMU, no fault is observed. DR of both ends not received.
		17-May-24	21:54	Phase to earth fault B-N. As per PMU & DR (of Debari end), B-N phase to earth fault is observed. As per PMU, no auto-reclosing is observed. DR of RAPS_A end not received.
4	220 KV Duni(RS)-Kota(PG) (RS) Ckt-1	03-May-24	10:03	Phase to earth fault B-N. As per PMU & DR (of both ends), B-N phase to earth fault with unsuccessful A/R operation is observed. As per DRs, delayed fault clearance of 400msec is observed from Duni end. Time is not synced in DR of Duni end.
		19-May-24	08:27	Phase to earth fault B-N. As per PMU & DR (of both ends), B-N phase to earth fault with unsuccessful A/R operation is observed. As per DRs, R-phase CB pole didn't open after unsuccessful A/R operation from Duni end. Time is not synced in DR of Duni end.
		21-May-24	13:05	Phase to earth fault B-N. As per PMU & DR (of both ends), B-N phase to earth fault with unsuccessful A/R operation at Kota end and no auto-reclosing at Duni end is observed. Time is not synced in DR of Duni end.
		30-May-24	13:54	Phase to earth fault B-N. As per PMU & DR (of both ends), B-N phase to earth fault in reclaim time is observed from both ends.
		31-May-24	05:07	Transient fault. As per PMU, no fault is observed. DR of both ends not received.
5	220 KV Kaul (HV)-Kurukshehra(PG) (HVPNL) Ckt-2	21-May-24	03:00	Failure of CT. As per PMU, no fault is observed. As per DR (of both ends), 3-phase fault is observed. Time & Date are not synced in DR of Kaul end.
		22-May-24	18:52	Phase to earth fault B-N. As per PMU & DR (of both ends), Y-N fault occurred and delayed clearance of 520ms with no auto-reclosing observed. Time & Date are not synced in DR of Kaul end.
		26-May-24	21:00	Phase to earth fault R-N. As per PMU, no fault is observed. As per PMU & DR (of both ends), multiple faults (R-N followed by Y-N followed by Y-B followed by Y-N followed by R-Y faulty) observed. Time sync issue in DR of both ends.
		29-May-24	10:56	Operating Mechanism Faulty. As per PMU, no fault is observed. DR of both ends not received.

		31-May-24	04:02	Phase to earth fault R-N. As per PMU, R-N followed by R-Y fault observed. DR of both ends not received.
6	220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-2	03-May-24	08:29	Phase to earth fault Y-N. As per PMU, voltage dip in R & Y phases observed. As per DR (of Panipat end), Y-N fault with unsuccessful 3- phase A/R operation is observed. DR of Narela end not received. Time sync issue in DR of Panipat end.
		04-May-24	03:58	Phase to earth fault B-N. As per PMU & DR (of Panipat end), B-N phase to earth fault is observed. As per PMU, no auto-reclosing is observed. As per DR (of Panipat end), successful A/R operation at Panipat end and no A/R operation at Narela end is observed. DR of Narela end not received. Time is not synced in DR of Panipat end.
		10-May-24	21:15	Phase to earth fault R-N. As per PMU, B-N fault occurred and delayed clearance of 400ms with no auto-reclosing observed. As per DR (of Panipat end), no fault is observed. DR of Narela end not received. Date & Time are not synced in DR of Panipat end.
		12-May-24	04:38	Phase to earth fault Y-N. As per PMU, Y-N fault occurred, no auto-reclosing is observed. As per DR (of Panipat end), no fault is observed. DR of Narela end not received.
		27-May-24	17:20	Phase to earth fault Y-N. As per PMU, Y-N fault and unsuccessful auto-reclosing observed. As per DR (of Panipat end), no fault is observed. DR of Narela end not received.
7	220 KV Panipat-Kurushetra (BB) Ckt-1	10-May-24	21:15	Phase to earth fault R-N. As per PMU, B-N fault occurred and delayed clearance of 400ms with no auto-reclosing observed. As per DR (of Panipat end), Y-N fault occurred, successful autorecloing is observed. DR of Kurushetra end not received.
		13-May-24	10:29	Phase to earth fault R-N. As per PMU & DR (of Panipat end), R-N fault and unsuccessful auto-reclosing observed. DR of Kurushetra end not received.
		19-May-24	12:12	Phase to earth fault Y-N. As per PMU & DR (of Panipat end), Y-N fault and unsuccessful auto-reclosing observed. As per DR (of Panipat end), delayed clearance of fault is observed from Kurushetra end. DR of Kurushetra end not received.
		20-May-24	13:23	Phase to earth fault Y-N. As per PMU & DR (of Panipat end), Y-N fault and unsuccessful auto-reclosing observed. DR of Kurushetra end not received.
		28-May-24	12:30	Phase to Phase Fault R-Y. As per PMU, voltage dip in all 3 phases observed. As per DR(of Panipat end), Y-N phase to earth fault is observed with unsuccessful A/R at the time of auto-reclosing fault in R-phase is also observed (R-Y-N double phase to earth fault).
8	400 KV Bamnoli(DV)-Tughlakabad(PG) (DTL) Ckt-2	17-May-24	15:22	Phase to earth fault R-N. As per PMU & DR (of both ends), R-N fault and unsuccessful auto-reclosing observed.
		18-May-24	13:13	Phase to earth fault R-N. As per PMU & DR (of both ends), R-N fault and unsuccessful auto-reclosing observed.
		19-May-24	13:22	Phase to earth fault R-N. As per PMU & DR (of both ends), R-N fault and unsuccessful auto-reclosing observed.
		20-May-24	16:48	Phase to Ground Fault R-N. As per PMU & DR (of both ends), R-N fault and unsuccessful auto-reclosing observed.



## Grid Event summary for May 2024

S.No.	Category of Grid Disturbance (GD-1 to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserviced due to Generation loss (MU)	Energy Unserviced 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	GD-1	1) 220 KV Bhadla(PG)-ESUCRL_SL_BHD_PG (ESUCRL) (ESUCRL) Ckt	Rajasthan	PGCIL, ESUCRL	1-May-24	09:31	1-May-24	12:11	02:40	i)Generation of 220kV SBE6PL station evacuates through 220 KV Bhadla(PG)-ESUCRL_SL_BHD_PG (ESUCRL) (ESUCRL) Ckt. During antecedent condition, SBE6PL station was generating approx. 244MW (as per PMU). ii)As reported, at 09:31hrs, 220 KV Bhadla(PG)-ESUCRL_SL_BHD_PG (ESUCRL) (ESUCRL) Ckt tripped from Bhadla(PG) end only on B-N phase to earth fault (fault sensed in zone-1 at Bhadla(PG) end) with fault current of 7.8kA and fault distance of 9.8km from Bhadla(PG) end. iii)As per PMU at Bhadla(PG), Y-N phase to earth fault is observed with delayed fault clearing time of 360ms (Phase sequence issue is observed at Bhadla(PG) end).	0	0	244	0	0.439	0.000	55573	57450	360
2	GD-1	1)220 KV Sarna(PG)-Dasuya(PG) (PG) Ckt-1 2)220 KV Sarna(PG)-Dasuya(PG) (PG) Ckt-2 3)220 KV Sarna(PG)-Udhampur(PDD) (PDD) Ckt 4)220 KV Sarna(PG)- Hiranagar(PDD) (PDD) Ckt 5)220 KV Kishenpur(PG)-Sarna(PG) (PG) Ckt-1 6)220 KV Kishenpur(PG)-Sarna(PG) (PG) Ckt-2 7)220 KV Sarna(PG)- Wadala(PG) Ckt-1 8)220 KV Sarna(PG)- Wadala(PG) Ckt-2 9)220 KV Sarna(PG)- Wadala(PG) Ckt-3 10)220 KV Sarna(PG)- Wadala(PG) Ckt-4 11)220 KV Sarna(PG)- RSDPH(PG) Ckt-1 12)220 KV Sarna(PG)- RSDPH(PG) Ckt-2 13)220 KV Sarna(PG)- RSDPH(PG) Ckt-3 14)220 KV Sarna(PG)- RSDPH(PG) Ckt-4 15)220 KV Sarna(PG)- Railway Ckt	Punjab	PDD-JK, PSTCL, PGCIL	4-May-24	07:10	4-May-24	09:20	02:10	i)As reported, at 07:10 hrs, 220kV side R-Ph CT of 220/132kV Auto T/F-1 at Sarna(PG) blasted which created bus fault at both the 220kV buses at Sarna(PG). ii)Bus-bar protection is not available at Sarna(PG). Hence, all the 220kV lines connected to Sarna(PG) tripped on zone-4 protection operation at Sarna(PG) end and lines tripped from remote ends on zone-2 protection operation. From DR at Sarna(PG), it was observed that zone-4 operated after a delay of ~500ms. iii)Due to tripping of all the 220kV lines connected to Sarna(PG), complete blackout occurred at iv)As per PMU at Kishenpur(PG), R-N phase to earth fault with fault clearing time of 120ms followed by R-B phase to phase fault converted to R-Y phase to phase fault with delayed fault clearing time of 560ms is observed. v)As per SCADA, no change in demand is observed in Punjab control area. But as reported by SLDC-Punjab, load loss of approx. 90MW occurred in Punjab Control area. vi)As per SCADA, change in demand of approx. 40MW is observed in J&K control area. But as reported by SLDC-J&K, no load loss occurred in J&K Control area.	0	0.195	0	90	0.000	0.158	47911	57078	560
3	GI-1	1)210 MW Guru Gobind Singh TPS (Ropar) - UNIT 3 2)210 MW Guru Gobind Singh TPS (Ropar) - UNIT 4 3)210 MW Guru Gobind Singh TPS (Ropar) - UNIT 6 4)220kV GGSTPS(PG) - Mohali(PG) ckt 5)220kV GGSTPS(PG) - Kharar(PG) ckt 6)220kV GGSTPS(PG) - Bassi Pathana(PG) ckt 7)220kV GGSTPS(PG) - Gobindgarh1(PG) ckt-2 8)220kV GGSTPS(PG) - Gobindgarh1(PG) ckt-3	Punjab	PSTCL	5-May-24	08:11	5-May-24	09:30	01:19	i)220/132kV Ropar GGSTPS(PG) has main and transfer bus scheme at 220kV level. ii)As per SCADA, during antecedent condition, 210 MW Guru Gobind Singh TPS (Ropar) - UNIT 3, 4 & 6 were carrying approx. 186MW, 148MW & 198 MW respectively. Unit-3, Unit-6, 220kV feeders to Kharar, Mohali, Bassi Pathana & Gobindgarh ckt-2 & 3 were connected to 220kV main bus section-III. Rest of the elements were connected to main bus section-I & II. iii)As reported at 08:11 hrs, during the boxing up (due to boiler tube leakage) of Unit-4, blue phase pole lagged in opening of GT breaker which led to LBB operation. Due to LBB operation, all 220kV feeders (Gobindgarh1 ckt-2 & 3, Bassi Pathana ckt, Kharar ckt, Mohali ckt) and Unit-6 tripped as Unit-4 was running on the same section (Section-III). iv)Further, as reported, during the same time, due to tripping of ST-3 (exact reason yet to shared) all allied auxiliaries of Unit-3 tripped causing tripping of Unit-3. v)As per PMU at Jalandhar(PG), no fault is observed in the system. vi)As per SCADA, generation loss of approx. 615MW occurred at Ropar GGSTPS. vii)As per SCADA no load loss is observed in Punjab control area. viii) As reported, corrective action has been taken and both the trip coils of blue phase of GT breaker of Unit-4 were replaced.	0	0	615	0	1.220	0.000	50430	58722	NA
4	GD-1	1)220 KV Pithoragarh-Jauljivi (PG) Ckt-1 2)220 KV Pithoragarh-Jauljivi (PG) Ckt-2 3)220/132 KV 100 MVA ICT 1 at Pithoragarh(PG) 4)220/132 KV 100 MVA ICT 2 at Pithoragarh(PG)	Uttarakhand	PGCIL, PTCUL	6-May-24	16:47	6-May-24	17:30	00:43	i)As reported, at 16:47 hrs, 220 KV Pithoragarh-Jauljivi(PG) ckt-1 tripped during bad weather condition on R-N phase to earth fault with fault distance of ~17km from Pithoragarh end. A/R is kept off in the line as there is cable in some part of the line. ii)At the same time, 220kV Pithoragarh-Jauljivi ckt-2 also tripped from Jauljivi end only on maloperation of D60 relay. However, R-phase pole of ckt-2 at Jauljivi end got stuck and didn't open. Due to unavailability of one phase, there was unbalance in system and 220/132kV ICT-1&2 at Pithoragarh(PG) tripped on DEF protection. iii)With the tripping of 220/132kV ICT-1&2, 132kV Pithoragarh(PG)-Pithoragarh(Utt) ckt and 132kV Pithoragarh(PG)-Almora(Utt) ckt became dead due to loss of supply. iv)132kV Pithoragarh(Utt) was radially connected to Pithoragarh(PG) hence, load of Pithoragarh(Utt) got affected which restored at 17:42hrs on revival of 220/132kV ICTs at Pithoragarh(PG). v)132kV Almora have further connectivity from 132kV Bhawali (connected to 220/132kV Haldwani) and 132kV Ranikhet and Bageshwar (having small hydro at 33kV level). Hence, supply to 132kV Almora didn't affect during the event. vi)As per PMU, R-N phase to earth fault with fault clearing time of 80ms is observed. vii)As per SCADA, no load loss is observed in Uttarakhand control area. However, 13MW load loss at Pithoragarh(Utt) S/s is reported by Uttarakhand SLDC.	0	0.009	0	13	0.000	0.021	55223	63163	80
5	GI-1	1)66 MW Pong HPS - UNIT 1 2)66 MW Pong HPS - UNIT 3 3)220 KV Bairasul(NH)-Pong(BB) (PG) Ckt 4)220 KV Pong(BB)-Dasuya(PG) (BBMB) Ckt-1 5)220 KV Jalandhar-Pong (BB) Ckt-1 6)220KV Bus 1 at Pong(BB) 7)220/66kV 40MVA ICT-1 at Pong(BB)	Himachal Pradesh	BBMB, NHPC, PSTCL, PGCIL	6-May-24	06:18	6-May-24	08:49	02:31	i)During antecedent condition, 66MW Unit-1, 2 & 3 at Pong HEP were running and generating approx. 59MW, 65MW and 65MW respectively (as per SCADA). 66MW Unit-4, 5 & 6 at Pong HEP were not in service. Unit-1 & 3, 220/66kV 40MVA Transformer and 220kV feeders to Bairasul, Jalandhar ckt-1 and Dasuya ckt-1 were connected at 220kV Bus-1 and Unit-2 & 220kV feeders to Jessore, Jalandhar ckt-2 and Dasuya ckt-2 were connected at 220kV Bus-2. ii)As reported, during the stopping process of 66MW Unit-1 (as per schedule change at Pong(BB)), blue phase pole of Unit-1 CB lagged in opening and couldn't open properly which caused flashover in CB. iii)During the same time, LBB operated which led to tripping of all 220kV feeders (Bairasul ckt, Jalandhar ckt-1 and Dasuya ckt-1), 66MW Unit-3 & 220kV 40MVA ICT connected to Bus-1 and Bus-1 became dead. iv) As per PMU at Jalandhar(PG), no fault is observed in the system. v)As per SCADA, generation loss of approx. 124MW occurred at Pong(BB) HEP and no load loss is observed in HP control area.	0	0	124	0	0.260	0.000	47693	60730	NA
6	GD-1	1)400 KV Tehri(THDC)-Koteshwar(PG) (PG) Ckt-1 2)400 KV Tehri(THDC)-Koteshwar(PG) (PG) Ckt-2	Uttarakhand	THDC, PGCIL	6-May-24	16:59	6-May-24	18:09	01:10	i)400KV Tehri(THDC) has double main bus scheme. ii)During antecedent condition, 250 MW TEHRI HPS - UNIT-1, 2, 3 & 4 were not in service. So, total generation at TEHRI HPS was 0 MW. Power flow from 400 KV Tehri(THDC)-Koteshwar(PG) (PG) Ckt-1 & Ckt-2 was also 0MW. iii)As reported, at 16:59 hrs, Y-B phase to phase fault is observed at a distance of 3.7km from Tehri(THDC) end on 400KV Tehri(THDC)-Koteshwar(PG)(PG) ckt-1. From Tehri(THDC) end, only 400kV Tehri(THDC)-Koteshwar(PG)(PG) ckt-1 tripped however both ckt-1 & 2 tripped from the Koteshwar(PG) end. iv)As per DR of 400KV Tehri(THDC)-Koteshwar(PG)(PG) ckt-1, directional E/F pick up is observed during Y-N phase to earth fault; however zone-1 operated at both ends after conversion of fault into Y-B phase to phase fault with fault current of Iy=5.7kA, Ix=5.1kA (from Tehri end) and Iy=6.0kA, Ix=5.1kA (from Koteshwar end). Delayed fault clearance of 880ms is observed. v)As per DR of 400KV Tehri(THDC)-Koteshwar(PG)(PG) ckt-2, directional E/F pick up is observed during Y-N phase to earth fault; however zone-1 operated at Koteshwar end after conversion of fault into Y-B phase to phase fault with fault current of Iy=4.5kA and Ix=3.8kA from Koteshwar end. Delayed fault clearance of 880ms is observed. vi)As per PMU at Koteshwar(PG), Y-N phase to earth fault converted into Y-B phase to phase fault is observed with delayed fault clearing time of 880ms is observed. vii) As per SCADA no load loss/generation loss is observed during the tripping event (there was no generation at Tehri HEP during the event).	0	0	0	0	0.000	0.000	54673	62854	880
7	GI-1	1)220 KV Sultanpur(PG)- Goindwal TPS(PG) Ckt-2 2)220 KV Sultanpur(PG)- Badshahpur(PG) Ckt 3)220 KV Sultanpur(PG)- Jamsheer(PG) Ckt 4)220 MW Goindwal(GVK) - UNIT 1 5)220 MW Goindwal(GVK) - UNIT 2	Punjab	PSTCL, GVK	7-May-24	14:30	7-May-24	19:10	04:40	i)During antecedent condition, 220 KV Sultanpur(PG)-Chohla Sahib(PG) Ckt, 220 KV Sultanpur(PG)-Patti(PG) Ckt and 220 KV Chohla Sahib(PG)-Patti(PG) Ckt were not in service. ii)As reported, at 14:30 hrs, a piece of stray flexible conductor came within induction zone of 220 KV Sultanpur(PG)- Goindwal TPS(PG) Ckt-2 as it fell on tower location no. 16 which led to tripping of this circuit with fault distance of 5km from Goindwal TPS end. iii)Distance Protection Relay (DPR) at Goindwal TPS end sensed the fault in zone-1 and line tripped immediately from Goindwal TPS end. But Distance Protection Relay at Sultanpur end detected power swing scenario and due to PSD block of DPR for 2 seconds (de-blocking time) at Sultanpur end, fault continued to feed through 220 KV Sultanpur(PG)- Badshahpur(PG) Ckt, 220 KV Sultanpur(PG)- Jamsheer(PG) Ckt and 220 KV Sultanpur(PG)- Goindwal TPS(PG) Ckt-1. iv)Badshahpur and Jamsheer end DPRs issued trip command in zone-3 after 800ms and fault feeding stopped from these ends. But fault feeding continued through 220 KV Sultanpur(PG)- Goindwal TPS(PG) Ckt-1 as Goindwal TPS end DPR did not pick up the fault in zone-3. v)This led to tripping of 270 MW Goindwal(GVK) - UNIT 1 & 2 on earth-fault protection operation (S1 NGT) after 1 sec. vi)As per PMU at Amritsar(PG), R-N phase to earth fault converted to 3-phase fault with delayed fault clearing time of 2120ms is observed. vii)As per SCADA, change in demand of approx. 100MW is observed in Punjab control area. viii)As reported by SLDC-Punjab, generation loss of approx. 500MW occurred at Goindwal TPS(PG).	0	0.467	500	100	0.830	0.150	60250	66629	2120
8	GD-1	1)220 KV Hissar(BB)-Hissar IA(HV) (HVPNL) Ckt-1 2)220 KV Hissar(BB)-Hissar IA(HV) (HVPNL) Ckt-2 3)220 KV Bhiwani-Hissar (BB) Ckt-1 4)220 KV Bhiwani-Hissar (BB) Ckt-2 5)220 KV Hissar-Sangrur (BB) Ckt-1 6)220 KV Hissar-Sangrur (BB) Ckt-2 7)220 KV Hissar(BB)-Jindal Steel(HR) (HVPNL) Ckt 8)220 KV Hissar(BB)-Chirawa(RS) (BB) Ckt 9)220 KV Barnala-Sangrur(BB) Ckt 10)220KV Bus 1 at Hissar(BB)	Haryana	BBMB, HVPNL, RVPNL	7-May-24	11:16	7-May-24	12:24	01:08	i)220/132/33kV Hissar(BB) S/s has double main bus scheme at 220kV level. ii)During antecedent condition, all the 220kV feeders (Chirawa ckt, Jindal Steel ckt, Sangrur ckt-1 & 2, Bhiwani ckt-1 & 2, Hissar I/A ckt-1 & 2) and 220/132kV 100MVA ICT-1, 2 & 3 were connected to 220kV Bus-1. 220kV Bus-2 was not in service. iii)As reported, at 11:16 hrs R-ph jumper of 220 KV Hissar-Sangrur (BB) Ckt-1 snapped from common point of 220kV Bus isolator no. 223 & 224 at Hissar(BBMB) S/s which caused R-N phase to earth fault. iv)As reported, on this fault, Bus bar relay at 220kV Hissar(BBMB) didn't operate. 220 KV Hissar(BB)-Hissar IA(HV) (HVPNL) Ckt-1 & 2 tripped in Zone-4 from Hissar(BB) end and other all 220kV feeders (Chirawa ckt, Jindal Steel ckt, Sangrur ckt-1 & ckt-2, Bhiwani ckt-1 & ckt-2) tripped from the remote ends in Zone-2 protection operation. v)During the same time 220 KV Barnala-Sangrur(BB) Ckt also tripped (exact reason of tripping need to be shared). vi)As per DR of 220 KV Hissar(BB)-Hissar IA(HV)(end) (BBMB) Ckt-2, R-N phase to earth fault (fault current Ix=7.4kA) is observed in zone-4 with fault clearing time of 360ms. vii)As per DR of 220 KV Hissar-Sangrur(end) (BB) Ckt-1, R-N phase to earth fault converted into R-Y phase to phase fault (fault current Ix=1.3kA, Iy=1.3kA) is observed in zone-2 with fault clearing time of 560ms. viii)As reported, Isolator status of 220 KV Hissar-Sangrur (BB) Ckt-2 provided in the Bus bar relay settings were incorrect (status of isolator no. 227 & 228 were incorrect). Due to this, false differential current generated in Bus Bar Z-2 and differential current supervision feature of relay picked up which led to blocking of Bus bar relay. ix) Due to tripping of all the elements connected to 220kV Bus-1 (220kV Bus-2 was not in service) at Hissar(BB), the complete 220/132/33kV Hissar(BB) S/s became dead. x)As per PMU at Hissar(PG), R-N phase to earth fault with fault clearing time of 360ms (delayed) is observed. xi)As per SCADA, change in demand of approx. 150MW is observed in Haryana control area. But as reported by BBMB, load loss of 207MW occurred in Haryana control area.	0	0.2346	0	270	0.000	0.421	61025	64157	360
9	GI-2	1)400/220 KV 315 MVA ICT-3 at Muzaffarnagar(UP) 2)400/220 KV 500 MVA ICT-4 at Muzaffarnagar(UP) 3)220/132kV 160MVA ICT-4 at Muzaffarnagar(UP) 4)220 KV Muzaffarnagar(UP)- Badhni Kalan Ckt 5)220 KV Muzaffarnagar(UP)- Jansath Ckt 6)220 KV Muzaffarnagar(UP)- Khatauli Ckt	Uttar Pradesh	UPPTCL	7-May-24	16:18	7-May-24	16:45	00:27	i)400/220/132kV Muzaffarnagar(UP) has double main and transfer bus scheme at 220kV level. ii)During antecedent condition, 400/220 KV 315 MVA ICT-3 & 500 MVA ICT-4 at Muzaffarnagar(UP), 220/132kV 160MVA ICT-4 at Muzaffarnagar(UP), 220 KV Muzaffarnagar(UP)- Badhni Kalan Ckt, 220 KV Muzaffarnagar(UP)- Jansath Ckt and 220 KV Muzaffarnagar(UP)- Khatauli Ckt were connected to 220kV Bus-1 at Muzaffarnagar(UP) and rest of the elements were connected to 220kV Bus-2 at Muzaffarnagar(UP). iii)As reported, at 16:18hrs, Y-ph CT at Muzaffarnagar(UP) end of 220 KV Muzaffarnagar(UP)- Badhni Kalan Ckt blasted which led to bus-bar protection operation at 220kV Bus-1 at Muzaffarnagar(UP). iv)Due to bus-bar protection operation, all the elements connected to 220kV Bus-1 at Muzaffarnagar(UP) tripped and Bus-1 became dead. v)As per PMU at Muzaffarnagar(UP), Y-N phase to earth fault with fault clearing time of 120ms is observed. vi)As per SCADA, change in demand of approx. 185 MW is observed in UP control area.	0	0.083	0	185	0.000	0.281	56440	65748	120

S.No.	Category of Grid Disturbance (GD-1 to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserviced due to Generation loss (MU)	Energy Unserviced 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)400 KV Parbati_2(NH)-Sainj[HP] (PKTCL) Ckt 2)400 KV Parbati_3(NH)-Sainj[HP] (PKTCL) Ckt 3)400 KV Parbati_2(NH)-Banala(PG) (PKTCL) Ckt 4)50 MW Unit-1 at Sainj HEP(HP)	Himachal Pradesh	NHPC, HPPTCL, PKTCL, PGCL	7-May-24	16:17	7-May-24	23:29	07:12	i)Total generated power of Sainj HEP(HP), Parbati_2(NH) and parbati_3(NH) evacuates through 400 KV Parbati_2(NH)-Banala(PG) (PKTCL) Ckt and 400 KV Parbati_3(NH)-Banala(PG) (PKTCL) Ckt via 400 KV Parbati_2(NH)-Sainj[HP] (PKTCL) Ckt and 400 KV Parbati_3(NH)-Sainj[HP] (PKTCL) Ckt. ii)During antecedent condition, only 50MW Unit-1 at Sainj HEP(HP) was running (generating approx. ~30MW) and 50MW Unit-2 at Sainj HEP(HP), all four units (4*250MW) at Parbati_2(NH) and all four units (4*130MW) at Parbati_3(NH) were not in service. iii)As reported, at 16:17hrs, 400 KV Parbati_3(NH)-Sainj[HP] (PKTCL) Ckt tripped on B-N phase to earth fault with fault distance of 1.808km from Sainj end. From initial patrolling it was observed that a Pine Tree measuring approx. 50m fell from an uphill position outside the transmission line corridor. The tree weight resulted in simultaneous falling of cross arm of Tower Location No. 7 of 400 KV Parbati_3(NH)-Sainj[HP] (PKTCL) Ckt as well as snapping of conductor leading to tripping of line. iv)As per DR of 400 KV Parbati_3(NH) (end)-Sainj[HP] (PKTCL) Ckt, B-N phase to earth fault is observed with delayed fault clearing time of 400ms and fault current of 7.105kA from Parbati_3(NH) end. Fault was sensed in zone-2 from Parbati_3(NH). Due to non-receipt of carrier signal from remote end, three phase trip command issued after 22 time delay. v)As further reported, 400 KV Parbati_2(NH)-Sainj[HP] (PKTCL) Ckt also tripped at the same time (exact reason of the same yet to be shared). As per DR (time sync issue observed), B-N phase to earth fault with fault current of 1.212kA from Parbati_2(NH) end is observed. vi)During the same time, 400 KV Parbati_2(NH)-Banala(PG) (PKTCL) Ckt also tripped from Parbati_2(NH) end only on B-N phase to earth fault with fault distance of 22.5km and fault current of 1.304kA from Banala(PG) end. As per DR, fault was sensed in zone-1 at Banala(PG) end and carrier sent to Parbati_2(NH) end and line successfully auto-reclosed from Banala(PG). But as reported by NHPC, fault was sensed in zone-2 at Parbati_2(NH) end and upon receipt of carrier signal from Banala(PG) B-phase CB opened. But reclosing command was not extended to B-phase CB after dead time, hence, line tripped from Parbati_2(NH) on operation of Pole discrepancy relay. vii)As per PMU at Banala(PG), B-N phase to earth fault is observed with delayed fault clearing time of 400ms. viii)As per SCADA, generation loss of approx. 30 MW at Sainj HEP (HP) is observed.	0	0	30	0	0.054	0.000	55751	65721	400
11	GD-1	1)220 KV Bhadla(PG)-ASER2PH(Phalodi) Ckt	Rajasthan	PGCL	8-May-24	12:18	8-May-24	17:19	05:01	i)Generation of 220KV ASER2PH(Phalodi) station evacuates through 220 KV Bhadla(PG)-ASER2PH(Phalodi) Ckt. During antecedent condition, ASER2PH(Phalodi) station was generating approx. 138MW (as per SCADA). ii)As reported, at 12:18hrs, 220 KV Bhadla(PG)-ASER2PH(Phalodi) Ckt tripped due to snapping of conductor at distance of 9.8km from Bhadla(PG) end (exact nature of protection operated yet to be shared). iii)As per PMU at Bhadla(PG), B-N phase to earth fault is observed with fault clearing time of 80ms. iv)As per SCADA, solar generation loss of approx. 138 MW is observed at ASER2PH (Phalodi).	0	0	138	0	0.237	0.000	58188	63043	80
12	GI-2	1)500 MW Rihand-1 STPS - UNIT 1 2)500 MW Rihand-1 STPS - UNIT 2	Uttar Pradesh	NTPC	9-May-24	13:40	9-May-24	21:49	08:09	i)During antecedent condition, 500 MW Rihand STPS - UNIT 1 & 2 were generating approx. 414MW & 443 MW respectively. ii)As reported at 13:40 hrs, four running circulating water pumps pertaining to 500 MW Rihand STPS - UNIT 1 & 2 tripped on Band screen (filter) high DP protection- 800 mmwc which led to tripping of 500 MW Rihand STPS - UNIT 1 & 2. iii)Vegetation debris in cooling water intake channel was causing choking of Band screen(filter) of CW pumps. According to Protection philosophy implemented for auxiliary equipments at Rihand(NTPC), CW pump will trip on Band screen high DP protection- 800 mmwc to save CW pumps. iv)As per PMU at Rihand(NT), no fault is observed in the system. v)As per SCADA, generation loss of approx. 860MW occurred at Rihand (NTPC). vi)As per SCADA, no load loss is observed in UP control area. vii)As further reported, as remedial action taken, multi-layer screen/ net was installed to prevent vegetation debris.	0	0	860	0	1.424	0.000	60409	64571	NA
13	GI-2	1)200 MW Singrauli STPS - UNIT 1 2)200 MW Singrauli STPS - UNIT 3 3)200 MW Singrauli STPS - UNIT 5 4)400 KV Singrauli(NT)-Lucknow(UP) (PG) Ckt 5)400 KV Singrauli(NT)-Allahabad(PG) (PG) Ckt-1 6)400KV Bus 2 at Singrauli(NT)	Uttar Pradesh	NTPC, PGCL, UPPTCL	9-May-24	17:06	9-May-24	19:49	02:43	i)During antecedent condition, 200 MW Singrauli STPS - UNIT 1, 3 & 5, 400 KV Singrauli(NT)-Lucknow(UP) (PG) Ckt and 400 KV Singrauli(NT)-Allahabad(PG) (PG) Ckt-1 were connected to 400KV Bus 2 at Singrauli(NT). As per SCADA, 200 MW Singrauli STPS - UNIT 1, 3 & 5 were generating approx. 187MW, 191MW & 183 MW respectively. ii)As reported at 17:06 hrs, busbar protection operated at 400KV Bus-2 at Singrauli(NT) as due to bad weather condition wave trap fallen over current transformer which in turn created bus fault. Due to busbar protection operation, all the elements connected to Bus-2 tripped and Bus-2 became dead. iii)As per DR of 400 KV Singrauli(NT)-Lucknow(UP) (end) (PG) Ckt, Y-B phase to phase fault is observed with fault current of Iy=952A and Ib=1405A from Lucknow(UP) end; fault sensed in in zone-2 at Lucknow(UP) end. However, line tripped on DT received at Lucknow(UP) end. iv)As per PMU at Singrauli(NT), Y-B phase to phase fault with fault clearing time of 80 ms is observed. v)As per SCADA, generation loss of approx. 585MW occurred at Singrauli (NTPC). vi)As per SCADA no load loss is observed in UP control area.	0	0	585	0	1.085	0.000	53903	63512	80
14	GI-2	1)400KV Fatehabad(PG)-Nuhiyawali(HR) ckt 2)400KV Khardar-Kirori (HR) ckt-1 3)400KV Khardar-Kirori (HR) ckt-2 4)400KV Khardar(HR)-Fatehabad(PG) ckt 5)400KV Khardar-Nuhiyawali ckt 6)600MW Unit-1 at Khardar (RGTPS) 7)600MW Unit-2 at Khardar (RGTPS)	Haryana	PGCL, HVPNL, HPGCL	10-May-24	19:35	10-May-24	21:18	01:43	i)Generation of 600MW Unit-1 & 2 at Khardar TPS (total ~1072MW) was evacuating through 400KV Khardar(HR)-Fatehabad(PG) ckt (carrying ~858MW), 400KV Khardar-Nuhiyawali (HR) ckt (carrying ~174MW) only. ii)At 19:35:24:255 hrs, R-N phase to earth fault occurred on 400KV Khardar-Nuhiyawali (HR) ckt. As per DR of 400KV Khardar-Nuhiyawali (HR) ckt, distance protection relay at both end sensed R-N fault in Z-1 (Khardar end: Ir=12kA, 75km). R-ph A/R started from both ends. iii)At 19:35:24:291 hrs, as per DR of 400KV Khardar(HR)-Fatehabad(PG) ckt, distance protection relay at Khardar end sensed B-N fault in Z-1(Khardar end: Ib=1.1kA, 8.5km) and initiated A/R in B-ph at Khardar end. Fatehabad(PG) end distance protection relay didn't sense this B-N fault and no operation occurred at Fatehabad end. iv)At 19:35:24:758 hrs, as per DR of 400KV Khardar(HR)-Fatehabad(PG) ckt, distance protection relay at Khardar end initiated 3-ph tripping command and R & Y ph pole also opened. v)As R-ph autoreclosing was also going on in 400KV Khardar-Nuhiyawali (HR) ckt at this time and all 3-ph pole of 400KV Khardar(HR)-Fatehabad(PG) ckt opened, all the power now started evacuating through Y & B phase of 400KV Khardar-Nuhiyawali (HR) ckt. Current in Y & B phase started increasing. It increased to ~1850A by 19:35:25:153 hrs. vi) At 19:35:25:376 hrs, R-ph pole of 400KV Khardar-Nuhiyawali (HR) ckt closed from both ends and line successfully autoreclosed. vii)At 19:35:25:421 hrs, all 3-ph pole at Khardar end of 400KV Khardar(HR)-Fatehabad(PG) ckt closed and line successfully autoreclosed. viii)At the same time, power swing also observed in DR of Unit-1&2 and evacuating lines. ix)At 19:35:25:944hrs, 600MW Unit-1 tripped on pole slip protection operation. x)At 19:35:25:974hrs, 600MW Unit-2 tripped on pole slip protection operation. xi)At 19:35:30:309 hrs and 19:35:30:350 hrs, over frequency protection also operated of Unit-1 & 2 respectively. xii)600MW Unit-1 at Khardar TPS revived at 04:26hrs on 11th May 2024 and Unit-2 have been kept out for inspection purpose.	0	0	1072	0	2.109	0.000	50841	63360	80
15	GI-2	1.800 KV HVDC Kurukshetra(PG) Pole-02 2.800 KV HVDC Kurukshetra(PG) Pole-04	Haryana	PGCL	10-May-24	19:41	11-May-24	02:24	06:43	i)During antecedent condition, 800KV HVDC Champa-Kurukshetra was carrying total 3000MW power from Champa to Kurukshetra (Pole-1=1500MW, Pole-2 & Pole-4: 750MW each). The weather condition at the time of incident was very worse accompanying thunderstorms & very heavy lightning along with wind was prevailing at Champa. ii)As reported, the sequence of event is as follows: a. At 19:41:46:169 hrs, 800 KV HVDC Kurukshetra (PG) Pole-02 blocked from Champa end on activation of SSAD Instability detection & DC Undercurrent Protection. There was SSAD Instability detected in Pole-2 Lane-1 which was the Active Lane. Then Lane Changeover from Lane-1 to Lane-2 as per Control Philosophy was facilitated by Pole-2 Control system. Again, DC Undercurrent Minor Fail alarm latched in Pole-2 & eventually Pole-2 blocked on latching of DC Undercurrent Protection at Champa. b. At 19:41:50:576 hrs, 800 KV HVDC Kurukshetra (PG) Pole-04 also blocked due to on latching of T-Zone Protection. As heavy flashover was detected at the instance of tripping of Pole-2 & Pole-4, there was noticeable increase in Idl (up to 3KA) in Pole-2 which was also seen by Pole-4 Idl & Ihl which generated T-Zone Protection operation in Pole-4 along with generation of CAT B alarm due to which Pole-4 got blocked. iii)As further reported, from logs it was observed that optical communication between Bipole 1 & Bipole 2 got unhealthy. Due to unhealthy optical communication, abnormal values of Pole Idl current resulted in latching of T-Zone protection. After re-inserting optical fibres in Bipole 1 lane 1 CIB-4, optical communication got healthy. iv)As per SCADA, due to tripping of two poles (Pole-02 and Pole-04), power order reduced from 3000MW to 1500MW. v)As per PMU, fluctuation in voltage was observed. vi)As per SCADA, no change in demand is observed in Haryana control area.	0	0	0	0	0.000	0.000	50214	63513	NA
16	GI-1	1)220 KV Amargarh (INDIGRID)-Ziankote(UK) (PDD JK) Ckt-1 2)220 KV Amargarh (INDIGRID)-Ziankote(UK) (PDD JK) Ckt-2	Jammu and Kashmir	INDIGRID, JKPTCL	10-May-24	13:06	10-May-24	18:10	05:04	i)220/132kV Ziankote S/s have two buses at 220kV side i.e., main bus & reserve bus. ii)During antecedent condition, 220KV Amargarh(INDIGRID)-Ziankote(UK) D/C (carrying 70MW each) was feeding Ziankote load. iii)As reported, at 13:06 hrs, 220 KV Amargarh(INDIGRID)-Ziankote(UK) (PDD JK) Ckt-1 tripped on R-Y phase to phase fault with fault current of Ir=2.11kA and Iy=2.363kA and fault distance of 4.714km from Ziankote(UK) end; fault sensed in zone-1 at Ziankote(UK) end. (Exact reason yet to be shared) iv)As further reported, at the same time, 220 KV Amargarh(INDIGRID)-Ziankote(UK) (PDD JK) Ckt-2 also tripped on over-current protection operation. v)As per PMU at Amargarh(INDIGRID), R-Y phase to phase fault with fault clearing time of 120ms is observed. vi)As per SCADA, change in demand of approx. 130MW is observed in J&K control area.	0	0.659	0	130	0.000	0.196	62886	66490	120
17	GI-2	1)130MW Unit-1 at Dulhasti HEP 2)130MW Unit-2 at Dulhasti HEP 3)130MW Unit-3 at Dulhasti HEP	Jammu and Kashmir	NHPC	12-May-24	07:26	12-May-24	08:12	00:46	i)During antecedent condition, 130MW Unit-1, 2 & 3 at Dulhasti HEP were running (generating approx. ~122MW, ~131MW & ~129MW respectively) and total generated power was evacuating through 400 KV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-1 only. 400 KV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-2 was not in service (planned shutdown since Jan, 2024). ii)As reported, at 07:26hrs, 400 KV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-1 successfully auto-reclosed from both the ends end on transient R-N phase to earth fault. Fault was sensed in zone-1 and fault current was Ir=1.82kA at Dulhasti(NH) end. iii)Due to the opening of R-phase pole of CB the three phase currents of all the three running units got unbalanced that lead to flow of unbalanced current in the GT neutral. iv)As further reported, all the three units got tripped on operation of three phase current monitoring protection. v)As per DR, 7ACT (alarm relay) and 50/51N (non-directional earth fault relay) operated. 7ACT operated after 1200ms which coincides with A/R dead time (as also confirmed from PMU). vi)As per PMU at Kishenpur (PG), R-N phase to earth fault is observed with delayed fault clearing time of 120ms. vii)Generation loss of approx. 373 MW at Dulhasti HEP (NHPC) (as per SCADA). However, NHPC reported generation loss of 390 MW at Dulhasti HEP (NHPC).	0	0	390	0	0.787	0.000	49537	55574	120
18	GI-1	1)220/33 kv 150 MVA ICT 1 at Mahoba Solar(Adani)	Rajasthan	PGCL, Adani	12-May-24	12:44	12-May-24	15:10	02:26	i)Generation of 220KV Mahoba Solar(Adani) station evacuates through 220 KV Bhadla(PG)-Mahoba Solar(Adani) Ckt which is connected to 220/33 kv 150 MVA ICT 1 & 2 at Mahoba Solar(Adani) carrying approx. 155MW and 152MW respectively. During antecedent condition, Mahoba Solar(Adani) station was generating approx. 307MW (as per SCADA). ii)As reported, at 12:44hrs, 220/33 kv 150 MVA ICT-1 at Mahoba Solar (Adani) tripped due to Y phase cable end kit failure (exact nature of protection operated yet to be shared). On inspection it was found that fire caught in Y-phase cable. iii)As per PMU at Bhadla(PG), Y-N phase to earth fault is observed with fault clearing time of 120ms. iv)As per SCADA, solar generation loss of approx. 156 MW is observed at Mahoba Solar(Adani).	0	0	156	0	0.250	0.000	62430	61010	120
19	GI-1	1)220 KV Jessore(HP)-Pong(BB) (PG) Ckt 2)220 KV Pong(BB)-Dasuya(PS) (BBMB) Ckt-2 3)220 KV Jalandhar-Pong (BB) Ckt-2 4)220KV Bus 2 at Pong(BB) 5)66 MW Pong HPS - UNIT 2 6)220/66KV 40MVA ICT-1 at Pong(BB)	Himachal Pradesh	BBMB, HPPTCL, PGCL	12-May-24	03:40	12-May-24	05:55	02:15	i)During antecedent condition, 66MW Unit-1, 2 & 3 at Pong HEP were running and generating approx. 58MW, 62MW and 64MW respectively (as per SCADA). 66MW Unit-4, 5 & 6 at Pong HEP were not in service. Unit-1 & 3, 220/66KV 40MVA Transformer and 220KV feeders to Bairasiul, Jalandhar ckt-1 and Dasuya ckt-1 were connected at 220KV Bus-1 and Unit-2 & 220KV feeders to Jessore, Jalandhar ckt-2 and Dasuya ckt-2 were connected at 220KV Bus-2. ii)As reported, at 03:40 hrs, heavy sparking was observed on Y-phase PT of 220KV Bus-2 at Pong(BB). Due to this sparking cables in trench caught fire. iii)During the same time, bus bar protection operated which led to tripping of all 220 KV feeders (Jessore ckt, Dasuya ckt-2, Jalandhar ckt-2), 66MW Unit-2 and Bus coupler between 220KV Bus-1 & Bus-2 connected to Bus-2 and Bus-2 became dead. iv)During the same time, 220/66KV 40MVA Transformer (connected to Bus-1) also tripped due to over current protection operation (exact reason yet to be shared). v)As per PMU at Jalandhar(PG), Y-N phase to earth fault is observed with fault clearing time of 120ms. vi)As per SCADA, generation loss of approx. 62 MW at Pong HEP (BB) and no load loss is observed in HP control area. However, BBMB reported 64MW generation loss at Pong HEP.	0	0	64	0	0.143	0.000	44636	56495	120
20	GD-1	1)400 KV Agra Fatehabad-Agra South (UP) Ckt 2)400 KV Agra South(UP)-Firozabad(PJFTL) (UP) Ckt	Uttar Pradesh	UPPTCL	13-May-24	17:27	13-May-24	20:11	02:44	i)During antecedent condition, load at 400KV Agra South(UP) was approx. 100MW (was evacuating through 132KV feeders). Power incoming at Agra South(UP) S/s was through 400 KV Agra Fatehabad-Agra South (UP) Ckt (approx. 76MW) and 400 KV Agra South(UP)-Firozabad(PJFTL) (UP) Ckt (approx. 24MW). ii)As reported, at 17:27 hrs, during inclement weather condition, B-N phase phase to earth fault occurred. (Exact location of fault yet to be received). iii)Due to B-N phase to earth fault, both the lines 400KV Agra South-Agra Fatehabad (UP) & 400KV Agra South -Firozabad (UP) tripped. iv)As per DR of Firozabad end of 400 KV Agra South(UP)-Firozabad(PJFTL) (UP) Ckt, B-N phase to earth fault is observed (Ib=845A). Line tripped on zone-1 distance protection operation. v)As per DR of both ends of 400 KV Agra Fatehabad-Agra South (UP) Ckt, B-N phase to earth fault is observed (Ib=796A, Ib=6.2kA from Agra South & Agra Fatehabad end respectively). No A/R operation is observed from Agra Fatehabad end. vi)Due to tripping of both 400KV feeders connected to 400KV Agra South(UP), Agra South(UP) S/s lost its connectivity from grid and the complete 400/132KV Agra South(UP) S/s became dead. vii)As per PMU at Agra(PG), multiple B-N phase to earth faults are observed with fault clearing time of 80ms. viii)As per SCADA, no load loss is observed in UP control area. However, SLDC-UP reported 5MW load loss at 132KV Kheragarh S/s in UP control area.	0	0.014	0	5	0.000	0.008	50404	62451	80



S.No.	Category of Grid Disturbance (GD-1 to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserviced due to Generation loss (MU)	Energy Unserviced 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)		
21	GI-2	1)400 KV Khetri (PKTSL)-Bhiwadi(PG) (PBTSU) Ckt-2 2)400 KV Khetri (PKTSL)-Bhiwadi(PG) (PBTSU) Ckt-1 3)400KV Bhiwadi-Neemrana (PG) Ckt-1 4)400 KV Bassi-Bhiwadi (PG) Ckt 5)500 KV HVDC Balla-Bhiwadi (PG) Ckt-1 6)500 KV HVDC Balla-Bhiwadi (PG) Ckt-2 7)220 KV Bhiwadi(PG)-Bhiwadi(RS) (RS) Ckt-1 8)220 KV Bhiwadi(PG)-Rewari(HV) (HV) Ckt-1 9)220 KV Bhiwadi(PG)-Rewari(HV) (HV) Ckt-2 10)220 KV Bhiwadi(PG)-HSIIDC Bawal(HV) (HVPNL) Ckt 11)220 KV Bhiwadi(PG)-Mau(HV) (HV) Ckt 12)220 KV Bhiwadi(PG)-Kushkhera(RS) (RS) Ckt 13)220 KV Neemrana(PG)-Neemrana(RS) (RS) Ckt-1	Rajasthan	RVPNP, POWERGRID	13-May-24	07:11	13-May-24	08:46	01:35	i)400/220KV Bhiwadi(PG) has one and half breaker bus arrangement at 400kV side and double main and transfer bus scheme at 220kV side. ii)During antecedent condition, 500 KV HVDC Balla-Bhiwadi (PG) ckt-1 & ckt-2 were carrying approx. 200 MW each. iii)As reported, at 07:11hrs, B-N phase to earth fault occurred (exact location of fault yet to be received). iv)As per DR of Bhiwadi(RS) end, 220 KV Bhiwadi(PG)-Bhiwadi(RS) (RS) Ckt-1 and 220 KV Bhiwadi(PG)-Kushkhera(RS) (RS) Ckt tripped from Bhiwadi(RS) end only on back up E/F protection operation. Line didn't trip from Bhiwadi(PG) end. v)At the same time, 400 KV Khetri (PKTSL)-Bhiwadi(PG) (PBTSU) D/C, 400KV Bhiwadi-Neemrana (PG) Ckt-1, 400 KV Bassi-Bhiwadi (PG) Ckt, 500 KV HVDC Balla-Bhiwadi (PG) D/C, 220 KV Neemrana(PG)-Neemrana(RS) (RS) Ckt-1 and 220kV lines from Bhiwadi(PG) to Rewari(HV) (HV) D/C, HSIIDC Bawal(HV), Mau(HV) also tripped (exact reason for multiple elements tripping yet to be received). vi)As per PMU at Bhiwadi(PG), at 07:11 hrs, B-N phase to earth fault with no A/R operation is observed with delayed fault clearing time of 1480ms. vii)As per SCADA, change in demand of approx. 136MW in Rajasthan control area is observed.	0	0.215	0	136	0.000	0.218	53784	62451	1480	
22	GD-1	1) 220KV Rishikesh-IIP Harrawala ckt	Uttarakhand	PTCUL	15-May-24	11:29	15-May-24	14:52	03:23	i)220/132kV Jhajra(Utt) S/s has double main bus scheme. 220kV Jhajra is connected with 220kV IIP Harrawala, 400/220kV Dehradun(PG), 220kV Vyasi HEP and 220kV Khodri HEP. 220kV IIP Harrawala is load station which is further connected to 220kV Rishikesh. ii)During antecedent condition, 220kV Khodri-Jhajra ckt was in open condition and 220kV Jhajra-Dehradun ckt, 220kV Jhajra-Vyasi ckt were under shutdown. 220kV Jhajra was connected to 220kV IIP Harrawala and source was through 220kV Rishikesh-Harrawal-Jhajra. As only one 220kV circuit was available at Jhajra S/s, partial load (120-130MW) were already shifted to 400/220/132kV Rishikesh. iii)As reported, at 11:29hrs, 220kV Rishikesh-IIP Harrawala ckt tripped on B-N phase to earth fault. At tower location no. 115, 11kV line came in contact with the line due to less spacing. 220kV Rishikesh-IIP Harrawala ckt was carrying ~200MW so clearance issue due to sag is also suspected. iv)As per PMU at Roorkee(PG), B-N phase to earth fault cleared within 120msec is observed. v)Due to tripping of 220kV Rishikesh-IIP Harrawala ckt, supply to 220/132kV Jhajra lost and S/s became dead. vi)As per SCADA, change in demand of approx. 200MW is observed in Uttarakhand control area. vii)As reported, PTCUL has communicated respective DISCOM to make the 11kV line underground.	0	0.67	0	200	0.000	0.285	65685	70164	120	
24	GD-1	1)220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1 2)220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-2 3)400/220 kv 315 MVA ICT 1 at Kabulpur(HV) 4)400/220 kv 315 MVA ICT 2 at Kabulpur(HV)	Haryana	HVPNL, POWERGRID	15-May-24	23:12	16-May-24	00:55	01:43	i)220/132kV Mohana S/s has six (06) 220kV lines i.e., 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C, 220kV Mohana-Samalkha (HV) D/C and 220kV Mohana-Sampla (HV) D/C. Samalkha and Sampla are load centre. Power source is through 220kV Sonipat only. Samalkha(HV) S/s had connectivity from grid through 220kV Mohana-Samalkha (HV) D/C only and 220kV Sampla is connected with 220kV Mohana and 400/220kV Kabulpur also. ii)During antecedent condition, 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C was carrying total ~300MW. Loading at 400/220 kv 315 MVA ICT 1 & 2 at Kabulpur(HV) was 282 MW & 279 MW respectively. iii)As reported, at 23:12 hrs, 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C tripped. (Exact reason of tripping yet to be received). iv)As per PMU at Bahadurgarh(PG), no fault is observed. v)At the same time, 400/220 kv 315 MVA ICT 1 & 2 at Kabulpur(HV) also tripped. vi)It is suspected that, after tripping of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C, loading of 220kV Sampla (HV) would have shifted to 400/220kV Kabulpur ICTs and 400/220 kv 315 MVA ICT 1 & 2 at Kabulpur(HV) tripped on overcurrent protection operation. vii)Due to tripping of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C, 220/132kV Mohana(HV) S/s lost its connectivity from grid and the complete 220/132kV Mohana(HV) S/s became dead. viii)As per SCADA, 870 MW load loss is observed in Haryana control area.	0	1.49	0	870	0.000	1.259	55540	69099	NA	
23	GI-2	1)500 KV HVDC Mahindergarh(APL) Pole-1 2)500 KV HVDC Mahindergarh(APL) Pole-1	Haryana	ADANI	17-May-24	16:21	17-May-24	17:15	00:54	i)During antecedent condition, 500 KV HVDC Mundra-Mahindergarh(APL) bipole was carrying total ~1500MW. ii)As reported, at 16:21 hrs, 500 KV HVDC Mundra-Mahindergarh(APL) bipole blocked due to RPC No AC Filter alarm raised at Mahindergarh end. After thorough investigation, it was observed that RCI changeover has been initiated from RCI B to RCI A ACTIVE and after that "RPC SET RANGE EXCEED" event triggered followed by RPC NO AC FILTER, which caused blocking of both the Poles. iii)As per PMU at Mahindergarh(PG), no fault in system is observed, fluctuation voltage is observed. iv)Due to blocking of both the poles of 500 KV HVDC Mundra-Mahindergarh(APL), there was power order reduction of ~1500MW. As per HVDC Mundra-Mahindergarh SPS, SPS case-3 would have operated and as per action in this case, load relief in UP, Haryana, Punjab, Rajasthan & Delhi and generation relief at Mundra Stage-III is desired. v) Details of load relief not received from SLDCs. Communication has been sent to all the SLDCs to share the quantum of load relief occurred in their respective control area due to SPS operation. SCADA data at NRLDC was not healthy during the event time. vi) As per detail BCU log of Mahindergarh end, DTPC fail alarm is recorded except Dhanonda. Any communication related issue need to be rectified at the earliest to ensure proper SPS operation. vii) Both RCI System was restarted and the system was normalized									SCADA Data Issue	NA
25	GD-1	1)400 KV Tehri(THDC)-Koteshwar(PG) (PG) Ckt-1 2)400 KV Tehri(THDC)-Koteshwar(PG) (PG) Ckt-2	Uttarkhand	THDC, POWERGRID	17-May-24	17:21	17-May-24	18:09	00:48	i)400kV Tehri(THDC) has double main bus scheme. ii)During antecedent condition, 250 MW TEHRI HPS – UNIT- 1, 2, 3 & 4 were not in service. iii)As reported, at 17:21 hrs, 400kV Tehri(THDC)-Koteshwar(PG)(PG) ckt-1 tripped on Y-B phase to phase fault. Fault distance was ~2.8km from Tehri(THDC) end. At the same time, 400kV Tehri(THDC)-Koteshwar(PG)(PG) ckt-2 tripped from Koteshwar(PG) end only. iv)As per DR of Tehri end of 400kV Tehri(THDC)-Koteshwar(PG)(PG) ckt-1, directional earth fault started followed by sensing Y-B-N fault in Z-1. Fault current was Iy=4.9kA, Ib=4.2kA. Total fault clearance time was ~760ms. v)As per DR of Tehri end of 400kV Tehri(THDC)-Koteshwar(PG)(PG) ckt-2, distance protection sensed Y-B-N fault in Z-4, no tripping was initiated. Fault current was Iy=4.8kA, Ib=4.0kA. vi)As per PMU at Koteshwar(PG), Y-N phase to earth fault converted into Y-B phase to phase fault is observed with delayed fault clearance time of 760ms is observed. vii) As per SCADA no load loss/generation loss is observed during the tripping event (there was no generation at Tehri HEP during the event).	0	0	0	0	0.000	0.000	56219	67302	760	
26	GD-1	1)220/66kV 100MVA Transformer-2 at Baddi(HP) 2)220/66kV 100MVA Transformer-3 at Baddi(HP) 3)220kV Baddi(HP)-Pinjore(HV) (HPPTCL) Ckt-1 4)220kV Baddi(HP)-Pinjore(HV) (HPPTCL) Ckt-2 5)220 KV Baddi-Kunihar(HP) Ckt-1 6)220 KV Baddi-Kunihar(HP) Ckt-2 7)220 KV Baddi-Upperla Nangal(HP) Ckt 8)220 KV Madhala -Upperla Nangal(HP) Ckt 9)220 KV Baddi-Madhala (HP) Ckt 10)220 KV Wangtoo-Kunihar(HP) ckt	Himachal Pradesh	HPPTCL	18-May-24	21:32	18-May-24	22:00	00:28	i)During antecedent condition, 220/66kV 100MVA Transformer-1,2&3 at Baddi(HP) were carrying approx. 70MW each. ii)As reported, at 21:32 hrs, R-ph CT at 220kV side of 220/66kV 100MVA transformer-3 damaged. Debris of damaged CT fell on B-ph CT of 220/66kV 100MVA transformer-2 and it also damaged. iii)As per PMU at Panchkula(PG), R-N fault followed by B-N fault with delayed clearance in 400msec is observed. iv)On this fault multiple 220kV lines at 220kV Kunihar, Baddi complex tripped. v)220kV lines tripped during the event are 220kV Baddi(HP)-Pinjore(HV) (HPPTCL) D/C, 220 KV Baddi-Kunihar(HP) D/C, 220 KV Baddi-Upperla Nangal(HP) Ckt, 220 KV Baddi-Madhala(HP) Ckt, 220kV Upperla Nangal-Baddi ckt and 220 KV Wangtoo-Kunihar ckt. vi)Due to tripping of aforementioned elements, 220/66kV Baddi(HP) became dead. Supply to 220/132kV Kunihar (HP) also affected. 132kV bus at Kunihar S/s was operated at split mode, due to which supply to 132kV Barotiwala remained healthy via 132kV Kangoo. vii)As per SCADA, change in demand of approx. 540MW in HP control area is observed. viii)Damaged B-ph CT of 220/66kV 100 MVA transformer-2 was replaced with B-ph CT of transformer-3 and transformer-2 was restored at 22:00hrs on the same day. ix)R & B phase CT of transformer-3 was replaced with the spare CT from other stations and transformer-3 at Baddi was restored at ~05:30hrs on 19th May 2024.	0	0.252	30	540	0.053	0.717	56182	75336	400	
27	GD-1	1)400/220 kv 315 MVA ICT 6 at Gr.Noida(UP) 2)220kV Gr. Noida – Noida Sec 20 ckt-1 3)220kV Gr. Noida – Noida Sec 20 ckt-2 4)220kV Gr. Noida – Noida Sec 129 ckt 5)220kV Greater Noida - Jalpura ckt	Uttar Pradesh	UPPTCL	18-May-24	17:25	18-May-24	18:00	00:35	i)400/220kV Gr. Noida S/s has double main transfer bus scheme and feeds 220/132kV Noida Sec20, Noida RC Green, Noida Sec 129 substations through 220kV feeders. ii)As reported, at 17:25hrs, B-ph CT at Gr. Noida end of 220kV Gr. Noida – Noida sec 20 ckt-1 damaged and R-ph isolator arm of 220kV Gr. Noida – Noida sec 20 ckt-1 also broked. iii)As per PMU at Dadri Thermal(NTPC), B-N and R-N fault with delayed clearance in ~600msec is observed. iv)On this fault, 220kV Gr. Noida – Noida sec 20 D/C tripped and supply to Noida Sec 20 S/s lost. v)At the same time, 400/220 kv 315 MVA ICT 6 at Gr.Noida(UP) tripped on of PRD (Pressure Relief Device) and OSR (Oil Surge Relay) protection operation. vi)As per SCADA SOE at NRLDC, 220kV Gr. Noida – Noida Sec 129 ckt and 220kV Greater Noida - Jalpura ckt also tripped at the same time. vii)As per SCADA, total change in demand of approx. 860MW occurred in UP contro, area. viii)Partial supply of Noida Sec 20 restored at 18:00 hrs from 132kV Noida Sec 45 and at 18:06 hrs from Noida Sec 66.	0	0.501	0	860	0.000	1.243	56695	69211	600	
28	GI-2	1)660 MW Bara TPS UNIT 2 2)660 MW Bara TPS UNIT 3 3)660 MW Bara TPS UNIT 1	Uttar Pradesh	UPPTCL	19-May-24	00:55	19-May-24	10:12	09:17	i)During antecedent condition, 660MW Unit-1, 2 & 3 at Bara TPS was carrying ~600MW, ~604MW & ~554MW respectively. Generation was evacuating through 765kV Bara-Mainpuri ckt (carrying ~1095MW) and 765/400kV 1500MW ICT-1 & 2 (carrying ~330MW each). ii)At 00:55:30hrs, 660MW Unit-2 at Bara TPS tripped. As reported, overall differential protection of GT of Unit-2 operated on B-N fault occurred due to surface tracking at bushing of GT of Unit-2. iii)As per PMU at Mainpuri(PG) at 00:55:30hrs, B-N phase to earth fault cleared within 80msec is observed. iv)At the same time, fluctuation (ramp down and up) in active power of Unit-1 at Bara TPS also started. As per SCADA data, MW reduced from 600MW to ~150MW and again ramped up to ~600MW. v)Further at 00:57:27 hrs, 660MW Unit-3 at Bara TPS also tripped. As reported, overall differential protection of GT of Unit-3 operated on B-N fault occurred due to surface tracking at bushing of GT of Unit-2. vi)As per PMU at Mainpuri(PG) at 00:57:27hrs, B-N phase to earth fault cleared within 80msec is observed. vii)Further at 00:57:35hrs, 660MW Unit-1 at Bara TPS also tripped. As reported, unit-1 tripped due to turbine extraction pressure ratio protection operation. viii)As per SCADA plot of Bara TPS generation, Unit-2 tripped at 00:55hrs and subsequently fluctuation in power of Unit-1 started. At 00:57 hrs, Unit-3 tripped followed by tripping of Unit-1. ix)Tripping of Unit-1 not recorded in SCADA SOE. x)As reported, bushing cleaning and IR test of GT-2&3 has been done.	0	0	1758	0	3.239	0.000	54284	73440	80	
29	GD-1	1)220 KV Jamalpur(BB)-Dandharikalani(PS) (PSTCL) Ckt-1 2)220 KV Jamalpur(BB)-Dandharikalani(PS) (PSTCL) Ckt-2 3)220 KV Dandharikalani(PS)-Ludhiana(PG) (PSTCL) Ckt-1 4)220/66kV ICT-1 at Dandharikalani(PS) 5)220/66kV ICT-2 at Dandharikalani(PS) 6)220 KV Ganguwal-Jamalpur (BB) Ckt-2 7)220 KV Jamalpur(BB)-Sangrur(PS) (BB) Ckt-2 8)220kV Bus 2 at Jamalpur(BB)	Punjab	PSTCL, BBMB	19-May-24	20:04	19-May-24	21:57	01:53	i)220kV Dandharikalani(PS) S/s has single Bus scheme. It has four (4) 220 kv lines i.e. 220 KV Jamalpur(BB)-Dandharikalani(PS) (PSTCL) D/C & 220 KV Dandharikalani(PS)-Ludhiana(PG) (PSTCL) D/C. ii)During antecedent condition, 220 KV Dandharikalani(PS)-Ludhiana(PG) (PSTCL) ckt-2 was not in service (As per SCADA). iii)As reported, at 20:04 hrs, B-phase CT of 220 KV Jamalpur(BB)-Dandharikalani(PS) (PSTCL) Ckt-1 burst which created a bus fault at 220 KV Dandharikalani(PS). Further all the elements (220 KV Jamalpur(BB)-Dandharikalani(PS) (PSTCL) D/C, 220 KV Dandharikalani(PS)-Ludhiana(PG) (PSTCL) ckt-1 and 220/66kV ICT-1 & 2) connected at 220kV Bus tripped due to Bus bar protection operation at Dandharikalani(PS) S/s. iv)At the same time 220 KV Ganguwal-Jamalpur(BB) Ckt-2, 220 KV Jamalpur(BB)-Sangrur(PS) (BB) Ckt-2 & 220kV Bus 2 at Jamalpur(BB) also tripped (Exact reason of tripping yet to be received). v)As per DR of Sangrur(PS) end of 220 KV Jamalpur(BB)-Sangrur(PS)(BB) Ckt-2, multiple faults (B-N & Y-N phase to earth) are observed. B-N phase to earth fault was sensed in zone-2. vi)Due to Bus bar protection operation, 220 KV Dandharikalani(PS) S/s lost its connectivity from grid and the complete 220 KV Dandharikalani(PS) S/s became dead. vii)As per PMU at Ludhiana(PG), B-N phase to earth fault is observed. viii)As per SCADA, 216 MW load loss is observed in Punjab control area. However SLDC-Punjab reported load loss of 90 MW in Punjab control area.	0	0.17	0	90	0.000	0.131	52155	68557	80	

S.No.	Category of Grid Disturbance (GD-1 to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserviced due to Generation loss (MU)	Energy Unserviced 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)	
30	GD-1	1) 400 KV Bawana CCGT(DTL)-Bahadurgarh(PG) (PG) Ckt 2) 216 MW Bawana GPS - UNIT 1 (GTG-1) 3) 216 MW Bawana GPS - UNIT 2 (GTG-2) 4) 253 MW Bawana GPS - UNIT 5 (STG-1)	Delhi	DTL, PGCIL	20-May-24	00:46	20-May-24	01:32	00:46	During antecedent condition, 400KV interconnectors between 400KV Bawana(DTL) and 400KV CCGT Bawana were in open position. 400/220KV 315MVA ICT-1, 4, 5 & 6 were connected to CCGT Bawana and 315 MVA ICT-2 & 3 were connected to Bawana(DTL). 216 MW Unit-1 (GTG-1), Unit-2 (GTG-2) & Unit-5 (STG-1) at CCGT Bawana were generating approx. 194MW, 197MW and 218MW respectively. 400/220KV 315MVA ICT-1,4,5&6 at Bawana(DTL) (connected at CCGT Bawana) were carrying total ~740MW. ii)As reported, at 21:22 hrs of 19th May 2024, 400 KV SFG Lockout alarm appeared on Main CB of 400 KV CCGT Bawana-Bhiwani ckt at CCGT Bawana end (connected at 400KV Bus-1). CCGT Bawana requested to take 400KV Bus-1 on shutdown to isolate the bus and attend the issue. iii)Further at 23:52hrs, 400 KV CCGT Bawana-Bhiwani ckt was opened from Bhiwani end and DT signal received at CCGT Bawana end. Tie CB at CCGT Bawana end opened on DT signal however, Main CB which was under lockout didn't open. iv)Further, the maintenance staff tried to isolate the lockout Main CB by opening the line Isolator however, huge spark along with blast sound emanated from the contacts of the isolator. v)As per PMU at Bhiwani(PG), Y-B fault converted into R-Y-B-N fault with delayed clearance of ~560msec is observed. vi)On this fault, 400 KV Bawana CCGT(DTL)-Bahadurgarh(PG) (PG) Ckt tripped from CCGT Bawana end on Z-4 distance protection operation with the delay of ~500msec and TEED protection operated on 400 KV CCGT Bawana-Bhiwani Line at CCGT Bawana end. (DR file attached) vii)With the tripping of 400 KV Bawana CCGT(DTL)-Bahadurgarh(PG) (PG) Ckt, generation at CCGT Bawana got islanded with the load of 400/220KV 315MVA ICT-1,4,5&6 at Bawana(DTL) (connected at CCGT Bawana). viii)As 400/220KV 315MVA ICT-1,4,5&6 at Bawana(DTL) (connected at CCGT Bawana) were carrying total ~740MW and running units at CCGT Bawana were generating ~605MW, there was load generation imbalance. Further, 216 MW Unit-1 (GTG-1), Unit-2 (GTG-2) & Unit-5 (STG-1) at CCGT Bawana tripped on back up impedance protection operation. ix)With the tripping of running units at CCGT Bawana, 400/220KV 315MVA ICT-1,4,5&6 at Bawana(DTL) got dead and the load of 220KV Shalimar Bagh, 220KV SGTN, 220KV Rohini-I and 220KV DSIDC substations got affected. x)As per SCADA, change in demand of approx. 780MW is observed in Delhi control area, but as reported by SLDC Delhi, load loss of approx. 700MW occurred. xi)As per SCADA, generation loss of ~605MW occurred at CCGT Bawana.	0	0.536	605	700	1.100	0.970	54981	72168	560
31	GD-1	1) 220 KV Neemrana(PG)-Khushkhera (RS) (RS) Ckt	Rajasthan	PGCIL, RVPNL	20-May-24	21:30	21-May-24	02:00	04:30	ii)220/132KV Khushkhera(RS) has Double main Bus arrangement at 220KV side. ii)During antecedent condition, 220/132KV 160MVA ICT-1, 220KV lines from Khushkhera to Bhiwadi(PG), Alwar(RS), Kishangarh(RS) were not in service. Only 220 KV Neemrana(PG)-Khushkhera(RS) (RS) Ckt and 220/132KV 160MVA ICT-2 were in service. iii)As reported, at 21:30hrs, during the charging of 220/132KV 160MVA ICT-1, jumper of the same ICT snapped which caused Y-B phase to phase fault which led to tripping of 220 KV Neemrana(PG)-Khushkhera(RS) (RS) Ckt on zone-2 distance protection operation from the Neemrana(PG) end. 220 KV Neemrana(PG)-Khushkhera(RS) (RS) Ckt was only source available at 220KV Khushkhera(RS). iv)As per DR of Neemrana(PG) end of 220 KV Neemrana(PG)-Khushkhera(RS) (RS) Ckt, Y-B phase to phase fault is observed with fault current of I <sub>y</sub> =3.6kA, I <sub>b</sub> =~3.4kA and line tripped on zone-2 distance protection operation from Neemrana end. v)Due to tripping of 220 KV Neemrana(PG)-Khushkhera(RS) (RS) Ckt, 220/132KV Khushkhera(RS) S/s lost its connectivity from grid and the complete 220/132KV Khushkhera(RS) S/s became dead. vi)As per PMU at Bhiwadi(PG), at 21:30 hrs, Y-B phase to phase fault is observed with delayed fault clearing time of 560ms. vii)As per SCADA, change in demand of approx. 148MW in Rajasthan control area is observed.	0	0.666	0	148	0.000	0.199	54630	74367	560
32	GD-1	1) 220 KV Baghapurana(PG)-Bajakhana(PS) Ckt-1 2) 220 KV Baghapurana(PG)-Bajakhana(PS) Ckt-2 3) 220 KV Baghapurana(PS)-Moga(PS) Ckt-1 4) 220 KV Baghapurana(PS)-Moga(PS) Ckt-2	Punjab	PSTCL	21-May-24	01:48	21-May-24	05:01	03:13	ii)220/132/66KV Baghapurana(PS) has single main and transfer bus scheme at 220KV level. ii)As reported, at 01:48hrs, 220 KV Y-phase line CT and R-phase limb of 220 KV SF-6 CB of 220 KV Baghapurana(PS)-Bajakhana(PS) Ckt-1 got damaged at Baghapurana(PS) end which created bus fault at 220KV main bus at Baghapurana(PS). iii)Due to this, bus bar protection operated at 220KV main bus of Baghapurana(PS). Hence, all the 220KV circuits connected to Baghapurana(PS), i.e., 220 KV Baghapurana(PS)-Bajakhana(PS) Ckt 1 & 2 and 220 KV Baghapurana(PS)-Moga(PS) Ckt-1 & 2 tripped and complete blackout occurred at Baghapurana(PS) S/s. iv)As per PMU at Ludhiana(PG), Y-N phase to earth fault followed by R-B phase to phase fault followed by R-Y phase to phase fault with fault clearance time of respectively 120ms, 200ms and 480ms (delayed) are observed. v)As per SCADA, change in demand of approx. 430MW is observed in Punjab control area. But as reported by SLDC Punjab, load loss of approx. 38MW occurred during the event.	0	0.122	0	38	0.000	0.054	52398	71010	480
33	GI-2	1) 400/220 KV 315 MVA ICT 1 at Kankani(RS) 2) 400/220 KV 500 MVA ICT 2 at Kankani(RS)	Rajasthan	RVPNL	23-May-24	13:02	23-May-24	14:29	01:27	ii)During antecedent condition, MVA power flows of 400/220 KV 315 MVA ICT 1 and 500 MVA ICT 2 at Kankani(RS) were approx. 248MVA and 388MVA respectively as per SCADA. iii)As reported and as confirmed from DR, at 13:02hrs, 400/220 KV 315 MVA ICT 1 at Kankani(RS) tripped due to PRD-1 (Pressure Relief Device) relay operation (exact reason of relay operation yet to be shared). ii)Due to this tripping, 400/220 KV 500 MVA ICT 2 at Kankani(RS) got overloaded and tripped due to over-current protection operation. iv)As per SCADA SOE, 220/132KV 100MVA ICT 1 & 2 at Bilara(RS) tripped during the same time (exact reason of tripping yet to be shared). v)As per PMU at Jodhpur(RS), no fault is observed in the system. But voltage dip of approx. 9.275kV (ph) was observed at the same time. vi)As per SCADA, change in demand of approx. 255MW is observed in Rajasthan control area.	0	0.37	0	255	0.000	0.324	69145	78813	NA
34	GD-1	1) 220 KV Kanpur(PG)-Kanpur Naubasta(UP) (PG) Ckt-1 2) 220 KV Fatehpur(PG)- Kanpur Naubasta(UP) (PG) Ckt-1 3) 220/132KV 160MVA ICT-1 at Kanpur Naubasta(UP) 4) 220/132KV 160MVA ICT-2 at Kanpur Naubasta(UP)	Uttar Pradesh	UPPTCL, PGCIL	23-May-24	03:28	23-May-24	04:49	01:21	ii)220/132/33KV Kanpur Naubasta(UP) has single main and transfer bus scheme at both 220KV and 132KV level. ii)During antecedent condition, MVA power flows of 220/132KV 160MVA ICT-1 & 2 at Kanpur Naubasta(UP) were approx. 83MVA and 85MVA respectively as per SCADA. iii)As reported, at 03:28hrs, B-N phase to earth fault occurred on 220 KV Kanpur(PG)-Kanpur Naubasta(UP) (PG) Ckt-1 (exact location of fault yet to be shared). Line auto-reclosed successfully from Kanpur(PG) end. As per DR at Kanpur Naubasta(UP) end, fault was sensed in zone-4 and fault current was approx. 8.64kA. Fault clearing time was approx. 55ms. iv)During the same time, bus bar protection operated at 220KV bus of Kanpur Naubasta(UP) which led to tripping of all the elements connected to 220KV bus and complete blackout occurred at 220/132/33KV Kanpur Naubasta(UP) (exact reason of bus bar protection operation yet to be shared). v)As per PMU at Kanpur(PG), B-N phase to earth fault with fault clearing time of 120ms is observed. vi)As per SCADA, change in demand of approx. 245MW is observed in Uttar Pradesh control area.	0	0.331	0	245	0.000	0.341	53019	71891	120
35	GD-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, PGCIL	23-May-24	14:49	23-May-24	16:13	01:24	ii)220/132KV Pampore(PDD) has Double main Bus arrangement at 220KV side. ii)During antecedent condition, power flow from Wagoora(PG) S/s to Pampore(PDD) S/s was approx. 200 MW through 220 KV Wagoora(PG)-Pampore(PDD) (PG) D/C. 220KV Pampore-Mirbazar(PDD) D/C was not in service. iii)As reported, at 14:49 hrs, 220 KV Wagoora(PG)-Pampore(PDD) (PG) D/C tripped from Wagoora(PG) end on R-N phase to earth fault on 220 KV Wagoora(PG)-Pampore(PDD) (PG) Ckt-2 with fault distance of 2.38km from Wagoora(PG) end. From Pampore(PDD) JK end, only 220 KV Wagoora(PG)-Pampore(PDD) (PG) Ckt-2 tripped. iv)As per DR of Wagoora(PG) end of 220 KV Wagoora(PG)-Pampore(PDD) (PG) ckt-1 & ckt-2, R-N phase to earth fault is observed in zone-1 and zone-1 for 220 KV Wagoora(PG)-Pampore(PDD) (PG) ckt-1 & ckt-2 respectively. Fault current observed is I <sub>r</sub> =7.9kA & I <sub>n</sub> =12.9kA for 220 KV Wagoora(PG)-Pampore(PDD) (PG) ckt-1 & ckt-2 respectively. From relay flags, it is suspected that fault was on 220 KV Wagoora(PG)-Pampore(PDD) (PG) ckt-2 and ckt-1 tripped from Wagoora(PG) end due to delayed clearance from Pampore end. Details of Pampore end yet to be received. v)As per PMU at Wagon(PG), R-N phase to earth fault is observed with delayed fault clearing time of 520ms. vi)As per SCADA, change in demand of approx. 235MW is observed in J&K control area.	0	0.329	0	235	0.000	0.289	69934	81359	520
36	GD-1	1)220KV Laltonkalan(PS)-Hambran(PS) Ckt 2)220KV Laltonkalan(PS)-Dandharikalan(PS) Ckt 3)220KV Laltonkalan(PS)-Jagraon(PS) Ckt 4)220KV Laltonkalan(PS)-Ferozepur Road LDH(PS) Ckt 5)220 KV Ludhiana(PG)-Laltonkalan(PS) (PSTCL) Ckt-1 6)220 KV Ludhiana(PG)-Laltonkalan(PS) (PSTCL) Ckt-2 7)220/66KV 160MVA ICT-1 at Laltonkalan(PS) 8)220/66KV 100MVA ICT-4 at Laltonkalan(PS) 9)220/66KV 100MVA ICT-5 at Laltonkalan(PS) 10)66/11KV 20MVA ICT-2 at Laltonkalan(PS) 11)66/11KV 20MVA ICT-3 at Laltonkalan(PS)	Punjab	PSTCL, PGCIL	24-May-24	10:08	24-May-24	10:27	00:19	ii)220/66KV Laltonkalan(PS) has double main bus scheme at 220KV level. ii)During antecedent condition, 220KV Bus-1 at Laltonkalan(PS) was under shutdown for maintenance. All the 220KV lines and 220/66KV ICTs were connected to Bus-2. iii)As reported, at 10:08hrs, Y-phase CT of 220/66KV 100MVA ICT-4 at Laltonkalan(PS) blasted which created bus fault at 220KV Bus-2 at Laltonkalan(PS). iv)Due to this, bus bar protection operated at 220KV Bus-2 of Laltonkalan(PS). Hence, all the 220KV circuits connected to Laltonkalan(PS) along with three 220/66KV ICTs tripped and complete blackout occurred at Laltonkalan(PS) S/s. v)As per PMU at Jalandhar(PG), Y-N phase to earth fault with fault clearance time of respectively 80ms is observed. vi)As per SCADA, change in demand of approx. 460MW is observed in Punjab control area.	0	0.146	0	460	0.000	0.577	69088	79682	NA
37	GI-2	1) 220 KV Hissar(BBMB)-Hissar IA(HV) (HVPNL) Ckt-1 2) 220 KV Hissar(BBMB)-Hissar IA(HV) (HVPNL) Ckt-2 3) 800 KV HVDC Kurukshetra(PG) Pole-1	Haryana, Punjab, UP, Delhi & Rajasthan	BBMB, PGCIL, PSTCL, UPPTCL, DTL, RVPNL, HVPNL,	25-May-24	12:46	25-May-24	14:16	01:30	ii)During antecedent condition, 800KV HVDC Champa-Kurukshetra Bipole-1&2 was running on its full capacity (carrying approx. 6000MW). ii)At 12:46:14:160hrs, Y-B fault converted into R-Y-B after ~220msec occurred on 220 KV Hissar(BBMB)-Hissar IA(HV) (HVPNL) Ckt-1. Line CB at Hissar(BBMB) end opened instantaneously on Y-B fault in Z-1. However, CB at Hissar_IA(HR) end opened with delay of ~440msec in Z-2. At the same time, line CB at Hissar(BBMB) end of 220 KV Hissar(BBMB)-Hissar IA(HV) (HVPNL) Ckt-2 also opened. Fault current was in the range of ~25kA. Snapshot of DR of 220 KV Hissar(BBMB)-Hissar IA(HV) (HVPNL) D/C attached in Annexure. iii)As reported, fault occurred due to vegetation fire incident in line corridor at distance ~3km from Hissar_IA(HR) end. Initially Y-B fault occurred and after ~220msec R-ph jumper at Hissar_IA end of 220 KV Hissar(BBMB)-Hissar IA(HV) (HVPNL) Ckt-1 snapped led to R-Y-B fault. iv)As per PMU plot of phase voltages, Y-B fault converted into R-Y-B fault with delayed clearance in ~480msec is observed. v)On this fault, generation reduction at some of the RE stations observed. As per SCADA, reduction of ~1100MW RE generation at Rajasthan occurred, out of which ~700MW recovered within 2.5minutes. As per PMU phase voltage at POI end of 220KV line of RE stations, voltage was above 0.9pu during the fault. vi)At 12:46:14:706hrs, 800KV HVDC Champa-Kurukshetra pole-1 blocked on DC overcurrent protection operation at Kurukshetra end. DC overcurrent protection operated due to multiple commutation failure in pole-1. vii)There was variation in frequency during the incident. From 12:46:15:800hrs, frequency started ramping down from 49.90Hz and reached 49.874Hz at 12:46:16:120hrs. During this frequency reduction, multiple feeders at distribution level in Northern Region tripped on df/dt (ROCOF) stage-1 (0.1Hz/sec) operation. List of feeders tripped on df/dt operation in UP, Punjab, Delhi and Rajasthan is attached in Annexure. DR file of df/dt relay of Lodhi Road S/s (Delhi control area) is also attached in Annexure. viii)As per SCADA, change in Northern Region demand of approx. 2200MW (Punjab:1140MW; Rajasthan:180MW; Haryana:520MW; Delhi:60MW) observed. As reported by SLDCs, load loss of ~172MW in UP, ~82MW in Delhi, ~1375MW in Punjab and ~140MW in Rajasthan occurred due to df/dt operation.	0	0	1100	2200	1.556	2.737	70679	80392	480
38	GI-1	1) 104.6 MW Pragati Gas Turbines - UNIT 1 2) 121.2 MW Pragati Gas Turbines - UNIT 3	Delhi	PPCL, DTL	25-May-24	16:10	25-May-24	17:20	01:10	ii)220/66KV Pragati(DV) has Double main Bus arrangement at 220KV side. ii)During antecedent condition, power generation of 104.6MW UNIT-1, 2 and 121.2MW UNIT-3 was 85MW, 80MW & 107MW respectively at 220/66KV Pragati(DV). iii)As reported, at 16:10 hrs, UNIT-1 & 3 tripped on internal fault of UNITS (exact reason of tripping yet to be received). iv)As per PMU at Maharanibagh(PG), Y-B phase to phase fault is observed with delayed fault clearing time of 400ms. v)As per SCADA, change in demand of approx. 211MW is observed in Delhi control area. Generation loss of approx. 195MW is observed at 220/66KV Pragati(DV) (as per SCADA).	0	0.246	195	211	0.295	0.267	66081	79118	400
39	GD-1	1) 220 KV Phozal(HP)-Nallagarh(PG) (ADHPL) Ckt 2) 220 KV AD hydro(AD)-Nallagarh(PG) (ADHPL) Ckt 3) 220 KV AD hydro(AD)-Phozal(HP) (ADHPL) Ckt 4) 96MW Unit-1 at AD hydro(AD) 5) 96MW Unit-1 at AD hydro(AD)	Himachal Pradesh	HPPTCL, PGCIL, ADHPL	26-May-24	13:30	26-May-24	14:12	00:42	ii)During antecedent condition (before event at @13:30hrs), 96 MW Unit-1 & 2 at ADHPL(IP) were generating approx. 93MW and 92MW respectively as per SCADA. ii)As reported, at 13:21 hrs, 220 KV Phozal(HP)-Nallagarh(PG) (ADHPL) Ckt tripped on B-N phase to earth fault with fault distance of 121km from Nallagarh(PG) end and 37.8km from Phozal(HP) end (as per DR). As per DR, fault sensed in zone-1 at Nallagarh(PG) end and zone-2 at Phozal(HP) and fault current was ~1.164kA from Nallagarh(PG). DT received at Phozal(HP) end. iii)As per PMU at Nallagarh(PG), B-N phase to earth fault with fault clearing time of 240ms is observed. iv)As per SCADA, generation loss of approx. 40MW is observed at ADHPL(IP). v)Further at 13:30hrs, R-N phase to earth fault occurred on 220 KV AD hydro(AD)-Nallagarh(PG) (ADHPL) Ckt with fault current of ~6.07kA from Nallagarh(PG) end and ~1.164kA from AD hydro end (as per DR). As reported, there was forest fire near 400/220KV Nallagarh(PG) S/s. vi)As per DR at Nallagarh(PG) end, fault was sensed in zone-1 at Nallagarh(PG) and line successfully auto-reclosed from Nallagarh(PG) end. vii)As per DR at AD hydro end, fault was sensed in zone-2 and carrier received at AD hydro, but zone-2 got reset. Y and B-ph current increased upto ~1.53kA and ~1.47kA and A/R lockout operated and line tripped from AD hydro end. viii)Again, B-N phase to earth fault occurred on 220 KV AD hydro(AD)-Nallagarh(PG) (ADHPL) Ckt within the reclaim time with fault current of ~1.07kA from Nallagarh(PG) end (as per DR); fault was sensed in zone-1 and tripped from Nallagarh(PG) end. ix)Due to tripping of 220 KV Phozal(HP)-Nallagarh(PG) (ADHPL) Ckt and 220 KV AD hydro(AD)-Nallagarh(PG) (ADHPL) Ckt, island formed with 96MW Unit-1 & 2 at AD hydro(AD) and 220 KV AD hydro(AD)-Phozal(HP) (ADHPL) Ckt and generation-load imbalance occurred. After this, 96MW Unit-1 & 2 at AD hydro(AD) tripped due to over-speeding. x)After tripping of 96MW Unit-1 & 2 at AD hydro(AD), 220 KV AD hydro(AD)-Phozal(HP) (ADHPL) Ckt got de-energized and complete blackout occurred at 220KV ADHPL(IP). xi)As reported, line CB at AD hydro end of 220 KV AD hydro(AD)-Phozal(HP) (ADHPL) Ckt was opened manually at 13:48 hrs. xii)As per PMU at Nallagarh(PG), R-N followed by B-N phase to earth fault Y-B fault with fault clearing time of 120ms and 120ms are observed. xiii)As per SCADA, no change in demand is observed in Himachal Pradesh control area. Generation loss of approx. 185MW occurred at ADHPL(IP).	0	0	185	0	0.271	0.000	68338	77854	120



S.No.	Category of Grid Disturbance (GD-1 to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserviced due to Generation loss (MU)	Energy Unserviced 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)	
40	GD-1	1) 220 KV Bassi(PG)-Bagru(RS) (PG) Ckt 2) 220 KV Phulera(RS)-Bagru(RS) Ckt	Rajasthan	PGCIL, RVPNL, NTPC (Anta Solar)	26-May-24	10:45	26-May-24	11:45	01:00	i)During antecedent condition, MW power flows of 220 KV Bassi(PG)-Bagru(RS) (PG) Ckt and 220 KV Phulera(RS)-Bagru(RS) Ckt were approx. 286MW and 217MW respectively as per SCADA. ii)As reported, at 10:45hrs, 220 KV Bassi(PG)-Bagru(RS) (PG) Ckt and 220 KV Phulera(RS)-Bagru(RS) Ckt tripped due to over-loading (exact reason, nature and location of fault yet to be shared). iii)Due to this tripping, complete blackout occurred at 220/132KV Bagru(RS) S/s. iv)During the same time, 90MW Anta Solar plant also tripped (exact reason of tripping yet to be shared). v)As per PMU at RAPP-C(NPC), R-N phase to earth fault with fault clearing time of 80ms is observed. vi)As per SCADA, change in demand of approx. 260MW is observed in Rajasthan control area. vii)As per SCADA, change in NR solar generation of approx. 85MW is observed.	0	0.26	85	260	0.134	0.339	63418	76627	80
41	GI-1	1) 132 KV Heerapura(RS)-Chambal(RS) Ckt 2) 220 KV Heerapura(RS)-Mansarovar(RS) Ckt 3) 220 KV Heerapura(RS)-VKIA(RS) Ckt 4) 220/132KV 160MVA ICT-1 at Heerapura220(RS) 5) 220/132KV 160MVA ICT-2 at Heerapura220(RS) 6) 220/132KV 160MVA ICT-4 at Heerapura220(RS)	Rajasthan	RVPNL	27-May-24	16:40	27-May-24	16:51	00:11	i)220/132KV Heerapura(RS) has double main and transfer bus arrangement at 220KV side. ii)During antecedent condition, 220/132KV 100MVA ICT-1 at Heerapura220(RS) was not in service. iii)As reported, at 16:40hrs, during the charging of 132 KV Heerapura(RS)-Chambal(RS) Ckt, line CB pole at Heerapura220(RS) end bursted. iv)During the same time, B-C-G bus coupler (Bus B and C coupled by B-C-G Bus coupler), 220 KV Heerapura(RS)-Mansarovar(RS) Ckt, 220 KV Heerapura(RS)-VKIA(RS) Ckt, 220/132KV 160MVA ICT-1, 2 and 3 at Heerapura220(RS) also tripped (exact reason and nature of protection operated yet to be shared). v)As per PMU at Bassi(PG), 3-phase to earth fault (delayed fault clearance in B-ph) is observed with delayed fault clearing time of 720ms. vi)As per SCADA, change in demand of approx. 165MW in Rajasthan control area is observed.	0	0.03	0	165	0.000	0.209	62324	78769	720
42	GI-2	1) 400 KV Jhajar(APCL)-Mundka(DV) (APCL) Ckt-2 2) 400 KV Jhajar(APCL)-Daulatabad(HV) (HV) Ckt-2	Haryana	APCPL, DTL, HVPNL	27-May-24	14:36	27-May-24	15:53	01:17	i)400KV Jhajar(APCPL) has one and half breaker arrangement at 400KV side. ii)During antecedent condition, 500MW Unit 1, 2 and 3 at Jhajar(APCPL) were generating approx. 280MW each. iii)As reported, at 14:36hrs, 400 KV Jhajar(APCL)-Mundka(DV) (APCL) Ckt-2 tripped on R-Y-N double phase to earth fault with fault distance of 55.1km from Mundka(DV) end. As per DR, fault current was Ir=8.263kA and Iy=8.258kA from Mundka(DV); zone-1 distance protection operated at Mundka(DV). iv)During the same time, 400 KV Jhajar(APCL)-Daulatabad(HV) (HV) Ckt-2 also tripped (exact reason and nature of protection operated yet to be shared). v)As per PMU at Gurgaon(PG), R-Y-N double phase to earth fault is observed with fault clearing time of 80ms. vi)As per SCADA, change in demand of approx. 340MW in Haryana, 280MW in Delhi, 140MW in UP and 100MW in Uttarakhand control area are observed (details from states regarding any frequency related protection (df/dt) operation yet to be received). vii)As per SCADA, change in NR solar generation of approx. 665MW among which almost 495MW revived within 3 minutes.	0	0	665	1060	0.959	1.249	69347	84892	80
43	GI-2	1) 400/220 KV 315 MVA ICT 1 at Bikaner(RS) 2) 400/220 KV 315 MVA ICT 2 at Bikaner(RS)	Rajasthan	RVPNL	28-May-24	05:37	28-May-24	06:38	01:01	i)During antecedent condition, 400/220 KV 315 MVA ICT 1 and 500 MVA ICT 2 at Bikaner(RS) was carrying approx. 294MVA and 296MVA respectively. 220KV Bikaner-Dungargarh (RS) line was in open condition from Bikaner end. ii)As reported, at 05:37 hrs, 400/220 KV 315 MVA ICT 2 at Bikaner(RS) tripped on WTI (Winding Temperature Indicator) protection operation. iii)As per PMU at Bhadla(PG), no fault in system is observed. iv)Due to tripping of ICT-2, SPS implemented at Bikaner(RS) S/s related to overloading of remaining ICTs after tripping of any ICT operated. As per SPS scheme, 220KV Bikaner-Nokha (RS) line and 220KV Bikaner-Dungargarh (RS) line has to open. 220KV Bikaner-Nokha (RS) line (carrying ~140MW) opened on SPS operation. v)With the tripping of 400/220KV ICT-2, load shifted on 400/220KV ICT-1 and as 220KV Bikaner-Dungargarh (RS) line was already in open condition, after SPS operation sufficient load relief was not achieved. Thus, loading of ICT-1 remained in the range of ~400MVA. vi)Further, 400/220 KV 315 MVA ICT 1 at Bikaner(RS) also tripped on overcurrent protection operation. vii)As per SCADA, change in demand of approx. 620MW is observed in Rajasthan control area. viii)As reported, setting of WTI in ICT-2 has been revised from 85-90°C to 95-100°C.	0	0.63	0	620	0.000	0.845	51468	73388	NA
44	GI-2	1) 400/220 KV 315 MVA ICT 1 at Bikaner(RS) 2) 400/220 KV 315 MVA ICT 2 at Bikaner(RS)	Rajasthan	RVPNL	28-May-24	10:43	28-May-24	11:31	00:48	i)During antecedent condition, 400/220 KV 315 MVA ICT 1 and 500 MVA ICT 2 at Bikaner(RS) were carrying approx. 300MVA. 220KV Bikaner-Dungargarh (RS) line was in open condition from Bikaner end. ii)As reported, at 10:43 hrs, 400/220 KV 315 MVA ICT 2 at Bikaner(RS) tripped on overcurrent protection operation. iii)From DR of 400/220 KV 315 MVA ICT 2 at Bikaner(RS) of HV side, it is observed that phase current were started increasing from 430A and reached till ~590A due to sudden increase in loading of 220KV Bikaner-Nokha (RS) line. Reason of sudden increase in loading of line is not identified yet. iv)As per PMU at Bhadla(PG), no fault in system is observed. v)Due to tripping of ICT-2, SPS implemented at Bikaner(RS) S/s related to overloading of remaining ICTs after tripping of any ICT operated. As per SPS scheme, 220KV Bikaner-Nokha (RS) line and 220KV Bikaner-Dungargarh (RS) line has to open. 220KV Bikaner-Nokha (RS) line opened on SPS operation. As per DR of 220KV Bikaner-Nokha (RS) line, phase current of line before tripping was in the range of ~680A. vi)With the tripping of 400/220KV ICT-2, load shifted on 400/220KV ICT-1 and as 220KV Bikaner-Dungargarh (RS) line was already in open condition, after SPS operation sufficient load relief was not achieved. Thus, loading of ICT-1 remained high (phase current increased from ~590A to ~770A after tripping of ICT-2). vii)Further, 400/220 KV 315 MVA ICT 1 at Bikaner(RS) also tripped on overcurrent protection operation. viii)As per SCADA, change in demand of approx. 495MW is observed in Rajasthan control area.	0	0.39	0	495	0.000	0.607	65751	81584	NA
45	GD-1	1) 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1 2) 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-2	Haryana	PGCIL, HVPNL	28-May-24	18:27	28-May-24	19:50	01:23	i)220/132KV Mohana S/s has six (06) 220kV lines i.e., 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C, 220KV Mohana-Samalkha (HV) D/C and 220KV Mohana-Sampla (HV) D/C. Samalkha and Sampla are load centre. Power source is through 220KV Sonipat only. Samalkha(HV) S/s is having connectivity from grid through 220KV Mohana-Samalkha (HV) D/C only and 220KV Sampla has connectivity with 220KV Mohana and 400/220KV Kabulpur also. ii)During antecedent condition, 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C was carrying total ~228MW. Approx. 116MW was evacuating through 220KV Mohana-Samalkha (HV) D/C and remaining power was evacuating through 132KV load feeders from Mohana(HV) S/s. 220KV Mohana-Sampla (HV) D/C was not in service during the event (opened from Sampla end). iii)As reported, at 18:27 hrs, R-phase CT of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1 blasted at Mohana(HV) end which resulted in tripping of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C from Sonipat(PG) end and only 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1 tripped from Mohana(HV) end. (exact location of fault during 2nd instant yet to be received). iv)As per DR at Sonipat(PG) end of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1, R-N phase to earth fault with fault current of Ir=14.3kA is observed. Line tripped instantaneously on distance protection operation in zone-1. As per relay flag at Mohana end of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1, line tripped instantaneously on distance protection operation in zone-1. v)As per DR at Sonipat(PG) end of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-2, R-N phase to earth fault with fault current of Ir=13.4kA is observed. Line tripped on distance protection operation in zone-2 with fault clearing time of 400msec. vi)Due to tripping of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) D/C, 220KV Mohana-Samalkha (HV) D/C became dead and 220/132KV Mohana (HV) S/s also lost its connectivity from grid and the complete 220/132KV Mohana(HV) S/s became dead. vii)As per PMU at Sonipat(PG), multiple R-N phase to earth fault is observed with fault clearing time of 160msec & 400msec. viii)As per SCADA, approx. 222 MW load loss is observed in Haryana control area.	0	0.344	0	222	0.000	0.314	53002	70596	400
46	GI-2	1) 400/132 KV 200 MVA ICT 1 at Masoli(UP) 2) 400/132 KV 200 MVA ICT 2 at Masoli(UP) 3) 400/132 KV 200 MVA ICT 3 at Masoli(UP) 4) 125 MVAR Bus Reactor No 1 at 400 KV Masoli(UP) 5) 132KV Masoli-Karchhana (UP) ckt 6) 132KV Masoli-Naini (UP) ckt	Uttar Pradesh	UPPTCL	29-May-24	15:57	29-May-24	17:11	01:14	i)400/132KV Masoli(UP) S/s has one and half breaker bus scheme at 400KV voltage level side. ii)During antecedent condition, loading of 400/132 KV 200 MVA ICT 1,2&3 at 400/132KV Masoli(UP) was approx. 162MW (approx. 54MW for each ICT) (As per SCADA). iii)As reported, at 15:57 hrs, during inclement weather condition, towers of 132KV feeders to Naini and Karchhana from Masoli(UP) damaged which created B-N phase to earth fault on 132KV Masoli-Naini (UP) ckt followed by Y-N phase to earth fault on 132KV Masoli-Karchhana (UP) ckt. iv)B-N phase to earth fault on 132KV Masoli-Naini (UP) ckt cleared instantaneously (within 120msec as per PMU). CB of 132KV Masoli-Karchhana (UP) ckt could not open from Masoli(UP) end on Y-N phase to earth fault. v)As CB of 132KV Masoli-Karchhana (UP) ckt failed to open, fault cleared with the tripping of 400/132 KV 200 MVA ICT 1,2&3 and 125 MVAR Bus Reactor at Masoli(UP) tripped on O/C/E/F protection operation. vi)As per PMU at Allahabad(PG), B-N followed by Y-N phase to earth fault is observed with fault clearing time of 120msec and 840msec respectively. vii)As per SCADA, change in demand of approx. 94MW is observed in UP control area. However, 100MW load loss is reported by SLDC-UP in UP control area.	0	0.123	0	100	0.000	0.121	66380	82732	840
47	GI-2	1) 800 KV HVDC Kurukshetra(PG) Pole-03 2) 800 KV HVDC Kurukshetra(PG) Pole-04	Haryana	PGCIL	30-May-24	09:07	30-May-24	09:53	00:46	i)During antecedent condition, 800KV HVDC Champa-Kurukshetra was carrying total 6000MW power from Kurukshetra to Champa (carrying ~1500MW each). ii)As reported, Bipole-2 (Pole-3&4) of 800KV HVDC Champa-Kurukshetra blocked due to non-availability of minimum AC filter. Further, as per detail received sequence of event are as follows: a. At 08:49:08:042hrs, B-type filter (HACQ-52) of bipole-2 tripped on capacitor unbalance stage-1 protection. b. Now, Bipole-2 was running with 3A (HACQ-41, HACQ-51, HACQ61)+1C+6E type filter at 3000MW without satisfying minimum filter requirement. c. B-type filter (HACQ-42) was available for energization but was not taken in service by Reactive Power Controller (RPC) as E-type filters were connected for Voltage Regulation which had resulted in generation of alarm "Fltr Ctrl Incorrect Element Energized". (As per M/s GE, RPC philosophy, when D/E type filters are connected, then RPC will not follow the filter table and RPC shall not allow for energization/de-energization of A/B type filter). d. For satisfying the harmonic performance of HVDC System, one B-Type filter was additionally supposed to be in service which could also satisfy the minimum filter requirement. e. At 09:08:03:182hrs, the operator tried to take B-type filter (HACQ-42) in manual mode. As soon as HACQ42 was taken in manual mode, Pole-3 & Pole-4 both got blocked on controlled blocking due to non-availability of minimum B type filter. iii)As per SCADA, due to outage of two poles (Pole-03 and Pole-04), power order reduced from 6000MW to 3000MW. iv)As per PMU, fluctuation in voltage was observed. v)As per SCADA, no change in demand is observed in Haryana control area.	0	0	0	0	0.000	0.000	66977	77406	NA
48	GI-2	1) 400 KV Sikar(PG)-Ratangarh(RS) (PG) Ckt-1	Rajasthan	PGCIL, RVPNL	30-May-24	10:16	31-May-24	10:33	24:17	i)During antecedent condition, 400 KV Sikar(PG)-Ratangarh(RS) (PG) Ckt-1, 400 KV Sikar(PG)-Bikaner(RS) (PG) Ckt-1 & 2 and 400 KV Ratangarh(RS)-Merta(RS) (RS) Ckt were not in service. Active power flow of 400 KV Sikar(PG)-Ratangarh(RS) (PG) Ckt-1 was approx. 470MW from Ratangarh(RS) to Sikar(PG). ii)As reported, at 10:16 hrs, 400 KV Sikar(PG)-Ratangarh(RS) (PG) Ckt-1 tripped on R-Y-N double phase to earth fault with fault distance of 26.592km from Sikar(PG) end. Y-ph conductor snapped between location 83-84. iii)As per DR, zone-1 distance protection operated at Sikar(PG) end. Fault current was Ir=11.986kA and Iy=12.735kA from Sikar(PG). iv)As per SCADA SOE, 220KV Ratangarh(RS)-Khetri(RS) Ckt-2 tripped during the same time (exact reason yet to be shared). v)As per PMU at Sikar(PG), R-Y-N double phase to earth fault with fault clearing time of 80ms is observed. Voltage dipped upto 0.746 p.u. at Sikar(PG). vi)As per SCADA, change in NR solar generation of approx. 1290MW is observed which revived within 3.5 minutes (change in Rajasthan solar generation of approx. 66MW is observed which revived within 2 minutes). vii)As per SCADA, change in Rajasthan wind generation of approx. 145MW is observed.	0	0	1435	0	2.014	0.000	71257	81922	80
49	GD-1	1) 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) Ckt-1 2) 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) Ckt-2	Haryana and Himachal Pradesh	PGCIL, HVPNL	31-May-24	11:25	31-May-24	14:54	03:29	i)220KV Pinjore(HR) S/s has double main bus arrangement at 220KV side. ii)During antecedent condition, Incoming power at Pinjore(HR) S/s was approx. 230 MW through 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) D/C out of which approx. 188 MW was evacuating through 220 KV Baddi(HP)-Pinjore (HR) (HPPTCL) D/C and approx. 42MW was evacuating through 66KV feeders at Pinjore(HR) S/s. 220 KV Baddi(HP)-Pinjore (HR) (HPPTCL) D/C and some 66KV feeders connected to 220KV Bus-2 at Baddi(HP) and no other 200KV line connected at the same Bus. (As per SCADA). iii)As reported, at 11:25 hrs, due to forest fire, B-N phase to earth occurred on 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) ckt-2 which led to tripping of 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) D/C from Panchkula(PG) end and only 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) ckt-2 tripped from Pinjore(HR) end. iv)At the same time, Bus coupler of 220KV Bus-1 & Bus-2 at Baddi(HP) S/s opened due to which 220KV Bus-2 & 220 KV Baddi(HP)-Pinjore (HR) (HPPTCL) D/C became dead. Detail of protection operation on which bus coupler opened is yet to be received from HP. v)As per DR at Panchkula(PG) end of 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) Ckt-1, B-N phase to earth fault is observed in Zone-2 and line tripped from Panchkula end with the delay of ~200msec. vi)As per DR at Panchkula(PG) end of 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) Ckt-2, initially B-N phase to earth fault in zone-1 with fault current of 1.3kA is observed. On this fault A/R operation started but before A/R reclosing Y-N phase to earth fault occurred which led to 3-phase tripping of the line. vii)As 220 KV Baddi(HP)-Pinjore (HR) (HPPTCL) D/C became dead and due to tripping of 220 KV Panchkula(PG)-Pinjore (HR) (HVPNL) D/C, 220 Pinjore(HR) lost its connectivity from Grid and complete Pinjore(HR) S/s became dead. viii)As per PMU at Abdullapur(PG), B-N phase to earth fault followed by Y-N fault is observed with delayed fault clearing time of 1240msec & 80msec respectively. ix)As per SCADA, change in demand of approx. 33MW & 98MW is observed in Haryana & HP control area respectively. However, approx. 60MW & 100MW load loss is reported by SLDC-Haryana & SLDC-HP in Haryana & HP control area respectively.	0	0.557	0	160	0.000	0.194	72346	82633	1240



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	132 KV Rihand(UP)-Garwa(JS) (UP) Ckt-1	UPPTCL	7-May-24	15:39	Nil	Phase to earth fault R-N	NA	NA	YES	YES			As per PMU, R-N fault observed. As per DR of Rihand end, R-Y phase to phase fault is observed. Date and Time sync issue in DR of Rihand end.
2	800 KV HVDC Kurukshetra(PG) Pole-2	POWERGRID	10-May-24	19:41	Nil	Earth fault	GI-2	NA	YES (After 24 hrs)	YES (After 24 hrs)			As per PMU, fluctuation in Voltage is observed. No fault in system is observed. As reported, Pole 2 blocked on Operation of SSAD Instability Detection along with DC Undercurrent Protection & Pole 4 blocked on Operation of T-Zone Protection at Champa.
3	800 KV HVDC Kurukshetra(PG) Pole-4	POWERGRID	10-May-24	19:41	Nil	Insulator flashover		NA	YES (After 24 hrs)	YES (After 24 hrs)			
4	800 KV HVDC Kurukshetra(PG) Pole-2	POWERGRID	11-May-24	02:38	Nil	Earth fault	NA	NA	YES (After 24 hrs)	YES (After 24 hrs)			As per PMU and DR of Varanasi end, R-N phase to earth fault with unsuccessful A/R operation is observed. Fault current $I_r=5.3kA$ .
5	765 KV Varanasi-Gaya (PG) Ckt-2	POWERGRID	12-May-24	18:05	Nil	Phase to earth fault R-N	NA	NA	YES	YES (After 24 hrs)			As per PMU and DR (of Phagi end), line tripped on B-N phase to earth fault in reclaim time fault current of $I_b=2.2kA$ is observed.
6	765 KV Phagi(RS)-Gwalior(PG) (PG) Ckt-2	POWERGRID	17-May-24	12:59	Nil	Phase to earth fault B-N	NA	NA	YES	YES (After 24 hrs)			As per PMU, B-N fault with unsuccessful A/R operation is observed. As per DR (of Phagi end), B-N fault ( $I_b=3.1kA$ ) with no A/R operation at Phagi end and unsuccessful A/R operation at Gwalior end is observed.
7	765 KV Phagi(RS)-Gwalior(PG) (PG) Ckt-2	POWERGRID	17-May-24	15:13	Nil	Phase to earth fault B-N	NA	NA	YES	YES (After 24 hrs)	No A/R operation at Phagi end		As reported, Pole 3 blocked on Pole DC differential protection operated at Kurukshetra end. As per PMU, B-N phase to earth fault with no A/R operation is observed.
8	800 KV HVDC Kurukshetra(PG) Pole-03	POWERGRID	19-May-24	13:54	Nil	DC differential protection operated at Kurukshetra end			YES (After 24 hrs)	YES (After 24 hrs)			As per PMU, Y-N phase to earth with unsuccessful A/R and delayed clearance of ~520msec is observed. DR/EL and tripping details not received
9	400 KV RAPS_D(NP)-Shujalpur(PG) (RTCL) Ckt-2	POWERGRID	19-May-24	14:30	Nil	Phase to earth fault Y-N			NO	NO	delayed clearance of fault (~520msec)		As per PMU and DR (of Varanasi end), R-N phase to earth fault with unsuccessful A/R operation with fault current of $I_r=5.2kA$ is observed.
10	765 KV Varanasi-Gaya (PG) Ckt-2	POWERGRID	21-May-24	05:08	Nil	Phase to Ground Fault R-N	NA	NA	YES	YES			As per PMU, fluctuation in voltage is observed. As reported, Pole-3 blocked on T-zone protection operated at Kurukshetra end. Pole 1 blocked on CAT B sequence initiated by parallel Pole 3 due to latching of T-zone protection.
11	800 KV HVDC Kurukshetra(PG) Pole-03	POWERGRID	21-May-24	19:45	Nil	DC overcurrent protection	GI-2		YES (After 24 hrs)	YES (After 24 hrs)			As per PMU, fluctuation in voltage is observed. As reported, Pole-1 blocked on DC Overcurrent protection operation.
12	800 KV HVDC Kurukshetra(PG) Pole-1	POWERGRID	25-May-24	12:46	Nil					YES (After 24 hrs)	YES (After 24 hrs)		
13	765 KV Orai-Satna (PG) Ckt-1	POWERGRID	26-May-24	11:04	Nil	Phase to earth fault Y-N	NA	NA	NO	YES (After 24 hrs)	No A/R operation at Orai end		As per PMU, fluctuation in Voltage is observed. As reported, Pole-3&4 tripped due to non-availability of minimum AC Filters at Champa.
14	800 KV HVDC Kurukshetra(PG) Pole-03	POWERGRID	30-May-24	09:08	Nil	Tripping of Pole 3 & 4 on non-availability of minimum AC Filters at Champa.	GI-2		YES	YES (After 24 hrs)			
15	800 KV HVDC Kurukshetra(PG) Pole-04	POWERGRID	30-May-24	09:08	Nil				YES	YES (After 24 hrs)			

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

\*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 37.2(c) 2. CEA Grid Standard 15.3
3	FIR Not Furnished	1. IEGC 37.2(b) 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 May 2024 - 31st May 2024**

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	AD HYDRO	2	0	0	0	1	0	0	1	0	0	1	0	Details received
2	ADANI	3	3	100	3	0	100	3	0	100	3	0	100	DR, EL & Tripping report not submitted
3	ANTA-NT	2	2	100	2	0	100	2	0	100	2	0	100	
4	AP43L	1	1	100	1	0	100	1	0	100	1	0	100	
5	APL	2	2	100	2	0	100	2	0	100	2	0	100	
6	ASEPL	1	1	100	1	0	100	1	0	100	1	0	100	Details received
7	AURAIYA-NT	1	0	0	0	0	0	1	0	100	0	0	0	
8	BAIRASUIL-NH	4	4	100	4	0	100	4	0	100	4	0	100	DR, EL & Tripping report not submitted
9	BBMB	122	16	13	48	12	44	58	18	56	22	13	20	
10	BUDHIL	1	1	100	1	0	100	1	0	100	1	0	100	
11	CHAMERA-III-NH	2	2	100	2	0	100	2	0	100	2	0	100	
12	CHAMERA-II-NH	3	3	100	3	0	100	3	0	100	3	0	100	
13	CHAMERA-I-NH	2	2	100	2	0	100	2	0	100	2	0	100	
14	CPCC1	121	2	2	10	19	10	24	18	23	8	6	7	
15	CPCC2	73	19	26	15	5	22	18	5	26	19	2	27	
16	CPCC3	67	8	12	6	6	10	6	5	10	38	0	57	
17	DADRI-NT	4	4	100	4	0	100	4	0	100	3	0	75	
18	DHAULIGANGA-NH	2	2	100	2	0	100	2	0	100	2	0	100	
19	DULHASTI-NH	4	1	25	1	0	25	1	0	25	1	0	25	
20	ESUCRL	1	1	100	1	0	100	1	0	100	1	0	100	
21	FARIDABAD-NT	1	1	100	1	0	100	1	0	100	1	0	100	
22	JHAJJAR	2	2	100	2	0	100	2	0	100	2	0	100	
23	KARCHAM	1	1	100	1	0	100	1	0	100	1	0	100	
24	MAHINDRA	2	2	100	2	0	100	2	0	100	2	0	100	
25	NAPP	3	0	0	0	1	0	0	1	0	0	0	0	Details received
26	PARBATI-III-NH	1	0	0	0	0	0	0	0	0	0	0	0	DR, EL & Tripping report not submitted
27	PARBATI-II-NH	2	1	50	0	0	0	0	0	0	1	0	50	
28	PKTSL	3	0	0	0	1	0	0	1	0	0	0	0	Details received
29	RAILWAYS	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report not submitted
30	RAPPA	8	0	0	8	0	100	8	0	100	8	0	100	
31	RAPPB	3	0	0	1	0	33	1	0	33	2	0	67	

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

**Time Period: 1st May 2024 - 31st May 2024**

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		%		
32	RAPPC	2	1	50	1	0	50	1	0	50	1	0	50	DR, EL & Tripping report not submitted	
33	RENEW	1	1	100	1	0	100	1	0	100	1	0	100		
34	RENEW SURYA VIHAAN PRIVATE L	2	2	100	2	0	100	2	0	100	2	0	100		
35	RIHAND-NT	2	2	100	2	0	100	2	0	100	2	0	100		
36	SALAL-NH	1	1	100	1	0	100	1	0	100	1	0	100		
37	SEWA-2-NH	2	2	100	2	0	100	2	0	100	2	0	100		
38	SHREE CEMENT	1	1	100	1	0	100	1	0	100	1	0	100		
39	SINGOLI	3	0	0	0	0	0	0	0	0	1	0	33		
40	SINGRAULI-NT	9	8	89	8	0	89	8	0	89	9	0	100		
41	SLDC-CHD	1	1	100	1	0	100	1	0	100	1	0	100		
42	SLDC-DV	44	0	0	24	0	55	24	0	55	25	0	57		
43	SLDC-HP	15	0	0	1	6	11	1	6	11	2	1	14		
44	SLDC-HR	84	36	43	26	14	37	26	14	37	36	4	45		
45	SLDC-JK	23	3	13	4	19	100	3	20	100	4	8	27		
46	SLDC-PS	56	17	30	31	6	62	30	5	59	43	2	80		
47	SLDC-RS	123	26	21	28	9	25	27	9	24	45	0	37		
48	SLDC-UK	18	2	11	3	5	23	3	6	25	2	0	11		
49	SLDC-UP	162	30	19	36	20	25	38	28	28	40	5	25		
50	STERLITE	6	3	50	3	1	60	3	1	60	5	1	100		
51	TANAKPUR-NH	3	3	100	3	0	100	3	0	100	3	0	100		
52	TANDA-NT	1	1	100	1	0	100	1	0	100	1	0	100		
53	TATAPOWER	1	1	100	1	0	100	1	0	100	1	0	100		
54	TEHRI	10	2	20	1	6	25	2	4	33	2	5	40		
55	UNCHAHAR-NT	4	2	50	2	0	50	2	0	50	2	0	50		
56	URI-II-NH	1	1	100	1	0	100	1	0	100	1	0	100		
<b>Total in NR Region</b>		<b>1020</b>	<b>228</b>	<b>22</b>	<b>308</b>	<b>131</b>	<b>35</b>	<b>336</b>	<b>142</b>	<b>38</b>	<b>366</b>	<b>48</b>	<b>38</b>		

*As per the IEGC provision under clause 37.2 (c), detailed tripping report along with DR & EL has to be furnished within 24 hrs of the occurrence of the event*

Mock trial run/black start schedule plan for 2024-25											Remarks
S.No.	Name of Generating Station	Fuel Type	Installed Capacity (in MW)	Whether Generating station has black start capability (Yes/ No)	Type of Black Start Source (DG set etc.)	Capacity of DG Set / Small Generator / Battery	Source of power supply to Communication and Telemetry during black start.	Compliance to 34.3 of IEGG for mock trial runs (Last date on which mock drill carried out)	Tentative schedule plan for mock trial run		
									Black start exercise of generating unit (dead bus charging)	Mock black start of subsystem (black start of generating unit / island operation / synchronization)	
<b>NTPC</b>											
1	Dadri GPS	Gas	4*130.19 + 2*154.51	Yes	DG Set	2.4 MW		16-Dec-23	31-Oct-24	NA	
2	Anta GPS	Gas	3*88.71 + 1*153.2	Yes	EGT	2.968 MW		29-Feb-24			
3	Auraiya GPS	Gas	4*111.19 + 2*109.3	Yes	DG Set	2900 kVA			09-07-2024	09-07-2024	
4	Faridabad GPS	Gas	2*137.75 + 1*156.07	Yes	DG Set	3.3 MW / 4.125 MVA					
5	Koldam HEP	Hydro	4*200	Yes	DG Set	2X1250 KVA		14-Mar-24	12-03-2025	12-03-2025	
<b>NHPC</b>											
6	Bairasull	Hydro	3*60	Yes	DG Set	2X1010 KVA		30-Nov-22			
7	Salal Stage-I	Hydro	3*115	Yes	DG Set	2X875 KVA		02-Nov-18			
8	Salal Stage-II	Hydro	3*115	Yes	DG Set	3X1020 KVA					
9	Tanakpur HPS	Hydro	3*31.4	Yes	DG Set	2X625 KVA & 1X312.5 KVA					
10	Chamera HPS-I	Hydro	3*180	Yes	DG Set	1X1010 KVA & 2x1000 KVA		02-Dec-22			
11	Chamera HPS-II	Hydro	3*100	Yes	DG Set	2x1250 KVA		02-Dec-22			
12	Chamera HPS-III	Hydro	3*77	Yes	DG Set	2x725 KVA		04-Dec-17			
13	URI-I	Hydro	4*120	Yes	DG Set	2x1000 KVA		20-Dec-16			
14	URI-II	Hydro	4*60	Yes	DG Set	2x1010 KVA		20-Dec-16			
15	Dhauliganga	Hydro	4*70	Yes	DG Set	2x625 KVA		28-Dec-21			
16	Dulhasti	Hydro	3*130		DG Set	2x640 KVA					
17	Sewa-II	Hydro	3*40	Yes	DG Set	2x500 KVA		29-May-22			
18	Parbati-3	Hydro	4*130	Yes	DG Set	2x1010 KVA		22-Dec-20			
19	Kishanganga	Hydro	3*110	Yes	DG Set	2x1010 KVA					
<b>SJVNL</b>											
20	Nathpa-Jhakri	Hydro	6*250	Yes	DG Sets	2x750 KVA	DC Battery Bank/DG sets	09-Dec-22	20.11.2024	20.11.2024	
21	Rampur	Hydro	6*68.67	Yes	DG Sets	2x1010 KVA	DC Battery Bank/DG sets	09-Dec-22	20.11.2024	20.11.2024	
<b>THDC</b>											
22	Tehri	Hydro	4*250	Yes	DG set	110 KVA	DG Set	07-11-23	06-11-24	06-11-24	
23	Koteshwar	Hydro	4*100	Yes	DG Set	2*1010KVA	UPS	14-Mar-24	Dec-24	Dec-24	
<b>BBMB</b>											
24	Bhakra (L)	Hydro	3*108 + 2*126	Yes				31-Dec-22			
25	Bhakra (R)	Hydro	5*157	Yes	DG Set	500KVA		26-Dec-22			
26	Ganguwal	Hydro	1*27.99 + 2*24.2								
27	Kotla	Hydro	1*28.94 + 2*24.2								
28	Dehar	Hydro	6*165								
29	Pong	Hydro	6*66		DG Set	500KVA, 380KVA		08-Jun-14			
*: Rampur can be black started only after starting of Nathpa-Jhakri units due to Tandem operation											
<b>IPPGL(Indraprastha power generating Corporation Ltd.)/ Delhi Gencos</b>											
30	I.P. Gas Turbine (IPGL G.T.)	Gas	6*30+ 3*30	Yes	DG Set	500kVA		20-Feb-19	10-04-2024	10-04-2024	Conducted
31	Pragati Gas Turbine (PPCL)	Gas	2*104.6 + 1*121.2	No							
32	Bawana GT	Gas	2*253+4*216	No							
33	Rithal(PPDL)	Gas	3*36								Not in operation
<b>Haryana</b>											
34	Western Yamuna Canal (WYC-I & II)	Hydro	6*8+ 2*7.2								
<b>Himachal Pradesh</b>											
35	Bhabha	Hydro	3*40		DG Set	500KVA					
36	Bassi	Hydro	4*16.5		DG Set	400KVA					
37	Ghanvi	Hydro	2*11.25		DG Set	400KVA					
38	Giri	Hydro	2*30		DG Set	250KVA					
39	Larji	Hydro	3*42		DG Set	500KVA					
40	Phojal	Hydro	24		DG Set	200KVA					
41	Sainj HEP	Hydro	2*50		DG Set	500KVA					
42	Swara Kuddu HEP	Hydro	3*37		DG Set	2x625 KVA					
43	Bajoli Holi HEP	Hydro	3*60								
<b>Malana Power Company Ltd.</b>											
44	Malana-I	Hydro	2*43	Yes	DG Set	250KVA		12-Mar-24			
<b>Everest Power Company Ltd.</b>											
45	Malana-II	Hydro	2*50	Yes	DG Set	725KVA		03-Jan-19			
<b>AD Hydro Power Ltd.</b>											
46	AD Hydro	Hydro	2*96	Yes	DG Set	750 kVA		27-Jan-23	24-02-2025	24-02-2025	
<b>JSW</b>											
47	Karcham Wangtoo	Hydro	4*250	Yes	DG Set	2*1500KVA		29-Dec-21			It is submitted that we shall perform black start Mock trial test after completion of M4 and M5 of GIS overhauling. In the meantime, Karcham Wangtoo HEP can carry out black start exercise of generating unit only at this point (dead bus charging).
48	Baspa	Hydro	3*100	Yes	DG Set	2*625KVA					
<b>Greenco</b>											
49	Budhil	Hydro	2*35	Yes							inability to carry out Mock Black start exercise keeping in view the Unit safety being installed capacity low and issue of Governing system. The Governing system of Budhil HEP is of M/S Dong Fong China make and we are not getting any support from OEM after COVID-19.. The planning for changing the governing system is in Process.
50	Sorang HEP	Hydro	2*50								
<b>Jammu &amp; Kashmir</b>											
51	Baghlihar-I	Hydro	3*150								
52	Baghlihar-II	Hydro	3*150								
53	Lower Jhelum	Hydro	3*35					20-Dec-16			
54	Upper Sindh	Hydro	2*11.3+ 3*35	Yes				20-Dec-16			
<b>Punjab</b>											
55	Jogendernagar/Shanan	Hydro	4*15+ 1*50								
56	UBDC	Hydro	3*15+ 3*15.45								
57	Mukerian	Hydro	6*15+ 6*19.5								
58	Anandpur Sahib (APS)	Hydro	4*33.5								
59	Ranjit Sagar (Thein Dam)	Hydro	4*150	Yes	DG Set	2*500KVA			04-05-2024	04-05-2024	

Mock trial run/black start schedule plan for 2024-25										Remarks		
S.No.	Name of Generating	Fuel	Installed Capacity (MW)	Whether Generating	Type of Black Start	Capacity of DG Set / Small	Source of power supply to	Compliance to 34.3 of IEGC for mock trial	Tentative schedule plan for mock trial run			
<b>Rajasthan</b>												
60	Ramgarh GT Extn.	Gas	1*3+1*35.5+2*37.5+1*110+1*50			DG Set	625kVA and 750kVA					
61	Dholpur CCGP	Gas	3*110			DG Set	1500kVA					
62	Rana Pratap Sagar (RPS)	Hydro	4*43	Yes		DG Set	250kVA	16-Jan-11				
63	Jawahar Sagar	Hydro	3*33			---	---					
64	Mahi Bajaj Sagar I	Hydro	2*25	Yes		DG Set	200kVA	21-Jul-15				
65	Mahi Bajaj Sagar II	Hydro	2*45	Yes		DG Set	2*200kVA (DG-1 is healthy)	24-Mar-16				
<b>Uttar Pradesh</b>												
66	Rihand (H) or Pipri	Hydro	6*50	Yes		DG Set	2*320kVA (DG-1 is healthy)	16-Feb-24				
67	Obra(H)	Hydro	3*33	Yes		DG Set	1*320kVA 1*250kVA	16-Feb-24				
68	Khara	Hydro	3*24									
69	Matatila	Hydro	3*10.2	Yes		DG Set	2*190kVA (DG-1 is healthy)					
<b>GVK</b>												
70	Alaknanda HEP	Hydro	4*82.5									
<b>Jaiprakash power Venture Ltd.</b>												
71	Vishnu Prayag IPP	Hydro	4*100									
<b>Uttarakhand</b>												
72	Ramganga	Hydro	3*66									
73	Chibro	Hydro	4*60	Yes								
74	Dhalipur	Hydro	3*17									
75	Khodri	Hydro	4*30									
76	Khatima	Hydro	3*13.8									
77	Chilla	Hydro	4*36									
78	Maneri Bhali-I	Hydro	3*30									
79	Maneri Bhali-II	Hydro	4*76									
80	Vyasi HEP	Hydro	2*60									
81	Dhakrani HEP	Hydro	3*11.25									
82	Kulhal HEP	Hydro	3*10									
83	Gamma GPS	Gas	3*75									
84	Sravanti GPS	Gas	3*75	No	NA	NA	NA	NA	NA	NA		
<b>L&amp;T</b>												
85	Singoli Bhatwari	Hydro	3*33	Yes		DG set	500kVA DG	15 kVA UPS connected with 600AH Battery Bank	Not done yet	03rd Dec 2024	03rd Dec 2024	Consent did not given for mock drill by SLDC Dehradun due to constraint of partial power evacuation



Sr. No.	Scheme Name	State Control Area	Last date on which Mock testing carried out	Tentative schedule of SPS Mock testing during 2024-25	Remarks
1	SPS for WR-NR corridor - 765KV Agra-Gwalior D/C	POWERGRID	12-03-2024		
2	SPS for contingency due to tripping of HVDC Mundra-Mahendergarh	ADANI			
3	SPS for high capacity 400 kV Muzaffarpur-Gorakhpur D/C Inter-regional tie-line related contingency	POWERGRID			
4	SPS for 1500 MW HVDC Rihand-Dadri Bipole related contingency	POWERGRID			
5	System Protection Scheme (SPS) for HVDC Balia-Bhiwadi Bipole	POWERGRID			
6	SPS for contingency due to tripping of multiple lines at Dadri(NTPC)	NTPC			
7	SPS for reliable evacuation of power from NJPS, Rampur, Sawra Kuddu, Baspa Sorang and Karcham Wangtoo HEP	SJVN/HPPTCL/JSW			
8	SPS for Reliable Evacuation of Ropar Generation	Punjab			
9	SPS for Reliable Evacuation of Rosa Generation	Uttar Pradesh	07-05-2022	conducted on 20-04-2024	
10	SPS for contingency due to tripping of evacuating lines from Narora Atomic Power Station	NAPS			
11	SPS for evacuation of Kawai TPS, Kalisindh TPS generation complex	Rajasthan			
12	SPS for evacuation of Anpara Generation Complex	Uttar Pradesh	06-07-2020		
13	SPS for evacuation of Lalitpur TPS Generation	Uttar Pradesh	14-07-2018	conducted on 21.05.2024	
14	SPS for Reliable Evacuation of Bara TPS Generation	Uttar Pradesh			
15	SPS for Lahal Generation	Himachal Pradesh	08-07-2020		
16	SPS for Transformers at Ballabgarh (PG) substation	POWERGRID			
17	SPS for Transformers at Maharaniyabagh (PG) substation	POWERGRID			
18	SPS for Transformers at Mandola (PG) substation	POWERGRID			
19	SPS for Transformers at Bamnauli (DTL) Substation	Delhi			
20	SPS for Transformers at Moradabad (UPPTCL) Substation	Uttar Pradesh		conducted on 20-04-2024	
21	SPS for Transformers at Muradnagar (UPPTCL) Substation	Uttar Pradesh	07-02-2023	conducted on 20-04-2024	
22	SPS for Transformers at Muzaffarnagar(UPPTCL) Substation	Uttar Pradesh		conducted on 20-04-2024	
23	SPS for Transformers at Greater Noida(UPPTCL) Substation	Uttar Pradesh			
24	SPS for Transformers at Agra (UPPTCL) Substation	Uttar Pradesh	12-07-2023		
25	SPS for Transformers at 400kV Sarojininagar (UPPTCL) Substation	Uttar Pradesh	17-05-2023		
26	SPS for Transformers at 220kV Sarojininagar (UPPTCL) Substation	Uttar Pradesh	18-05-2022		
27	SPS for Transformers at 400kV Unnao (UPPTCL) Substation	Uttar Pradesh	19-05-2023		
28	SPS for Transformers at 220kV Unnao (UPPTCL) Substation	Uttar Pradesh			
29	SPS for Transformers at 400kV Sultanpur (UPPTCL) Substation	Uttar Pradesh			
30	SPS for Transformers at 400kV Bareilly (UPPTCL) Substation	Uttar Pradesh			
31	SPS for Transformers at 400kV Azamgarh (UPPTCL) Substation	Uttar Pradesh	14-05-2023	conducted on 06-05-2024	
32	SPS for Transformers at 400kV Mau (UPPTCL) Substation	Uttar Pradesh	17-01-2019	conducted on 27-04-2024	
33	SPS for Transformers at 400kV Gorakhpur (UPPTCL) Substation	Uttar Pradesh	14-05-2023	conducted on 27-04-2024	
34	SPS for Transformers at 400kV Sarnath (UPPTCL) Substation	Uttar Pradesh	19-05-2023	conducted on 23-05-2024	
35	SPS for Transformer at 400kV Rajpura (PSTCL) Substation	Punjab			
36	SPS for Transformers at 400kV Mundka (DTL) Substation	Delhi	19-06-2023		
37	SPS for Transformers at 400kV Deepalpur (JKTPL) Substation	Haryana			
38	SPS for Transformers at 400kV Ajmer (RVPN) Substation	Rajasthan			
39	SPS for Transformers at 400kV Merta (RVPN) Substation	Rajasthan			
40	SPS for Transformers at 400kV Chittorgarh (RVPN) Substation	Rajasthan			
41	SPS for Transformers at 400kV Jodhpur (RVPN) Substation	Rajasthan			
42	SPS for Transformers at 400kV Bhadla (RVPN) Substation	Rajasthan			
43	SPS for Transformers at 400kV Ratangarh (RVPN) Substation	Rajasthan			
44	SPS for Transformers at 400kV Nehtaur(UPPTCL) Substation	Uttar Pradesh	05-07-2022		
45	SPS for Transformers at Obra TPS	Uttar Pradesh		conducted on 20-05-2024	
46	SPS for Transformers at 400kV Kashipur (PTCUL) substation	Uttarakhand	03-09-2023	Septemeber 2024	
47	SPS for Transformers at 400kV Fatehgarh Solar Park (AREPRL)	ADANI			
48	SPS to relive transmission congestion in RE complex (Bhadla2)	POWERGRID			
49	SPS for Transformers at 400kV Bikaner (RVPN) Substation	Rajasthan			
50	SPS for Transformers at 400kV Bawana (DTL) Substation	Delhi	06-09-2023		
51	SPS for Transformers at 400kV Bhilwara (RVPN) Substation	Rajasthan			
52	SPS for Transformers at 400kV Hinduan (RVPN) Substation	Rajasthan			
53	SPS for Transformers at 400kV Suratgarh (RVPN) Substation	Rajasthan			

